4.0 DESCRIPTION OF BIOLOGICAL RESOURCES

4.1 OVERVIEW

The following descriptions of vegetation and landcover types are based on those of O'Leary et al. (1994). Vegetation types, such as coastal sage scrub, are not discussed as a habitat type. Discussions of habitat are organism (i.e., species) specific. Vernal pools at MCAS Miramar are discussed separately because they occur 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). As a result of ongoing biological studies at MCAS Miramar, the following information will require periodic updating. 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 the HEM.

4.2 VEGETATION AND LANDCOVER TYPES

O'Leary et al. (1994) described and mapped 19 native and non-native vegetation types, and three landcover types on MCAS Miramar (Figure 7). 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) because they were deemed ecologically important. Additional vegetation types, consistent with those outlined in the MSCP, include the recognition of eucalyptus woodland and disturbed vegetation. Unless cited otherwise, the following descriptions are based on O'Leary et al. (1994). MCAS Miramar is in the process of updating the vegetation mapping of the Station which should be completed by October 2000.

The majority of the vegetation types have disturbed versions that are different than the disturbed habitat designation added from the MSCP**C**the latter pertains to areas that are generally denuded or of little wildlife value (e.g., fuelbreaks). Areas were classified as disturbed habitat 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 3,134 acres of the Station were classified as disturbed. Refer to Appendix D for a list of plant species known to occur at the Station.

4.2.1 Coastal Sage Scrub

The coastal sage scrub vegetation on MCAS Miramar is categorized as Diegan coastal sage scrub (Holland 1986). The Station supports approximately 3,109 acres of coastal sage scrub, 2,442 acres of which are classified as disturbed. This vegetation type consists of sparsely to densely spaced, low-growing, drought deciduous shrubs; it frequently occurs on south-facing slopes and ridges below 3,000 feet elevation where the rainfall, drainage, soil type, and exposure to the sun provide the conditions necessary for the plant community. Coastal sage scrub is thought to be one of the most endangered vegetation types in California

(Atwood 1993). Species characteristic of coastal sage scrub include coastal 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*).

Coastal Sage/Chaparral Scrub
Natural Resources Branch

4.2.2 Chaparral

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 9,740 acres on MCAS Miramar, of which 2,126 are disturbed. Chamise (*Adenostoma fasciculatum*) is the indicator species that defines chaparral vegetation types and is present to some degree in all chaparral vegetation at MCAS Miramar. The chaparral types are chamise, Nuttall's scrub oak (*Quercus dumosa*), ceanothus (*Ceanothus tomentosus* and *C. verrucosus*), mixed, and disturbed versions of each.

4.2.3 Coastal Sage/Chaparral Scrub

This vegetation type combines attributes, in nearly equal measures, of the coastal sage scrub and chaparral vegetation types. This vegetation type covers approximately 457 acres on the Station.

4.2.4 Grasslands

Grasslands are a characteristic feature of the California landscape; however, most of the 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 (CDFG) (1994).

Native Grassland *Native Resources Branch*

Native grassland is characterized by 40 percent ground cover of grasses and forbs, with greater than

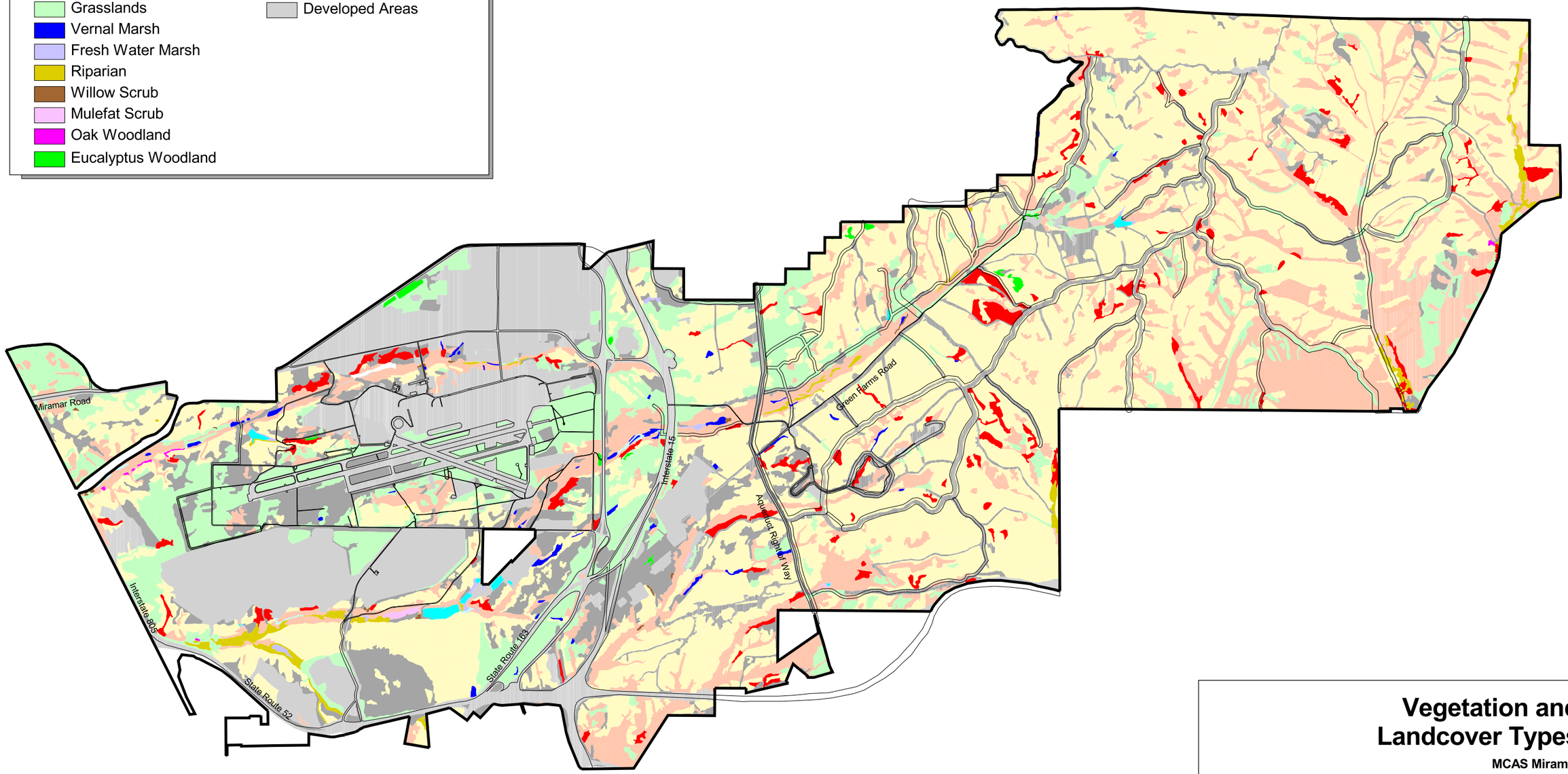
Legend

Vegetation Types

- Coastal Sage Scrub
- Chaparral
- Coastal Sage/Chaparral
- Grasslands
- Vernal Marsh
- Fresh Water Marsh
- Riparian
- Willow Scrub
- Mulefat Scrub
- Oak Woodland
- Eucalyptus Woodland

Landcover Types

- Open Water
- Flood Channel/Streambed
- Disturbed Habitat
- Developed Areas



0 0.5 1 1.5 2

Scale in Miles

N

Vegetation and Landcover Types

MCAS Miramar

Source: O'Leary et al. 1994

Figure 7

two-thirds cover attributable to needlegrasses; native and non-native grasses and forbs may be intermixed. Disturbed and undisturbed versions of native grassland cover approximately 30 acres 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 1,987 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 438 acres of MCAS Miramar. The total vegetative cover of the three grassland types described here is approximately 2,452 acres, of which 1,383 acres are classified as disturbed.

4.2.5 Vernal Marsh

These seasonal wetlands are dominated by toad rush (*Juncus bufonius*), although other forbs and grasslike species occur to a much smaller extent. Approximately 57 acres of these wetlands occur on the Station. Unlike vernal pools, vernal marshes typically occur in major drainages as opposed to depressions underlain by hardpan. 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.), smart weed (*Persicaria* spp.), and dock (*Rumex* spp.). Approximately 22 acres of this vegetation type occur on the Station, of which 2.5 are disturbed.

4.2.7 Riparian Forests

Southern Arroyo-Willow Riparian Forest

Natural Resources Branch

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 153 acres, of which 10 acres are disturbed. Riparian vegetation types are generally associated with bodies of water such as streams, lakes, or wetlands, or are dependent upon the existence of 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 which is dominated by several species of willow. The willows form relatively dense stands of vegetation averaging less than 20 feet high. Disturbed areas include non-native species, such as giant reed (*Arundo donax*), tamarisk (*Tamarix* spp.), gum tree (*Eucalyptus* spp.), and pampas grass (*Cortaderia* spp.). Approximately 9 acres of willow scrub occur on the Station, of which 2.4 acres are disturbed.

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 10 acres on the Station typically on intermittent stream channels with coarse substrates. Approximately 0.5 acre is classified as disturbed.

4.2.10 Coast Live Oak Woodland

More than 25 percent of the overstory cover of the coast live oak (*Quercus agrifoli*a) woodland consists of coast live oak. 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 6 acres of this vegetation type occur on the Station.

Coast Live Oak Woodland

Natural Resources Branch

4.2.11 Eucalyptus Woodland

In this vegetation type greater than 25 percent of the overstory cover consists of *Eucalyptus* species. Approximately 28 acres of Eucalyptus woodland occur on the Station

4.2.12 Open Water

At MCAS Miramar, bodies of open water, because of size, are defined as ponds and not lakes and account for approximately 34 acres.

4.2.13 Natural Flood Channel/Streambed

Natural Flood Channel/Streambed
Natural Resources Branch

Approximately 13 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.

4.2.14 Disturbed Habitat (Vegetation)

Areas classified as disturbed habitat (vegetation) are those where past or present physical disturbance (e.g., brushing, tilling, or vehicle disturbance) is prevalent. In these areas over half the area is covered by species adapted to disturbance, especially forbs, or by bare ground. These areas have a potential to support native vegetation if left undisturbed. Approximately 2,651 acres of MCAS Miramar have been characterized as disturbed habitat.

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 3,619 acres of MCAS Miramar are developed.

4.3 VERNAL POOLS

Vernal pools are ephemeral wetlands that develop on a variety of soils, usually underlain by hardpan, in a variety of habitats. The soils of clay hardpan prevent the natural rainwater from percolating through and ponding occurs in depressions on the surface.

The ponded water allows for a unique assemblage of plants and animals to occur in these pools, some of which occur nowhere else. As the water evaporates, the plants take on a terrestrial life form. In some areas rounded crests separate vernal pools and are known as mima mounds. However, not all vernal pool areas contain mima mounds.

On MCAS Miramar, more than three-quarters of the soils are in the Redding groups of shallow, cobbly, or gravelly loams that range from 2 to 50 percent slopes. These soils characteristically support mima mounds and vernal pools. These pools are defined as San Diego Mesa Hardpan type by Holland (1986). While the usual vegetation is chaparral or coastal sage scrub, past grazing has disturbed many areas and

converted the vegetation to non-native grasslands (Bauder and Wier 1991; Kellogg 1994; Simovich et al. 1996).

Vernal pools are considered non-tidal waters that are isolated seasonal wetlands and, as such, are subject to the provisions of Section 404 of the Clean Water Act administered by the Army Corps of Engineers (ACOE). Vernal pools are considered "problem area" wetlands because of the lack of all three wetland characteristics at all times of the year (ACOE 1987). The depressions in which rainwater collects in pools have all three wetland indicators (hydric soils, hydrophytic vegetation, and hydrology) during the wet season and normally lack the wetland indicators of hydrology and/or vegetation during the drier portion of the growing season.

Vernal Pool – Wet 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 the vernal pools on privately owned land within the City of San Diego were lost (Bauder and Wier 1991). Loss of historical vernal pool habitat in San Diego County was estimated at 93 percent by 1986 (Bauder 1986) and at 97 percent by 1990 (Oberbauer 1990). The vernal pool resource at MCAS Miramar is the largest and most contiguous in southern California, supporting the most important and least disturbed examples of endangered and sensitive species dependent on vernal pools in the region (Bauder and Wier 1991). Approximately 80 percent of the known vernal pools remaining in San Diego County occur on MCAS Miramar (U.S. Fish and Wildlife Service [USFWS] 1996a).

Vernal Pool-Dry Season Natural Resources Branch

Currently there are an estimated 124 acres of vernal pool basin area mapped on MCAS Miramar. All vernal pools identified on the Station were assigned a group designation in 1991 by the NAS Miramar Vernal Pool Management Plan (Bauder and Wier 1991) following the system of vernal pool units and groups developed by Beauchamp and Case (1979) for San Diego County as supplemented by Bauder 1986 (Figure 8). The vernal pools on MCAS Miramar have been mapped using several different methods. The initial vernal pool mapping on Station was conducted in 1993 using 1 inch equals 400 feet three-dimensional aerial photographs coupled with extensive field surveys. Typically, this method overestimated the surface area of vernal pool basins. In 1995, the Station began re-mapping the individual vernal pool basins using a sub-meter accuracy global positioning system (GPS). The re-mapping of all the pools on the Station should be completed in 2005.

Vernal pools are essential to the survival of six species protected under the Federal Endangered Species Act. At MCAS Miramar, five vernal pool 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*), San Diego fairy shrimp (*Branchinecta sandiegonensis*). The spreading navarretia (*Navarretia fossalis*) is listed as threatened.

4.4 WILDLIFE AND WILDLIFE HABITAT

MCAS Miramar provides habitat of importance to a wide variety of wildlife species. At a minimum, MCAS Miramar supports 8 species of amphibians, 21 species of reptiles, and 31 species of mammals. In addition, 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 E. Chaparral and coastal sage scrub are the most common vegetation types on the Station, and many species of wildlife are adapted to both types. These vegetation types support a particularly diverse reptile fauna. Many species of wildlife that are well adapted to these vegetation types are uncommon elsewhere.

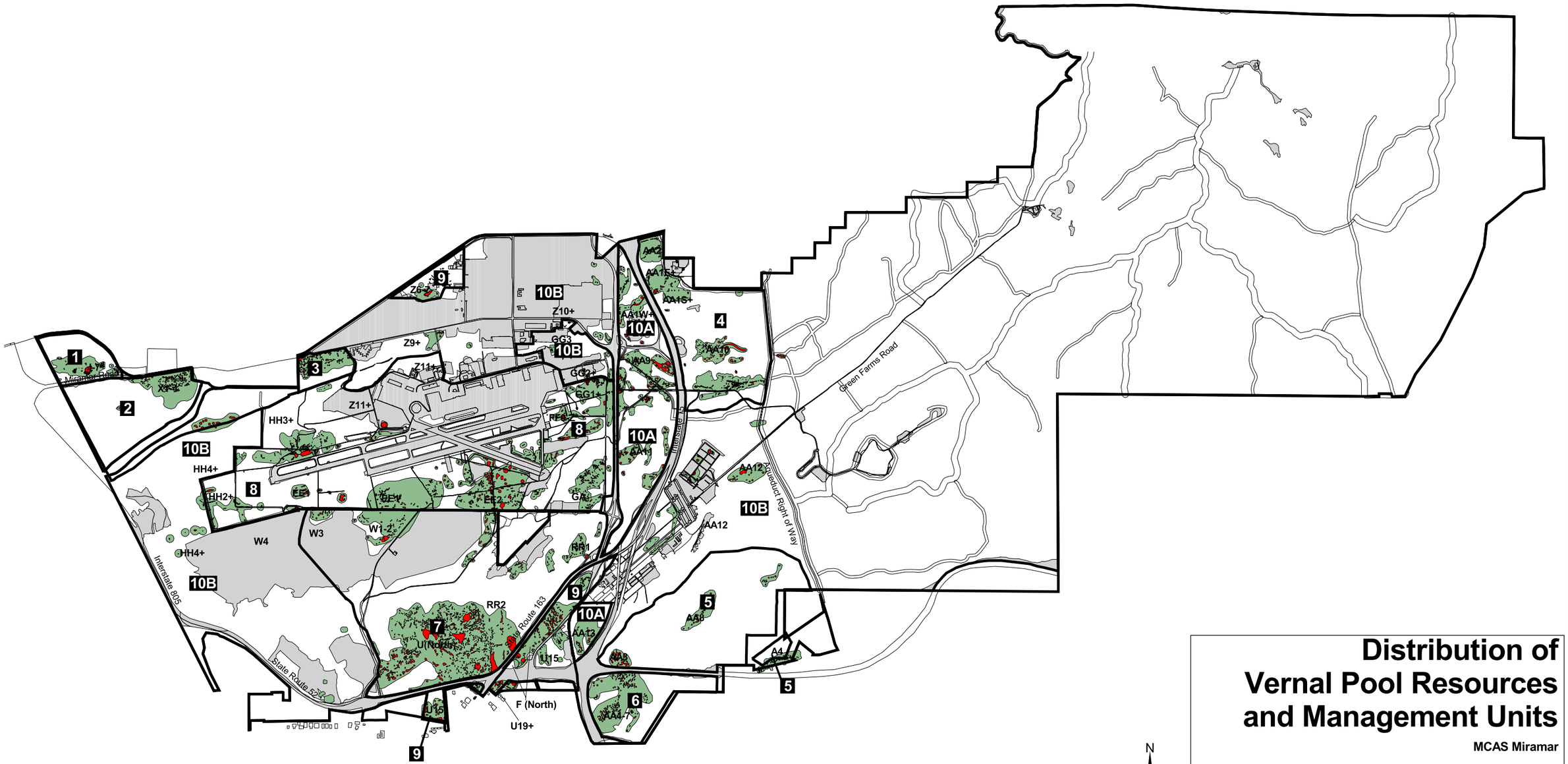
As is the case with vernal pools, the loss of coastal sage scrub throughout southern California has resulted in the listing of several species as endangered or threatened under the Federal Endangered Species Act. The most well known example is that of the coastal California gnatcatcher. Native grasslands, 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.


William Haas

The riparian/wetland/open water areas at MCAS Miramar are also of importance to wildlife, especially amphibians. Even though these areas contribute only 1.3 percent of the native vegetative cover on Miramar, 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). This is because 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 the corridor 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 the corridor in the future. Riparian vegetation generally maintains visual stimuli along the length of the corridor, a characteristic that may keep animals moving through it (Ogden 1992). Since many areas within riparian corridors meet the criteria of wetlands, they are therefore subject to the regulations of section 404 of the Clean Water Act.

Legend

- Vernal Pool basin
- Vernal Pool watershed
- Developed Areas



Distribution of Vernal Pool Resources and Management Units

MCAS Miramar

Source for Management Units: Beauchamp and Case (1979) as supplemented by Bauder (1986) and Bauder and Weir (1991)

Figure 8

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 Plan (City of San Diego 1996a; Ogden 1993b). 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 9 and 10) and they function as connections with habitat patches in the region (Figure 11). Wildlife corridors follow major drainages and open ridgelines.

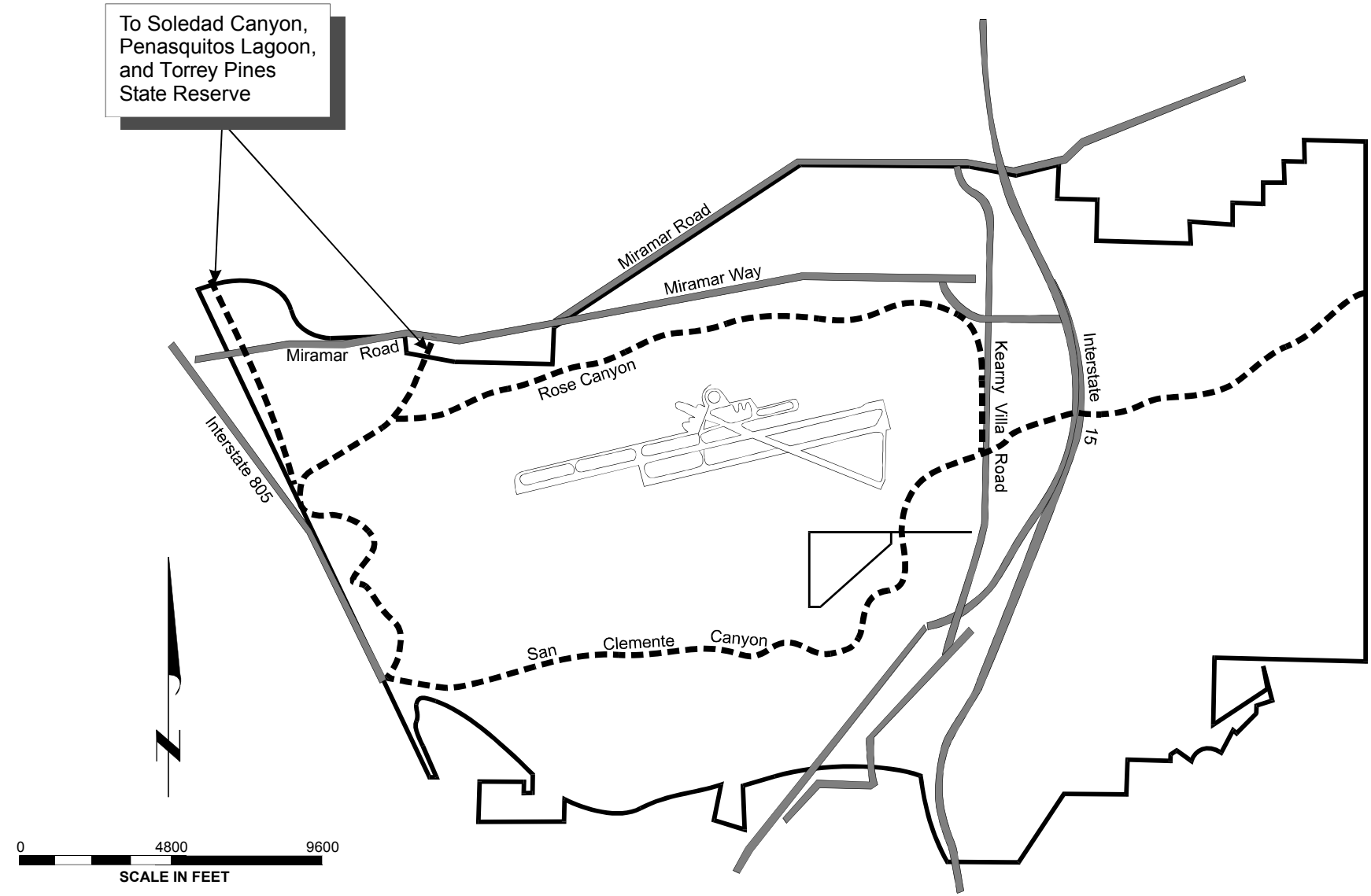
4.5.1 Habitat Linkages

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. The conservation of habitat linkages is preferred over wildlife corridors, which are more constrained. However, 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

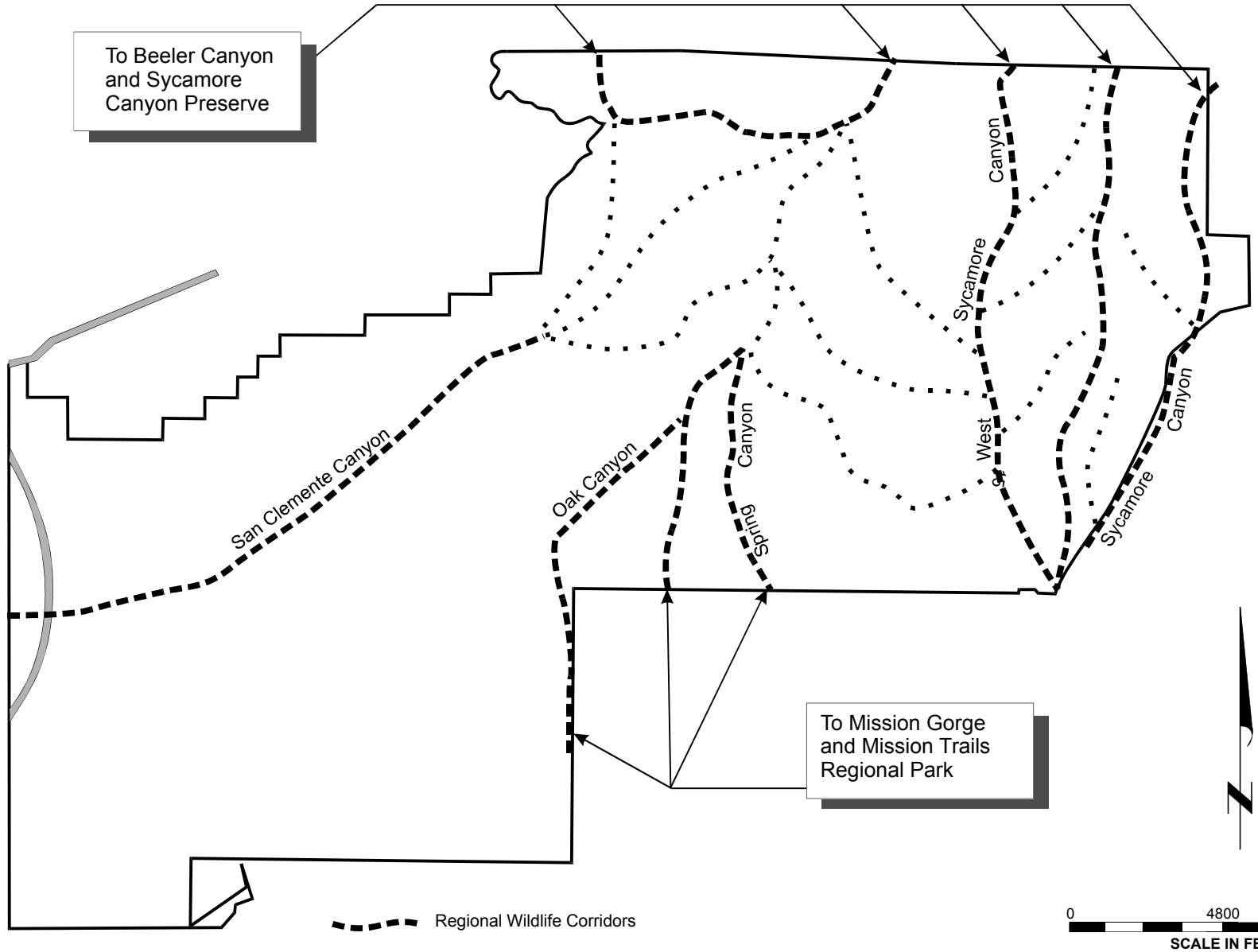
Methods Delineating Wildlife Corridors

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. The target species were mountain lion (*Felis concolor*), bobcat (*F. rufus*), and mule deer (*Odocoileus hemionus fuliginita*). Presumed corridors were surveyed for animal sign during April, May, and 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 on recent sightings. Data were also collected on roadkill locations that occurred between January 1990 and April 1992, and augmented by recent roadkill 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 the 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



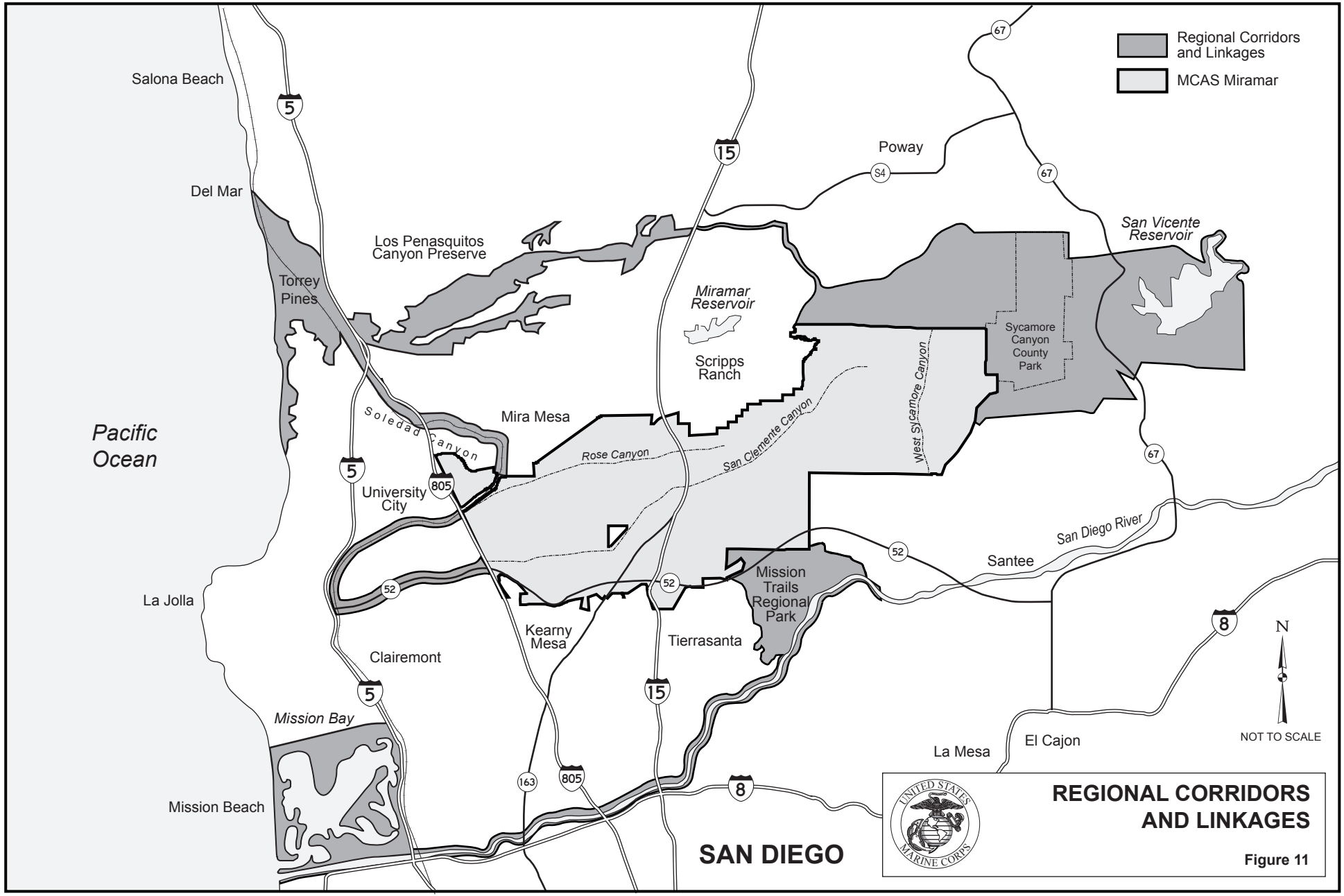
WILDLIFE CORRIDORS ON WESTERN MCAS MIRAMAR

Figure 9



WILDLIFE CORRIDORS ON EASTERN MCAS MIRAMAR

Figure 10


Regional Corridors and Linkages
MCAS Miramar
Salona Beach
Del Mar
Torrey Pines
Los Penasquitos Canyon Preserve
Poway
Miramar Reservoir
Scripps Ranch
San Vicente Reservoir
Sycamore Canyon County Park
West Sycamore Canyon
San Clemente Canyon
Rose Canyon
Soledad Canyon
Mira Mesa
Pacific Ocean
University City
La Jolla
Clairemont
Kearny Mesa
Tierrasanta
Mission Trails Regional Park
San Diego River
Santee
La Mesa
El Cajon
Mission Bay
Mission Beach
SAN DIEGO
N
NOT TO SCALE
REGIONAL CORRIDORS AND LINKAGES
Figure 11

supplemented by more recent evaluations reported in the Final Environmental Impact Statement for the Realignment of NAS Miramar as well as information provided by Station personnel.

MCAS Miramar Corridors

The primary east-west corridors on MCAS Miramar are Rose and San Clemente canyons (refer to Figures 9 and 10). Rose Canyon originates on Main Station and drains west under I-805 on MCAS Miramar's western boundary. 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 the northwest corner of the East Miramar sector and flows south and west through MCAS Miramar before draining under I-805 in the southwest corner of the property. 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 an 8-foot-high fence along the entire west edge of the road at the under-crossing that appears to be passable by deer (Ogden 1996). While this portion of the corridor is quite constrained by the two roadways, there is evidence of mule deer use. The north-south wildlife corridors of Oak, Spring, West Sycamore, and Sycamore canyons on eastern MCAS Miramar (refer to Figure 10) are relatively unconstrained.

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 (refer to Figure 12). 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 east 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 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). As development continues along I-805, this corridor may lose its value as a viable wildlife corridor. Construction is underway on the I-805/Mira Mesa Boulevard off-ramp, along Vista Sorrento Parkway, and on the mesa near Lusk Boulevard. These activities and the resulting roads may substantially decrease the use of this corridor or endanger the lives of animals that attempt to use it. The extension of Nobel Drive through the northwest corner of MCAS Miramar will likely eliminate use of this north-south corridor by the target mammal species used to assess corridor use.

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. The 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 northeast corner of MCAS Miramar to the southwest 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. 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 west 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 Corridors Through Eastern Miramar

The core biological resource areas and linkages maps for the MSCP illustrate two regional corridors through eastern MCAS Miramar linking the undeveloped lands in eastern San Diego County and the Mission Trails Regional Park to coastal areas. One corridor is to the north of MCAS Miramar and the other is to the south (refer to Figure 12).

The northern corridor 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 corridor extending south from eastern MCAS Miramar requires wildlife to travel under State Route 52. Two travel routes are under the bridges spanning Oak and Spring canyons, and a third is a culvert located west of Oak Canyon immediately east of the aqueduct. In general, bridges are preferred over culverts for wildlife movement. These routes allow the safe movement for wildlife in eastern MCAS Miramar to Mission Trails Regional Park as compared to movement over State Route 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.

Legend

- California Gnatcatcher Territories
- Willowy Monardella Locations
- Del Mar Manzanita Locations
- Least Bell's Vireo Locations
- Developed Areas

Miramar Road
Interstate 15
Green Farms Road
Aqueduct Right of Way
Interstate 805
State Route 163
State Route 52

0 0.5 1 1.5 2
Scale in Miles

N

Distribution of California Gnatcatcher, Least Bell's Vireo, Willowy Monardella and Del Mar Manzanita

MCAS Miramar

Figure 12

4.6 SPECIAL STATUS SPECIES

Special Status Species are species 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 these Special Status Species under the provisions of the Federal Endangered Species Act and Bald Eagle Protection Act. Information on these species is provided in Table 1 (at the end of Chapter 4 on page 4-27), and the distribution for the threatened coastal California gnatcatcher (*Polioptila californica californica*), endangered least Bell's vireo (*Vireo bellii pusillus*), and endangered willowy monardella (*Monardella linoides spp. viminea*) is shown on Figure 12.

The applicable federal classification system for Special Status Species are:

- 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) = Species for which there is sufficient information on biological vulnerability and threats to support proposals to list them as endangered or threatened. (Note: Currently no species on MCAS Miramar are candidates for federal listing.)

- Fully Protected (FP) = Golden eagle is fully protected by the Bald Eagle Protection Act.

4.7 OTHER SPECIES OF REGIONAL SPECIAL CONCERN

Species of Regional Special Concern at MCAS Miramar include former candidates for federal listing as threatened or endangered, species of concern to the State of California, and species that are regionally rare or of limited distribution. Mountain lions and mule deer (*Odocoileus hemionus fuliginata*) are relatively common and wide ranging species, but are included because they represent an important part of the ecosystem. These species are included for consideration during environmental planning at MCAS Miramar (Chapters 5 and 6). Information on these species is provided in Table 2 (at the end of Chapter 4, starting on page 4-31), and the currently known distribution for seven of these species is shown on Figure 13.

The applicable classifications for these species are:

- Species of Special Concern (SSC) = Species formerly under consideration by the USFWS for status changes (includes Category 1, 2, and 3 taxa). As of February 1996, the USFWS

discontinued the use of these designations, but remains concerned about these species and encourages further study into their conservation status. As more information is obtained on such species, their protected status could change (USFWS 1996b).

- State Endangered (CE) = Taxa in serious danger of becoming extinct throughout all, or a significant portion, of its range due to threats to the taxa.

- 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.

- 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.

Rare plants in California are also listed in the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Vascular Plants* (Skinner and Pavlik 1994) as follows:

- Plants included on List 1B (CNPS-1B) 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 the 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 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 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 (Skinner and Pavlik 1994).

4.8 HABITAT EVALUATION MODEL

The primary purpose for the development of a Habitat Evaluation Model (HEM) (Figure 14) is to identify and rank important biological resource areas within MCAS Miramar. These rankings are used to help delineate Management Areas (MAs) (refer to Chapter 5). The HEM is a geographic information system (GIS) model which takes advantage of the wealth of information collected on MCAS Miramar relative to the distribution of sensitive biological resources. Components of the HEM include (1) vernal pools and their associated watersheds, (2) non-vernal pool threatened and endangered species, and (3) a habitat evaluation index. Non-vernal pool species include the coastal California gnatcatcher (hereafter referred to as California gnatcatcher) territories (breeding and nonbreeding), willowy monardella locations, Del Manzanita locations,

Legend

- Orange-throated Whiptail
- San Diego Horned Lizard
- Burrowing Owl
- Costal Cactus Wren
- Rufus Crowned Sparrow
- Sage Sparrow
- Hermes Cooper Butterfly
- Developed Areas

Miramar Road
Interstate 805
State Route 52
State Route 163
Interstate 15
Aqueduct Right of Way
Green Farms Road

0 0.5 1 1.5 2
Scale in Miles

N

Distribution of Other Species of Special Concern

MCAS Miramar

Figure 13

I. Vernal Pools

Very High:
Vernal Pool Basin

Very High:
Vernal Pool Watershed

II. Non-Vernal Pool Threatened and Endangered Species

Very High:
California Gnatcatcher
Territory, Willowy Monardella,
Del Mar Manzanita, and
Least Bell's Vireo

I.
Vernal Pools

II.
Non-Vernal Pool
Threatened and
Endangered Species

III.
Habitat Value Index

Composite Results

Very High:	Vernal Pool Basin or Watershed, or Non-Vernal Pool Threatened and Endangered Species, or 10 to 12 points in Habitat Value Index
High:	7 to 9 points in Habitat Value Index
Moderate:	4 to 6 points in Habitat Value Index
Low	0 to 3 points in Habitat Value Index

Very High:
76 to 100 percentile

High:
51 to 75 percentile

Moderate:
26 to 50 percentile

Low:
1 to 25 percentile

3 Pts.
Riparian Vegetation

2 Pts.
Known Corridors
x2

Wildlife Corridors

Rarity of
Regional Vegetation
Types

Rarity of Local
Vegetation
Types

3 Points

2 Points

1 Point

0 Points

Regional VegetationTypes

Coast Live Oak Woodlands
Vernal Marsh
Fresh Water Marsh
Native Grassland
Native/Non-Native Grassland
Southern Coast Live Oak Riparian Forest
Southern Willow Oak Scrub
Mulefat Scrub
Sycamore Woodland Riparian
Southern Arroyo Willow Riparian Forest
Natural Flood Channel/Streambed
Open Water

Coastal Sage Scrub
Coastal Sage-Chaparral Scrub

Chamise Chaparral
Scrub Oak Chaparral
Mixed Chaparral
Non-Native Grassland

Disturbed Habitat
Eucalyptus Woodland

Local Station VegetatonTypes

Coast Live Oak Woodland (5.6)
Southern Willow Scrub (8.3)
Mulefat Scrub (10.2)
Freshwater Marsh (24.2)
Native Grassland (30.3)
Southern Arroyo Willow Riparian Forest (34.8)
Open Water (44.6)
Southern Coast Live Oak Riparian Forest (44.7)
Sycamore Riparian Woodland (76.4)

Ceanothus Chaparral (120.5)
Mixed Grassland (455.5)
Coastal Sage/Chaparral Scrub (473.7)
Scrub Oak Chaparral (563.2)

Mixed Chaparral (3,066.2)
Coastal Sage Scrub (3,780.9)
Chamise Chaparral (6,025.8)

Non-Native Annual Grassland
Eucalyptus Woodland
Disturbed Habitat

<100 acres
3 Points

<1000 acres
(2 Points)

>1000 acres
1 Point

0 Points

III. Habitat Value Index

GIS Habitat Evaluation Model

Figure 14

and least Bell's vireo nest locations. The third component combines an evaluation of wildlife corridors, and rarity of local and regional vegetation types (and associated habitats). Each component was developed as a separate GIS layer and then combined to produce a final HEM that ranks the entire surface area as Very High, High, Moderate, or Low in terms of biological value. These components were derived from existing GIS layers developed by the MCAS Miramar, Environmental Management Department, Natural Resources Division. The following sections explain the rationale, evaluation procedures, and the criteria used to assess the relative values of biological resources.

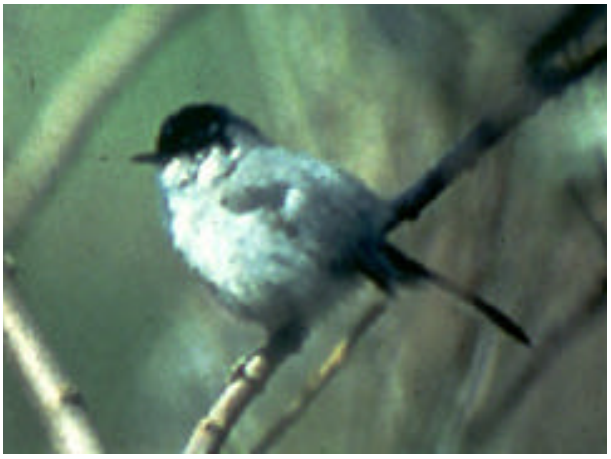
4.8.1 Habitat Evaluation Elements

Vernal Pools

All vernal pool basins and all associated watersheds on MCAS Miramar were assigned a value of Very High (refer to Figure 10). The vernal pool watersheds were given a value of Very High to reflect the importance of maintaining the hydrological regime that supports the vernal pools themselves. These values are based on the rarity of vernal pools and their importance in providing essential habitat to several Special Status Species of plant and wildlife. The vernal pool watersheds on MCAS Miramar were delineated in the 1991 Vernal Pool Management Plan. The designation of the watershed boundary was based on topographic changes (e.g., canyons, ridgelines) and existing developed areas (e.g., roads, buildings). A formal delineation of the watershed for each individual vernal pool basin has not been conducted.

California Gnatcatcher Territories

All California gnatcatcher territories, both breeding and nonbreeding, were assigned a value of Very High. Methods for determining territories (home range) are described in Hunsaker et al. (1995). Polygons represent observed territories mapped by Hunsaker et al (1995) for California gnatcatcher pairs. Where territory polygon data were not available, the average territory size for the specific year (breeding and non-breeding, respectively) was centered on the mapped location of the California gnatcatcher territory. Thus for the 1994 breeding season, the missing territory polygon for a mapped location was depicted as the average breeding season territory for that year and was overlain and centered on the nest location. Territory locations were chosen over a habitat modeling based on presumed habitat features so as to better identify actual California gnatcatcher habitat at MCAS Miramar. The breeding season territories include 1994, 1995, 1996, and 1997; the nonbreeding seasons include 1994, 1995, and



California Gnatcatcher Natural Resources Division

1996. The California gnatcatcher data layer was prepared by MCAS Miramar, Environmental Management Department from Hunsaker et al. (1995) and subsequent annual reports from Hunsaker et al. The results of this evaluation are shown on Figure 15.

Willowy Monardella

All known locations of the willowy monardella were plotted, along with a 30-meter buffer, and were assigned a value of Very High. Beginning in 1994, surveys have been conducted using the State of California Natural Diversity Database supplemented by suitable habitat searches by Miramar natural resources staff using a GPS unit to record sites. Surveys were conducted in drainages where each populated site was identified with the GPS unit and the number of individual plants at the site were recorded and associated with the point. Therefore, one mapped site normally represents many individuals. The database includes information on plant condition, reproductive stage, and local dominant plant community at each point. Although the entire Station has not been surveyed, all major populations are believed to have been identified. The results of this evaluation are shown on Figure 16.

Habitat Value Index

The habitat value index evaluates areas in terms of their relative biological value, based on the following three criteria: wildlife corridors, rarity of local vegetation types, and rarity of regional vegetation types. The vegetation data used for this habitat layer was collected in 1994 and has been modified to account for BRAC facilities construction. Other than these modifications from a vegetated to a developed classification, the mapping provides the best information on vegetation throughout MCA S Miramar. However, some minor changes to vegetation may have occurred since the last mapping.

Compilation of the Habitat Value Index

The components of the habitat value index were compiled in separate GIS layers and then combined to rate areas relative to their biological value based on the three criteria listed above and described in detail below (Figure 15). The entire land area, except those in developed areas, was assigned a relative point value based on the above criteria for each layer. For most criteria, scores ranged from 0 to 3, with 3 representing the highest value. Values for all criteria were summed to provide a total score for any area. Values for wildlife corridors were doubled in order to emphasize their relative importance in the context of regional conservation goals. The potential range of points assigned to any one cell is from 0 to 12. A frequency distribution of the total scores for all cells within the undeveloped area was then generated. The frequency distribution score was divided into quartiles and the scores rank-ordered for assignment into one of the four habitat value categories (i.e., Very High, High, Moderate, or Low) (refer to Figure 16).

Legend

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

Miramar Road
Interstate 805
State Route 52
State Route 163
Interstate 15
Aqueduct Right of Way
Green Farms Road

0 0.5 1 1.5 2
Scale in Miles

N

Habitat Value Index Layer of Habitat Evaluation Model

MCAS Miramar

Figure 15

Legend

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

Miramar Road
Interstate 805
State Route 52
State Route 163
Interstate 15
Aqueduct Right of Way
Green Farms Road

0 0.5 1 1.5 2
Scale in Miles

N

Habitat Evaluation Model Composite Map

MCAS Miramar

Figure 16

Wildlife Corridors

Riparian vegetation was used as a preliminary indicator of potential wildlife corridors because of the cover that these habitats provide for the larger vertebrates (mountain lion, mule deer, coyote, bobcat, etc.). Because these large vertebrates are considered more sensitive to human development and disturbance, it is assumed that any corridors used by them would also be used by smaller, less sensitive species. Wildlife corridors delineated by riparian vegetation were assigned a point value of 3. Then, because of the importance of riparian areas for wildlife movement, this value was doubled (giving an overall point value of riparian corridors of 6 points). The data for this analysis (including the acreage) are from the vegetation analysis conducted by O'Leary et al. (1994).

Ogden (1992, 1996) identified additional regional wildlife corridors that connect areas within MCAS Miramar to each other and to adjacent open space areas (refer to Figures 8, 9 and 10). Regional wildlife corridors were mapped as 500 feet wide and assigned a point value of 2. These point values were also doubled (giving an overall point value of riparian corridors of 4 points).

Rarity of Local Vegetation Types

Although MCAS Miramar complements a larger, regional system that incorporates a range of vegetation types, maintaining a portion of the full range of vegetation and associated wildlife habitats that occur on MCAS Miramar is an important consideration. This is especially true for those vegetation types that are considered to be rare. This component ranks vegetation types based on their relative rarity on MCAS Miramar. Disturbed and undisturbed phases of each vegetation type were aggregated for this analysis. The data for this analysis (including the acreage) are from the vegetation analysis conducted on MCAS Miramar by O'Leary et al. (1994).

Vegetation types that compose less than 100 acres received the highest number of points (3). Native vegetation types that compose between 100 and 1,000 acres received 2 points, and vegetation types that compose more than 1,000 acres received 1 point. Disturbed and undisturbed phases of each habitat association were aggregated for this analysis. Vernal pools were not included in this analysis because they are addressed individually in the vernal pool component. The point value for each vegetation type is listed on Figure 14.

Rarity of Regional Vegetation Types

Vegetation types and their associated wildlife habitats at MCAS Miramar were also assigned points based on rarity within the region (refer to Figure 16). These rankings were adapted from the MSCP Plan 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). The point value for each vegetation type based on this regional criteria is listed on Figure 14.

4.8.2 Compilation of the Habitat Evaluation Model

The four components (GIS layers) of the HEM were juxtaposed and the highest value on any one map received the highest value on the combined map to produce a composite habitat evaluation map (Figure 16). For example, if an area were rated as High based on being within a vernal pool watershed and was also within a California gnatcatcher territory; this area would be shown as Very High on the composite map based on the California gnatcatcher territory component (the highest value) (refer to Figure 16). In this manner the HEM rates the entire surface area as Very High, High, Moderate, or Low in terms of biological value based on the four components (refer to Figure 14).

4.8.3 Use of the Habitat Evaluation Model

The HEM is being used as a tool to identify high value areas relative to the known distribution of Special Status Species and associated habitats (e.g., vegetation types, vernal pools, wetlands) present at MCAS Miramar. The composite map assisted in delineating MAs on the Station (Chapter 5). It should be noted that the 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 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.

No.	Species Name Status (Federal) Family	Habitat	Rangewide and MCAS Miramar Distribution	Comments
FE = Federally endangered FT = Federally threatened PE = Proposed endangered (federal)	PT = Proposed threatened (federal) FP = Fully protected	**Boldface type indicates species that are known to occur on MCAS Miramar**		
		Plants		
1	**Del Mar manzanita (*Arctostaphylos glandulosa* var. *crassifolia*)** **Status: FE** **Family: Ericaceae**	This evergreen shrub is present on sandy mesas and coastal bluffs in maritime chaparral in San Diego County.	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. This species has been documented in training areas 3 and 4 in East Miramar. Focused surveys for the species have only been conducted in the East Miramar training areas (Rebman and Dossey 1999).	This taxon was recently listed as endangered by the USFWS (1996c). Urban sprawl and the associated clearing of land is the major threat to this species. Focused presence/absence surveys on the entire Station have not been conducted as of 1998. Focused presence/absence surveys for the entire Station have not been completed outside of the ground training areas as of 1999 (Rebman and Dossey 1999).
2	Orcutt's spineflower (*Chorizanthe orcuttiana*) Status: FE Family: Polygonaceae	This annual herb may be found in sandy soils in coastal sage scrub, chaparral, and close-coned coniferous forest habitats.	Currently known populations of this species are located within Oak Crest Park in Encinitas. Additionally, a population of approximately 600 plants inhabits the Naval Submarine Base, San Diego (Stone 1997). Another population, previously reported from Torrey Pines State Park, has not been observed since 1987.	This taxon was recently listed as endangered by the USFWS (1996c). Loss of suitable habitat to development is a major threat to the species. Focused presence/absence surveys on the entire Station have not been conducted as of 1998.
3	**San Diego Button-celery/Coyote thistle (*Eryngium aristulatum* var. *parishii*)** **Status: FE** **Family: Apiaceae**	The San Diego button celery occurs in vernal pools and marshes in grasslands and coastal sage scrub vegetation.	This taxon is distributed from Riverside and San Diego Counties to Baja California. Approximately 65 remnant populations exist in San Diego County. In one study, this plant was found in 8 of the 10 vernal pool management units on MCAS Miramar (Bauder and Wier 1991).	This species is endangered in large part due to loss of habitat on the coastal plain. Development, agriculture, and off-highway vehicle use are the main threats (Skinner and Pavlik 1994).
4	**Spreading navarretia (*Navarretia fossalis*)** **Status: FT** **Family: Polemoniaceae**	The spreading navarretia is a wetland species of vernal pools within chenopod scrub (not found on Miramar), and coastal sage scrub (Hickman 1993; Skinner and Pavlik 1994).	This species' range extends from Riverside and San Diego Counties to Baja, California, Mexico. Populations exist at Camp Pendleton and Romona and the largest concentration of this species is located on private parcels in the Otay Mesa area. It was reported from two vernal pools in the vernal pool Management Unit 7 on the Station (Bauder and Wier 1991).	It is threatened by urbanization, grazing, road construction, and off-highway vehicle use (Skinner and Pavlik 1994).
5	San Diego thornmint (*Acanthomintha ilicifolia*) Status: FT Family: Lamiaceae	The San Diego thornmint inhabits vernal pools and clay depressions on mesas in coastal sage scrub and on slopes in chaparral habitat (Hickman 1993).	This species range extends from San Diego County south to northern Baja, California, Mexico. It is known currently from approximately 30 populations that are typically small. While the apparently appropriate habitat for this species (e.g., vernal pools) is present on the Station; it has not been identified on the Station.	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. Focused presence/absence surveys on the entire Station have not been conducted as of 1998.
6	**Willowy monardella (*Monardella linoides* spp. *viminea*)** **Status: FE** **Family: Lamiaceae**	This perennial herb occurs in rocky washes and drainages in coastal sage scrub, chaparral, close-coned coniferous forest and riparian scrub woodland areas.	The species is a San Diego County endemic that extends to northern Baja California, Mexico. Approximately 112 population localities exist in San Diego County. Localities reported on MCAS Miramar and surrounding areas are located in the canyons in East Miramar and along San Clemente Canyon in West Miramar.	It has been reported that about 95 percent of the domestic range of this taxon occurs within the MSCP region, with about 70 percent occurring on MCAS Miramar (USFWS 1995b).
7	**San Diego mesa mint (*Pogogyne abramsii*)** **Status: FE** **Family: Lamiaceae**	The San Diego mesa mint inhabits vernal pool complexes in chaparral and 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 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).

TABLE 1
SPECIAL STATUS SPECIES AT MCAS MIRAMAR

No.	Species Name Status (Federal) Family	Habitat	Rangewide and MCAS Miramar Distribution	Comments
8	Encinitas baccharis (*Baccharis vanessae*) Status: FT Family: Asteraceae	The Encinitas baccharis is a deciduous shrub that occurs in chaparral primarily in Torrey Pine Forest on sandstone soils.	This is a San Diego County Endemic with historic populations at 19 natural locations extending from Encinitas eastward to the Del Dios highlands, Lake Hodges, and Mount Woodson, and southward to Poway and Carmel Mountain. Populations still extant number 14, with approximately 2,000 plants. This species has not been identified on MCAS Miramar.	This taxon was recently listed as threatened by the USFWS (1996c). Focused presence/absence surveys on the entire Station have not been conducted as of 1998.
9	**California Orcutt grass (*Orcuttia californica*)** **Status: FE** **Family: Poaceae**	This annual herb is present exclusively in vernal pool complexes.	On MCAS Miramar, it was reported from vernal pool Management Units 7 and 8 (Bauder and Wier 1991).	This species ranges from Riverside and San Diego Counties to Baja California, Mexico. California orcutt grass is known from fewer than 20 locations and continues to be threatened by development, agriculture, non-native invasive plant species, and off-highway vehicle use (Skinner and Pavlik 1994).
	Invertebrates			
10	**San Diego fairy shrimp (*Branchinecta sandiegonensis*)** **Status: FE**	San Diego fairy shrimp may be present in seasonally astatic vernal pools in coastal areas within grassland, agriculture, coastal sage scrub, and chaparral habitats.	The fairy shrimp's range extends from Santa Barbara County south to northwestern Baja California, Mexico (USFWS 1997b). It occurs throughout San Diego County and is known from all 10 vernal pool management units on MCAS Miramar (Vernal Pool Fauna Survey, 1996). Approximately 80 percent of the vernal pools on 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 1997b). The USFWS published a proposed rule to designate critical habitat for this species on March 8, 2000 that includes lands on MCAS Miramar.
11	Quino checkerspot butterfly (*Euphydryas editha quino*) 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 taxon has not been identified on MCAS Miramar.	The Quino checkerspot occurs in localized colonies closely associated with its foodplant, but undergoes dramatic cyclical fluctuations in population size. It is threatened by loss and degradation of suitable habitat and stochastic events (USFWS 1997b). Focused surveys conducted by well qualified experts from the San Diego Natural History Museum during 1996, 1997, and 1998 failed to locate this species on the Station.
12	**Riverside fairy shrimp (Streptocephalus woottoni)** **Status: FE**	The Riverside fairy shrimp is found in deep vernal pools and ephemeral wetlands that retain water through the warmer weather of late spring.	This species is known from vernal pools near Temecula, Riverside County; one population in Orange County; vernal pools on Otay Mesa and MCAS Miramar; and two locations in Baja California (USFWS 1993c). On MCAS Miramar, Riverside fairy shrimp are known from only one pool east of Interstate 15 (Vernal Pool Unit 4, group AA1 south).	Eggs of this species will not hatch in pools that are shallow or receive cool waters from early winter rains.
	Birds			
13	**Golden eagle (*Aquila chrysaetos*)** **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 the 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 et al. 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 on 21 and 22 April 21 and 22, 1998, on "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.

TABLE 1
SPECIAL STATUS SPECIES AT MCAS MIRAMAR

No.	Species Name Status (Federal/State/CNPS*) Family	Habitat	Rangewide and MCAS Miramar Distribution	Comments
	California Native Plant Society Status (Other) SSC = Federal Species of Special Concern CE = State endangered CR = State rare CSC = State "Species of Concern" 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 Boldface type indicates species that are known to occur on MCAS Miramar			
1	**Pygmy spike moss (*Selaginella cinerascens*)** **Status: SSC/None/List 4** **Family: Selaginellaceae (spike mosses)**	Pygmy spike moss is found on dry slopes and mesas in coastal sage scrub and chaparral habitats.	Its range includes Orange and San Diego counties and adjacent Baja California. Pygmy spike moss is present throughout MCAS Miramar (Ogden 1996).	This species has the appearance of a close ashen carpet on the ground.
2	**California adder's tongue fern (*Ophioglossum californicum*)** **Status: SSC/None/List 4** **Family: Ophioglossaceae**	California adder's tongue fern is present in chaparral and grassland habitats and at the margins of vernal pools.	This fern species is distributed from central California to Baja California (Skinner and Pavlik 1994). Munz (1974) reports occurrences from the vicinities of Lee Valley and Jamal Mountain. It has been reported from MCAS Miramar (C. Cobb, personal communication).	California adder's tongue fern is a rhizomatous perennial herb.
3	**Little mousetail (*Myosurus minimus*)** **Status: SSC/None/List 3** **Family: Ranunculaceae**	The little mousetail, an annual herb, occurs in alkaline vernal pools and flowers from March to June (Munz 1974).	Little mousetail is restricted to several vernal pool complexes on the mesas north of San Diego and on Otay mesa. It was observed in three of the ten vernal pool management units on MCAS Miramar (Bauder and Wier 1991).	The rarity of this plant is subject to debate due to the uncertainty of its designation as a unique subspecies; it may be a stabilized hybrid of *M. minimus* and *M. sessillis*.
4	**Nuttall's scrub oak (*Quercus dumosa*)** **Status: SSC/None/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 known from the western portion of MCAS Miramar (C. Cobb, personal communication).	Nuttall's scrub oak was once considered to be widespread in chaparral throughout cismontane California; however, that species is now called *Q. berberidifolia*. Nuttall's scrub oak is threatened by development (Skinner and Pavlik 1994).
5	**San Diego barrel cactus (*Ferocactus viridescens*)** **Status: SSC/None/List 2)** **Family: Cactaceae**	This species of cactus is found in San Diego County and Baja California in coastal sage scrub, chaparral, maritime succulent scrub, and grasslands (including vernal pool grasslands).	This species' range extends from San Diego County to Baja California, Mexico. Numerous fragmented localities exist in San Diego County. It has been reported on the south-facing slopes of Rose and San Clemente canyons (Ogden 1996) on MCAS Miramar.	At present, the San Diego barrel cactus is threatened by urbanization, off-highway vehicle use, and horticultural collecting (Skinner and Pavlik 1994).
6	**Summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*)** **Status: SSC/None/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. Some reported localities in San Diego County include San Marcos Mountains, Encinitas, Los Penasquitos Canyon, Del Mar Heights, and canyons of Mission Valley. Summer holly was observed in a drainage in the southwest portion of MCAS Miramar (Ogden 1996).	The species is threatened by development and gravel mining (Skinner and Pavlik 1994).
7	**Variegated dudleya (*Dudleya variegata*)** **Status: SSC/None/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. It is known from some 60 localities in San Diego County including from the San Vicente Reservoir, El Cajon, Alpine, and Poway U.S. Geological Survey 7.5-minute quadrangles. Populations of variegated dudleya are known from East Miramar (A. Cario, personal communication) in the southeastern portion of Training Area 1 (Rebman and Dossey 1999). Additionally, this species is known from the Station at Parcel G.	This species is considered threatened by urbanization and grazing (Skinner and Pavlik 1994). Focused presence/absence surveys for the entire Station have not been completed for this species as of 1999.
8	**Wart-stemmed ceanothus (*Ceanothus verrucosus*)** **Status: SSC/None/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 *Ceanothus tomentosus* var. olivaceus) is a common component of the ceanothus chaparral distributed throughout San Diego County and Baja California, Mexico. It is known from approximately 17 locations in San Diego County including from MCAS Miramar (O'Leary et al. 1994).	Wart-stemmed ceanothus flowers from January to April (Munz 1974) and is vulnerable to development, which is its primary threat (Skinner and Pavlik 1994).
9	**Long-spined spineflower (*Chorizanthe polygonoides* var. longispina)** **Status: SSC/None/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).	This spineflower is endemic to San Diego County. Ogden (1996) reported observing four populations in vernal pools and adjacent grassland and chaparral habitats on MCAS Miramar.	The species is threatened by development and by competition with non-native grasses (Skinner and Pavlik 1994).
10	**Western dichondra (*Dichondra occidentalis*)** **Status: SSC/None/List 4** **Family: Convolvulaceae**	Western dichondra may be found within chaparral, coastal scrub, oak woodland, and grassland habitats.	Western dichondra ranges along the coast of southern California and in appropriate habitat inland and south to Baja California, Mexico. Western dichondra has been documented from MCAS Miramar (USFWS 1993a).	Formerly a 3C species, western dichondra is not on the current list of taxa that are candidates for listing as threatened or endangered due to the discontinuation of the 3C category (USFWS 1996b).

TABLE 2

OTHER SPECIES OF REGIONAL SPECIAL CONCERN AT MCAS MIRAMAR

No.	Species Name Status (Federal/State/CNPS*) Family	Habitat	Rangewide and MCAS Miramar Distribution	Comments
11	**Palmer's grappling hook (*Harpagonella palmeri* var. *palmeri*)** **Status: SSC/None/List 2** **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, Sonora in Mexico, and Arizona. In San Diego County, one large population exists near Jacumba while most populations are small and along the coast. This species has been observed in Training Area 4 of East Miramar (Rebman and Dossey 1999).	Palmer's grappling hook flowers from March through April. It is susceptible to development activities and losses of habitat. Focused presence/absence surveys for the entire station have not been completed for the plans as of 1999. Focused presence/absence surveys for the entire Station have not been completed for this plant as of 1999.
12	Mission Canyon bluecup (*Githopsis diffusa* ssp. *filicaulis*) Status: SSC/None/List 1B Family: Campanulaceae	Mission Canyon bluecup occupies mesic and disturbed sites in 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. Geological Survey 7.5-minute quadrangles.	Prior USFWS Notices of Review in the Federal Register classified this taxon as a Category 2 candidate species. The Category 2 classification has been discontinued by USFWS (1996b).
13	San Diego ambrosia (*Ambrosia pumila*) Status: SSC/None/List 1B Family: Asteraceae	San Diego ambrosia occurs in a variety of habitats including chaparral, coastal sage scrub, grassland, and vernal pools, often in disturbed areas.	San Diego ambrosia ranges from Riverside and San Diego Counties south to Baja California, Mexico. It is currently known from four scattered locations in San Diego County. Many of the known populations of San Diego ambrosia in San Diego County have been extirpated.	As with many plant species, San Diego ambrosia is threatened by development (Skinner and Pavlik 1994).
14	**Palmer sagewort (*Artemisia palmeri*)** **Status: None/None/List 2** **Family: Asteraceae**	This plant species prefers sandy soils, primarily in coastal sage scrub (Munz 1974).	Although it is known from no more than 20 locations in California, it reportedly ranges from southwestern San Diego County to Baja California, Mexico. Included in its range is MCAS Miramar, from where, it has been documented (USFWS 1993a).	Palmer sagewort is threatened by destructive activities associated with development (Skinner and Pavlik 1994).
15	**San Diego sunflower (*Viguiera laciniata*)** **Status: None/None/List 2** **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. *V. laciniata* is known from MCAS Miramar, with one observation off Kearney Villa Road. Skinner and Pavlik (1994) note that this species is locally common in San Diego County. This species has also been observed in Training Area 1 of East Miramar (Rebman and Dossey 1999).	San Diego sunflower is threatened by losses of habitat from development. . Focused presence/absence surveys for the entire station have not been completed for the plans as of 1999. Focused presence/absence surveys for the entire Station have not been completed for this plant as of 1999.
16	**Orcutt's brodiaea (*Brodiaea orcuttii*)** **Status: SSC/None/List 1B** **Family: Liliaceae**	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 pools in southern California (Hickman 1993).	This species is known from all 10 vernal pool management units on MCAS Miramar (Bauder and Wier 1991).	This species is threatened by development, road construction, and dumping (Skinner and Pavlik 1994).
17	**San Diego goldenstar (*Muilla clevelandii*)** **Status: SSC/None/List 1B** **Family: Liliaceae**	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 reported to occur in vernal pool Management Unit 3 (Bauder and Wier 1991). and is known to occur throughout the Station, however, no focused surveys for this species have been conducted on the Station.	This species was a candidate for listing because of loss and degradation of habitat from road construction, urbanization, and off-highway vehicle use (Skinner and Pavlik 1994).
	Invertebrates			
18	**Hermes copper butterfly (*Lycaena hermes*)** **Status: SSC/None**	Hermes copper butterfly may be present where redberry (*Rhamnus crocea*) is present, especially in mixed chaparral (O'Leary et al. 1994).	The Hermes copper butterfly ranges throughout southern California where appropriate habitat is found. It is found in all suitable habitat in a large portion of San Clemente canyon east of Interstate 15. Refer to Figure 13 for known distribution.	This butterfly is locally common in the vicinity of its foodplant where it can generally be found feeding on nectar of California buckwheat (*Eriogonum fasciculatum*) flowers (Emmel and Emmel 1973).
	Amphibians			
19	**Western spadefoot toad (*Spea hammondii*)** **Status: SSC/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 chamise chaparral with vernal pools and in pools in Sycamore canyon (Hunsaker and Cox 1997).	The western spadefoot toad emerges from underground retreats following fall, winter, and spring rains and breeds in the temporary ponds that form.
	Reptiles			
20	Southwestern pond turtle (*Clemmys marmorata pallida*) Status: SSC/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 that six to eight viable populations of this species are located south of the Santa Clara River system in California. The southwestern pond turtle has not been reported from the Station (Hunsaker and Cox 1997).	Losses of habitat, use of insecticides, and development are major threats to this species.

TABLE 2

OTHER SPECIES OF REGIONAL SPECIAL CONCERN AT MCAS MIRAMAR

No.	Species Name Status (Federal/State/CNPS*) Family	Habitat	Rangewide and MCAS Miramar Distribution	Comments
21	**San Diego horned lizard (*Phrynosoma coronatum blainvillei*)** **Status: SSC/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 as occurring in chaparral, coastal sage scrub and vernal pools of the central and western portion of the Station (Hunsaker and Cox 1997). Refer to Figure 13 for known distribution.	Like other horned lizards, this species can be immediately 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.
22	**Coronado Island skink** (*Eumeces skiltonianus interparietalis*) **Status: SSC/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.
23	**Orange-throated whiptail (*Cnemidophorus hyperythrus beldingi*)** **Status: SSC/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). Refer to Figure 15 for known distribution	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.
24	**Coastal western whiptail (*Cnemidophorus tigris multiscutatus*)** **Status: SSC/None** **Family: Teiidae**	This species is located in a variety of habitats including coastal sage scrub, chaparral, and open grassland. It can be locally common in arid and semi-arid habitats with sparse to dense vegetation and open areas for fleeing potential predators.	Due to its ability to use a variety of habitats, this lizard's range extends throughout most of cismontane southern California. This subspecies is common in open chaparral, coastal sage scrub, grassland, and disturbed areas of the central and eastern portions of the Station (Hunsaker and Cox 1997).	The coastal whiptail is threatened because vast areas of its former range have been converted to urban and agricultural development and its numbers are thought to be declining.
25	**Coastal rosy boa (*Lichanura trivirgata roseofusca*)** **Status: SSC/None** **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. The coastal rosy boa has been observed on the Station as reported in the USFWS (1993a) Wildlife Management Plan for the Station. Hunsaker and Cox (1997) reported two observations, both in the north-central portion of the Station.	Activity is mostly nocturnal but there is relatively little information available on its life history (Zeiner et al. 1988).
26	**San Diego ringneck snake (*Diadophis punctatus similis*)** **Status: SSC/None** **Family: Colubridae**	The San Diego ringneck snake is present in a variety of habitats including chaparral, oak woodland, canyon bottoms, and riparian woodlands.	The ringneck snake ranges from southwestern San Bernadino County south to coastal San Diego County and northern Baja California, Mexico (Stebbins 1985). It has been observed on the western end of MCAS Miramar (Cox et al. 1994) and Ogden (1996) reported one observation south of the main runway.	Its numbers are thought to be declining because of the loss and degradation of habitat resulting from urbanization and the construction of transportation corridors throughout southern California.
27	**Coast patch-nosed snake (*Salvadora hexalepis virgultea*)** **Status: SSC/None** **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. This taxon likely occurs throughout Miramar in appropriate habitat. Hunsaker and Cox (1997) reported four observations on the Station.	The coast patch-nosed snake is a subspecies of the western patch-nosed snake present in coastal southern California and northern Baja California, Mexico.
28	**Two-striped garter snake (*Thamnophis hammondii*)** **Status: SSC/None** **Family: Colubridae**	The two-striped garter snake is found along permanent streams, creeks, and vernal pools 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 1986).
29	**Northern red diamond rattlesnake (*Crotalus ruber ruber*)** **Status: SSC/CSC** **Family: Viperidae**	This rattlesnake prefers coastal sage scrub and chaparral, and may be found in oak woodland and canyon bottoms and along the 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			
30	**Northern harrier (*Circus cyaneus*)** **Status: None/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. It is a rare local summer resident in San Diego County (Ogden 1996). 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).

TABLE 2

OTHER SPECIES OF REGIONAL SPECIAL CONCERN AT MCAS MIRAMAR

No.	Species Name Status (Federal/State/CNPS*) Family	Habitat	Rangewide and MCAS Miramar Distribution	Comments
31	Ferruginous hawk (*Buteo regalis*) Status: SSC/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.	The breeding range of this hawk extends from eastern Washington and southeastern Canada south to eastern Oregon, Nevada, northern and southeastern Arizona, northern New Mexico, north-central Texas, western Oklahoma, and western Texas. It is an uncommon winter visitor in San Diego County. This species does not breed on the Station, however, 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 1992).
32	**Western burrowing owl (*Speotyto cunicularia hypugaea*)** **Status: SSC/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 United States 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. One location is in South/West Miramar southeast of the runways, and two in East Miramar (refer to Figure 15). This species is a former resident but is now a fall/spring migrant and 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).
33	**California horned lark (*Eremophila alpestris actia*)** **Status: SSC/None** **Family: Troglodytidae**	The California horned lark occurs in a variety of habitats including grasslands and open fields.	California horned larks occur mainly in cismontane southern California. The sub-species is locally common in open disturbed areas on MCAS Miramar, especially along fuel breaks and the aqueduct route (Cox et al. 1994). This subspecies is known to breed on the Station, commonly along fuelbreak roads, especially in East Miramar and occasionally in other areas (including Green Farms and at the eastern end of the flightline) (T. Conkle, personal communication; Hunsaker and Cox 1997).	Black feathers that have the appearance of horns are common throughout the species.
34	**Bewick's wren (*Thryomanes bewickii*)** **Status: None/None** **Family: Troglodytidae**	Bewick's wren inhabits brushy areas of coastal sage scrub, chaparral, and grassland habitats.	Bewick's wren ranges from the eastern United States to the Pacific northwest and south into Mexico. Its winter range includes southern California. The Bewick's wren is a permanent resident on the Station, and is common in coastal sage scrub, chaparral and woodland areas throughout the Station (Hunsaker and Cox 1997).	Currently this species is regarded as successfully breeding in California (Small 1994) and was not listed as showing declines in California as it is in other states.
35	**San Diego cactus wren (*Camplyorhynchus brunneicapillus sandiegensis*)** **Status: SSC/None** **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 one record in the vicinity of the Station. One pair of this species was a permanent resident in native grassland in the central portion of the Station (refer to Figure 15). This subspecies is no longer known to breed on the Station (Hunsaker and Cox 1997).	This taxon is considered to be a coastal population of the cactus wren by the USFWS (1994a), and is not considered an entity appropriate for listing. The San Diego cactus wren is currently considered a species of special concern by CDFG (1994).
36	**Blue-gray gnatcatcher (*Polioptila caerulea*)** **Status: None/None** **Family: Muscicapidae**	Garrett and Dunn (1981) describe this species as an uncommon to fairly common summer resident in oak, oak-riparian, and chaparral-bordered woodlands.	The San Diego Audubon Society considers the regional population to be declining. Reported as a common summer resident in scrub oak chaparral, ceanothus chaparral, and riparian woodlands in the central and eastern portions of the Statiion (Hunsaker and Cox 1997). This species is known to breed on the Station. It has also been reported to have a patchy distribution occurring in chamise chaparral, and less frequently in willow scrub and thickets of *Baccharis* (any species of *Baccharis*) (T. Conkle, personal communication).	Brown-headed cowbird brood parasitism has greatly reduced lowland breeding populations of blue-gray gnatcatcher in San Diego County (Small 1994).
37	**Loggerhead shrike (*Lanius ludovicianus*)** **Status: SSC/None** **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 including much of the western portion of the United States. Substantial declines in the eastern portion of its range have been observed. This species is known to breed on the Station. There are two pair near Eastgate Mall, and pair at Research Pond, another along Green Farm Road. Other areas supporting this species include Quail Canyon, West Sycamore Canyon, and Green Farms. All pairs have successfully fledged young at some time in the past three year (T. Conkle, personal communication).	While the loggerhead shrike was a former Category 2 candidate for federal listing, and is therefore addressed here as a species of special concern, this species was not considered by USFWS to be threatened or in decline in California.

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No.	Species Name Status (Federal/State/CNPS*) Family	Habitat	Rangewide and MCAS Miramar Distribution	Comments
38	**Bell's sage sparrow (*Amphiza belli belli*)** **Status: SSC/None** **Family:**	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. They are relatively common in certain stands of coastal sage scrub, often adjacent to chamise chaparral. 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. Refer to Figure 13 for known distribution.	The sage sparrow is thought to be intolerant of disturbed habitat edge conditions and is possibly sensitive to habitat fragmentation.
39	**Southern California rufous-crowned sparrow (*Aimophila ruficeps canascens*)** **Status: SSC/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 the Station in undisturbed areas. It is especially common in steeper, rocky canyons of coastal sage scrub and chamise chaparral (refer to Figure 13). Its distribution appears to coincide with that of the orange-throated whiptail (T. Conkle, personal communication).	It is considered a species of special concern by the state because its habitat continues to be developed throughout the region.
40	**Tricolored blackbird (*Agelaius tricolor*)** **Status: SSC/CSC** **Family: Emberizidae**	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. SDSU 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).	The species is threatened by the loss and degradation of habitat. Recent surveys have shown that this bird is more abundant than once believed; however, proactive steps are being taken to increase numbers to historic levels throughout its range.
	Mammals			
41	Mexican long-tongued bat (*Choeronycteris mexicana*) Status: SSC/CSC Family: Phyllostomidae (American leaf-nosed bats)	In the United States, 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.
42	Western small-footed myotis (*Myotis ciliolabrum*) Status: SSC/None 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. Bats of this species typically forage 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 Mirarmar.	Yuma myotis require water more than other bats and are often spotted drinking soon after emergence from the roost. The species displays a high tolerance for cold and dry conditions, hibernating in colder and dryer conditions than most other bats.
43	**Yuma myotis (*Myotis yumanensis*)** **Status: SSC/CSC** **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 or 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).
44	Townsend's big-eared bat (*Plecotus townsendii*) 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.e., 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 United States but is found throughout California, especially in mesic habitats.	During the day, this species is most likely to be found hanging from open ceilings of caves and mines as they do not use cracks or crevices. They may also be found roosting in buildings and trees (Nowak 1991). At night, they forage for insects above the local vegetation.
45	Pallid bat (*Antrozous pallidus*) Status: None/CSC Family: Vespertilionidae	Pallid bats are generally considered to prefer desert areas with rocky outcrops below about 6,000 feet elevation. Colonies are usually located 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 United States, including southern coastal California (Burt and Grossenheider 1976).	Colonies of pallid bats vary in size and range to 100 individuals (Nowak 1991).

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No.	Species Name Status (Federal/State/CNPS*) Family	Habitat	Rangewide and MCAS Miramar Distribution	Comments
46	**Brazilian free-tailed bat (*Tadarida brasiliensis*)** **Status: None/CSC** **Family: Molossidae (free-tailed bats)**	Brazilian free-tailed bats are the most common of the free tailed bats in California. They typically inhabit buildings, mine shafts, caves, and undersides of bridges. They have been noted from sea level up to 5,000 feet in mountainous areas.	This bat species is known from northern South America and the Caribbean, northward through the southwestern and southeastern United States (Nowak 1991 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).	Brazilian free-tailed bats, like most bats, are susceptible to human disturbance and loss of habitat, but blame for the drastic decline in population has been attributed to poisoning through organochlorine residues from DDT spraying.
47	**Pocketed free-tailed bat (*Nyctinomops femorosaccus*)** **Status: None/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, however, 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 partake in seasonal local migrations, some migrate short distances into Mexico and others over-winter in their summer use areas (Hunsaker 1997; Nowak 1991).
48	Big free-tailed bat (*Nyctinomops macrotis*) Status: None/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.	This species' range extends from north and central Mexico, most of South America, and the Caribbean Islands northward to southwestern United States. In the fall the species 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.
49	**California mastiff bat (*Eumops perotis californicus*)** **Status: SSC/CSC** **Family: Molossidae**	Roost sites usually consist of natural crevices on cliff faces over 20 feet in height (see comments). They will use artificial crevices such as under corrugated roofing of buildings and mine shafts.	California mastiff bats range from the southwestern United States and northern Mexico, through most of South America (Nowak 1991). This species has been observed foraging at several locations at MCAS Miramar, but has not been observed roosting (D. Stokes, personal communication).	Because of its size (40 to 65 grams) and narrow wings, it has special requirements for flight. California mastiff bats must be at least six feet above the ground to have sufficient drop to become airborne (Nowak 1991).
50	**San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)** **Status: SSC/None** **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 occasional in ridge-top chamise chaparral areas and open areas of central and easternmost MCAS Miramar (Cox et al. 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.
51	**Dulzura California pocket mouse (*Chaetopidus californicus femoralis*)** **Status: SSC/None** **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. 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.
52	**Northwestern San Diego pocket mouse (*Chaetopidus fallax fallax)*** **Status: SSC/None** **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. 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.
53	Southern grasshopper mouse (Onychomys torridus ramona) Status: SSC/None Family: Cricetinae	The southern grasshopper mouse occurs in arid, open country with sandy or gravely 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 the burrows of other rodents including probably Botta's pocket gopher and California ground squirrel.
54	**San Diego desert woodrat (*Neotoma lipida intermedia*)** **Status: SSC/None** **Family: Cricetinae**	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 study area, 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 them from the sympatric dusky-footed woodrat (Neotoma fuscipes). Population information for this species is lacking.

TABLE 2

OTHER SPECIES OF REGIONAL SPECIAL CONCERN AT MCAS MIRAMAR

No.	Species Name Status (Federal/State/CNPS*) Family	Habitat	Rangewide and MCAS Miramar Distribution	Comments
55	**Mountain lion (*Felis concolor*)** **Status: None/None** **Family: Felidae (cats)**	Mountain lions are found in nearly all habitats but are most common in riparian situations. Areas that are largely unpopulated and that support healthy deer and other large and medium-sized mammal populations are preferred. Mountain lions range widely across most of North America.	Mountain lions are known from sea level to alpine meadows in southern California. Observations of mountain lion tracks at MCAS Miramar were reported by Kellogg (1994).	This large predator is the primary consideration in determining the placement, size, and number of wildlife corridors within the region. This is due mainly to its large home range size and inability to survive in small disjunct habitat patches.
56	**Mule deer (*Odocoileus hemionus fuliginata*)** **Status: None/None** **Family: Cervidae (deer)**	Southern mule deer are present in a wide variety of habitat types including coastal sage scrub, riparian, mountain forest, chaparral, open grasslands and desert mountain areas.	Southern mule deer occur in portions of southern Riverside County southward to Baja California, Mexico. They are relatively common in the coastal foothills. Populations in the southern California region are nonmigratory (Environmental Science Associates, Inc. 1992; PRC Engineering 1988). Mule deer are known from MCAS Miramar and surrounding habitat in undeveloped portions of San Diego County.	Southern mule deer are large, hoofed mammals found in a variety of habitats on MCAS Miramar and are an important prey species of the mountain lion. Wildlife corridors should be designed in consideration of the activity patterns of this species.

TABLE 2

OTHER SPECIES OF REGIONAL SPECIAL CONCERN AT MCAS MIRAMAR