Secretary of Defense
Secretary of the Navy
FY 2012 Environmental Award Nomination
Natural Resources – Large Installation
Marine Corps Installations West-Marine Corps Base Camp Pendleton

INTRODUCTION

Mission

Marine Corps Installations West-Marine Corps Base Camp Pendleton (MCIWEST-MCB Campen) is the Corps premier amphibious training base and the only west coast military installation where comprehensive air, sea, and ground assault training can be conducted. The Base is one of the Department of Defense's (DoD) busiest installations and home to Command Elements of the First Marine Expeditionary Force and First Marine Logistics Group, as well as several tenant units, including the Navy's Assault Craft Unit Five and the Naval Hospital Camp Pendleton. The mission of the base is *"to operate an amphibious training base that promotes the combat readiness of operating forces by providing facilities, services, and support…"*

Population

The Base has a peacetime population of approximately 41,500 service members and also provides important training services for law enforcement, fire, and the Department of Homeland Security personnel. Average daytime population exceeds 85,000 personnel including civilians.

Environmental Setting

The Base is bordered on the west by the Pacific Ocean and encompasses 17 miles of relatively undisturbed coastline. Rolling hills and valleys range inland an average of 10 to 12 miles. The 125,000 acres of the base vary widely and include sandy shores, seaside cliffs, coastal plains, rolling hills, canyons, and mountains rising to elevations of nearly 2,700 feet. Development represents approximately 10,000 acres and roughly 2,000 acres are leased to the State of California for use as a state park. The remaining training areas, excluding about 33,000 acres of impact area, are available for outdoor recreation, primarily hunting and fishing on a non-interference basis. The Base represents an important island of biodiversity within the developed landscape of southern California. Four major watersheds support eight coastal lagoons and estuaries. Over 1,000 species of wildlife, including 13 listed as federally or threatened reside on the base during all or part of the year including: *arroyo toad, California gnatcatcher, least Bell's vireo, Stephens' kangaroo rat and Pacific pocket mouse.* The Base also supports 3 federally listed plant species.

BACKGROUND

FY11 and FY12 saw a very heavy emphasis on project support. Natural Resources staff focused heavily on U.S. Fish and Wildlife Service (FWS) consultations and U.S. Army Corps of Engineers permitting in support of a roughly $4 billon infrastructure improvement initiative. During the

majority of the award period the Natural Resources (Conservation) Division was composed of the Environmental Planning Branch with responsibility for NEPA management, long-term planning, and maintaining the installation's Integrated Natural Resources Management Plan (INRMP); and the Resource Management Division charged with regulatory interface, wildlife and land management, outdoor recreation, and resource enforcement. Despite the heavy emphasis on project support, the natural resources staff was able to implement key components of the INRMP.

SUMMARY OF ACCOMPLISHMENTS

EROSION CONTROL PROGRAM

Through both internal project implementation and collaborative efforts with Base partners (e.g. Fire Department, Range Maintenance Division, and Facilities Maintenance Division), the Erosion Control Program was able to greatly reduce factors which contribute to soil loss and erosion throughout the Base. By establishing sound lines of communications and collaboration, the Erosion Control program was able to prevent erosion and enhance military training and Base operations by stabilizing soil in key training areas. The Land Management Section coordinates regularly with Range Maintenance and Cantonment Area S-3 staffs to identify erosion control requirements. All erosion projects are managed to repair both the existing damage and the underlying cause of the erosion. Eroded sites are revegetated with native grasses and forbs from seed collected on Base from Native Seed Collection License administered through the Agricultural Outlease Program.

Projects

Emergency Erosion Control (EEC) is a flexible and dynamic method to effect repairs of minor erosion issues to catastrophic landscape failures. The project targeted priority sites and included successful stabilization of the Pio Pico habitat restoration area, Cristianitos Washout, Ash Road pipe break Repair, and San Onofre Firebreak areas. All sites received invasive weed control and were supplemented with appropriate native plants species to achieve both ecosystem and military training sustainability. The use of local genetic stock during revegetation maximizes the likelihood of sprouting and cover success.

2012 saw the successful completion of an erosion control project at Landing Zone (LZ) 53. LZ-53 is a helicopter landing pad was extensively eroded by an expanding gully threatening the stability of the landing pad. Erosion control efforts included: repairing existing erosion gullies, re-contouring the slope adjacent to the pad, building a flow channel along the edge of the landing pad, building a sediment basin to reduce the flow of sediment off of the site, and treating a population of non-native fountain grass on the site.

The site was hydroseeded with a native plant mix following the heavy equipment work.

Another erosion project successfully completed in 2012 was the Edson Range West project. An expanding canyon two stories deep and a half-mile long was threatening an important training road, endangered species habitat and vernal pools. In addition to stabilizing the highly erodible soils and restoring the site with native vegetation, the project also relocated a misplaced culvert that was the source of the erosion. This project required extensive planning as well as coordination and permitting with Regulatory Agencies prior to the field work needed to stabilize the site and return it to the training land inventory.

2012 saw the conclusion of the training land reclamation project in the Juliett Training Area. This site had extensive erosion rills and gullies caused by improper water flow from roads and firebreaks adjacent to the site. The erosion created unsafe conditions for Marine field exercises and damaged habitat of the endangered Stephens' kangaroo rat. The project repaired existing rill and gully erosion, identified and corrected the source of erosion, integrated restoration with proper erosion control measures, monitored repaired and reinforced breaches to erosion control measures following subsequent rain events, and monitored and maintained the restored native habitat. The success at this site lead to the Facilities Maintenance Division adopting these erosion control features for future actions.

Liaison

The Erosion Control Program provided effective support, recommendations and a collaborative work environment with other Base and regional organizations. The following are notable erosion control projects where Land Management Section provided guidance and assistance:

- **West Point Soils Research:** West Point Military Academy and the Desert Research Institute collected soil samples on Camp Pendleton as part of a nationwide study of disturbed soils on Military Training Lands.

- **Combat Town Erosion:** New construction at the 25 Area Combat Town created unintended erosion problems. Through several on-site meetings with Stormwater Section, Land Management Section, Range Planners and the construction contractor we were able to develop and implement successful erosion stabilization strategies.

- **ASP Bunker Upgrades:** Provided recommendations to address erosion concerns during project planning for upgrades of the Base Ammunition Supply Point bunkers.

- **IED Training Lanes:** Assisted Facilities Maintenance Division and G-3/G-5 to correct erosion damage to road within an Improvised Explosive Device (IED) training facility. Without timely stabilization the road would have failed and interrupted critical military training.

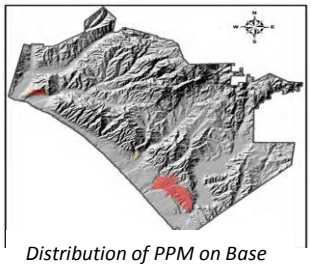
- **San Clemente Island Assault Vehicle Maneuver Route:** Collaborated with the U.S. Navy during planning and implementation of a large scale assault vehicle maneuver course on San Clemente Island. Navy and Marine Corps erosion control specialists met on several occasions to share information, experiences and relevant success measures gained from on similar projects.

ENDANGERED SPECIES RESEARCH AND MANAGEMENT

Management of wildlife programs on Base includes cooperation and close coordination with federal and state agencies and some of the leading scientists in the Southern California region. Through these efforts we have launched unique and innovative studies to advance recovery of listed species while supporting the mission of training Marines for combat. In June 2012 the FWS published their final rule for critical habitat for the western snowy plover. The FWS did not designate critical habitat for the plover aboard the Base because the INRMP provides a benefit to the species, even on the State Park Lease area. This action removed the only remaining critical habitat designation aboard the Base. The discussion below focuses on one of the most critically endangered species in North America as a representative of our management efforts.

Pacific Pocket Mouse

The Pacific Pocket Mouse (PPM), is a subspecies of Little Pocket Mouse believed to have gone extinct by the 1980's but was rediscovered in 1993 and emergency listed as endangered by FWS. PPM are now limited to four remaining populations in coastal Southern California, three of which are on the Base. The Base has conducted PPM presence/absence surveys since rediscovery, but has recently launched a more comprehensive management strategy to better balance the needs of training, construction projects, and conserving the species' limited distribution. Two of the management tools that have been implemented or are in progress include the successful development and implementation of an adaptive monitoring plan and a partnering effort with non-governmental organizations and agencies for a PPM captive breeding program.



Distribution of PPM on Base

Monitoring Plan Development and Implementation

In 2012, the Wildlife Management Section in cooperation with U.S. Geological Survey (USGS) and FWS successfully implemented a newly developed adaptive monitoring plan for PPM with dual goals of 1) determining the extent of occupied habitat and 2) analyzing trends in population using a Percent Area Occupied (PAO) approach. The monitoring plan addresses the difficulty in detecting the tiny, nocturnal PPM in expanses of open sage scrub habitat through innovative techniques developed on-site. The plan was developed by a scientific panel comprised of installation biologists, regulatory agency biologists, land managers, and local PPM experts. Development of the monitoring plan assessed the accuracy and cost of many PPM

detection techniques including live traps, track tubes, a trained scent dog, and laboratory DNA analysis.

Three sizes/shapes of Sherman traps were tested side-by-side for efficacy of trapping PPM in known locations of the species. Specialized, open-ended tracking tubes developed by USGS were used to capture footprints of PPM (and competitor species). Tracking tubes were placed in arrays surrounding PPM burrows alongside traps in 468 trials designed to compare the effectiveness of different methods of detection. Video cameras recorded a subset of the trials and confirmed the difficulty of safely trapping the 5-gram animals. PPM were recorded entering and exiting live traps multiple times while only occasionally triggering the trap. The ultimate design of the Sherman traps was selected based on efficacy in the field and was used in 2012 to successfully trap adult PPM in our first year of PAO monitoring. Tracking tubes were determined to be the optimal method for long-term monitoring because of high detectability, low impact to the species and relatively low cost.

As trapping for initial "discovery" is very expensive and time consuming, the panel looked for an approach to cover more territory in a short period of time. A scent dog was trained at the University of Washington, Center for Conservation Biology to detect PPM scat. The dog and handler worked 269 cells in established grids of occupied habitat on the Base wherein the dog communicated positive "hits" to her handler. A two-step least-cost analysis was used to verify positive dog responses by placing track tubes in areas the dog identified as occupied; if the track tubes recorded PPM tracks then the detection was confirmed. If no tracks were detected, mouse scat from the area was collected and identified to species via DNA analysis. Canine scent detection proved to be 66% accurate and was subsequently used to increase the boundaries of two of the three known populations on the Base.

In 2012, the Base's Pacific Pocket Mouse Monitoring Protocol was finalized and the Base successfully initiated the first year of the PAO monitoring effort. Tracking tubes are used to detect PPM in sample plots multi-scaled from 12.5 m^2 to 100 m^2. PPM occupancy and response to habitat covariates are being analyzed at multiple spatial scales, and we will track PPM density over time from the number of occupied 12.5 m^2 plots within each larger sample plot. While 80% of plots will be permanent (i.e. sampled every year), 20% of plots will be randomly chosen each year to generate a better spatial coverage within PPM habitat over time. This also samples more plots across a wider range of habitat and landscape conditions through time to better model habitat relationships and help inform management decisions. Data from the core plots will be

used to determine annual times of emergence, peaks in activity, period(s) of reproduction, and torpor, as well as survivorship between years. This will benefit in the understanding of PPM demography and phenology in relation to climatic variables, spatial occupancy, and aid in predictions of responses to climate change. There will also be an effort to discover new populations. The protocol will be re-evaluated for Base objectives and power to detect PPM population trends after 3 to 5 years. The monitoring plan will be incorporated in to the greater management plan as it is refined and finalized.

Captive Breeding and Release Program

A captive breeding program was initiated in 2012 by FWS with the goal of reintroducing PPM to historically occupied sites to expand the range and further the recovery of the species. The San Diego Zoological Society's Institute for Conservation Research is leading the effort to trap, house and raise a genetically diverse sample of adults from 3 of the 4 extant populations. This captive breeding effort includes input from stakeholders at the Base, the Center for Natural Lands Management, USGS, FWS, San Diego Zoo, California Department of State Fish and Game and California State Parks. This multi-organization recovery team successfully coordinated the capture of 22 animals in 2012, which are being housed at the San Diego Zoo Safari Park. The animals have been tested for genetic diversity, and will be bred (along with future captures) to produce up to 250 individuals. Base staff will continue to work with the team to identify suitable off-base locations for release of the captive-reared PPM, and identify research needs for the recovery of the species. Currently the team is reviewing and considering several proposed studies to increase release success, including studies on competition between species, marking methods, and habitat use. The Base will contribute funds to the captive breeding program to partially offset impacts to PPM habitat during construction of critical infrastructure upgrades on Base.

With enhanced techniques and increased knowledge from the newly developed Pacific Pocket Mouse monitoring Protocol and the captive breeding program, Base biologists are working hard to support the recovery of this critically endangered species with the goal of reducing future management efforts on Base and increasing opportunities for military training.

REDUCING WILDLIFE CONFLICTS: CONSERVATION AND INTEGRATED PEST MANAGEMENT

With the urbanization of society people have become isolated from the natural environment and are not experienced with wild animals. Consequently, many Marines and their families who discover a wild animal near their home or work site, often will not know how to react. The Game Warden staff resolves wildlife conflicts and educates Base users on the value of wildlife conservation on a daily basis.

Bat conservation and exclusion

Bats are a diverse and highly adapted group of flying mammals that provide important ecological benefits. Bats regularly consume insects that are active at night including moths and mosquitoes. Bat Conservation International reports that a single bat can eat 1,200 mosquito-sized insects in one hour. Mosquitoes can transmit West Nile

Virus, which occurs in southern California and is a threat to human health and many moth species are destructive agriculture pests. Bats often roost or live in older concrete buildings on Base. Bat colonies in buildings accumulate waste if not cleaned continuously. As waste accrues it can produce noxious odors and serve as a source for the Histoplasma fungus, which can infect people with a flu-like disease. Another concern when bats live close to people is an increased risk of rabies exposure.

Game Warden staff will capture and release an individual bat found roosting in a building. If many bats are roosting in a building, Game Wardens will use humane methods approved by Bat Conservation International to exclude bats from living in buildings and military homes. For small projects Game Wardens will perform the work in-house; for larger projects, Game Wardens collaborate with Facilities Maintenance for bat exclusion work. Cracks are sealed to prevent waste dropping into human working and living spaces. Next, workers install netting or cones which allow bats to leave for nightly foraging, but not re-enter the structure. To complete the work, the entrances are permanently sealed after all bats have safely departed. This work is performed in fall and winter months to avoid bat pupping season, to prevent sealing juvenile, flightless bats within buildings.

Relocating venomous snakes and training others how to do it safely

In a typical year, Game Wardens will capture and relocate 200 rattlesnakes. Captured rattlesnakes are released within 500 meters of where they were found because research suggests they will not suffer from a relocation of this distance. Rattlesnakes eat many rodents each year and in turn serve as prey items for animals such as the Red-tailed Hawk. The rattlesnake's ecological role is both to eat and be eaten.

Game Wardens are skilled at capturing and relocating venomous snakes and they pass their knowledge on to Navy Preventive Medicine units (PMU). Local Navy personnel have trained on several occasions at the Game Warden office to learn and practice venomous snake handling with local rattlesnakes. The most recent class was provided in 2012. Navy PMU leaders request the venomous snake training because their units are often asked to remove venomous snakes discovered during deployment in other countries including Iraq and Afghanistan. Rattlesnakes are similar to venomous snakes found in Afghanistan and Game Warden instructors discuss other venomous snakes that Marines and Sailors might encounter overseas including kraits and cobras. Students are trained to use a snake hook or tongs to capture a snake and safely place it in a rigid container for relocation. While relocation of venomous snakes helps conserve their ecological value, students are briefed on safely killing and disposing of a venomous snake, which may be the most prudent action for resolving snake conflicts in a combat theater.

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Nomination Submission Page

Award Category: FY12 Secretary of Defense and Secretary of the Navy Environmental Award Nomination
Natural Resources – Large Installation

Installation: Marine Corps Installations West/Marine Corps Base Camp Pendleton

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Summary for Awards Ceremony Brochure

The Natural Resource (Conservation) Division at Marine Corps Installations West-Marine Corps Base Camp Pendleton implements a robust natural resource management program through its Integrated Natural Resources Management Plan (INRMP). The 125,000 acre Base functions as an island of biodiversity within the highly developed landscape of coastal southern California. The Base supports 16 federally listed species that are broadly distributed across the installation, so the potential for conflict with military training mission is always present. In FY11 and FY12, the Base's Environmental Security Office had a very heavy emphasis on project support. Natural Resources staff focused heavily on U.S. Fish and Wildlife Service consultations and U.S. Army Corps of Engineers permitting in support of a roughly $4 billon infrastructure improvement initiative. Despite the heavy emphasis on project support, the natural resources staff was able to implement key components of the INRMP to ensure military training support and training land reclamation, as well as management of sensitive plants and wildlife and the habitats that support them *and* the installation's training requirements. The Natural Resources Division also implemented an exceptional outdoor recreation program and wildlife conflict management program to enhance the quality-of-life of the Marines, Sailors and their families working and living on one of the nation's busiest military installations. Notable accomplishments during the award period included:

- Implemented a cutting-edge Erosion Management Program that repaired damaged training lands and restored ecological function. Erosion sites threatening a helicopter landing pad and training roads were stabilized, repaired and re-seeded with native plants. In all cases the source of initial erosion was identified and corrected to prevent repeated future erosion. Success stories were shared with regional land managers.

- Implementation of management actions that demonstrated to the US Fish and Wildlife Service that the INRMP provides a benefit to the western snowy plover on the California State Park Lease portion of the installation. This resulted in the removal of a previous critical habitat designation for the plover. There are now no critical habitat designations aboard the installation.

- Developed and implemented a scientifically robust monitoring protocol for the critically endangered Pacific Pocket Mouse. Natural resources staff collaborated with agency biologists, regional land managers and species experts to develop a methodology that is accurate, repeatable and cost effective. The results were shared with other organizations in the region involved with managing this tiny rodent.

- Collaborated with regional experts to establish a Pacific Pocket Mouse captive rearing program to support the long-term recovery of the species. The Base provided animals for the breeding program and will provide additional animals and supplemental funding in the future. Base biologists participated in identifying potential off-Base release sites and additional research needed to ensure the success of the program.

- Trained deploying preventive medical personnel to recognize venomous snakes that could pose a health and safety hazard to troops overseas. Students were instructed how to safely capture and relocate snakes or to safely euthanize the animals if required to protect the safety of personnel.

Photo captions:

Erosion control project: Erosion control project at MCIWEST-MCB Camp Pendleton to enhance training lands damaged by a poorly placed culvert. The area has been stabilized, contoured and hydroseeded with a native seed mix. The culvert was realigned and fortified to prevent future erosion.

Sedimentation basin: Sedimentation basin designed and installed to prevent soil loss at Landing Zone 53 on MCIWEST-MCB Camp Pendleton. Erosion was threatening the stability of this important helicopter landing area. Erosion management is a key component of the installations INRMP and directly benefits both the training mission and ecosystem health.

Live traps and tracking tubes: Different live traps and tracking tubes were evaluated for detection of Pacific Pocket Mouse aboard MCIWEST-MCB Camp Pendleton. The Pacific Pocket Mouse is one of the most critically endangered mammals in the Nation and is found predominantly on the Base. Base managers are collaborating with regional experts to optimize monitoring methods across the range of the species.

Pacific Pocket Mouse: A Pacific Pocket Mouse in a tracking tube aboard MCIWEST-MCB Camp Pendleton. Tracking tubes were determined to be the optimal method for long-term monitoring because of high detectability, low impact to the species and relatively low cost. The tubes will be used to track trends of abundance and distribution through time as part of a management approach to move the species toward recovery and minimizing conflicts with the military training mission.

Trained scent dog: A trained scent dog and its handler searching for Pacific Pocket Mouse aboard MCIWEST-MCB Camp Pendleton. Positive "hits" from the dog were followed up with tracking tubes to confirm presence. Dog detection was found to be 66% effective and will be an important tool in locating new Pacific Pocket Mouse occupied areas.

Southern Pacific Rattlesnake: A Southern Pacific Rattlesnake aboard MCIWEST-MCB Camp Pendleton. The Installation Game Wardens use the rattlesnakes to train deploying preventive medical personnel to recognize and safely relocate or euthanize venomous snakes encountered by troops overseas. The rattlesnakes used in training were removed from housing or work areas and were safely relocated after the training was completed.