

## 7.0 NATURAL RESOURCES MANAGEMENT

A Comprehensive Natural Resources Management Plan (Kellogg 1994) was developed for the U.S. Navy to provide guidance for natural resources management on NAS Miramar. A number of specific management plans were incorporated and appended into that 1994 Natural Resources Management Plan, including the Fish and Wildlife Management Plan (USFWS 1993a), Outdoor Recreation Management Plan (NAS Miramar 1991), and Vernal Pool Management Plan (Bauder and Wier 1991). MCAS Miramar incorporated information that remained relevant into the 2000 and 2005 INRMPs (MCAS Miramar INRMP 2000, MCAS Miramar INRMP 2006). All of these previous plans are updated and incorporated into this INRMP for implementation.

### 7.1 Natural Resources Goals

This chapter presents policies, objectives, and projects necessary for MCAS Miramar to achieve the Marine Corps' natural resources management goals in support of Station military readiness requirements. These goals, as set forth in MCO P5090.2A, are as follows:

- preserve access to air, land, and sea spaces to meet military readiness requirements;
- comply with applicable natural resources protection requirements (*e.g.*, laws, executive orders, and regulations);
- provide public access to installation lands, where practicable, provided such access does not conflict with military readiness and does not harm sensitive installation natural resources; and
- participate in regional ecosystem partnerships, provided such participation does not conflict with military readiness and does not harm installation natural resources.

Natural resource management goals specifically adopted by MCAS Miramar are as follows:

- support the MCAS Miramar military mission by ensuring compliance with applicable environmental laws and regulations;
- include natural resource management as a component of planning for execution of Marine Corps operational requirements;
- identify and select opportunities for maintaining biodiversity, including conservation of important plants and animals; and
- secure regulatory agency and public recognition of Marine Corps environmental stewardship efforts.

Department of Defense policy directs that each INRMP must address resource management on all lands for which the installation has real property accountability, including lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. Additionally, DoD policy authorized that installation commanders may require tenants, lessees, permittees, and other parties to accept responsibility for performing appropriate natural resource management actions as a condition of their occupancy or use<sup>18</sup>.

As such, all MCAS Miramar actions will consider natural resource management policies and objectives of this INRMP for all lands of MCAS Miramar. As new real estate and permission documents are developed and as modifications to existing permissions are prepared, the clear applicability of this guidance in the context of the

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<sup>18</sup> Assistant Deputy Under Secretary of Defense (Environment, Safety, and Occupational Health) Memorandum for the Deputy Assistant Secretary of the Army (Environment, Safety, and Occupational Health), Deputy Assistant Secretary of the Navy (Environment), Deputy Assistant Secretary of the Air Force (Environment, Safety, and Occupational Health), and Director, Defense Logistics Agency of 17 May 2005 on the subject of Implementation of Sikes Act Improvement Amendments: Supplemental Guidance concerning Leased Lands.

entire INRMP will be reinforced. Natural resource management actions outlined in this INRMP will be planned and executed on all applicable lands of MCAS Miramar by Station resource management actions, others using Station lands, or both. Where applicable, this will include lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission following necessary coordination. Existing land use agreements already subject to environmental planning and resources agency authorizations are expected to be operating already in a way that complements the philosophies and objectives of this INRMP.

This chapter's purpose is to describe integration of management and conservation of natural resources to support military operational requirements of the Station. Objectives and projects presented in this chapter were developed and prioritized to support the Station's approach to natural resource management, as discussed in Chapter 5, and planning needs, as discussed in Chapter 6.

## 7.2 INRMP Projects

INRMP projects within this chapter are summarized by general topics (*e.g.*, Special Status Species Management, Vernal Pool and Wetland Management, Fish and Wildlife Management). Each general section has one or more objectives. Under each objective are applicable **In-house Management Actions, Projects in Progress, Must Fund Projects, and Other Planned Projects** in an abbreviated format (project title and its project implementation year(s)).

Below sections describe some more recent MCAS Miramar surveys including vernal pool mapping with pool flora and fauna sampling, 2007 and 2009 surveys for coastal California gnatcatchers, a 2008 least Bell's vireo/southwestern willow flycatcher survey, 2009 willow monardella surveys and Del Mar manzanita monitoring, long-term ecosystem monitoring for flora and fauna (2009 and 2010, respectively), and Clean Water Act jurisdictional Delineation of Waters of the U.S. on Main Station and the Flightline. NEPA documentation associated with these routine surveys and studies specified within this INRMP is a component of and was completed via this INRMP's EA.

Section 9.1.2, *Funding Definitions* describes the budget classification system. **Must Fund Projects** are either budget class 0 or 1; **Other Planned Projects** are either budget class 2 or 3. Full implementation of this INRMP includes implementing all Must Fund Projects. DoD Instruction 4715.3 describes funding classifications as Class 0 – “Recurring Conservation Requirements” and Class 1 – “Current Compliance” and Other Planned Projects that are not required to meet INRMP implementation status (Class 2 – “Maintenance Requirements” and Class 3 – “Enhancement Beyond Compliance”).

Must Fund Projects and Other Planned Projects within each general topic are budget items entered into the Marine Corps CompTRAK budget system. Section 9.4, *INRMP Implementation Funding* integrates implementation of this INRMP with the budget process.

Must Fund Projects and Other Planned Projects identified in this chapter (and Chapter 9) are described in a more detailed, standardized format in Appendix D. All actions and projects (In-house Management Actions, Projects in Progress, Must Fund Projects, and Other Planned Projects) are summarized in tabular format in Appendix E to provide a means of monitoring overall INRMP implementation.

## 7.3 Vegetation Management and Soil Conservation

Watershed, floodplain, fuelbreak/fire management, grounds maintenance and landscaping, and soil conservation are components of this subsection. Meeting objectives of each of these components requires an integrated approach to vegetation management as well as other natural resources components identified in this chapter. Plant Special Status Species and vegetation management specifically for these species are addressed in

### **7.3.1 General Vegetation Management and Soil Conservation**

#### **7.3.1.1 Policy and Background**

Effective vegetation management and associated soil conservation are critical to maintaining, restoring, and rehabilitating native vegetation and its associated wildlife habitats. When vegetation management is focused on habitat improvement for wildlife, it should include maintenance of wildlife corridors and habitat linkages. An example of ongoing habitat maintenance on the Station is the informal policy of discouraging the removal of snags (standing dead trees) and logs. Whether left standing or laying on the ground, these materials provide valuable wildlife habitat. The maintenance and restoration of training lands is an equally important aspect of general vegetation management and soil conservation.

#### **Invasive Plant Management**

MCO 5090.2A (para. 11104.1g(2)) states, “*Installations, organizations and military units shall not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere. They shall provide for invasive species control and minimize the economic, ecological, and human health impacts that invasive species cause.*”

MCAS Miramar must comply with Executive Order 13112, *Invasive Species*. An invasive species is defined as “*an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health*” (Executive Order 13112). Federal agencies are to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. Invasive plants can be a serious threat to natural plant communities. These species can change the structure of a plant community and degrade its value for wildlife and native plant species.

MCAS Miramar has been identifying and controlling invasive plant species, including pampas grass (*Cortaderia* spp.), tamarisk (*Tamarix* spp.), and arundo (*Arundo donax*). The priority for species controls changes due to changing threats associated with invasive species, effectiveness of ongoing control, cost/benefit factors, and available control resources. There are 20 invasive species under contract for control with additional species to be added as needed. Several additional vernal pool weed species are controlled in specific vernal pool restoration and enhancement projects.

#### **General Vegetation Management**

Quantitative descriptions of vegetative attributes, such as cover, biomass, or composition, are helpful for habitat condition or trend monitoring, a planned management objective. Monitoring allows for periodic review of ecosystem quality and management objective success. The Natural Resources Division updated its vegetation/landcover mapping, producing a report that included information on vegetation changes since 1994 (O’Leary *et al.* 2002) and an updated geospatial information system (GIS) database. This vegetation database warrants updates on an approximate 5-year basis; however, a planned update in 2008 was postponed due to the extensive Cedar Fire burn that occurred in Oct 2003.

#### **Long-Term Ecosystem Monitoring**

MCAS Miramar has implemented a Long-Term Ecosystem Monitoring (LTEM) program of vegetation and soil conditions. Results of the initial year (1999) field studies for both flora and fauna were summarized (Varanus Biological Services, Inc., and San Diego Natural History Museum 2003<sup>19</sup>) and are available for baseline comparisons. The current floral portion of the long-term ecosystem monitoring effort (O’Leary 2009)

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<sup>19</sup> J.L. O’Leary, San Diego State University, provided the vegetation evaluation.

was completed in 2009.

O’Leary (2009) summarized results of the vegetation component of the LTEM program, which included the following:

- the development and implementation of a work plan for the spring 2008 and future vegetation sampling of 82 permanent plots located on the Station;
- the relocation and resampling of 75 vegetation plots last sampled in spring 1999;
- the establishment and sampling of seven additional plots;
- the production of detailed site descriptions, information on disturbance activities and erosion on ‘Land Use Forms,’ and directions, and maps recorded on standardized ‘Plot Map Forms;’
- the collection, pressing, identification, and mounting onto herbarium sheets of any plants found within plots that were previously not known to occur on the Station;
- creation of individual summaries of the compositional, structural, and site characteristics of the 82 plots sampled in 2008;
- creation of composite summaries of the individual plots that comprise each major vegetation type;
- contrasts between summaries of each major vegetation type sampled in 1999 with those sampled in 2008;
- summary contrasts for average cover for growth forms for 1993-94, 1999, and 2008;
- discussion of vegetation management implications; and
- production of a detailed methods manual to assist in the future relocation and sampling of the 82 vegetation plots.

O’Leary (2009) evaluated changes in vegetation between 1993-94, 1999, and 2008 and concluded, “*With only one exception (plot 80-5), none of the changes detected on individual sample plots appear attributable to U.S. Marine Corps military readiness activities. A significant factor affecting the Station’s vegetation was the Cedar Fire of October 2003 which burned 67 of the 82 vegetation plots. Generally, most vegetation types appear to be recovering fairly well, but exceptions occur.*”

LTEM special purpose plots are placed in specific sites to provide information on management issues. For example, the Natural Resources Division has established LTEM special purpose plots (Section 7.3.1, *General Vegetation Management and Soil Conservation*) in areas for controlled burns or wildfire corridors to monitor long-term effects to vegetation and soil conservation.

### **Soil Erosion and Revegetation**

MCO 5090.2A (para. 11104.2d) states, “*The Marine Corps shall manage its lands and waters to control and prevent soil erosion, soil loss, and aquatic sedimentation and to preserve natural resources by conducting surveys and implementing soil conservation measures. Construction projects shall be designed to eliminate post construction soil erosion, and altered or degraded landscapes and associated habitats shall be restored and rehabilitated whenever practicable.*”

Soil erosion can severely delay the re-establishment of vegetation and habitat conditions needed to sustain plant and wildlife species. This is of particular concern when Special Status Species habitat is the focus of habitat improvements. Soil erosion also affects the maintenance of training lands, which require vegetative cover for training realism.

MCAS Miramar (as are all Marine Corps installations) is required to manage its lands to control and prevent soil erosion and preserve natural resources by conducting surveys and implementing soil conservation measures. Erosion control is meant to preserve the integrity of soil productivity and function. It encompasses

water quality concerns and protection of wetland functions that affect water quality.



*Marines provide manpower to reseed a training area with native plant seed*  
Photo courtesy of GySgt Christopher Long, January 14, 2010, H & HS Marines

Erosion and sedimentation issues are important at MCAS Miramar due to highly erodible soils and above normal fire risk throughout most of the year. Excess sediment or altered flows can affect watershed hydrologic function, water quality, and wildlife habitat. Watershed malfunction that results in excessive runoff can degrade or even destroy whole ecosystems, individual plant communities, or specialized zones, such as riparian areas. Gullies can lower the water table, potentially affecting vegetative cover and the hydrology of an entire watershed. Roads can alter water flow and potentially divert water from natural streams.

A soil erosion inventory of the Station was completed in 1991 (Kellogg and Kellogg 1991). Of 287 erosion sites described, 51 were classified as active and 32 with minor activity. Almost three-quarters of the sites were natural landslides off eroded ridges in East Miramar. The greatest manmade erosion hazards on the Station were wide, unvegetated fuelbreaks without water diversion devices (Kellogg 1994).

In 2004-05, URS (2005) inventoried undeveloped portions of the Station on a landscape level to assess, document, and prioritize active erosion sites and provide recommendations for restoration of priority erosion sites. Erosion sites were classified into the following categories: sheet, rill, gully, channel, and mass wasting/landslide; sites were further categorized as natural or accelerated by human-induced processes. URS identified 98 sites with erosion problems; 68 contained gullies. Rills were identified at 19 sites; channel erosion at 8 sites; streambank erosion at 6 sites; slumps at 5 sites; and mass wasting was recorded at 12 sites.



*Slope Restoration - Fish Pond Natural Resources Division*

Site prioritization was based on the following: 1) sites that potentially affect Station training needs, 2) sites that potentially affect Station facilities, 3) sites that potentially affect Station cultural/biological resources, and 4) sites that affect Station maintenance projects. URS (2005) completed detailed erosion restoration recommendations for 18 priority erosion sites. These recommendations are adaptable to other erosion sites with the same erosion classification. Current effort involves establishing restoration project programming and implementation efforts for these recommendations.

During 1999-2001, field work was conducted for a Public Works Division project to locate restoration sites for coastal sage scrub, grasslands, and wetlands. This study (Johnson *et al.* 2003) identified 102 restoration sites encompassing 598 acres.

MCAS Miramar has instituted several restoration projects for restoration of coastal sage scrub habitat due to its regional rarity and importance to the threatened coastal California gnatcatcher.

- In 1997, the restoration of 0.143 acres was begun to mitigate for impacts from the removal of one abandoned Land Vehicle Tracked (Personnel) 5. Methods involved using a berm to protect the area and allowing natural revegetation (Heffernan 1999).
- In 1999, the restoration of 87.5 acres was begun to mitigate for impacts from construction associated with BRAC realignment. Methods involved burning, irrigation, ripping and tilling, mulching, and local seed to grow seedlings for transplanting (Heffernan 2002).
- In 1999, the restoration of 3.16 acres was begun to repair damage caused by fuelbreak maintenance operations. Methods involved straw flake erosion control dams and seedling plantings from local stocks, follow-up weed control, and irrigation (Johnson 2003a).
- In 1999, restoration of 0.6 acres was begun to mitigate for impacts associated with repair and improvements to the Ammunition Road leading to the Flightline. Methods involved seedling plantings from local stocks, follow-up weed control, and irrigation. This project also included a study of the effects of soil compaction on seedling survival (Johnson 2003b).
- Beginning in 2001, three eroded sites associated with the Fish Pond were restored to reduce sediment flow into the pond (Green *et al.* 2001). This project is complete (see above photo), and the pond is open for patron use (Section 7.7, *Natural Resources-related Outdoor Recreation Management*).
- In 2002, MCAS Miramar stabilized and revegetated a chaparral slope at Homestead Dam (Tierra Data 2003).
- In 2006, soil erosion was controlled on 0.09 acres on slopes in east Miramar along the San Clemente riparian corridor and Training Area 4.
- In 2007, soil erosion control was initiated on 1.19 acres of slope at the Ordnance Complex (Environmental Engineering Division lead).
- In 2007, restoration was begun for Site Remediation of Tank 9935 and Rose Creek Stormwater Outfall Basin.
- In 2008, restoration of 7.2 acres was begun to compensate for habitat loss from development and enhancement of 2.5 acres of habitat in Rose Canyon associated with the construction of a new Jet Fuel Farm (P-125).

- In 2009, soil erosion control was begun on 1.8 acres at the Fish Pond outfall on Rose Canyon tributary slope (Environmental Engineering Division lead) (different from 2001 project above).
- In 2010, 7.19 acres of Training Area 4 was reseeded with native grassland seed mix to reduce slope erosion (see above photo).

### **Agricultural Outleases**

As part of the integrated management of natural resources, installation commanders shall review the suitability of their lands for agricultural leasing, under the Military Construction Authorization Act, when such leasing is advantageous to the United States. Installation commanders should also review the suitability of existing leases to ensure they promote the national defense or are in the public interest and do not conflict with existing or planned military land use requirements. In addition, any agricultural leases must be compatible with goals and objectives of the installation's INRMP. (MCO P5090.2A, para. 11104.2c). Section 9.4.2, *Agricultural Funds* describes this program in more detail.

### **Watershed and Floodplain Management**

MCAS Miramar avoids direct or indirect development of floodplains and restores and preserves natural and beneficial values served by floodplains as it implements land management, construction, and land use actions, as required by Executive Order 11988, *Floodplain Management* and outlined by MCO P5090.2A. This approach serves to prevent flood damage to facilities.

Watershed management preserves soil and water productivity and function. Erosion and water quality management approaches on MCAS Miramar use best management practices approved by the State of California under the Non-Point Source Pollution Control Plan.

Smith and Lichvar (2001) conducted a Station-wide planning level delineation of aquatic resources, mapping of floodplains, and a functional assessment of riparian ecosystems at MCAS Miramar. The study accomplished the following:

- identified Waters of the United States to help address jurisdictional requirement(s) of Section 404, CWA, regulated water bodies, and aquatic resources;
- mapped the 100-year return period floodplain; and
- provided a baseline assessment of riparian integrity for the 116 riparian “reaches” on the Station.

In addition, effective watershed management can be achieved through fire management, erosion control programs, and assessments of impacts of surface runoff into watersheds. Maintaining riparian vegetation cover through invasive plant removal and fire protection are watershed management actions that contribute to water quality by preventing siltation into streambeds (*e.g.*, minimizing new surface drainage into canyons).

The 2003 Cedar Fire demonstrated the potential for substantial damage to riparian systems. Damage occurred in riparian areas from (1) riparian vegetation loss, (2) siltation from the adjacent slopes during rainfall events, and (3) higher water volumes during rainfall events that eroded channels and banks more than normal. A project was initiated in 2004 by the Miramar Public Works Division to mitigate some watershed damage caused by the fire and to prevent or minimize downstream flooding and sedimentation. Sedimentation barriers and plantings of riparian vegetation were installed in West Sycamore and San Clemente canyons to compensate for potential permanent loss of native riparian vegetation and accelerate vegetation recovery.

Green Farm earthen dam was repaired in 2003 to reduce risk of dam failure, which could have impacted the new Rifle/Pistol Training Range Complex and federally endangered willow monardella plants downstream. In 2002, MCAS Miramar stabilized and revegetated a chaparral slope at Homestead Dam (Tierra Data 2003).

### 7.3.1.2 Objective(s) and Planned Actions

**Objective 1:** Develop and implement a program for natural land and habitat restoration and rehabilitation.

***In-house Management Action:***

- Provide specifications for reseeding/revegetation of sites disturbed by Station activities.

***Project in Progress:***

- Soil Erosion Control and Revegetation in East Miramar to be completed in 2015.

***Must Fund Projects:***

- Invasive Species Control (MI55353) to be done annually.
- Minor Projects/Damage Repair (MI25555) to be done annually, as needed.

***Other Planned Projects:***

- Vegetation Mapping (MI85555) to be initiated in 2012.
- Restore Eroded Areas (MI0600002) to be initiated in 2013.

**Objective 2:** Continue the Long-Term Ecosystem Monitoring program of vegetation and soil conditions on MCAS Miramar.

***Other Planned Project:***

- Long-term Ecosystem Monitoring (MI95556) to be initiated in 2014.

**Objective 3:** Maintain watershed productivity, quality, and functioning through an effective non-point source pollution control program (soil erosion control and maintenance of vegetative cover). Emphasize seasonal distribution of water availability, minimization of flooding, reduced sedimentation, and maintenance of wetland quality performing planned actions in other compatible management areas.

***In-house Management Actions:***

- Identify potential effects of actions in floodplains early in the NEPA planning process.
- Monitor stormwater discharge outfalls, annually (Environmental Engineering Division action).
- Maintain functionality of oil/water separators.

***Projects in Progress:***

- Soil erosion control projects at the Ordnance Complex (Environmental Engineering Division lead).
- Soil erosion control project at the Fish Pond outfall (Environmental Engineering Division lead).

## **7.3.2 Wildland Fire Management**

### **7.3.2.1 Policy and Background**

MCO 5090.2A (para. 11104.2h) states, “*Fire is an important component of fire-adapted ecosystems. These ecosystems may require some level of prescribed burning to mimic the temporal frequency and intensity of the natural fire regime. Burning outside the natural fire regime may impact or convert vegetation plant communities to a non-native type. Prescribed burning is an important tool to reduce fuel loading and maintain fire-dependent ecosystems.*” MCO 5090.2A (para. 11204.2a) requires installations with burnable acreage, or bordered by burnable acreage, to develop and implement a Wildland Fire Management Plan, which will be incorporated into or consistent with the INRMP.

The primary reason for fire management at the Station is the protection of human life, health, and property. Proper land and vegetation management aids in suppressing and reducing damage from wildland fires, which helps maintain watersheds and, thereby, water quality.

Potential ignition sources on and off the Station create risks from wildfire. Management is needed to support emergency response control efforts to reduce the likelihood of catastrophic wildfires, which can cause significant loss of resources. The MCAS Miramar Fire Department is responsible for fire management on the Station. Fire Department wildland fire managers work with the Public Works Division and Environment Management Department to maintain fuelbreaks and access roads.

The management of vegetation to meet fire management needs and soil/vegetation conservation will be evaluated jointly between wildland fire managers and the Station Natural Resource Division. Ideally, plans and actions should be directed to avoid grading or blading the soil beyond maintenance of an access road width with the remainder maintained by vegetation crushing, mowing, or prescribed burning. Where vegetation is cleared down to mineral soil on steep slopes, water bars or other diversion structures need to be placed at regular intervals to minimize soil erosion.

The *Wildland Fire Management Plan for Marine Corps Air Station Miramar, San Diego, California* (MCAS Miramar Fire Department 2009a) is referenced, but not incorporated into this INRMP. This plan and its accompanying environmental assessment were prepared to guide wildland fire management and planning decisions on MCAS Miramar during 2010-2015. The MCAS Miramar Fire Department has responsibility of fire prevention and fire suppression on the Station. Fire prevention and suppression measures described in the plan serve to prevent and/or control the frequency, size, distribution, and intensity of wildfires. Furthermore, these measures are intended to protect high-value areas on- (*e.g.*, military assets and sensitive natural and cultural resources) and off-Station (*e.g.*, residential and commercial areas that border MCAS Miramar). The plan is compatible with this INRMP. It emphasizes the protection of listed species from wildfire and identifies required conservation measures (termed MIST for Minimum Impact Suppression Tactics) associated with fire management actions.

The *Fireroad/Fuelbreak Maintenance Plan and Standard Operating Procedures* (MCAS Miramar Fire Department 2009b) is also referenced, but not incorporated into this INRMP. Implementation of this plan is included in the environmental assessment for the Wildlife Fire Management Plan. The Fireroad/Fuelbreak Plan is updated annually and includes details on the maintenance of fuelbreaks and fireroads on the Station. This plan emphasizes the cutting of vegetation to maintain fuelbreaks, instead of using heavy equipment to expose bare ground. Most fireroads are normally 15 feet wide unless they are within a fuelbreak when they are 20 feet wide with a 50-foot fuelbreak on each side. The Natural Resources Division maintains a GIS database on prescribed fire and wildland fire burn boundaries; these GIS data were used to help develop the Fireroad/Fuelbreak Maintenance Plan.



*Flightline Control Burn*      *Natural Resources*  
*Division*

The Station evaluated the use of native grass seeding for erosion control on Fuelbreak NS-5 and effects of such grasses on wildland fire fuel management (Section 7.3.1, *General Vegetation Management and Soil Conservation*). However, native grass was not established due to drought. The study was not continued due to costs and potential benefits. The Station is implementing a 2010 soil erosion control project (Restore Eroded Areas) on the upper portion of Fireroad R-15. R-15 was a 15-foot wide road that will be restored to surrounding habitat to reduce erosion. It will not be maintained as a fireroad any longer due to the proximity of Del Mar manzanita.

The Fire Department accomplishes necessary coordination and subsequent burning activities involving prescribed burning. Past fire management at MCAS Miramar has included fuelbreak maintenance and prescribed fire. Recent wildfires have accomplished some fuel management objectives. Between 1990 and 2000 roughly half of the easternmost portion of the Station, east of the rifle range, has burned (MCAS Miramar INRMP 2000). The Cedar Fire burned approximately 17,600 acres in fall 2003 (see Section 4.8, *Cedar Fire*).

The Miramar Fire Department includes prescribed burning as one of several fuel management tools that will support fire and resource management objectives identified in the Station Fire Management Planning and this INRMP. Prescribed burn plans contain measurable objectives and a predetermined prescription, an escaped fire contingency plan and receive environmental review. The wildland fire management planning contains policies and guiding principles of fire management for all wildland acres within the Air Station boundary, including an element that all fire management activities will support and enhance ecosystem sustainability and the interrelated ecological, economic, and social components on a landscape scale.

Hunsaker and Awbrey (1999) studied the effects of fire on the Station using 12 study sites. This study showed the effects of a moderate intensity fire. The study indicated that unburned vegetation within general burn areas was important for ecosystem recovery. Cobb (2005 and in preparation) studied the effects of wildfire on vernal pool habitat vegetation and fairy shrimp (see Section 7.5.1, *Vernal Pool Habitat Management*).

Fire can have a positive impact on native vegetation and wildlife habitat. Fire management helps maintain ecological diversity by fostering a mosaic of successional stages and age classes of vegetation types. The primary benefit of patchy mosaics to fire control is to lower the age class of vegetation, thereby lessening fuel load and buildup of the duff layer. This helps reduce the intensity and spread of unintentional spot wildfire ignitions (*e.g.*, roadside accidents, equipment sparks, powerline wire sparks). The resulting fire pattern is one of more frequent, smaller fires instead of providing seasoned, high fuel load vegetation that would contribute to larger-sized installation fires.

While wildfire typically occurs on MCAS Miramar each year, fire in any one area is typically much less frequent (*i.e.*, approximately every 20 years or more). Besides fire protection, there are benefits to wildlife from periodically providing edge effect vegetation patterns, which increases forage. Better understanding of the effects of fire on vegetation and wildlife habitat can come from tracking and monitoring effects of fuel load modifications, prescribed burns, and wildfires.

The Natural Resources Division has established LTEM special purpose plots (Section 7.3.1, *General Vegetation Management and Soil Conservation*) in representative wildfire areas to monitor long-term effects to vegetation and soil conservation. Long-term monitoring will provide information into the effects of fire on vegetation and wildlife habitat.

### *7.3.2.2 Objective(s) and Planned Actions*

**Objective 1:** Support a Wildland Fire Management Program to protect high value human and natural resource areas from catastrophic wildfire while conserving resources and military operational flexibility.

#### ***In-house Management Action:***

- Provide technical, natural resource-based support to the Fire Department for wildland fire management planning.

#### ***Project in Progress:***

- Revegetate a severely eroded portion of fire access road R-15 (jointly with Public Works Division and Fire Department) to be completed by 2015.

**Objective 2:** Track and monitor effects of fires and fuel modifications to support hazardous fuel reduction actions in strategic areas of MCAS Miramar and enhance/maintain native plant diversity and improve wildlife habitat.

#### ***In-house Management Action:***

- Maintain an up-to-date GIS database of past fires and other fuel management activities.

## **7.3.3 Grounds Maintenance and Landscaping**

### *7.3.3.1 Policy and Background*

Grounds maintenance and landscaping includes water conservation landscape design, use of native or regionally adapted plants in developed areas, reduction of fertilizer and pesticide use, drip irrigation, recycling of green waste, and weed control. It is Marine Corps policy that environmentally and economically beneficial landscaping practices be used, per Executive Order 13148 and as outlined in a Presidential Memorandum (26 April 1994). The Presidential Memorandum directs federal agencies to:

- use regionally native plants for landscaping;
- design, use, or promote construction practices to minimize adverse effects on the natural habitat;
- prevent pollution by reducing fertilizer and pesticide use, using integrated pest management, recycling green waste, minimizing runoff, and similar practices;
- implement water efficient practices; and
- create outdoor demonstrations incorporating native plants and other similar practices.

A “native plant” occurs naturally in a particular region, ecosystem, and/or habitat without direct or indirect human actions (60 FR 40840).

Other laws, orders, directives, policies, and regulations that affect grounds maintenance and landscaping on MCAS Miramar include:

- ***Executive Order 13148, Greening the Government Through Leadership in Environmental Management***, which also addresses the use of “environmentally and economically beneficial landscaping;”
- ***Executive Order 13112, Invasive Species***, which requires preventing the introduction of and controlling invasive species;
- ***National Invasive Species Management Plan*** (2001), which include DoD goals to prevent and control invasive species as well as restore lands with native species;
- ***DoD directives 4715.1 and 4715.3***, which require military services to protect, preserve, and restore the natural environment using regionally native plants for landscaping;
- ***MCO P5090.2A***, which implements the above laws, orders, and directives;
- ***Commandant of the Marine Corps Letter 5090 LFL/1*** (10 April 2006), which states that installations are to maximize the use of native plants for urban and open areas incorporating cost-effective, environmentally sound landscaping practices; and
- ***MCAS Miramar Base Exterior Architecture Plan*** (2008), which provides landscape architecture guidelines in Chapter 6 and Master Plant List in Appendix B. (MCAS Miramar Base Exterior Architecture Plan 2008)

The Natural Resources Division has distributed copies of Presidential Memorandum and Executive Order 13148 to personnel in charge of Station landscaping plans. Lists of regional native plants suitable for the landscaping and sources for procurement have been provided to Station personnel involved with landscaping and can be provided to others upon request. . The current Station Base Exterior Architecture Plan (MCAS Miramar Base Exterior Architecture Plan 2008) follows the most current landscape conservation guidance as the template for all landscape design and management in developed portions of the installation.

The Environmental Management Department reviews and recommends changes to Station landscaping plans for compliance with the above legal instrumentalities. MCAS Miramar uses invasive plant control programs to control spread of invasive landscaping plants into natural areas (also see Section 7.3.1, *General Vegetation Management and Soil Conservation, Invasive Plant Species*).

In many locations on MCAS Miramar, species protected by the ESA occur in the immediate vicinity of developed areas. Persons should inspect limbs and branches prior to clearing natural vegetation. Persons should also coordinate with the Natural Resources Division prior to tree/brush trimming or removal during the breeding season of birds to ensure that they do not remove limbs/trees that support active bird nests (Section 7.6.2, *Migratory Bird Management*). Pesticide application must be coordinated with the Station pesticide management coordinator and should be part of an integrated pest management approach (Section 7.6.4, *Integrated Pest Management*).

Persons responsible for mowing around the runways and parking aprons should be aware that, in many locations, there are Special Status Species in the immediate vicinity of the runways. This is particularly true in the case of vernal pool basins and watersheds that support such species. Mowing taller grasses around runways tends to attract birds that can become a Bird and Animal Air Strike Hazard (BAASH). This circumstance requires that special planning be done to avoid or minimize damage to Special Status Species and that BAASH hazards are kept at a minimum. The flightline mowing program has been coordinated with the USFWS<sup>20</sup>

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<sup>20</sup> Bird Air Strike Hazard Prevention Program Mowing Operations, NAS Miramar (1-6-94-I-33) dated 14 January 1994.

(Section 7.6.3, *Wildlife Damage Management*). MCAS Miramar has reviewed and revised the flightline mowing program standard operating procedures to maintain consistency with BAASH program and vernal pool habitat endangered species management requirements (Section 7.5.1, *Vernal Pool Habitat Management*).

### 7.3.3.2 Objective(s) and Planned Actions

**Objective:** Ensure that grounds maintenance and landscaping operations are consistent with natural resource goals and objectives.

#### ***In-house Management Actions:***

- Provide technical support for invasive landscape plant control (as needed).
- Provide technical support for the flightline mowing program (annually).
- Provide technical support for weed/exotic plant control on the airfields to Public Works, Facilities Maintenance.

#### ***Projects in Progress:***

- Develop native plant/water conservation garden for Building 6311 for education to be completed by 2010.
- Develop native plant/water conservation garden for Building 6022 for education to be completed by 2012, including monitoring.

## 7.4 Special Status Species Management

### 7.4.1 Policy and Background

Special Status Species include those that are federally listed as endangered or threatened, or proposed candidates for such listing (refer to Table 4.6). Definitions for categories of Special Status Species are provided in Section 4.6, *Federal Special Status Species*.

MCO 5090.2A (para. 11104.3a) states, “*Each installation shall survey and take other appropriate actions to document the presence of candidate species and endangered or threatened species on the installation, and identify their currently used and periodically-or indirectly-used habitats. Each installation shall assist FWS in determining whether any such habitats may be included or excluded from critical habitat designation. Each installation shall also survey and take other appropriate actions to document the presence of state or territory rare and endangered species.*”

MCAS Miramar’s approach to Special Status Species is to proactively collect information on presence or absence, location, habitat availability and suitability, and life history requirements to support planning for military operational requirements and habitat conservation.

MCAS Miramar consults with the USFWS (as appropriate) to ensure that its actions are not likely to jeopardize the continued existence of any endangered or threatened species in compliance with sections 7 and 9 of the ESA. Pursuant to Section 7 of the ESA, federal agencies, such as the Marine Corps, must consult with USFWS if their action “may affect” a federally listed endangered or threatened species (50 CFR 402). Such consultations may be formal or informal (Section 6.1.2.1, *Endangered Species Act*).

The 2000 INRMP (MCAS Miramar INRMP 2000) addressed ESA requirements associated with the Biological

Opinion for the Realignment of Naval Air Station Miramar to MCAS Miramar (USFWS 1996a). The 2005 INRMP (MCAS Miramar INRMP 2006) carried forward the applicable and ongoing management commitments made by this action, such as having a plan for multi-species conservation. This INRMP continues implementation of these commitments.

#### 7.4.1.1 Federally Listed Species

Table 4.6 summarizes information on federally listed species on MCAS Miramar. The six Special Status Species dependent on vernal pool habitat at MCAS Miramar are described in Section 4.3, *Vernal Pool Habitat*. Surveys for fairy shrimp and vernal plants on MCAS Miramar are ongoing (e.g., Black 2004c). About 98% of vernal pool habitat on Station has been intensively surveyed since 2000 to document species presence and precisely map the pools and their associated watersheds. Surveys were originally focused in operationally important areas of the Station, but recent surveys have extended the survey areas to all portions of the installation including areas occupied by the agricultural outlease and areas managed by the Miramar Landfill. Basin and watershed delineation, associated species inventories, invasive species assessment, and associated GIS data provide resource information for appropriate habitat management.

Lepidoptera surveys were conducted on MCAS Miramar from 1995 to 1998 and in 2000 that looked for Quino checkerspot butterfly. An estimated 625 Lepidoptera, including up to 10 previously undescribed species were found (San Diego Natural History Museum 2004b). To date, no confirmed Quino checkerspot butterfly sightings have been reported on Station. Due to recent sighting of this species adjacent to the Station in areas burned by the Cedar Fire, a new survey for this species on MCAS Miramar was conducted in 2011 for identification of suitable habitat and presence/ absence survey of the most promising 1,400 acres of suitable habitat in East Miramar. No individuals were found throughout the flight season by surveys completed using USFWS protocols.

The 1996-98 lepidoptera surveys (San Diego Natural History Museum 2004b) also included the Hermes copper butterfly (*Hermelycaena [Lycaena] hermes*), which the USFWS (2011b) concluded that listing the butterfly under the Endangered Species Act was warranted but was precluded by higher priority listing actions. As part of this determination, the USFWS added the butterfly to its Candidate list.. These surveys found the butterflies at five sites in East Miramar. All of the sites were severely burned by the 2003 Cedar Fire. Its host plant, spiny redberry (*Rhamnus crocea*), has resprouted well. Miramar environmental staff conducted surveys for the species during the 2010 flight season (mid-May-July) at sites where the species was previously reported and other locations where redberry occurs in canyon bottoms. They were unable to find the species on MCAS Miramar.

A post-Cedar Fire, Station-wide survey for the coastal California gnatcatcher was completed in 2004 (Bitterroot Restoration Incorporated 2005). This survey found 21 breeding pair in unburned portions of the Station. Surveys in 2007 (RECON Environmental, Inc. 2008) found 34 breeding pairs and 3 territorial males, which represent 16 additional use areas compared to 2004 results. Some recolonization of 2003 burned areas was noted for the first time. Surveys in 2009 (Haas *in preparation*) of the entire Station found about 50 breeding pairs of gnatcatchers, similar to the highest densities recorded in earlier surveys; many were in areas burned by the Cedar Fire.

Effects of helicopter operations at MCAS Miramar on the coastal California gnatcatcher were studied by Awbrey and Hunsaker (2000). They found that take-off and landing maneuvers may pose a physical threat (egg and/or chick displacement from nests) only to nests within 100 meters of touchdown points. Effects of overflights on nesting birds were variable, and overflights at 1,500 feet only partially masked calls. A more recent study (Hubbs-Sea World Research Institute 2006) concluded the following.

- The gnatcatcher will find and inhabit suitable nesting habitat, in spite of the noise environment at MCAS Miramar. Nest success is equally likely in quiet and noisy areas within MCAS Miramar.
- Gnatcatcher nesting success was negatively associated with tall stands of broom baccharis and black sage with an understory dominated by dead leaf litter.
- Habitat, topography and fall rainfall were positively associated with reproductive success.
- Nesting success was not associated with any noise metrics measured, suggesting that noise from helicopters was not detrimental to coastal California gnatcatcher reproductive success.
- Nesting success rates increased with distance from flight tracks; however, after adjusting for covariation with habitat, climate, and physical metrics, success rates for nests close to helicopter flight tracks were statistically similar to those more distant nests.

Hunsaker *et al.* (1994, 1995, 1997, 2000) evaluated coastal California gnatcatcher habitat and home range. They provided management information regarding habitat requirements, fire, invasive plants, and Station operations. Section 7.3.1, *General Vegetation Management and Soil Conservation* describes these efforts on the Station.

In 1998 a breeding least Bell's vireo was found on the Station for the first time. Surveys for the endangered least Bell's vireo were conducted on MCAS Miramar in 2001/2002 with similar results. Willow flycatchers have been observed on the Station, but the southwestern willow flycatcher subspecies was not observed (Varanus Biological Services, Inc. and San Diego Natural History Museum 2003). Surveys for these species are planned to occur at 3-year intervals to have up-to-date location information for planning.

In 2008, eight surveys detected least Bell's vireos at five locations in willow riparian woodland near the confluence of Sycamore and West Sycamore canyons of far East Miramar; two of these territories were just south of the Station boundary. These sightings represent a net increase of four vireo territories in the area and two on the Station since 2002, in spite of severe habitat damage from the 2003 Cedar Fire (AmDyne Corporation 2008). Five of these surveys detected four single "fitz-brewing" willow flycatchers on the Station. The failure to detect this bird during the final three surveys suggested that these individuals were one of the migratory subspecies of willow flycatcher, not the southwestern species. Suitable vireo habitat remains extant in other non-occupied areas of the Station (AmDyne Corporation 2008). Ongoing surveys in 2011 found the vireo breeding in Sycamore Canyon and also in new locations in San Clemente Canyon east of Interstate-15. As of early May 2011, no southwestern willow flycatchers have been found.

MCAS Miramar supports a large proportion of the known population of the endangered plant, willow monardella. Under contract for the Station, Rebman and Dossey (2007) completed a Station-wide census for this plant and developed a long-term monitoring program for this plant on MCAS Miramar. The survey located 3,379 individual plants in 393 occurrences in six watersheds with active populations (a seventh watershed had three dead plants). Pre-Cedar Fire willow monardella sites showed regrowth from the October 2003 Cedar Fire. However, after the high rainfall of 2004-2005, the willow monardella population appeared to decrease significantly within the monitoring plots. As a result, two projects were undertaken to evaluate the Station population and habitat. Current data collection for a Station-wide census report and habitat enhancement annual reporting indicate that juveniles are establishing (unpublished data). Data collection for both population and habitat evaluation will continue, enabling more accurate assessments of population trends, habitat management needs, and regional understanding of this species' life history.

Surveys have documented intermixed populations of Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), Eastwood manzanita (*Arctostaphylos glandulosa* ssp. *zacaensis*), and hybrids between the two subspecies in East Miramar. In 2006, a complete census of Del Mar manzanita was conducted with a monitoring plan for population trends and habitat assessment (Licon Engineering Co., Inc. & Garcia and

Associates 2006). The census identified 2,341 individual plants within 5,610 acres within east Miramar. Of this Station-wide population, 722 Del Mar manzanita plants will be monitored long-term within 11 established monitoring plots. Collected data will increase knowledge of this species' population trends, habitat definition, and regional ecosystem importance. To date, the Station's Del Mar manzanita population has resprouted from the Cedar Fire, with 114 new seedlings identified during the census, and responded with vigorous regrowth due to less competition from previous surrounding vegetation.

Section 6.2.3.2, *Encroachment Partnering*, described the potential to implement land and conservation buffering partnerships on MCAS Miramar. There is a need to identify opportunities to acquire conservation buffer lands in the vicinity of MCAS Miramar, ideally lands that would secure habitat areas supporting rare and endangered resources. Such conservation buffers would buffer the Station from encroachment development and could be used for off-site mitigation.

#### 7.4.1.2 Critical Habitat Considerations

The Endangered Species Act was revised (ESA Section 4(a)(3)(b)(i)) via the National Defense Authorization Act of 2004, which states that, "*The Secretary [of the Interior] shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.*" The USFWS has determined that, where applicable, federal critical habitat designation is not warranted if the INRMP includes the following three criteria<sup>21</sup>:



*San Diego Mesa Mint* Natural Resources Division

**1. The plan provides a benefit to the species.** Cumulative benefits of the management activities identified in a management plan, for the length of the plan, must maintain or provide for an increase in a species' population or the enhancement or restoration of its habitat within the area covered by the plan [*i.e.*, those areas deemed essential to the protection of the species]. A benefit may result from reducing fragmentation of habitat, maintaining or increasing populations, ensuring against catastrophic events, enhancing and restoring habitats, buffering protected areas, or testing and implementing new strategies.

**2. The plan provides certainty that the management plan will be implemented.** Persons charged with plan implementation are capable of accomplishing objectives of the management plan and have adequate funding for the management plan. They have the authority to implement the plan and have obtained all necessary authorizations or approvals. An implementation schedule (including completion dates) for the management effort is provided in the plan.

**3. The plan provides certainty that the management effort will be effective.** The following criteria will be considered when determining the effectiveness of the management effort. The plan includes (1) biological goals (broad guiding principles for the program) and objectives (measurable targets for achieving the goals);

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<sup>21</sup> As stated in, Office of the Under Secretary of Defense. October 10, 2002. Memorandum. *Implementation of Sikes Act Improvement Act: Update Guidance.*

(2) quantifiable, scientifically valid parameters that will demonstrate achievement of objectives and standards for these parameters by which progress will be measured are identified; (3) provisions for monitoring and, where appropriate, adaptive management; (4) provisions for reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of quantifiable parameters) of the management effort are provided; and (5) a duration sufficient to implement the plan and achieve benefits of its goals and objectives.

Land-use planning strategies (*i.e.*, the incorporation of essential habitat<sup>22</sup> into high priority management areas [Section 5.1, *Management Area Designations*]), flora and fauna inventory and monitoring, habitat management, wildlife management, Special Status Species management, and numerous other projects discussed in this INRMP will provide a cumulative benefit to federally listed species. Most essential habitat identified by the USFWS for species on MCAS Miramar is in areas identified in this INRMP as level I or II MAs, which focus on management of these resources (see Table 5.1).

The MCAS Miramar Commanding Officer has the authority to implement the plan, which will be accomplished by the Environmental Management Department staff, as scheduled and budgeted. Formal adoption of an INRMP by the installation commander constitutes a commitment to seek funding and execute, subject to the availability of funding, all Must Fund Projects and activities in accordance with specific timeframes identified in the INRMP. Under the Sikes Act, any natural resources management activity that is specifically addressed in the plan must be implemented (subject to availability of funds). Failure to implement the INRMP is a violation of the Sikes Act and may be a source of litigation (USMC 2007). Annual reporting on implementation of the current INRMP to both the USFWS and CDFG has documented the commitment of MCAS Miramar to acquire funding and implement the INRMP.

Goals, objectives, and long-term ecosystem needs, based on land-use sustainability for the MCAS Miramar military mission, have been analyzed and considered extensively in collaboration with regulatory agencies. Marine Corps and MCAS Miramar goals are defined for the plan as a whole (Section 1.3, *Management Approach*), and objectives with specific project are established within the plan (chapters 7 and 9 and appendices D and E). Each INRMP objective has standards by which success will be monitored. Monitoring will occur within the Environmental Management Department on a regular basis, as described in Section 1.1.4, *Reviews, Approvals, and Revisions*.

Critical habitat has been designated for five threatened or endangered species that occur on MCAS Miramar. Critical habitat has been designated for the Riverside fairy shrimp (USFWS 2005, 2011a [proposed revision]), willow monardella (USFWS 2006), coastal California gnatcatcher (USFWS 2007a), spreading navarretia (USFWS 2010), and San Diego fairy shrimp (USFWS 2007b). Essential habitat not designated as critical habitat on MCAS Miramar has been identified for the endangered Quino checkerspot butterfly; this species has not been found on the Station (USFWS 2009). While essential habitat was identified on MCAS Miramar, lands on the Station, in all cases, were excluded from critical habitat designation rules for these species based on the Station having legally operative INRMPs (MCAS Miramar INRMP 2000, 2006) that benefits each of these species.

This INRMP is an update of the 2006 INRMP and continues the protection and benefits afforded to all

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<sup>22</sup> The final determination of critical habitat for the endangered plant spreading navarretia included a definition of “essential habitat” (FR 70, No 200, p. 60662; 18 Oct 2005). The text states, “*The Service in this and other notices has been using the term “essential habitat” as shorthand for “areas eligible for designation as critical habitat.”*” It further states, “*The use of the term “essential habitat” in this and past notices is not a determination by the Service or the Secretary that this habitat is, within the terms of the Act, essential to the conservation of the species, unless the use of the term is accompanied by an expressed statement that the Secretary has made such a determination.*”

threatened and endangered species present on MCAS Miramar, as outlined below.

- Development and use of Management Areas focused on differing resource types and sensitivities to guide management and planning afford protection to high concentrations of listed species and essential habitats. Associated guidance attempts to limit activities, minimize development, and mitigate actions in areas supporting high densities of vernal pools, listed species, and other wetlands and managed activities and development in areas with low densities, or no special status species and sensitive habitat. For example, 76.14 percent of essential habitat identified for the California gnatcatcher and 85.3 percent of essential habitat identified for the willowy monardella occur within Level I and II MAs, which are focused on the management of vernal pools and non-vernal pool threatened and endangered species (see Table 5.1). These same MA Levels I and II include a high proportion of the vernal pool habitat, including 84.0 percent of essential habitat for the San Diego fairy shrimp, 82.0 percent identified for Riverside fairy shrimp, and 90.3 percent for spreading navarretia.
- General management actions include restoring degraded sites, restricting access to sensitive areas through fencing/signage, training military personnel to recognize and avoid sensitive areas via incorporated natural resources instructions in the Station training order, distributing sensitive resources maps and brochures to Station personnel, invasive/exotic species removal, removal of unlawfully dumped trash, surveys to identify areas suitable for habitat restoration/enhancement, habitat compensation for unavoidable impacts from Station projects to ensure no net loss of habitat value, plant and animal surveys for listed and rare species, and long-term ecosystem monitoring of both plant communities and selected wildlife.
- Specifically regarding vernal pool species, *San Diego fairy shrimp*, *Riverside fairy shrimp*, and *spreading navarretia*, measures completed, being conducted, and planned for 2011-2015 on MCAS Miramar, as described in sections 7.4.1.1, *Federally Listed Species*, 7.4.2, *Objective(s) and Planned*



Fairy Shrimp Natural Resources Division

*Actions*, and 7.5.1, *Vernal Pool Habitat Management* have and will continue to appreciably benefit the species. These actions have and will also continue to appreciably benefit other federally listed species found in vernal pool habitats (*i.e.*, endangered San Diego button-celery, California Orcutt grass, San Diego mesa mint, Riverside fairy shrimp, and threatened spreading navarretia). Past, ongoing, and planned actions include protective fencing along susceptible vernal pool group boundaries; trash removal (more than 250 tons); a Vernal Pool Burn Study (2000-2014); initiation of a Long-Term Vernal

Pool monitoring program (2010); identification of areas suitable for habitat restoration and re-establishment; posting signage to delineate vernal pool areas adjacent to Station activities; exotic plant removal; a study of *Agrostis avenacae* occurrence in vernal pools and options for control; Vernal Pool Surveys (~1989-2007, 2009, 2010); successful completion of all field work meeting BRAC 1995 vernal pool mitigation commitments with an additional surplus to bank; and restoration of impacted pool habitat.

- Specifically regarding the *coastal California gnatcatcher*, measures completed, being conducted, and planned for 2011-2015, as described in sections 7.4.1.1, *Federally Listed Species* and 7.4.2, *Objective(s) and Planned Actions* have and will continue to appreciably benefit the species. Past, ongoing, and planned actions include Habitat Evaluation, Home Range Determination and Dispersal

Study (1993-1996); coastal sage scrub restoration site survey; study for effects of helicopter noise on the coastal California gnatcatcher (Hubbs-Sea World Research Institute 2006); Station-wide population surveys (conducted 1998-2001, 2004, 2007, and 2009) to include mapping of “use areas” (2004, 2007, and 2009); numerous habitat compensation projects on Station (see Section 6.2.1, *Mitigation Actions*), including completion of field work meeting BRAC 1995 commitments to restore 87 acres of coastal sage scrub habitat. In 2009 a perpetual and irrevocable, off-Station, conservation easement (San Dieguito River Valley Regional Open Space Park Joint Powers Authority and Naval Facilities Engineering Command Southwest 2009) was completed, primarily as mitigation for permanent impacts to the coastal California gnatcatcher and associated regionally rare coastal sage scrub vegetation. This easement conserves 8.9 acres of habitat in compensation for permanent impacts from expansion of the Navy Consolidated Brig on MCAS Miramar to become the Joint Regional Confinement Facility, Southwest.

- Specifically regarding *willow monardella*, measures completed, being conducted, and planned for 2011-2015, as described in sections 7.4.1.1, *Federally Listed Species* and 7.4.2, *Objective(s) and Planned Actions* have and will continue to appreciably benefit the species. Past, ongoing, and planned actions include partial surveys prior to listing, Station-wide baseline survey (2002 and 2009), establishment of monitoring plots (2003) and re-surveying of plots (2004 and 2005), and willow monardella habitat enhancement project (2006-2010). Long-term monitoring is planned to continue with data from plots collected about every three years and a resurvey of the Station about every six years.
- Specifically regarding the *Hermes copper butterfly*, all sites identified as supporting the species prior to the 2003 Cedar Fire remain undeveloped, and most sites are within areas already identified for special attention to conserve other non-vernal pool threatened and endangered species (Level II MA). Additional areas with unburned patches of its host plant in western San Clemente Canyon, never documented to support the butterfly, also occur within Level II Management Areas. Miramar environmental staff were not able to find the species where previously reported during the 2010 flight season surveys (mid-May-July), nor at other locations where redberry occurs in canyon bottoms. However, guidance in Table 4.6 of this INRMP specifies that if the species becomes listed as threatened or endangered, focused surveys for the species must be completed prior to actions that would remove stands of its host plant. Miramar staff has identified a management action in Section 7.4.2 to program for additional surveys of the Station should USFWS list the species.

#### 7.4.1.3 Other Species of Special Regional Concern

MCO 5090.2A states that installations should inventory and monitor state-listed species because NEPA analyses may require an installation to consider a proposed action’s impacts on state-listed species and state laws and regulations may govern their possession, propagation, sale, or taking on the installation.

Other Species of Special Regional Concern at MCAS Miramar have been defined to 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 (refer to Table 4.7). These species and their habitats are considered as part of MCAS Miramar’s general vegetation and wildlife management program.

MCAS Miramar had the Station surveyed for 17 rare and endangered plant species. This 4-phase project (Rebman and Dossey 2002, Tierra Data Inc. 2004, Saucedo-Ortiz and Scheid 2005, and Dossey and Associates 2007) was completed in March 2007. Other site-specific surveys are also used to update MCAS Miramar Special Status Species, such as the “G” (Teacup) parcel survey in 2001 (Ecological Restoration Service) and surveys conducted in support of planning for the Military Family Housing environmental impact statement. As

a result, the entire Station has been surveyed for *Acanthomintha ilicifolia*, *Arctostaphylos glandulosa* ssp. *crassifolia*, *Baccharis vanessae*, *Chorizanthe orcuttiana*, *Fremontodendron mexicanum*, *Ambrosia pumilla*, *Adolphia californica*, *Artemisia palmeri*, *Ceanothus verrucosus*, *Chorizanthe polygonoides* ssp. *longispina*, *Comarostaphylis diversifolia* ssp. *diversifolia*, *Dudleya variegata*, *Ferocactus viridescens*, *Githopsis diffusa* ssp. *filicaulus*, *Harpagonella palmeri* var. *palmeri*, *Muilla clevelandii*, and *Quercus dumosa*. During the final survey phase, one new regionally rare species was found, *Ceanothus otayensis* (Otay lilac).

The Natural Resources Division uses station-wide e-mails, brochures, and quarterly training classes to create and promote awareness of natural resources to Station personnel of the sensitivity, values, and obligations regarding the conservation of Special Status Species and their habitat.

#### **7.4.2 Objective(s) and Planned Actions**

Section 7.5.1, *Vernal Pool Habitat Management* includes actions and projects that affect Special Status Species. Similarly, projects below that involve vernal pool habitat also affect resources described in Section 7.5.1.

**Objective 1:** Proactively maintain up-to-date presence/absence, distribution, and habitat data for all Special Status Species to support project and activity planning, management, and implementation on MCAS Miramar.

#### ***In-house Management Actions:***

- Maintain lists of species of regional concern to monitor status and address in NEPA reviews.
- Use various media to create and maintain awareness of Station personnel of the sensitivity, values, and obligations regarding the conservation of Special Status Species and their habitat. This may include presentations, briefs, newspaper articles, special messages, and an information brochure.
- Complete GIS database update with recent data that accurately mapped and sampled pools.
- If needed (based on USFWS decision that listing is warranted), program a project to survey for the Hermes copper butterfly and its habitat during 2011-2015.

#### ***Projects in Progress:***

- Vernal Pool Resources/Endangered Species Surveys (100 basins to be mapped and approximately 1,400 basins to be sampled) to be completed by 2014.
- Willowy Monardella Census and Monitoring for Del Mar Manzanita to be completed by 2010.
- Endangered Willowy Monardella Habitat Enhancement Project, an on-going study that is funded through 2011.
- Endangered Least Bell's Vireo/Willow Flycatcher Surveys to be completed in 2011.
- Endangered Quino Checkerspot Butterfly Survey to be completed in 2012.

#### ***Must Fund Projects***

- Presence/Absence California Gnatcatcher Surveys (MI37405) to be initiated in 2012 and 2015.
- Endangered Least Bell's Vireo/Willow Flycatcher Surveys (MI97016) to be initiated in 2013.
- Non-Vernal Pool Endangered Plant Monitoring (MI0500005) to be initiated in 2011 and 2013.

#### ***Other Planned Projects:***

- Endangered Fairy Shrimp Genetics Study (MI14AG01) to be initiated in 2014.

- Endangered California Orcutt’s Grass/Spreading Navarretia Habitat Study (MI115AG01) to be initiated in 2015.

**Objective 2:** Proactively manage Special Status Species habitat.

***In-house Management Actions:***

- Identify, map, and selectively field mark/fence sites supporting endangered species likely to be affected by Station operations.
- Produce sensitive resource GIS maps for Station staff to reference (updated every 6 months).
- Identify and take appropriate action on opportunities for off-Station conservation easement mitigation.

***Must Fund Project:***

There are no specific “must fund” projects listed here. However, Section 7.3.1, *General Vegetation Management and Soil Conservation* has a project, Invasive Species Control (MI55353) that is important to this objective as well.

***Other Planned Project:***

- Conservation Buffer/Mitigation Planning Study<sup>23</sup> (MI1100001) to be initiated in 2011.

**Objective 3:** Monitor to ensure ESA Section 7 compliance, as set forth in existing biological opinions, for projects implemented or actions taken.

***In-house Management Action:***

- Monitor internal MCAS Miramar compliance commitments.

**7.5 Vernal Pool Habitat and Other Wetland Management**

This section addresses vernal pool habitat and other wetlands on MCAS Miramar which are described in greater detail in Chapter 4. Special Status Species dependent on vernal pool habitat at MCAS Miramar are described in Section 4.3, *Vernal Pool Habitat*. The San Diego button-celery, California Orcutt grass, San Diego mesa mint, Riverside fairy shrimp, and San Diego fairy shrimp are listed as endangered, and spreading navarretia is listed as threatened.

Other wetlands include vernal marshes, fresh water marshes, portions of some riparian vegetation types, and edges of open water ponds. Management and use of these areas requires careful consideration of the CWA, ESA, and the national policy (Executive Order 11990, *Protection of Wetlands*) to permit no overall net loss of wetlands. Table 7.5 provides estimates of acreages of various wetland types found on MCAS Miramar. These data, in no way, are intended to identify which wetlands are subject to regulatory requirements of the CWA.

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<sup>23</sup> Mitigation opportunities would be focused on conserving off-station populations of special status species and their habitat to support military readiness requirements on the installation.

**Table 7.5. Wetlands on MCAS Miramar**

<b>Types of Wetlands</b>	<b>Acreage</b>
Vernal Pool	94.7
Other Seasonally Poned Features	52.4
Freshwater Marsh	31.6
Vernal Marsh	89.3
Southern Willow Riparian Forest	29.1
Southern Willow Riparian Scrub	14.2
<b>Total Wetlands</b>	<b>311.3</b>

### **7.5.1 Vernal Pool Habitat Management**

#### *7.5.1.1 Policy and Background*

##### **Previous Plans**

Previously prepared and relevant documents for the management of vernal pool habitat at MCAS Miramar include the 2000 and 2005 INRMPs (MCAS Miramar INRMP 2000, MCAS Miramar INRMP 2006), NAS Miramar Vernal Pool Management Plan (Bauder and Wier 1991) and *The Ecology of Southern California Vernal Pools* by Zedler (1987). Relevant contents of these management plans have been incorporated into this INRMP.

The NAS Miramar Vernal Pool Management Plan (Bauder and Wier 1991) was prepared for a Naval Air Station with a different mission than that of MCAS Miramar. Since that time boundaries have changed, more accurate inventories have been conducted, technology has progressed, and the science of vernal pool management has progressed. The current INRMP contains portions of the NAS Miramar Vernal Pool Management Plan that remain applicable for continuing management of vernal pool habitat on the Station.

##### **Early Surveys**

Two vernal pool habitat surveys were conducted in the region during 1979 that include parts of MCAS Miramar: one for CDFG (Beauchamp and Cass 1979) and the other for Pardee Construction Company (Villasenor and Riggan 1979). Both surveys included many vernal pool areas not on the then NAS Miramar, and neither survey included the entire Station. Beauchamp and Cass (1979) mapped and counted vernal pools and estimated the surface area of pools and their watershed area. They also indicated the presence or absence of nine sensitive vernal pool taxa in each pool group, the type of associated vegetation, the degree of disturbance, and the land owner. Villasenor and Riggan (1979) mapped and numbered individual pools and noted the presence or absence of 12 vernal pool taxa in each pool. In some pools, only the presence of *Pogogyne abramsii* and *Eryngium aristulatum* var. *parishii* was noted. Pool dimensions were estimated.

Beauchamp (1982) conducted a vernal pool habitat survey limited to NAS Miramar with the purpose of mapping pool areas around runways on the Main Station and on Miramar Mounds National Natural Landmark. Maps were created for all of the Station, but detailed information on plant species and pool size was provided for only six pool series (AA - a portion, EE, GA, GG, HH, and U). He noted the presence or absence of 16 vernal pool habitat taxa and estimated pool size for these pools.

The Bauder (1986) report, compiled for CDFG, was intended to update the Beauchamp and Cass (1979) report. It surveyed all previously mapped pools and made an assessment of their condition, noted the presence/absence of sensitive taxa, and calculated the number of pools or pool areas that had been lost to development. This survey and those in 1991 by Bauder and Weir are the only surveys to assess pool habitat condition in detail. Bauder made no attempt to remap pools or map newly discovered pools. In addition to

these comprehensive studies, a number of more focused surveys has been conducted over the period, including Woodward-Clyde Consultants (1980), City of San Diego (1981), Patterson (1987), Steele (1988), and Michael Brandman Associates, Inc. (1988).

Differences from survey to survey in the level of detail used in mapping pools in the field and the tendency to either merge pools that are interconnected or count them separately have contributed to different numbers of pools being recorded for each pool group during 1979, 1982, 1986, and 1990 surveys. In addition, the prolonged drought from 1986 through spring of 1990 may have reduced the numbers of plants of vernal pool habitat species in a given area and, thus, made locating vernal pool habitat more difficult.

### **Management Units**

All vernal pool habitats identified on MCAS Miramar were assigned a group designation in 1991 (Bauder and Weir) following the system of vernal pool groups developed by Beauchamp and Cass (1979) for San Diego County, as supplemented by Bauder (1986). Individual clusters/groups of pools were identified by a code employing letters and numbers. Letters refer to regions or series of pools, and numbers refer to clusters/groups within regions or series. Pool groups newly mapped or renamed in 1990 were assigned codes that were followed by a "+" (Bauder and Wier 1991). Data regarding the number of pools, plant species present, characteristics of pools, and other qualities were presented in descriptive paragraphs and summarized in Table 2 and Appendix 1 of the 1991 plan (Bauder and Wier). Exhibit 4 in that plan illustrated the distribution of pool groups, sensitive species, and Management Units. This exhibit was a synthesis of all previous mapping efforts. The abundance and distribution of vernal pools and other seasonally ponded features supporting vernal pool adapted species has been updated in recent years with additional and more intensive surveys (see Section 4.3.4, *Vernal Pool Habitat at MCAS Miramar*). Figure 4.3.4 of this INRMP shows current vernal pool habitat distribution and management units on MCAS Miramar.

### **Vernal Pool Habitat Damage and Other Risks**

Bauder and Wier (1991) summarized the relative likelihood of damage to vernal pool habitats via different mechanisms on a qualitative basis. The type and extent of damage visible (in 1991) at each site was used to predict future conditions unless a significant change in land use or management had recently taken place. Probability or likelihood of occurrence was coupled with an estimate of habitat restorability given the particular type of damage. For example, some events had a low probability of occurrence (*e.g.*, air crashes, toxic spills) but a high potential for inflicting serious, perhaps, irreversible damage. Conversely, dumping or mowing had a high probability of occurrence, but resulted in little irreversible damage.

Bauder and Wier (1991) summarized the following types of damage, either potential or realized for vernal pool habitat.

***Aviation Mishaps*** - Although air crashes may occur infrequently, when they do happen, pools and surrounding habitat could sustain substantial damage from the impact of the plane, fuel spillage, fire, fire suppression, and the activities of emergency crews and vehicles. Crashes during the rainy season would result in greater damage due to soft soils.

***Altered Hydrology*** - The construction of roads, runways, and buildings that interrupts the normal surface and subsurface flow of water creates an altered hydrology of pool areas. Pool groups adjacent to runways and freeways are most affected. Some areas receive increased flow due to storm drains and culverts, and berms and roads act as small dams. Other areas may be deprived of the normal flow of water. Vernal pool habitat plants are tolerant of limited periods of inundation but suffer increased mortality with increased inundation; these plants are absent from ponds and lakes that have water most or all of the year (Zedler 1987). If pools rarely retain water or have water only for short periods of time, pool species such as *Downingia* (which requires saturated or inundated soil to germinate) or *Pogogyne* (which is sensitive to competition from weedy grassland

species) may be unable to persist, particularly during an extended drought period. Ripping, grading, or plowing can, in addition to destruction of habitat, decrease the propensity for water to pond by interrupting the hardpan and removing layers of clayey soils, creating “leaky bottom” pools. Vehicles usually cause longer periods of water retention (Bauder 1989a, 1989b), probably due to a combination of soil compaction and removal of soil that puts the hardpan closer to the surface.

**Dumping/Trash** - Dumping of trash refers to the accumulation of inert materials, such as wood, metal, bricks, and household goods, but not toxic materials. The likelihood of dumping is directly related to the ease of access and is generally coupled with vehicle damage.

**Fire/Fire Suppression** - Wildfires and associated activities can affect vernal pool habitat in three ways: fire suppression (vehicles, grading, chemical fire retardants), fire risk reduction (discing, grading, brushing), and the actual burning of vegetation (prescribed burns, wildland fires). Because vernal pool flora and fauna evolved in a landscape subject to periodic wildfires, they ought to be able to withstand fires so long as their frequency and intensity do not differ markedly from the historical norm. Unfortunately, information is scanty on the historical nature of California wildland fires. A study by Cox and Austin (1990) indicated that fire can have at least a temporary adverse impact on *Pogogyne*, but studies by Cobb (2005) showed that burning can have positive effects on vernal pool flora and fauna. Wells *et al.* (1997) found little effect of fires on San Diego fairy shrimp cysts and hatched populations in pools in naturally burned areas and areas where control burns had been conducted. Discing and grading of pool basins or adjacent habitat for fire risk reduction could have serious, and in some cases irreversible, impacts on the distribution and abundance of pool species. Vehicles associated with the suppression activities would probably do less damage than discing or grading because fires tend to occur when soils are dry and hard.

**Future Projects** – Potential future projects<sup>24</sup> or altered land uses (resulting from both military and non-military sources) occurring in vernal pool habitat would have a very high probability of damaging vernal pool habitat. These types of actions could cause irreversible changes, and there is no restoration potential for the destroyed habitat. Projects that will affect nearby land may impact pools via altered hydrology, toxic spills, increased disturbance, or some other effect associated with the juxtaposition of incompatible land uses. In general, there is a direct relationship between the proximity of the proposed land use change and the likelihood of damage to pool habitat. Also, changes to land higher in the drainage increase the probability of impacts to pools as does the creation of long edges or boundaries.

**Grading** - The threat of damage due to grading, defined as soil disturbance well below the surface, includes that of approved land uses as well as grading incidental to other activities. If grading or ripping pierce the hardpan or fill pool basins with soil, pool hydrology may be permanently altered.

**Mowing and Discing** - Mowing is known to alter the competitive relationships of species, but its effect on vernal pool species is unknown. Mowing generally occurs around the runways. If mowing is done when soils are dry and annuals have set seed, damage should be minimal. Discing is defined as surface soil disturbance. The damage of such disturbances could be substantial. Even ruts in road pools differ from immediately adjacent habitat in the length of the period of inundation and the frequency of occurrence of pool species (Bauder 1989a, 1989b).

**Pedestrians and Horses** - Although effects of foot paths and bridle trails are not as detrimental as motorized vehicles, both humans and horses can have substantial negative impacts on vernal pool habitat. Horse paths can become as wide as a road when riders travel abreast or when they detour low spots in the trail during rainy periods. Equestrian use in areas of MCAS Miramar containing vernal pools is significantly reduced now that the stables facility is closed. Pedestrian use of the Station is restricted to authorized Marine Corps activities, such as military training, operation and maintenance activities, and field data collection. Authorized activities are generally unrestricted except for in higher security areas, including the Flightline Area and firing range surface danger zones.

**Toxics** - Toxics can directly kill vernal pool flora and fauna and may persist in soil and water for long periods

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<sup>24</sup> This discussion refers to a concept and is NOT referring to a specific list of projects being planned.

of time. The risk of damage from toxics is greatest to pools near the runways, hangars, maintenance facilities, and fuel farms. Dumping, accidental spills, or emissions incidental to normal operations would cause the most damage if materials directly entered pools. The next greatest impact would be if toxics entered drainage and traveled through soil and water. Vernal pool flora or fauna could also be affected by the application of herbicides and pesticides.

**Vehicles** - Other than destruction of habitat by conversion to buildings, parking lots, and roadways, vehicles pose the greatest threat to vernal pool habitat. Information evident in aerial photos and field surveys (in 1991) on the ground suggested that vernal pool habitat on NAS Miramar was steadily being degraded and destroyed. This observation from 1991 failed to acknowledge the long history of military land use of the Station dating back to World War I. No comparison was made to conditions following World War II land use when Camp Elliott was the primary training base for the Fleet Marine Force.

The larger the vehicle, the greater the damage that may occur, although repeated use of motorcycles over a period of years can have just as serious of an impact as a tank. If the vehicles pass through pools when soils are saturated, ruts up to 0.5 m deep can develop (Bauder 1991 personal observation). This is deeper than most natural pools (Zedler *et al.* 1979). Ruts alter the hydrology and distribution of species (Bauder 1989a, 1989b). Cysts and seeds of vernal pool species can be spread by vehicle traffic. More recently, the non-endangered Lindahl's fairy shrimp (*Branchinecta lindahli*) has been found, either by itself or co-occurring with San Diego fairy shrimp, in puddles of dirt roads or immediately adjacent to these roads (Black 2010). There is potential for competitive interactions between the two species. Vehicle tires remove clayey soils on pool bottoms, reducing the soil volume available to plant roots and in some cases exposing the hardpan. Vehicle traffic can also create new habitat or enlarge existing ruts that are populated by fairy shrimp populations on a regular basis. Vehicle tracks will probably be evident many decades into the future, just as disc furrows from over 40 years ago can still be seen (in 1991) clearly on the Miramar Mounds National Natural Landmark (Bauder personal observation).

### Vernal Pool Habitat Management

Compatibility of uses within Level I MAs is discussed in Chapter 5. The vast majority of vernal pool habitat basins and watersheds are encompassed within Level I MAs on MCAS Miramar to highlight them for management and conservation. Protection of vernal pool habitat has been given the highest management priority at MCAS Miramar. Management recommendations have been, and continue to be, developed to prevent the degradation or destruction of vernal pool habitat.

The 1991 vernal pool plan included (Bauder and Wier 1991, Appendix 6) prioritized lists of management recommendations for each management unit. Many of these have been accomplished; some are outdated; and some remain to be done.

This 1991 Vernal Pool Management Plan (Bauder and Wier 1991, Appendix 7) includes vernal pool habitat restoration techniques (*i.e.*, decompaction, sculpting/recontouring, reseeding pools, re-establishment, invasive species removal), which have been used, and when necessary modified, to restore pools on NAS Miramar and MCAS Miramar during the past 14 years, as indicated by the following examples.



*Vernal Pool Habitat Restoration* Natural Resources Division

- In 1988-1996, 23 vernal pool basins (0.36 ac; 15,681 sq. ft.) were created in the northwestern portion of the Station (X1-3 Group) to compensate for vernal pools lost from construction of the West Coast Navy Consolidated Brig. This project included excavation of basins and inoculation with soil and seed collected from surrounding basins at the restoration site. Maintenance and success monitoring continued for seven years, and at the end of seven years all basins continued to meet success criteria (Black *et al.* 1996). A review of created vernal pool basins completed by Black and Zedler (1998) found that these basins suggested a gradual convergence of the function and characteristics toward those of natural pools and that artificial basins can support populations of native species for considerable periods. Recent sampling for a few of these pools showed that the basins continue to provide vernal pool habitat in 2010 (C. Black, unpublished data).
- In 1992-94, 30 pool basins were restored. This project included reconstructed mounds reseeded with appropriate upland native species and basins inoculated with appropriate species from pools that were to be developed; it also included removal of invasive plants in the surrounding watershed (Bauder *et al.* 2001).
- In 1997, 2.30 acres (79 pools) were restored within AA4-7, F (north), F16, U15, and U19 pool groups (Black 2000a, 2003a).
- In 1997, 2.3 acres (75 pools) were restored within Management Unit 2, X1-4, Z1-3, EE1, and HH3+ pool groups (Black 2000b, 2003b).
- In 1998-1999, 0.85 acres (69 pools) were restored within A4, AA8, AA9, and AA10 pool groups (KEA Environmental, Inc. 1999; EDAW, Inc. 2005).
- In 1999-2000, MCAS Miramar re-established/restored about 170,000 square feet of vernal pool surface in the Miramar Mounds National Natural Landmark Vernal Pool Group U (north) (Tomsovic and Macaller 2003, 2004a, and 2004b; Saucedo-Ortiz and Macaller 2005).
- In 2004, 0.50 acres of vernal pool habitat were restored in compensation for San Diego fairy shrimp habitat lost in association with improvements and paving of roads and lots of the Flightline Perimeter Road and Camp Elliott Warehouse Area (Tierra Data, Inc. 2008).

Cobb (2003) developed a restoration plan for the vernal pool habitat at the Miramar Mounds National Natural Landmark on the Station. This plan identified 124 vernal pool habitats (3.2 acres) within the Landmark that are suitable for vernal pool habitat restoration. The plan includes performance criteria and annual reporting requirements. This restoration planning methodology has value for Other Seasonally Pondered Features restoration projects in the future.

Black (2007) identified 293 acres in seven areas of the Station that appear suitable for re-establishing vernal pools. During 2005-2008 Black (2009b) identified basins suitable for restoration and enhancement in all suitable areas of the Station (see Section 7.5.2, *General Wetland Management, including Mitigation* for details).

The Branchiopod Research Group (2003) concluded monitoring water quality in vernal pool habitat restored in 1998-99 (KEA Environmental, Inc. 1999; EDAW, Inc. 2005). No significant coliform bacteria or hydrocarbon contamination was found. Soil disturbance associated with pool re-establishment/restoration did not appear to increase the availability or solubility of heavy metals. Soluble levels of heavy metals were generally low, but cadmium, lead, and iron were above Environmental Protection Agency potable levels in some areas. However, no comparison was made to naturally occurring background levels.

Cobb (2005, *in preparation*) studied effects of wildfire on vernal pools in the F (north) vernal pool group. In 2000, a wildfire started along a freeway (SR 163); 15 vernal pools burned by the fire were studied along with 30 unburned pools as controls. Subsequently, the October 2003 Cedar Fire burned the entire study site. Another smaller fire later burned a portion of the study site. The study continued to collect data on all pools

through spring of 2009. This study showed positive effects of rainfall on vernal pool habitat recovery from wildfire, both for plants and fairy shrimp. Invasive plant species numbers have increased dramatically in control vernal pools during a good rainfall year with no similar increase in invasive plant species in burned vernal pools.

Vernal pool ecosystem functionality is threatened by invasive plant species. *Agrostis avenacea* has invaded San Diego vernal pools since the 1980s and has become firmly established. This species adversely affects at least three Special Status Species. The Station funded a study of the effects of *Agrostis avenacea* in vernal pool habitat on MCAS Miramar. Labor-intensive, hand weeding was suggested to be the best option for minimizing effects of this species (Bauder *et al.* 2002).

The Natural Resources Division has developed a general approach to respond to and repair accidental damage to vernal pool habitat and associated threatened and endangered species and maintains a budget line item to respond to damage repair and vernal pool habitat management. The Natural Resources Division has been using field markers, signs, or fencing around vernal pool habitat groups with a higher susceptibility for damage to prevent accidental and/or unintentional damage. The perimeter of the Sander Parcel, south of State Route 52, was fenced in 2005 to reduce trespass damage.

The Natural Resources Division continues delineating isolated ephemeral wetlands and other depressions ponding water (including vernal pool habitat) during winter/spring. This effort was started in 1999 and has included virtually all of the Station with more than 7,500 basins surveyed. Virtually all vernal pool basins have been or are being surveyed for all vernal pool resources. This was accomplished both as specific survey projects and using other projects that require vernal pool habitat mapping, such as the survey of Parcel G for possible transfer to the USFWS (Ecological Restoration Service 2001). Recent mapping of pools previously mapped with old technology using sub-meter accurate GPS equipment has resulted in a more accurate, but lower, estimate of total acreage of vernal pool habitat on the Station (147.1 acres in 2010 vs 157.3 acres reported in 2006). The apparent loss of vernal pool habitat acreage is only the result of more accurate mapping. The total number of basins mapped has increased by a few hundred. With virtually all of the Station now surveyed for vernal pool resources, the current focus is being put into performing survey updates for operationally important areas.

#### *7.5.1.2 Objective(s) and Planned Actions*

Section 7.4, *Special Status Species Management* includes actions and projects that affect vernal pool habitat. Similarly, projects below that involve Special Status Species also affect resources described in Section 7.4.

**Objective 1:** Take proactive action to prevent damage to vernal pool habitat.

#### *In-house Management Actions:*

- Continue resource conservation and protection awareness efforts that focus on vernal pool conservation.
- Produce GIS maps of sensitive resources that show vernal pool habitat and associated watersheds for distribution to Station planners (updated about every 6 months).
- Field mark/fence vernal pools or groups with a reasonably high likelihood for accidental damage by Marine Corps activities.
- Work continuously with project and activity planners to avoid or minimize impacts to vernal pool habitat early in the planning process using the conservation approach identified in Chapter 5 as an initial planning tool to avoid areas containing a high density of vernal pool habitat (Level I MAs).
- Develop and implement a long-term ecosystem monitoring program for vernal pools.

***Projects in Progress:***

- Vernal pool interpretive kiosk and demonstration vernal pool to be completed in 2011.
- Complete vernal pool burn study data analysis.

***Must Fund Project:***

- Vernal Pool Management (MI82949); ongoing, annually.

**Objective 2:** Develop and maintain high-quality and up-to-date GIS mapping of vernal pool habitat and its watersheds that supports proactive planning and impact avoidance.

***In-house Management Actions:***

- Maintain an up-to-date GIS database by incorporating new field survey data.
- Continue mapping and sampling vernal pool resources as workload permits.

**Objective 3:** Implement a program for vernal pool habitat restoration and re-establishment to maintain no net loss of vernal pool habitat basin resources.

***In-house Management Action:***

- Develop vernal pool enhancement/restoration protocols to expedite Section 7 consultation and Biological Opinion issuance.

***Project in Progress:***

- Restore 2,800 square feet of basin in the HH1+ Vernal Pool Group to be completed by 2014.

***Must Fund Project:***

Section 7.3.1, *General Vegetation Management and Soil Conservation* has a project, Minor Projects/Damage Repair (MI25555) that is important to this objective as well.

***7.5.2 General Wetland Management, including Mitigation***

***7.5.2.1 Policy and Background***

MCO 5090.2A (para. 11104.2a) states, “*The Marine Corps will comply with the national goal of no net loss of wetlands and will avoid loss of size, function, and value of wetlands. In addition, the Marine Corps will preserve and enhance the natural and beneficial values of wetlands while conducting its activities.*”

MCAS Miramar supports wetlands other than the vernal pool habitat addressed above, including vernal marshes, fresh water marshes, and portions of some riparian vegetation types and edges of open water ponds. As is the case with vernal pool habitat, management and use of these areas requires careful consideration of the CWA, ESA, and the national policy (Executive Order 11990, *Protection of Wetlands*) to permit no overall net loss of wetlands.

Lichvar (2000) delineated non-vernal pool wetlands and Waters of the U.S. at Main Station, including portions of the Rose Canyon area, on MCAS Miramar. He delineated 14.9 acres of non-vernal pool wetlands and 0.26

acres of drainage ditches and intermittent stream channels in the cantonment area.

Smith and Lichvar (2001) conducted a Station-wide planning level delineation of aquatic resources, mapping of floodplains, and a functional assessment of riparian ecosystems at MCAS Miramar, as discussed in Section 7.3.1, *General Vegetation Management and Soil Conservation, Watershed and Floodplain Management*.

Lichvar and Dixon (2008) delineated non-vernal pool wetlands and other waters of the United States, updating the 2000 delineation done for the Main Station and adding all areas within the Flightline security fence. This work used the recently published Corps of Engineers Wetland Delineation Manual: Arid Wet Supplement of 2006. Additionally, the project made “nexus” determinations (of hydrologic connection) for all waters of the U.S., including vernal pool basins, within this same area, consistent with clarifications to the Clean Water Act that resulted from recent U.S. Supreme Court decisions.

### ***Mitigation Planning***

In anticipation of a need for non-vernal pool wetland mitigation for BRAC construction impacts, Burkhart (1999) analyzed two potential restoration sites (totaling 3.1 acres). To compensate for impacts of BRAC projects, the Murphy Canyon site analyzed by Burkhart (1999) was used. The second site in San Clemente Canyon, east of I-15, could be used for future wetland mitigation efforts.

During 1999-2001 a contracted study was conducted for the Public Works Division to identify suitable restoration sites for coastal sage scrub, grasslands, and wetlands. This study (Johnson *et al.* 2003) identified 88.1 acres suitable for wetland restoration or enhancement.

Black (2007) identified 293 acres in seven areas of the Station that appear suitable for re-establishing vernal pools. During 2005-2008 Black (2009b) identified basins suitable for restoration and enhancement in all suitable areas of the Station. In all, 1,716 basins (22.814 acres) were suitable for some type of restoration or enhancement treatment. The most common recommended treatments were deepening and enlarging marginal basins or combining and enlarging small adjacent basins. A total of 284.171 acres was suitable for new basin and associated new basin watershed construction. A net increase of 48.302 acres could be achieved through existing basin restoration and enhancement plus new basin construction.

Recent surveys for suitable streambed and associated riparian wetland mitigation sites to meet upcoming projects have identified a number of man-made berms and other excavations in San Clemente Canyon, west of Kearny Villa Road and I-15, that are suitable for CWA mitigation. Removal of the man-made berms and restoration of riparian habitat would provide beneficial repair to the hydrology of the San Clemente watershed on Station. Removal and restoration of portions of this area is being considered to meet anticipated mitigation requirements in support of MV-22 and Joint Strike Fighter (F-35B) West Coast Basing projects. However, this area has more mitigation opportunities than these projects will require. A project (MI1100001) has been submitted to determine the best location to provide this mitigation.

### ***7.5.2.2 Objective(s) and Planned Actions***

**Objective:** Identify and manage wetlands on MCAS to maintain no net loss of wetland values.

#### ***In-house Management Action:***

- Ensure compliance with existing and future Section 404 Clean Water Act permitting requirements.

**Other Planned Project:**

- Wetland/Streambed Mitigation Siting Survey (MI1100001); initiate survey in 2011.

**7.6 Fish and Wildlife Management**

Fish and wildlife management is defined by the Marine Corps as, “A coordinated program of actions for conserving, enhancing, and regulating indigenous wildlife and its habitats, including conserving protected species and non-game species, managing and harvesting game species, reducing bird aircraft strike hazards, and controlling animal damage.” (MCO P5090.2A, para, 11105.17). At MCAS Miramar, BASH is considered along with animal air strike hazard and has also been referred to as BAASH (bird and animal air strike hazard). Topics included in this section include general wildlife management, migratory bird management, wildlife damage management (including BAASH), and integrated pest management. Pest management is included since it has potential effects on fish and wildlife, particularly the application of pesticides and rodenticides. Special Status Species of wildlife are addressed separately in the Section 7.4, *Special Status Species Management*.

**7.6.1 General Wildlife Management**

**7.6.1.1 Policy and Background**

Conservation of undeveloped areas of the Station and the habitat in those areas will protect the viability of all wildlife populations on MCAS Miramar. All species of wildlife will benefit from MCAS Miramar’s basic strategy to limit activities, avoid development, and perform mitigation actions in areas supporting high densities of predominantly vernal pool habitat, threatened or endangered species, and other wetlands.



Owl Box

Natural Resources Division

Furthermore, the basis of good management is an understanding of the diversity, abundance, distribution, population dynamics, and habitat requirements of species. This approach is reflected in the Station’s past and ongoing biological studies. These studies include monitoring of neotropical migrant birds and surveys of Lepidoptera, bats, reptiles, amphibians, small mammals, coyotes, and mule deer, in addition to focused surveys for threatened and endangered wildlife species.

Hunsaker and Cox (1997, 2001) conducted a vertebrate survey on MCAS Miramar that identified 190 bird species, 36 mammal species, 25 reptile species, and 7 amphibian species. Hunsaker (1997, 2001) studied the habitat use and

relative density of bats at the Station. Habitat use and relative density of reptile and amphibian populations at the Station are summarized by Varanus Biological Services, Inc., and San Diego Natural History Museum (2001).

Game fish species recorded as having been stocked on Miramar include largemouth bass, rainbow trout, channel catfish, bluegill, and red-eared sunfish (USFWS 1992b). The Fish Pond, after being closed to fishing since about 1990, was restored and reopened to fishing in May 2003 (Section 7.7, *Natural Resources-related Outdoor Recreation Management*).

As discussed in Section 7.7, *Natural Resources-related Outdoor Recreation Management*, MCAS Miramar has determined that it is not currently feasible to develop and implement a recreational hunting program. However, wildlife game species at MCAS Miramar include California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), brush rabbit (*Sylvilagus bachmani*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), waterfowl, and southern mule deer.

The deer population on East Miramar in 1986 was estimated at 100 to 150 animals (Hannan 1987). Spotlight surveys conducted through 1999 by the Station, show a similar deer population. Quail surveys, conducted in 1986, estimated the quail population at 900 to 2,500 on East Miramar (Hannan 1987). Subsequent 1989 quail surveys indicated they were still abundant. The mourning dove population on East Miramar in 1986 was estimated at about 500 (Hannan 1987). Coyote surveys conducted in fall 1995 estimated densities of 4.1 coyotes per square kilometer for East Miramar and 2.3 in West Miramar, noting that densities were equal to the highest published densities in North America (Mason 1998).

The Natural Resource Division has worked with Station planners and security personnel to minimize barriers to movement of large wildlife that may be created by necessary security fencing. In areas of lower security concern, devices to allow larger wildlife passage have been included in new fencing plans. However, in some areas, such as the Flightline Area, Ordnance Magazine Area, and those containing munitions of explosive concern, heightened security or safety requirements preclude provision of any openings that would allow human access.

MCAS Miramar contracted for the removal of non-native fish and amphibians from aquatic ecosystems on MCAS Miramar, in accordance with the Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990 and Executive Order 13112, *Invasive Species* (Varanus Monitoring Services 2002); results were not effective on a long-term basis. Issues of complete removal, reintroduction, or immigration after removal of these species are very difficult to resolve.

MCAS Miramar supports habitat for burrowing owl, which is both a federal and California Species of Special Concern. There has been a dramatic reduction in numbers of resident breeding, as well as wintering, burrowing owls in coastal Southern California. The species is under imminent threat of extirpation from San Diego County. Focused surveys for burrowing owl have not been conducted on the Station; rather, incidental observations are noted by the Natural Resources Division staff or biological contractors. No potentially breeding pairs of burrowing owl have been recorded on the Station since 1994 (Table 4.7).

### ***Long-Term Ecosystem Monitoring***

MCAS Miramar has implemented a Long-Term Ecosystem Monitoring (LTEM) program. MCAS Miramar and the Naval Facilities Engineering Command, Southwest developed a faunal component for the LTEM program that coincides with a subset of the vegetation LTEM plots. Results of the initial year (1999) field studies for both flora and fauna were summarized (Varanus Biological Services, Inc., and San Diego Natural History Museum 2003) and provide a baseline for future comparisons. The fauna component includes small mammals, bats, reptiles, amphibians, and results of spotlight surveys. A repeat monitoring effort has recently completed field data collection, and a final report is in preparation.

#### ***7.6.1.2 Objective(s) and Planned Actions***

Note: Below projects do not include Special Status Species, which are included in Section 7.4, *Special Status Species Management*.

**Objective:** Maintain healthy wildlife populations as a component of the ecosystem.

### ***In-house Management Action:***

- Review NEPA documentation to address wildlife conservation issues.

### ***Other Planned Projects:***

- Burrowing Owl Population Survey (MI14NR001), to be initiated in 2014.
- Long-term Ecosystem Monitoring, Faunal Component (MI95556), to be initiated in 2015.

## **7.6.2 Migratory Bird Management**

### ***7.6.2.1 Policy and Background***

MCO 5090.2A (para. 11104.3c) states, “*The Marine Corps shall consult with FWS during INRMP preparation to ensure that actions not directly associated with military readiness activities (e.g., training) are conducted in a manner that minimizes the taking of birds protected by [Migratory Bird Treaty Act] and listed in [Title 50, Code of Federal Regulations, Part 10, Section 13, “List of Migratory Birds,” 2005 edition] . While incidental take of migratory birds is authorized during the conduct of military readiness activities, the Marine Corps will discuss with FWS the impacts of such activities to migratory birds. Installations shall consult with local or regional FWS offices on proposed actions intended to take (e.g., banding or marking, scientific collecting) migratory birds, their young, or eggs.*”

The primary consideration with regard to migratory birds is compliance with the Migratory Bird Treaty Act. Except as permitted, actions may not result in pursuit, hunting, taking, capture, killing, possession, or transportation of any migratory bird, bird part, or nest of any species listed in 50 CFR 10.13. Marine Corps installations must apply for depredation permits for those actions with the primary intent to capture, move, or kill migratory birds, their young, or eggs. MCAS Miramar has obtained and maintained a depredation-airport permit that allows authorized Station personnel to take, temporarily possess, and transport migratory birds to relieve or prevent injurious situations impacting public safety. Such depredation control activities must be within MCAS Miramar-specific and standard permit conditions. No hunting is allowed on MCAS Miramar. Section 6.1.2.3, *Migratory Bird Legal Instrumentalities* discusses requirements of the Migratory Bird Treaty Act in more detail.

The bird component of the LTEM program (Project - Long-term Ecosystem Monitoring, Faunal Component (MI95556), Section 7.6.1, *General Wildlife Management*) is used to monitor migratory birds on the Station in accordance with Executive Order 13186, DoD policy; and the Memorandum of Understanding between DoD and the USFWS for Migratory Bird Conservation (see Section 6.1.2.3, *Migratory Bird Legal Instrumentalities*). Section 6.1.2.3 outlines organizations and their respective lists of Bird Species of Concern that warrant particular consideration and monitoring in accordance with these laws. A comprehensive list for coastal California, including species that may not occur on MCAS Miramar, can be viewed at <http://www.dodpif.org/downloads/bcc2002.pdf>.

All persons, organizations, and agencies, are liable for prosecution for violations and must follow permitting requirements for taking migratory birds. Special purpose permits may be requested and issued that allow for the relocation or transport of migratory birds for management purposes. However, the long timeframe required to apply for and obtain special purpose permits makes it inappropriate for most one-time, individual cases. MCAS Miramar maintains a depredation-airport permit that allows authorized Station personnel to take, temporarily possess, and transport migratory birds to relieve or prevent injurious situations impacting public safety.

The following considerations are pertinent to migratory bird management.

- ***Nuisance bird problem prevention:*** Exclusion of nuisance birds is the preferred method; NRD can provide technical support to those needing assistance. Installation and materials for such exclusion must be accomplished in coordination with the Public Works Division. Unfortunately, exclusion is not always possible or completely effective. Natural Resources Division biologists will assist in developing exclusion devices where bird access or nesting cause problems.
- ***Injured and nuisance birds:*** A final federal rule allows removal of some migratory bird species from inside buildings but does not allow removal of birds or nests from the outside of buildings without a permit. This rule also allows removal of active nests from inside buildings only by a federally permitted migratory bird rehabilitator. (See Section 7.6.3, *Wildlife Damage Management* for more details). MCAS Miramar annually renews a depredation-airport permit that allows authorized Station personnel to take, temporarily possess, and transport migratory birds to relieve or prevent injurious situations impacting public safety. Such depredation control activities must be within MCAS Miramar-specific and standard permit conditions. The Natural Resources Division and Public Works Division have developed procedures for responding to injured or nuisance birds including active bird nests (with or without eggs or chicks). It is important to understand that removal of active nests requires that arrangements with a wildlife care facility be in made prior to removal. The Public Works Division maintenance trouble call system is to be used for assistance. A standard form has been developed to record data for each removal action in order to support annual permit reporting requirements.
- ***Construction and Maintenance:*** The approach will be to coordinate with those scheduling and performing construction and/or maintenance to avoid the breeding season, where possible. Wording in contracts and work orders will explain the law, and that it applies to all persons (not just federal agencies). A contract or work order does not authorize, encourage, or condone violation of the law, and workers are expected to comply. The Natural Resources Division has developed contractual and work order language for construction, reconstruction, and maintenance projects on the Station to minimize loss of bird nests and costly delays due to Migratory Bird Treaty Act prohibitions. This information is available for use in contracts and work orders and has been incorporated into many project specifications.

MCAS Miramar supports the DoD policy for integrating neotropical migratory bird management into existing natural resource and land management programs, consistent with the military mission. MCAS Miramar established and maintained Monitoring Avian Productivity and Survivorship stations to help determine nationwide bird demographics. From 1996 through 2002 (Jones & Stokes 2003), 94 species were captured; both total numbers and adult breeders showed declines during poor rainfall years.

#### ***7.6.2.2 Objective(s) and Planned Actions***

**Objective:** Manage migratory bird conservation compliance requirements (as discussed in Section 6.1.2.3, *Migratory Bird Legal Instrumentalities*) to minimize conflicts with military mission requirements.

#### ***In-house Management Actions:***

- Ensure that migratory bird conservation, as required by Executive Order and DoD policy, is addressed in NEPA documentation.
- Maintain the MCAS Miramar Special Purpose Migratory Bird Permit for non-readiness activities in good standing.

***Must Fund Project:***

There are no specific “must fund” projects for this objective. However, Section 7.6.1, *General Wildlife Management* has a project, Long-term Ecosystem Monitoring, Faunal Component (MI95556) that supports this objective by monitoring migratory bird populations.

**7.6.3 Wildlife Damage Management (Including Bird and Animal Air Strike Hazard)**

**7.6.3.1 Policy and Background**

MCAS Miramar's boundaries interface with both urban and natural environments. Conflicts can arise with nuisance animals (*e.g.*, coyotes, ground squirrels, rattlesnakes, rats), which occasionally pose a health hazard. Furthermore, Special Status Species and other native wildlife are prey for some domestic animals. MCAS Miramar pest control is conducted through the Public Works Division, and if necessary, other local vector/animal control agencies. Wildlife problems previously identified at MCAS Miramar include coyotes around the stables and housing areas, gulls and ravens from the landfill, and interference from birds, coyotes, and deer on the runway.

Assistance with nuisance animal problems can be acquired from U.S. Department of Agriculture, Wildlife Services. In general, special permits are usually required to remove nuisance animals and can delay the response to the problem. Although leg hold traps are often the most effective technique for catching some animals, the use of body gripping traps by Wildlife Services personnel is restricted to addressing a demonstrated human health or safety problem with the concurrence of the CDFG. Additionally, State law has further restricted control of mountain lions with a protected species status.

The BASH (Bird/Animal Air Strike Hazard) program is an important consideration at MCAS Miramar. Bird collisions with aircraft are a serious threat to flight safety. At MCAS Miramar, few problems have been documented in recent years. Distribution and abundance of bird species that pose a potential hazard can change seasonally and also vary by altitude, temperature, rainfall patterns, and surrounding land use. The U.S. Department of Agriculture, Wildlife Services (2002) completed a Bird Air Strike Hazard Assessment for the Station. Flightline mowing is planned to minimize the attractiveness to birds and avoid adverse effects to Special Status Species with guidance provided by the USFWS<sup>25</sup>.

Miramar Station Order 3750.2, *Bird/Animal Aircraft Strike Hazard (BASH) Reduction Plan* (16 May 2008), was implemented to minimize aircraft exposure to potentially hazardous bird/animal strikes at and around the Air Station and reduce bird/animal strike potential through awareness, avoidance, monitoring, and actively controlling bird and animal populations and movements. The plan implements a red, yellow, and green Bird Warning Condition system to adjust awareness and flying activities to various risk levels. It also establishes a Bird Working Group with assigned responsibilities. The Airfield Operations Officer is the Chairman. The Natural Resources Division Director, with the Wildlife Biologist as the staff lead, has responsibilities to:

- maintain required permits for dispersal and depredation programs;
- ensure trained personnel and equipment are available for animal control activities;
- maintain records of control efforts;
- coordinate animal control activities with the Provost Marshal;
- advise the Airfield Operations Officer on procedures to abate bird/animal hazards;
- provide bird activity analysis to the Airfield Operations Officer and Aviation Safety Officer;
- review all locally generated BASH reports and attempts to identify bird remains;

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<sup>25</sup> Bird Air Strike Hazard Prevention Program Mowing Operations, NAS Miramar (1-6-94-I-33) dated 14 January 1994.

- review aircraft routes and changes to routes/areas for BASH potential;
- liaison with USFWS, Audubon Society, and other agencies to provide information on migratory, local, and seasonal bird activities; and
- assist the Aviation Safety Officer with the information and education program.

City of San Diego landfill operations with regard to bird abatement have been improved in recent years, as required by the lease. Bird concentrations at the landfill are now a very rare occurrence.

Potential beneficial effects of owls inhabiting aircraft hangers have been evaluated at other air stations. Since owls are nocturnal, they are much less of a BASH concern than other species. They may also prevent or reduce the presence of other birds and rodents from inhabiting hangars. Unfortunately, the mess created by owls living in some of the aircraft hangers on Station has created conflicts with aircraft maintenance. A variety of methods are used to resolve problems, including exclusion, harassment, and relocation. Most other birds, since they are active during daylight hours, are a greater BASH concern.

Section 7.6.2, *Migratory Bird Management* discusses protocols for dealing with injured or nuisance migratory birds. The Natural Resources Division maintains a list of wildlife rehabilitation centers for placement of injured or abandoned wildlife. The Division also has prepared standard operating procedures for handling road-killed/injured deer and other larger animals. The feeding of wild animals is discouraged.

*Final Rule –Removal of Migratory Birds From Buildings* (as discussed in Section 6.1.2.3, *Migratory Bird Legal Instrumentalities*) allows removal of migratory birds (other than federally listed threatened or endangered species, Bald Eagles, and Golden Eagles) from inside buildings in which the birds may pose a threat to themselves, to public health and safety, or to commercial interests. This regulatory addition facilitates removal of birds from buildings, which would otherwise require a migratory bird permit.

Birds removed under this rule must be captured using a humane method and, in most cases, immediately released to the wild. “*This regulation does not allow removal of birds or nests from the outside of buildings without a permit. Removal of active nests from inside buildings must be conducted by a federally permitted migratory bird rehabilitator.*”

The MCAS Miramar Migratory Bird Permit (as discussed in Section 6.1.2.3, *Migratory Bird Legal Instrumentalities*) covers take, temporary possession, and transport of injured birds to rehabilitation facilities to “*relieve or prevent injurious situations impacting public safety.*” In the past, removal actions to alleviate excrement falling onto workspaces and aircraft have been deemed impacting public safety. The permit excludes federally listed threatened or endangered species, Bald Eagles, and Golden Eagles. The permit cannot be used for situations where birds “*are merely causing a nuisance.*”

The CDFG web site “*What to do about Nuisance, Dangerous or Injured Wildlife*” (<http://www.dfg.ca.gov/education/living.html>) discusses injured or orphaned wildlife and provides advice for common human-wildlife interactions. The CDFG Keep Me Wild program (<http://www.dfg.ca.gov/keepmewild/index.html>) is designed to avoid issues created by providing food to wildlife, either inadvertently or on purpose. Wild animals naturally fear humans and keep their distance—so long as they remain fully wild. If wild animals have access to human food and garbage, they lose their natural fear of humans and can become aggressive; they might be killed.

### 7.6.3.2 Objective(s) and Planned Actions

**Objective:** Reduce the potential for wildlife damage, including animal collisions with aircraft.

### ***In-house Management Actions:***

- Provide technical biological assistance for the Station BASH program.
- Provide technical assistance and coordination for the flightline mowing program.
- Support coordination with the Miramar Landfill bird abatement program, as needed.
- Assess reports of wildlife damage and health/safety concerns.
- Assist with and advise measures for damage control/prevention and living with wildlife.

## **7.6.4 Integrated Pest Management**

### **7.6.4.1 Policy and Background**

Pest control includes insect, rodent, and disease management, particularly pesticide application management. Most pest management activities on Station are performed in coordination with or under the supervision of the Public Works Division. A 2006 integrated pest management plan (MCAS Miramar Installation and Logistics 2006) for the Station complies with applicable requirements, particularly those of the federal Insecticide, Fungicide, and Rodenticide Act and DoD and Department of the Navy policies. MCO P5090.2A, para. 11104.1b) states, “*Each installation shall use the principles of Integrated Pest Management to avoid and minimize the use of pesticides when non-chemical alternatives are available and cost effective.*” Pesticide use in support of Station natural resources management activities involves invasive plant/weed control (Section 7.3.1, *General Vegetation Management and Soil Conservation*). Sections 7.6.2, *Migratory Bird Management* and 7.6.3, *Wildlife Damage Management* of this INRMP discuss nuisance bird, wildlife, and BASH topics associated with integrated pest management.

A 2010 mosquito/West Nile virus risk assessment<sup>26</sup> indicated that naturally ponding areas have sufficient populations of natural predators to effectively suppress mosquito breeding. Treating vernal pools and other naturally ponding areas for mosquito control (larvacide) was not recommended, but continued monitoring was recommended. Ponding at unnatural sites should be addressed by making alterations to operations to prevent water from ponding. No historic information was found to confirm the absence or presence of West Nile virus in mosquito populations on Station.

Africanized honey bees are expanding their range, including in the direction of MCAS Miramar; however, these bees have not been found on the Station to date. The Miramar Fire Department is the designated first responder to incidents suspected of involving Africanized honey bees. The Natural Resources Division assisted the Fire Department and Safety Division with the development of an Africanized honey bee response plan.

### **7.6.4.2 Objective(s) and Planned Actions**

**Objective:** Comply with the federal Insecticide, Fungicide, and Rodenticide Act and minimize the use of pesticides.

### ***In-house Management Action:***

- Provide ongoing natural resource based technical support for the MCAS Miramar Integrated Pest Management Plan.

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<sup>26</sup> Memo from Officer in Charge, Navy Environmental and Preventive Medicine Unit Five, Naval Base San Diego, CA to Commanding Officer, Preventive Medicine, Naval Medical Center San Diego, CA. 15 June 2010. Subject: *Findings and Recommendations for the West Nile Virus Surveillance Program at Marine Corps Air Station (MCAS) Miramar.*

## 7.7 Natural Resources-related Outdoor Recreation Management

### 7.7.1 Policy and Background

MCO 5090.2A (para. 11104.1c) states, “*Marine Corps lands will be available to the public for enjoyment and use of natural resources, except when a specific determination has been made by the installation Commanding General/Commanding Officer (CG/CO) that a military requirement prevents such use for safety or security reasons, or when such use would cause substantial environmental degradation. A nonaccess or limited access determination will be explained in the installation’s INRMP.*”

A draft NAS Miramar Outdoor Recreation Tripartite Agreement (precursor to INRMPs) was prepared in 1992. This INRMP incorporates relevant aspects of the draft agreement that remain applicable, as related to natural resource management, and supersedes any benefits of such an agreement.

A further goal of Marine Corps natural resources management is to manage natural resources to provide outdoor recreational opportunities, as appropriate. However, recreational opportunities at MCAS Miramar are limited by military operational and security needs, safety concerns, limited management staff to administer programs, and the relatively small land area with a finite resource base. Recreational activities dependent on developed facilities, such as the Miramar golf course, are managed and operated by Marine Corps Community Services (MCCS) under their specific guidelines. Management of the Miramar Fish Pond is accomplished jointly with the Miramar MCCS managing recreational aspects and the Environmental Management Department providing technical support regarding fishery and water quality issues.



*Fish Pond*

*Natural Resources Division*

### Management Issues

MCO 5090.2A (para. 11104.5a) states, “*Installations shall provide the public access to natural resources, provided such access is consistent with natural resources and military readiness preservation.*”

Management issues at MCAS Miramar include determining the appropriate level of public access to allow for natural resource-dependent outdoor recreation on MCAS Miramar; implementing a program for such access; and integrating outdoor recreation with the operations and military mission of MCAS Miramar without compromising either. Proper management and supervision of outdoor recreation programs is needed to ensure that military safety and security requirements are met and natural resource damage is prevented. Current staffing does not allow for any increase in outdoor recreation opportunities or access. Without an increase in staffing, future development of natural resources-based outdoor recreation is not possible. Further, recreational access to undeveloped areas at MCAS Miramar is limited to a few activities that have been approved by the Committee for Land and Airspace Management Policy and/or the Commanding Officer.

Marine Corps policy is to permit off-road vehicle use only in areas and on trails designated by installation commanders. Unimproved roads must be monitored to prevent movement into sensitive areas (MCO P5090.2A). MCAS Miramar does not have the staffing to implement such a program for recreational off-road vehicle use that would include monitoring to ensure natural resources are not damaged.

As surrounding areas have become urbanized, there has been increasing interest from the public to access MCAS Miramar for natural resource-related field tours and other outdoor recreation. Requests for field tours are typically limited to granting about one per month due to staffing constraints. Requests for field trips need to be submitted to the Public Affairs Office at least 60 days in advance along with proof of liability insurance.

Compatibility of other outdoor recreational activities must meet:

- 1) military operational and security needs;
- 2) safety hazards, such as explosive safety distances, firing range surface danger zones, and aircraft operation compatible use/clear zones;
- 3) staffing limitations; and
- 4) requirements for resources conservation, which must be carefully evaluated and will continue to limit recreational access.

Implementation of any new outdoor recreational program would involve initial trial phases and will be limited to MCAS Miramar, Marine Corps Recruiting Depot, and local Marine Corps Recruiting personnel (active duty and DoD employees), their dependents, and guests. Initial trial phases are expected to last for two to three years. Following initial trial phases and a determination of surplus resource availability, access by the general public will be accommodated through lottery drawing.

### **Hunting and Fishing**

Executive Order 12962, *Recreational Fisheries* directs federal departments, including DoD, to improve the quantity, function, and sustainable productivity of recreational fisheries for increased opportunities, when practical to do so. A main focus of NAS Miramar original plan for recreational fisheries that has been continuously maintained is the operation of a 7-acre pond in West Miramar (the Fish Pond) as a recreational fishery. Due to its limited size and management by MCCA, access has been limited to authorized MCCA patrons (Active Duty, Reservists, retirees, DoD civilian employees of MCAS Miramar, and family members). Limited guests of these categories are also authorized.

The pond was stocked repeatedly with rainbow trout and warm water fishes over its early years. The pond was closed to fishing about 1990. The USFWS (1992b) concluded that, with management, the Fish Pond could support a viable recreational sport fishery for Station personnel. In 1998 the Station Installation Restoration Program concluded that no clean up action was required and recreational fishing would not be a human health risk. During the 1990s, conditions at the Fish Pond deteriorated due to strong eutrophication and dissolved

oxygen problems. A shoreline, fishery, recreation facilities restoration project was conducted (Green *et al.* 2001) through a combined restoration effort of the Marine Support Squadron 373, Public Works Center (Southwest), MCCA, Environmental Management Department, and the Public Works Division. In 2004, the Fish Pond was re-opened. Naval Consolidated Brig working parties have removed a considerable amount of vegetation and debris since re-opening of the pond.

MCAS Miramar maintains a CDFG aquaculture permit, which allows fish stocking and removal (including fishing) without the requirement for individuals to possess a State fishing license. The MCCA Outdoor Recreation Center issues free fishing permits to authorized patrons, which have the aquaculture permit number to allow the transport of fish caught in the pond and support annual reporting requirements.



*Happy Anglers      Natural Resources Division*

Executive Order 13443, *Facilitation of Hunting Heritage and Wildlife Conservation*, directs Federal agencies with programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

No formal hunting program has operated on the Station. Beginning in the mid-1980s, Navy natural resource staff initiated work toward development of a formal recreational hunting program involving archery deer and upland game hunting. This work showed that sufficient populations of deer, coyotes, and upland game (rabbits, quail, and doves) were present on the Station to support a limited hunting program (Hannan 1987). Changing priorities related to BRAC ceased any further work on this effort due to the transfer of the Station from the Navy to Marine Corps.

Since then, MCAS Miramar has determined that it is not currently feasible to develop and implement a recreational hunting program. Opportunities for such hunting would be extremely limited, and the Station does not have the personnel to operate such a program, which would require close monitoring of hunting.

### **7.7.2 Objective(s) and Planned Actions**

**Objective:** Provide outdoor recreation opportunities for MCAS Miramar personnel and the general public within constraints of the military mission and capability of the resources.

#### ***In-house Management Actions:***

- Provide technical assistance with fishery management at the Miramar Fish Pond.
- Maintain a CDFG Aquaculture Permit for the Miramar Fish Pond.
- Prepare natural resource information and briefings, as requested.
- Provide a limited number of field trips to interested parties, as staff time permits.

## 7.8 Cultural Resources Considerations

### 7.8.1 Policy and Background

Cultural resources management at MCAS Miramar is provided in accordance with Section 106 and Section 110 of the National Historic Preservation Act (16 USC Section 470, as amended), the Archeological Resources Protection Act (16 USC Section 470aa-47011), the American Indian Religious Freedom Act (42 USC), the Native American Graves Protection and Repatriation Act (25 USC Section 3001 *et seq.*), Executive Order 11593 (*Protection and Enhancement of Cultural Environment*), DoD Directive 4710.1 (*Archeological and Historic Resources Management*, 1984), and U.S. Marine Corps policies. Means to achieve compliance with these laws and policies are outlined in the MCAS Integrated Cultural Resources Management Plan (MCAS Miramar ICRMP 2004), currently under revision.

Cultural resource management efforts at MCAS Miramar have accomplished or documented the completion of basic archaeological surveys for virtually all undeveloped lands on Station and have evaluated a majority of the previously recorded archaeological sites for eligibility for the National Register of Historic Places, as required by the National Historic Preservation Act. Nearly all of MCAS Miramar has been adequately surveyed for cultural resources. As such, adequate survey information exists to support most natural resources, and other installation, management activities and operations.

### Cultural Resources Implications for Natural Resources Management

Few natural resources projects would have the potential to adversely affect significant archaeological sites because most activities associated with substantial soil disturbance would only occur on sites already degraded by historical activities. The environmental assessment associated with the development of this INRMP provides an assessment of the potential for cultural resources effects (undertakings) during INRMP implementation.

It is important to ensure that provisions of this INRMP are consistent with the protection of cultural resources. Prior to any ground-disturbing, natural resources activity, the Cultural Resources Program Manager will evaluate proposed activities for compliance with all appropriate cultural resources laws and regulations. The National Historic Preservation Act, Section 106, requires consultation with the State Historic Preservation Office, affected Indian Tribes, and other interested parties regarding “undertakings” that may affect historic properties. The Cultural Resources Program Manager will assist with Section 106 consultation, as necessary. If cultural resources may be impacted, steps must be taken to avoid or mitigate damage.

**Vegetation and soils management.** Of all practices associated with natural resources management on MCAS Miramar, vegetation restoration and erosion control projects have perhaps the greatest potential to disturb archeological sites. Natural resources projects that involve excavation, earth moving, and/or fill deposition can damage or bury archeological sites.

**Wetland mitigation.** The construction of compensatory wetlands, including vernal pool habitat, can involve moderate ground disturbance that can damage archeological sites.

Where restoration or mitigation work is a planned component of a construction project, necessary National Historic Preservation Act consultation is now being integrated into the project planning process.

### 7.8.2 Objective(s) and Planned Actions

**Objective:** Implement this INRMP in a manner consistent with the protection of cultural resources at MCAS Miramar.

***In-house Management Action:***

- Ensure appropriate review of natural resource management projects by Cultural Resource Manager to ensure that adverse effects to archeological sites are avoided.

**7.9 INRMP Planning**

**7.9.1 Policy and Background**

This INRMP must be reviewed at least every five years, as stipulated by the Sikes Act and Marine Corps policy. The lists of objectives and planned projects and actions in Appendix E can be used to guide the review and adjust programs, per the adaptive management process.

**7.9.2 Objective(s) and Planned Actions**

**Objective:** Review and update this INRMP at least every five years or when major changes are made to the natural resources program; coordinate this update with the USFWS and CDFG.

***In-house Management Action:***

- Monitor and annually review implementation of this INRMP, as required by Marine Corps policy; report implementation progress; and record revisions necessary for the next INRMP update, annually.

***Must Fund Project:***

- Prepare INRMP/Environmental Assessment (MI40225), initiate in 2014.