INTEGRATED PEST MANAGEMENT PLAN

MARINE CORPS BASE
CAMP PENDLETON, CALIFORNIA

JUNE 2019

PREPARED BY

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MCB Camp Pendleton Integrated Pest Management Plan
Technical Approval

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Technical and Administrative Approval:
Approved and signed in accordance with DoDI 4150.07

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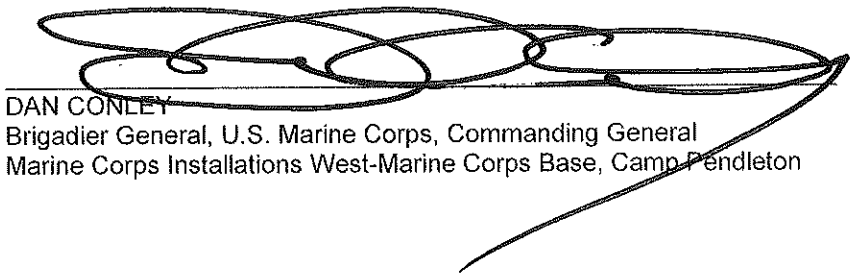
MCB Camp Pendleton Integrated Pest Management Plan
Approval for Implementation

This Integrated Pest Management Plan has been prepared to describe pest management responsibilities and activities at Marine Corps Installations West- Marine Corps Base Camp Pendleton in accordance with Department of Defense Instruction 4150.07, and Marine Corps Order 5090.2.

Approved for Implementation:



DAN CONLEY
Brigadier General, U.S. Marine Corps, Commanding General
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MCB Camp Pendleton Integrated Pest Management Plan

Technical Review

The Integrated Pest Management Plan has been reviewed in accordance with DoDI 4150.07.

Sabra Scheffel Date: 6/3/19

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Integrated Pest Management Plan Annual Review

Year	Completion Date	Integrated Pest Management Coordinator	Copies of Changes to the Pest Management Consultant (Annual) Date Completed
20			
21			
22			
23			
24	Rewrite		

Scheduled On-Site Pest Management Technical Review

Scheduled Date	Integrated Pest Management Coordinator	Pest Management Consultant Date Review Completed

Note: Technical Reviews should be scheduled approximately 3 years apart and in conjunction with an EMS review if possible.

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Executive Summary

This Integrated Pest Management Plan is a comprehensive, long-range planning document that describes all of the pest management operations and pesticide-related activities conducted on the installation. It incorporates pest management practices and the local, state, federal, and Department of Defense regulations, and conforms to the requirements of Department of Defense Instruction 4150.07, DoD Pest Management Program, and Marine Corps Order 5090.2, Environmental Compliance and Protection Program, Volume 14, Integrated Pest Management. It supplies comprehensive information about the pest management program to installation staff and internal and external compliance auditors.

The Naval Facilities Engineering Command Atlantic's Applied Biology Center prepared this plan using information obtained through pest management data collection, on-site observations, installation personnel interviews, and document reviews.

The main goal of the various pest control functions is to support the mission of Marine Corps Base (MCB) Camp Pendleton. In-house DoD pest control operators currently provide the majority of the pest control services for the installation while contractors manage vegetation, which includes the use of herbicides, outside the cantonment areas. An in-house DoD pest control operator provides pest control at the Marine Memorial Golf Course. Pest control services are needed on the installation in order to:

1. Provide services that will prolong the life of the structures through subterranean termite and nuisance pest control

2. Maintain the safety and security of industrial and storage areas through weed control

3. Provide nuisance pest control to all buildings (except public-private venture housing) and outdoor areas to ensure a good working and living environment

4. Control weed and insect pests in all recreational and lawn areas to maintain aesthetics and provide recreational facilities to personnel

5. Provide control of mosquitoes, flies, and other potential disease vectors to ensure the comfort and well-being of all personnel

6. Provide vertebrate pest control, including rodent control, to all areas of the installation.

For the current level of work to be accomplished, a sufficient staff of qualified applicators must be maintained. Contract personnel must meet state certification requirements as specified by the contract. Pest management performance assessment representatives must successfully take an initial pest management performance assessment representatives course. To maintain their certification, the pest management performance assessment representatives and Department of Defense pesticide applicators must successfully pass a Department of Defense pest management training and recertification course every three years. Pest control facilities must comply with current safety standards to provide a safe workplace and to minimize pesticide hazards.

This plan focuses on safe, environmentally-sound, and cost-effective control of pests through integrated pest management. Integrated pest management depends on education, proper surveillance, and identification of pests, non-chemical and chemical control methods, and individual responsibility for pest prevention.

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Chapter 1. Introduction

1.1. INTEGRATED PEST MANAGEMENT PLAN

The Integrated Pest Management Plan (IPMP) is a long-range, comprehensive planning and operational document that establishes the strategy and methods for conducting a safe, effective, and environmentally-sound Integrated Pest Management (IPM) program. The IPMP covers all pest management and pesticide-related activities conducted by civilian and military Department of Defense (DoD) personnel and commercial contractors within all functional areas of the installation.

1.1.1. Authority

Department of Defense Instruction (DoDI) 4150.07, DoD Pest Management Program and Marine Corps Order (MCO) 5090.2, Environmental Compliance and Protection Program, Volume 14, Integrated Pest Management, require that all Marine Corps installations develop and implement an IPMP in accordance to the guidelines therein. The IPMP will describe all aspects of pesticide management including administration, procurement, contract services, storage, disposal, safety, reporting, vehicles, integrated pest management, and applicable laws and regulations.

1.1.2. Department of Defense Measures of Merit

This plan provides the framework for the installation to meet the DoD's annual goals or measures of merit (MoMs). As established in DoDI 4150.07, and updated by the Armed Forces Pest Management Board, the MoMs are:

1. Measure of Merit 1: All DoD installations will maintain installation Pest Management Plans that have been reviewed and approved by a DoD-certified Pest Management Consultant and annually updated by the installation pest management coordinator.

   MCB Camp Pendleton helps meet this goal by implementing (via the commanding general's signature) this plan.

2. Measure of Merit 2: All DoD installations will adhere to the principals of integrated pest management and the DoD will maintain the goal of minimizing annual pesticide use by both government and contractor pesticide applicators on its installations. This goal is set at 425,000 pounds of active ingredient, the DoD's average annual usage for Fiscal Years 2007–2009 and an overall 52 percent reduction from the original fiscal year 1993 baseline.

   MCB Camp Pendleton provides data for this MoM through the reporting requirement (section 2.3).

3. Measure of Merit 3: All DoD pesticide applicators will be certified. All contracted employees shall have appropriate state or host-nation pesticide applicator certification in the appropriate categories at the time the contract is let.

MCB Camp Pendleton ensures proper certification of all applicators through regular verifications and maintains a list of certifications in appendix E of this plan. See section 2.4 for training and certification requirements.

1.1.3. Integrated Pest Management Plan Implementation

The IPMP must be reviewed and approved by installation stakeholders and professional pest management consultants (PPMCs) from Naval Facilities Engineering Command (NAVFAC), Atlantic and the Bureau of Medicine and Surgery (BUMED). The IPMP is implemented upon signature of the installation's commanding general. The integrated pest management coordinator (IPMC) has the task of implementing, coordinating, and executing the IPMP among each of the functional areas of the installation.

1.1.4. Integrated Pest Management Plan Maintenance

Once the IPMP has been developed and implemented, it must be reviewed annually and updated as necessary. The installation IPMC is responsible for maintaining the IPMP.

1.1.4.1. Internal Review

The IPMC shall conduct an internal review annually in coordination with the pest management service providers (PMSPs) and other functional area points of contact (POCs). The review should include updating contract information, applicator certifications, pesticides, and pest management operations to be used on the installation, as well as, updating pesticide use records. The pest management program self-assessment checklist (appendix C) is available as a tool to review compliance issues during the internal review.

1.1.4.2. Off-Site Review

The IPMC may request that a NAVFAC Atlantic Applied Biology PPMC perform a review of regulatory requirements, reporting, and pesticide approval procedures.

1.1.4.3. On-Site Review

The NAVFAC Atlantic Applied Biology PPMC shall perform an on-site review of the entire pest management program every three years to ensure compliance with the IPMP. The review may be performed more frequently if extensive program problems exist. A copy of the last technical review report can be found in appendix C.

1.1.4.4. Integrated Pest Management Plan Rewrite

The IPMP should be rewritten every five years to reflect new contracts, personnel, pest management practices, and regulatory changes.

1.2. INSTALLATION BACKGROUND

MCB Camp Pendleton is the Corps' largest West Coast expeditionary training facility, encompassing 125,547 acres of Southern California terrain which includes the largest undeveloped coastline in the region. There are more than 1,000 species of plants, fish, and animals, some of which are threatened or endangered.

1.2.1. Mission

The mission of MCB Camp Pendleton is to operate a training base that promotes the combat readiness of the Operating Forces and the mission of other tenant commands by providing training opportunities, facilities, services and support responsive to the needs of Marines, Sailors and their families. It is home to the I Marine Expeditionary Force, 1st Marine Division, 1st Marine Logistics Group and many tenant units, including Marine Corps Installations-West, 1st Marine Raider Battalion, Wounded Warrior Battalion-West, Marine Corps Air Station Camp Pendleton, Marine Aircraft Group 39, Marine Corps Tactical Systems Support Activity, Marine Corps Recruit Depot San Diego's Weapons & Field Training Battalion, Marine Corps and Army Reserve Forces, the Navy's Assault Craft Unit 5, a Navy Medicine Readiness Training Command, and 1st Dental Battalion.

The Base also provides specialized schools and training as directed by the Commandant of the Marine Corps. Several schools are located on MCB Camp Pendleton including Assault Amphibian Schools Battalion, School of Infantry-West, Field Medical Training Battalion - West and Marine Corps University. Following recruit graduation, enlisted Marines receive basic infantry training at the School of Infantry-West before assignment to other units throughout the Corps.

1.2.2. Location and Facilities

MCB Camp Pendleton is located 38 miles from downtown San Diego and 82 miles south of Los Angles. With a daytime population of more than 70,000 the installation hosts a self-sustaining water supply, sewage treatment plants, telephone and electrical systems. To help maintain the high demand on Camp Pendleton's utilities, there are seven sewage treatment plants, 150 miles of sewer mainlines, 24 wells, 375 miles of water mainlines, 23 reservoirs, 145 miles of gas lines, 335 miles of electrical lines, 215 electric substations and two landfills.

Along with having its own utility distribution systems, MCB Camp Pendleton also maintains 7,300 family housing units and is constructing additional units in conjunction with maintaining 18,000 permanent party billeting spaces. In addition, there are more than 2,600 buildings and structures.

1.3. PEST MANAGEMENT PROGRAM OVERVIEW

The pest management program is summarized below.

1. Three DoD-certified pest control operators who work in the G-F Facilities Maintenance Division (FMD) provide general pest control services. This includes ground-based larval and adult mosquito control.

2. Gulf South Research (GSR) Corporation, AECOM Technical, Agrichem, Innovative Inclosures Apex, and Patriot JV manages vegetation outside the cantonment areas for the Land Management Section.

3. An ecologist in the Land Management Section applies pesticides in natural areas.

4. Base Operating Support Contractor Chugach infrequently uses Western Exterminators on an indefinite delivery/indefinite quantity basis to provide unique, large-scale pest control operations. Examples in the past include barracks-wide bed bug control and building fumigation to treat dry wood termites.

5. A DoD-certified pesticide applicator applies pesticides at the Marine Corps Community Services (MCCS) Marine Memorial Golf Course and a state-certified pesticide applicator applies pesticides for the MCCS Semper Fit Fields and Grounds.

6. Dewey Pest Control performs pest management for most of the MCCS activities.

7. The MCCS restaurants that are privately owned and operated individually contract pest control separately from MCCS.

8. Agricultural Pest Control Services provides pest management at the Defense Commissary Agency (DeCA) Commissary.

9. G-F Housing's public-private venture (Lincoln Military Housing) contracts most pest control services with Payne Pest Management but Corky's Pest Management services the Mesa District.

10. The MCCS Marine Corps Exchange (MCX) Garden Center and the Commissary display and sell garden and household pesticides.

11. The installation preventive medicine division is located at Navy Medicine Readiness Training Command Camp Pendleton and performs food service sanitation and oversees programs to prevent vector-borne and other infectious diseases. The installation preventive medicine division also provides training and oversees facilities habitability inspections performed by medical staff who are assigned to units on the installation.

12. G-F Facilities Engineering and Acquisition Division (FEAD) contracts with Hummingbird Aviation (Wolf Creek) to apply aerial larvicides about 4 times a year to control mosquitoes.

1.3.1. Pest Management Objectives

The objectives of the installation's pest management program are:

1. The prevention of pest-related health and safety problems that affect the mission.

   Examples of health-related pests that may affect the mission include, but are not limited to mosquitoes, fire ants, and bed bugs. Any pest may impact the mission when its numbers become excessive. Prevention of pest-borne disease and injury is a component of force health protection. Force health protection seeks to maintain a healthy and fit military and civilian force in order to maintain the highest levels of readiness. Pest management is a force multiplier for construction battalions, maintenance commands, and other deployable units. Additionally, the military and civilian infrastructure on the installation must be protected in order to provide the necessary support to these units as well.

2. The prevention of pest damage to equipment and subsistence used to support the operational mission of the activities and tenant commands.

   Equipment and materials are susceptible to physical damage by pests and the financial costs of such damage can be high. Rodents, for example, can cause considerable damage to electronic equipment through gnawing on electrical components. Examples of pests that may damage equipment and subsistence include, but are not limited to rodents, wood-destroying pests, and stored-product pests.

3. Vegetation management to protect the local environment.

   The introduction of non-native/invasive species of plants can increase the risk of wildfires and degrade the surrounding native environment that is home to a number of endangered and threatened animal and plant species.

4. The protection of government real property, materiel, and aesthetics.

   Buildings and roads that form the infrastructure of the installation are susceptible to pests. If not adequately prevented and controlled, termites can cause extensive damage to wood structures. Weeds can cause damage to roadways and increase the risk of fire.

5. The reduction of the use of and dependence on pesticides.

1.3.2. Program Requirements

1.3.2.1. Administration

Proper administration of the pest management program ensures accountability and documentation through planning, record keeping, reporting, training, pesticide and contract approval, and regulatory compliance. Table 1-1 outlines the pest management administrative program requirements.

Requirement	Description	Reference	Responsibility	Locator
PLANNING	Review and revise the Integrated Pest Management Plan annually.	OPNAVINST 6250.4C DoDI 4150.07	IPMC	Section 1.1.4
RECORDING	Record all pest management operations conducted on the installation after each operation.	OPNAVINST 6250.4C DoDI 4150.07 7 CFR §110*	All pesticide applicators	Section 2.3.1
MAINTAINING	Maintain records of all pest management operations conducted on installation on-site indefinitely.	OPNAVINST 6250.4C DoDI 4150.07 7 CFR §110*	IPMC in coordination with PMPARs	Section 2.3.2
REPORTING	Compile and report all pest management operations to NAVFAC Atlantic Applied Biology monthly.	OPNAVINST 6250.4C DoDI 4150.07 7 CFR §110*	IPMC in coordination with PMPARs	Section 2.3.3

PESTICIDE APPLICATOR CERTIFICATION	Ensure that all personnel applying pesticides on installations have current DoD pesticide applicator certification if in-house or state commercial applicator certification if contracted.	OPNAVINST 6250.4C BUMEDINST 6250.12D DoDI 4150.07 40 CFR §171*	IPMC in coordination with PMPARs	Section 2.4
COMPLIANCE	Ensure that all program elements are in compliance with all federal regulations. Navy policy is to comply with local/state regulations.	OPNAVINST 6250.4C DoDI 4150.07	IPMC in coordination with PMPARs	Section 3.3
PESTICIDE APPROVAL	Compile and submit list of new pesticides to NAVFAC Atlantic Applied Biology for approval for use on the installation.	OPNAVINST 6250.4C DoDI 4150.07	IPMC in coordination with PMPARs	Section 2.2
CONTRACT REVIEW	Review pest management contract specifications for compliance with the Integrated Pest Management Plan and submit to NAVFAC Atlantic Applied Biology for final review and approval prior to advertising.	OPNAVINST 6250.4C DoDI 4150.07	PMPARs in coordination with the IPMC	Section 2.5
• * (applies to restricted-use pesticides only)				

Table 1-1. Pest management administrative program requirements.

1.3.2.2. Operations

Operations are the day-to-day management of pests through pesticides and non-chemical means. Pest management on the installation includes the following categories of operations:

1. Ornamental and turf—Control and management of pests of landscape plants and turf including arthropods, fungi, and weeds.

2. Right-of-way—Control and management of vegetation along roadways, near fuel farms to reduce fire risk, and along fence lines to enhance security.

3. Aquatic Weed Control—Control of vegetation in ponds and ditches.

4. Industrial, Institutional, Structural, and Health-Related—Control and management of pests in and around buildings. Pests may include cockroaches, termites, bees, venomous animals, stored product insects, rodents, and feral animals.

5. Public Health—Control and management of human and animal disease vectors such as rodents, mosquitoes, flies, ticks, and fleas.

6. Nuisance Pest Control—Control of insect pests that are a nuisance or annoyance to base personnel, but do not present a health risk.

7. Invasive plants—Removal of non-native species of plants that are detrimental to native plant and animal habitats.

8. Vertebrate Control—Control of animal predators that prey upon endangered or threatened animals and their habitats, or infest food and material storage.

Each of these operations must meet various requirements that are listed and described in table 1-2.

Requirement	Description	Reference	Responsibility	Locator
INTEGRATED PEST MANAGEMENT	"Federal agencies shall use Integrated Pest Management techniques in carrying out pest management activities and shall promote Integrated Pest Management through procurement and regulatory policies, and other activities."	7 U.S.C. § 136r-1	IPMC Pesticide applicators	Section 3.1.1
STORAGE	Pesticides kept on installations must be procured and stored in accordance with installation and federal regulations. Navy policy is to comply with local/state regulations.	OPNAVINST 6250.4C AFPMB TG 17 29 CFR §1910 40 CFR §165	Pest control shop supervisor	Section 3.4.3

CONTAINERS	All containers used to store or transport a pesticide must have the original or copy of the original label attached. Service containers must have attached label identifying: the person responsible for the container, the name of chemical, and the signal word.	OPNAVINST 6250.4C DoDI 4150.07 40 CFR §156	Pesticide applicators	Section 3.4.5.1
VEHICLES	Must carry pesticide spill kits and properly secure pesticides and pesticide application equipment when not in use.	OPNAVINST 6250.4C	Pesticide applicators Vehicle operators	Section 3.4.3.3
APPLICATION	Only registered pesticides will be used. Applicators must apply pesticides in a manner that ensures safety and protects the environment. A copy of the pesticide label shall be available at the application site.	OPNAVINST 6250.4C DoDI 4150.07 40 CFR §166	Pesticide applicators	Section 3.4.5

APPLICATOR SAFETY	The installation must provide procedures, medical support, equipment, and supplies to ensure the safety of DoD pesticide applicators during pest control operations. Note: Contractors are responsible for supplying their own PPE and having a medical support plan in place in the event of an accident.	OPNAVINST 6250.4C 29 CFR §1910	Naval Branch Health Clinic Safety Department	Section 4.1
OCCUPATIONAL HAZARDS MONITORING	Workplace monitoring shall be conducted by the medical department to ensure a safe and healthful environment for pest management personnel.	OPNAVINST 6250.4C OPNAVINST 5100.23G	Naval Branch Health Clinic	Section 4.1.2.9
CLEANING AND DISPOSAL	Equipment shall be cleaned to prevent health and environmental hazards due to chemical residues. Prevent water from container and equipment rinsing from entering storm drains and water bodies. Dispose of empty containers properly. Manage and dispose hazardous waste and non-hazardous waste properly.	OPNAVINST 6250.4C 40 CFR §165 40 CFR §260-273	Pesticide applicators	Section 3.4.6

SPILL PREVENTION	Spill kits shall be maintained in pest control shops and on pest control vehicles. Pest management personnel shall be familiar with the installation spill contingency plan.	OPNAVINST 6250.4C 40 CFR §300	Pesticide applicators	Section 5.3.4

Table 1-2. Pest management operations program requirements.

Chapter 2. Program Administration

2.1. ROLES AND RESPONSIBILITIES

The success of the pest management program depends largely on a clear understanding of the roles and responsibilities for the organizations and personnel involved. The following is a listing of the key organizations and personnel and their duties as presented in DoD guidance documents for the implementation of the IPMP.

2.1.1. Commanding General, Marine Corps Installations

The Commanding General, Marine Corps Installations is responsible for the funding and prioritization of the pest management program.

2.1.2. Installation Commanding General

The installation commanding general (CG) is responsible for the compliance and enforcement of the pest management program. The installation CG delegates compliance and enforcement of the pest management program to the IPMC via the IPMC designation letter. Responsibilities of the installation CG include:

1. Budgeting for IPMPs, training, operations, and facilities in compliance with legal and DoD requirements
2. Designating an integrated pest management coordinator in writing
3. Implementing and supporting the IPMP
4. Ensuring all pest management operations are conducted safely and have minimal impact on the environment
5. Ensuring an IPM program, minimizing the use of pesticides, is implemented
6. Ensuring the installation's IPM plan and program are in compliance with all applicable federal, state, and local laws as well as DoD regulations.

2.1.3. Integrated Pest Management Coordinator

The IPMC is designated by the installation CG in writing as the advisor to the installation CG and coordinator of all installation pest management activities. The IPMC designation letter is in appendix E. Responsibilities of the IPMC include:

1. Coordinating the installation's pest management program including implementation, maintenance, and annual update of the IPMP
2. Coordinating the rewrite of the IPMP every 5 years
3. Promoting integrated pest management (IPM) in the pest management program to cost-effectively and safely manage pests and to prevent adverse environmental impact
4. Coordinating reporting of all pest management operations on the installation to NAVFAC Atlantic Applied Biology

5. Ensuring current certification and continuing pest management training of pesticide applicators and pest management performance assessment representatives (PMPARs)

6. Receiving and compiling lists of new pesticides and uses from all PMSPs on the installation and submitting them to NAVFAC Atlantic Applied Biology for review and approval

7. Maintaining current list of approved pesticides

8. Acting as liaison between installation and Applied Biology and local, state, and federal agencies for pest management and pesticide regulatory issues

9. Ensuring the installation contracting officers submit pest management contract specifications to the Applied Biology PPMC for review prior to advertising.

2.1.4. Environmental Security Department

The installation environmental security department provides oversight on environmental protection and compliance regarding pest management operations. Responsibilities of the department include:

1. Reviewing and approving new pesticides and pest management operations that may adversely impact the environment

2. Conducting internal compliance assessments of the pesticide and pest management program

3. Providing technical review of the IPMP

4. Permitting of pesticide applications such as Clean Water Act's National Pollution Discharge Elimination System.

As part of the environmental security department, the natural resources manager is responsible for managing natural resources at the installation. In this capacity, the manager may be responsible for conducting or contracting some pest management operations (e.g., invasive species management). Natural resources are further described in the installation's Integrated Natural Resources Management Plan (INRMP). A copy of the INRMP is included on the CD of supporting documents provided with this plan. Responsibilities of the natural resources manager include:

1. Providing information on protected species, endangered or threatened species, noxious or invasive species, and environmentally-sensitive sites

2. Providing management of nuisance wildlife

3. Providing forest pest control and invasive species control.

The cultural resources manager is responsible for managing cultural resources at the installation, including properties that are officially listed in or eligible for inclusion in the National Register of Historic Places. In this capacity, the manager is responsible for approving pest control in and around these areas. The cultural resources are further described in the installation's Integrated Cultural Resources Management Plan (ICRMP). A copy of the ICRMP is included on the CD of supporting documents provided with this plan.

2.1.5. G-F Facilities Engineering and Acquisition Division

The Facilities Engineering and Acquisition Division (FEAD) prepares, manages, and assesses pest control and grounds maintenance contracts. The PMPAR monitors and evaluates the performance of contracted PMSPs to ensure that pest control measures are properly applied. The PMPAR serves as liaison between the contractor and the IPMC. Responsibilities of the FEAD include:

1. Preparing contracts ensuring that all requirements of the IPMP are included in the contract specifications
2. Coordinating with the IPMC and NAVFAC Atlantic Applied Biology PPMC for a review of pest management contract specifications prior to advertisement for bid
3. Maintaining copy of each contract on file
4. Monitoring pest management contractors; ensuring effective and safe application of pest management practices, identifying and documenting discrepancies, and seeking corrective action with contractors in accordance with the contract
5. Ensuring contractors record all pest management activities and submit reports including actual pesticide use through the NAVFAC Online Pesticide Reporting System (NOPRS) which will be reviewed by the IPMC.

All PMPARs shall be delegated the authority (in the contract and in the PMPAR appointment letter) to halt any contract pesticide applications that:

1. Endanger or present a hazard to humans, animals, or the environment
2. Violate contract specifications, or applicable federal, state, DoD, or Navy laws/regulations
3. Violate the pesticide label.

2.1.6. G-F Housing Division/ Public-Private Venture Housing

The public-private venture (PPV) housing manager provides pest control and landscape maintenance for military family housing residents.

1. Ensure that pesticide usage reports for outdoor pesticide applications (including herbicides) are reported using NOPRS, which will be reviewed by the IPMC and NAVFAC Atlantic PPMC
2. Ensure that only current, state licensed pesticide applicators apply pesticides.

2.1.7. G-F Facilities Maintenance Division (FMD) Pest Control Shop

The in-house pest control shop performs routine pest management on the installation and responds to service requests from tenants. To put in a call for pest management services, personnel must contact the FMD call center at extension (760) 725-4683. Responsibilities of the shop include:

1. Controlling nuisance, public-health, and structural pests

2. Conducting pest control inside buildings and facilities

3. Conducting pest control on improved grounds.

2.1.8. Navy Medicine Readiness Training Command

Navy Medicine Readiness Training Command Camp Pendleton (NMRTC) includes preventive medicine, industrial hygiene, and occupational health departments. This section discusses responsibilities for each department.

2.1.8.1. Preventive Medicine

The NMRTC Preventive Medicine Department provides public health support to the installation in accordance with Navy Medical (NAVMED) P-5010, Manual of Naval Preventive Medicine, and OPNAVINST 6250.4C. Responsibilities of the NMRTC Prevent Medicine Department include:

1. Acting as advisor and liaison to the installation CG for public health pest prevention and management

2. Conducting surveys for pests of medical importance, such as cockroaches, mosquitoes, bed bugs, etc., through habitability and food service sanitation inspections

3. Establishing and maintaining liaison with local health agencies as they pertain to vector management and vector-borne and zoonotic disease prevention

4. Maintaining current certification as DoD category 8 (public health) pesticide applicator

5. Developing and maintaining an emergency vector control plan in response to a vector-borne disease outbreak or disaster

6. Providing technical review of the IPMP.

2.1.8.2. Industrial Hygiene

Industrial hygiene (IH) personnel perform surveys for pest management employees to characterize occupational exposures (i.e., to inherent chemical, physical, ergonomic, and biological stressors) and control measures (e.g., engineering–local exhaust and mechanical dilution ventilation systems; administrative–warning signs, standard operating procedures, training requirements, etc.; and personal protective equipment–respiratory protection and chemical resistant clothing). In addition, IH surveillance information is used to initiate, continue, or end medical surveillance.

2.1.8.3. Occupational Health

Occupational health personnel are responsible for performing all necessary medical surveillance (such as physical examinations and blood testing) for government pest management personnel, as deemed necessary.

2.1.9. Marine Corps Community Services

Marine Corps Community Services (MCCS) provides recreational activities for military and civilian personnel on the installation. This includes maintenance of the golf course and athletic fields. Additionally, MCCS oversees 38 commercial food concessions on the installation. A list of

MCCS food concessions are included on the CD accompanying this plan. With respect to golf course and athletic field maintenance, MCCS must:

1. Ensure that all personnel who apply pesticides maintain current certifications in the appropriate categories (see section 2.4 for more information)
2. Ensure that all pesticides are approved, prior to use, by the NAVFAC PPMC
3. Ensure copies of the pesticide labels are available to the IPMC
4. Maintain and report records of all pesticide applications in accordance with the requirements outlined in this IPMP
5. Maintain the pesticide storage and mixing facility in accordance with the requirements of this IPMP and installation regulations
6. Obtain adequate supplies of pesticides, pesticide dispersal equipment, and personal protective equipment (PPE), and ensure equipment is properly maintained
7. Ensure that all pesticide applicators practice IPM
8. Ensure that landscape cultural management practices are used to maintain the health of plants and turf to prevent disease and pest infestations
9. Ensure that new plants brought onto the installation for landscaping in recreational areas are not invasive, infested with pests, or infected with disease.

With respect to MCCS food establishments, MCCS must:

1. Ensure that proper sanitation is maintained in all food handling facilities
2. Submit any contract specifications (outside of the installation pest management contract) for pest management to the IPMC and NAVFAC PPMC for technical review prior to submitting the contract for bid
3. Ensure that only current, state-certified pesticide applicators apply pesticides
4. Ensure that all pest management activities are reported in accordance with the requirements outlined in this IPMP (for pest management that is conducted separately from the installation contract).

2.1.10. MCCS Marine Corps Exchange

The Marine Corps Exchange (MCX) displays and sells household and garden pesticides for retail sale. With respect to pesticide sales, the MCX must:

1. Ensure that pesticides are displayed in accordance with the pesticide label and other federal, state, and local regulations.
2. Ensure that store employees are properly trained on emergency procedures in the event of a pesticide spill.

2.1.11. Commissary

The commissary not only sells food and healthcare items, but also household pesticide items. The commissary must:

1. Ensure proper sanitation is maintained in the store
2. Ensure food items for sale are free from stored product pests
3. Ensure commissary facilities are surveyed and controlled for invading pests
4. Coordinate with the Army Veterinarian on pest or sanitation problems
5. Ensure that pesticides are displayed in accordance with the pesticide label and other federal, state, and local regulations
6. Ensure store employees are properly trained on emergency procedures in the event of a pesticide spill.

2.1.12. Contract Pest Management Service Providers

Contract PMSPs are required to be certified as pesticide applicators by the State of California. These responsibilities apply to all contractors on the installation. Responsibilities of contract PMSPs include:

1. Conducting pest management operations in accordance with the contract specifications or lease agreements and the IPMP and in compliance with federal and state laws and regulations
2. Submitting a list of pesticides proposed for use on the installation to their government representative
3. Communicating all pest management issues and requirements via the government representative
4. Submitting daily pest management operation records to the government representative or through NOPRS.

2.1.13. Building Occupants and Barracks/Housing Residents

All installation personnel have the responsibility to:

1. Apply good sanitary and pest exclusionary practices to prevent pest infestations
2. If permitted for personal use, use pesticides in accordance with the pesticide label
3. Coordinate and cooperate fully with PMSPs in scheduling pest management and preparing the areas for pesticide treatment if necessary.

2.1.14. United States Army Veterinary Services

The veterinary services department provides clinical support for military working dogs and services for privately-owned pets and animals. Veterinary technicians also provide food inspection for the commissary and for other food items delivered to the installation. Responsibilities of the veterinarian include:

1. Conducting surveillance for pests which damage, destroy, and contaminate food stored in the commissary and installation facilities

2. Ensuring stored field rations (e.g., meals, ready to eat (MREs), etc.) are free from pests

3. Advising preventive medicine and the IPMC of any zoonotic diseases that may require pest management

4. Providing advice and education to pet owners on preventing pest infestations.

2.2. PESTICIDE APPROVAL

Only pesticides approved by both the Environmental Protection Agency (EPA) and the state shall be used. Additionally, DoD and Department of the Navy (DON) directives require installations to submit a list of all pesticides that will be used during control operations to the cognizant NAVFAC Atlantic PPMC for review and approval (OPNAVINST 6250.4C, paragraph 4). The purpose of this approval process is to ensure that only registered pesticides which are safe, effective, and appropriate for the site will be used on the installation. Requests for pesticide approval will be submitted to the NAVFAC Atlantic PPMC via the installation IPMC using NOPRS (see section 2.3.3). Once a pesticide is approved, it may be used on-site as per the label directions. New pesticides may also be added to the list and submitted for approval as needed. The list should be reviewed and updated annually by the IPMC as part of the IPMP maintenance. Pesticides currently approved for use on the installation are listed in appendix D.

The IPMC shall have access to hard copy or electronic versions of the manufacturer's label and safety data sheet (SDS) for each pesticide on the pesticide authorized use list (AUL); these should be made easily accessible to installation personnel upon request. The PMPARs or the PMSPs will maintain their SDS sheets. Pesticide labels and their registration status can be found on the EPA's National Pesticide Information Retrieval System.

2.3. RECORDS AND REPORTING

All shore installations and units performing pest control operations shall maintain daily records of pesticide applications and submit reports of pest management operations in NOPRS at least monthly to the cognizant PPMC. (MCO 5090.2, Volume 14, paragraph 0310)

2.3.1. Pest Management Record Keeping

All PMSPs shall record pest management operations daily. Records shall include all pest management operations including surveys and non-chemical control operations performed on the installation by commercial contractors as well as work performed by DoD pest management personnel. The records will include the following information: date of application, location and site, type of operation, target pest, area treated, name of applicator, pesticide information (trade name, active ingredient, and formulation), amount of pesticide applied, and calculated pounds of active ingredient applied. The following operations are excluded from the record keeping requirement:

1. Personal use of insect repellent

2. Application of repellent by deployable units during mass treatment of clothing and tentage

3. Application of pesticides for personal relief by residents of military housing

4. Application of pesticides for flea and tick control to pets by pet owners and veterinary services.

Records shall be submitted to the IPMC monthly via the NAVFAC Online Pesticide Reporting System (section 2.3.3).

Note: Personnel with access to the Navy and Marine Corps Intranet (NMCI) network and a Common Access Card (CAC) may view a multitude of shore installation maps through GeoReadiness Explorer (GRX). Several functions within this program may be useful to environmental personnel and pesticide applicators such as the capability to retrieve the coordinates of a location, and measurement tools which the user then can use to calculate the size of a job.

2.3.2. Maintaining Pest Management Operations Records

The installation must archive complete daily pest management operation records on-site indefinitely. Pesticide applications for each building, structure, or outdoor site must be accounted for. Past hardcopy records must be archived so as to prevent them from being destroyed. Electronic records shall be stored to prevent destruction or loss; back-up copies are recommended. All records reported to NAVFAC Atlantic will be stored and may be used as a back-up. Downloading records from NOPRS at least annually and maintaining them on-site is highly recommended.

2.3.3. Pest Management Service Provider Reporting Procedures

Reports will be reviewed by the IPMC and the NAVFAC Atlantic PPMC to provide program oversight to the installation and to generate data for tracking overall DON pesticide usage.

All PMSPs that have Internet access must use the NAVFAC Online Pesticide Reporting System to record, report, and manage pesticide and pest management records. This system is preferred to other methods because it eliminates the need to send hardcopy or electronic records to the IPMC and then to the PPMC. The records are entered directly into a central database that can be accessed by the PPMC and the IPMC and downloaded into a spreadsheet. The only computer requirement is reliable Internet access. Integrated pest management coordinators must contact the NAVFAC Atlantic PPMC to establish a supervisor account. Pest management service provider's applicators can then contact the IPMC to request an applicator account. The NOPRS website is at: https://noprs.pestlogics.com/. The NOPRS PowerPoint tutorial is included on the CD of supporting documents provided with this plan.

2.4. TRAINING, CERTIFICATION, AND LICENSING

Integrated pest management requires personnel who are properly trained to investigate and diagnose pest problems, select the appropriate pest management method, apply the appropriate pesticide, perform these operations so that they are safe to humans and the environment, and educate and advise their customers on pest prevention methods. All DoD personnel who apply or supervise the application of pesticides shall be trained and certified within two years of employment in accordance with the DoD Plan for the Certification of Pesticide Applicators, or EPA-approved state certification plan (OPNAVINST 6250.4C, paragraph 11). Additionally, professional pest management personnel shall be certified if their duties include:

1. Making recommendations for the use of pesticides, applying pesticides, or directly supervising the application of pesticides

2. Conducting demonstrations on the proper use and techniques of pesticide application or the supervision of pesticides

3. Conducting field research that includes using or supervising the use of pesticides.

An exception to the standard training and certification requirements are those individuals approved by the IPMC to apply ready-to-use pesticides as part of the self-help program.

2.4.1. Verification of Qualifications

Copies of contractor or lessee state licenses shall be obtained from all PMSP personnel applying pesticides on the installation. Verification of DoD pesticide applicator certifications, as well as IPMC and PMPAR accreditation, can be obtained from the NAVFAC Atlantic PPMC. A list of applicator certifications as well as a list of pest control business licenses is found in appendix E.

2.4.2. Requirements for Department of Defense Pesticide Applicators

DoD applicators may be certified in the following categories:

1. Category 2—Forestry

2. Category 3—Ornamental and Turf (e.g., landscape arthropod and vertebrate pests)

3. Category 5—Aquatic (e.g., aquatic weeds in lakes, ponds, rivers, streams, irrigation canals)

4. Category 6—Right-of-Way (e.g., weeds on sidewalks, along fence lines, parking lots, road ways, storage tank grounds)

5. Category 7—Industrial, Institutional, Structural, and Health-Related (e.g., termites and other wood-destroying insects, cockroaches, crickets and other invading organisms)

6. Category 8—Public Health (e.g., mosquitoes, ticks, fleas, rodents)

7. Category 11—Aerial Application (e.g., application of pesticides for any pest by fixed or rotary-wing aircraft).

Preventive medicine technicians (PMTs) are required to be certified only in Category 8 and receive certification during PMT school. Golf course applicators are only required to be certified in categories 3, 5, and 6.

Initial certification in categories 2, 3, 5, 6, 7, and 8 for civilian employees is a three-week course conducted by a designated DoD training agency. The Navy course is conducted by the Navy Entomology Center of Excellence (NECE) in Jacksonville, Florida. Initial certification and recertification in category 11 is a one-week course conducted by the Air Force Reserve. Certification for all categories is valid for three years. With proper justification, certifications can be extended by the applicator's certifying authority for an additional six months for civilian personnel or an additional 12 months for military personnel. Recertification courses for civilians in all categories except category 11 are conducted annually by NAVFAC Atlantic. The Armed Forces Pest Management Board's Training and Certification website contains schedules for DoD Initial and recertification courses.

2.4.3. Requirements for Commercial Contract Applicators

"Contractor employees performing pest management work on a DoD installation shall be certified prior to the beginning of the contract under a State plan accepted in the State in which the work is performed. Additionally, the contractor shall provide evidence of training and experience equivalent to that determined by the Military Services as necessary to satisfy the performance requirements for the particular pest management function to be contracted." (DoDI 4150.07, Para. E4.4.2.2). Copies of contractor business licenses and applicator certificates can be found in appendix E.

For personnel performing weed control and ornamental pest control, California regulations state that commercial applicators may apply pesticides if they hold a:

1. Qualified Applicator Certificate (QAC) issued by the California Department of Pesticide Regulation (DPR); or

2. Qualified Applicator License (QAL) issued by DPR

Applicators with a QAC or QAL must be licensed in DPR Category B, landscape maintenance, and/or Category C, right-of-way, and may apply restricted use pesticides (RUP). Certifications and licenses must be renewed every two years through a continuing education program. For more information on pesticide applicator licensing in California go to http://www.cdpr.ca.gov/docs/license/liccert.htm.

For contractors applying pesticides inside and outside buildings to control household or structural pests, California regulations require applicators to have a license as an "Operator" (OPR) or "Field Representative" (FR) from the California Structural Pest Control Board (SPCB). Applicators must be licensed in Branch 2: General pests. If they will be controlling wood-destroying pests, excluding fumigation, then they must be licensed in Branch 3. Persons supervising fumigations must be licensed in Branch 1: Fumigation. For more information, go to http://www.pestboard.ca.gov/.

Vector control licenses and certifications are offered through the Division of Communicable Disease Control and are only for individuals currently employed at a government public health agency that performs vector control. For more information, go to https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Vector-Control-Technician-Certification-Program.aspx.

2.4.4. Requirements for Natural Resource Management Applicators

Commercial contract applicators applying herbicides for invasive plant control or habitat restoration must hold a state license. Personnel using pesticides for wildlife control must also hold an appropriate state license. Department of Defense employees applying pesticides for invasive plant control or habitat restoration shall be DoD-certified as a pesticide applicator.

2.4.5. Requirements for Performance Assessment Representatives

Pest management performance assessment representatives assess the performance of contractors in the Performance-Based Acquisition (contracting) Program. The installation is required to train personnel to provide performance assessment for commercial pest control or grounds maintenance services in pest management within one year of appointment and send them to refresher training every three years (OPNAV M-5090.1D, paragraph 24-3.19). Naval Facilities Engineering Command provides initial and refresher PMPAR training annually. The training schedule is available at the Armed Forces Pest Management Board's DoD Training and Certification website.

2.4.6. Requirements for Integrated Pest Management Coordinators and Environmental Personnel

"The IPMC shall have the educational background, technical knowledge, and management skills to implement and oversee the pest management program" (DoDI 4150.07, section E.4.4.1). Newly designated IPMCs are required to receive training in the administrative and operational requirements of installation pest management. Environmental personnel who have compliance oversight of pesticides on the installation should also receive training. The initial PMPAR and IPMC course provides the necessary training. Naval Facilities Engineering Command, Atlantic conducts these courses annually. If applying pesticides or recommending pesticide applications, the IPMC must be certified as a DoD pesticide applicator. The training schedule is available at the Armed Forces Pest Management Board's DoD Training and Certification website.

2.5. PEST MANAGEMENT CONTRACTING

Contracts requiring the use of pesticides must be reviewed and approved by the NAVFAC Atlantic Applied Biology PPMC. This includes contracts issued by non-appropriated activities and tenant commands on the installation. Pest control contracts are required to be monitored by a trained PMPAR (MCO 5090.2, Volume 14, paragraph 030502.D.).

2.5.1. Pest Management Contracts

The installation's pest management contracts are listed below.

2.5.1.1. Base Operations Support Contract

The installation Assistant Chief of Staff (AC/S) G-F has the option to use an indefinite delivery/indefinite quantity (IDIQ) pest management contract under the Base Operations Support (BOS) contract. This contract can be used for unique or large-scale pest control operations, and covers general indoor and outdoor pest management for invertebrate and vertebrate pests. The names of the current contract companies are listed in appendix E.

2.5.1.2. Vegetation Management Contract

The installation Environmental Security Department has vegetation management contracts to manage invasive weeds; these contracts are overseen primarily by the Land Management Section. Vegetation management work includes the use of pesticides (herbicides) to control weeds in unimproved grounds. The contractors also use non-chemical methods of control such as mechanical removal. The names of the current contract companies are listed in appendix E.

2.5.1.3. Miscellaneous Pest Management Contracts

The MCCS restaurants perform their own pest management independently of the AC/S G_F installation pest management service providers. Hummingbird Aviation applies aerial larvicides about 4 times a year to control mosquitoes; their contract is managed through the AC/S G-F Facilities Engineering and Acquisition Division. Payne Pest Management manages pests for most of the privatized housing, and Corky's Pest Management services the Mesa District of privatized housing, as overseen by the AC/S G-F Housing Division.

2.5.2. Contract Specifications and Review

Pest management contract specifications must be written to ensure effectiveness, safety, and regulatory compliance. The facilities support contract/base operation support (FSC/BOS)

performance-based contract template for pest control (sub-annex 1503020) and grounds maintenance (sub-annex 1503050) is available from NAVFAC Atlantic or on the NAVFAC Portal Public Works Business Line Technical Annex Templates (requires login). The facilities contracting officer (KO) or contracting officer representative (COR) can provide additional information. The KO shall send the contract specifications to the NAVFAC Atlantic PPMC for review prior to sending the contract out for bidding (OPNAVINST 6250.4C, paragraph 4).

Termite pretreatment contract specifications for new construction shall also be reviewed by the NAVFAC Atlantic PPMC prior to procurement. The Unified Facilities Guide Specifications (UFGS) 31 31 16 Soil Treatment for Subterranean Termite Control should be included in all new construction contracts for termite pretreatment. See section 3.2.5.3 for more information on termite treatment contracts.

2.5.3. Government Representatives

Contractors will communicate and submit required pest management reports via their government representative. For the pest control (FSC/BOS) contracts, the representative is the PMPAR who is responsible for assessing the contract. For Non-Appropriated Fund Instrumentality programs (NAFI) (i.e., MCCS) contracts, the representative is the local NAFI organization manager. In cases where a government representative is not available, the installation IPMC may liaison with a contractor's representative.

2.5.4. Contract Requirements

The application of pesticides on Naval properties by contractors is strictly regulated by Department of Defense and Navy regulations, this IPMP, and state regulations. These requirements apply to all pesticide applications including insecticides, herbicides, fungicides, molluscicides, etc. to any area in or outdoors. These requirements apply to any size contract (small purchase or facility support contract generated) and services acquired by any other means including government purchase cards (EBUSOFFINST 4200.1, chapter 6, paragraph 7). The specific requirements for contracted pest control operators working on Naval properties are:

1. Contractor Work Plan (CWP): If required by the contract, a CWP shall be submitted as part of the contractor's proposal. The CWP specifies how the contractor will meet the contract requirements.

2. Pesticide Applicator Certification: All contractor personnel, who apply pesticides (which include all herbicides), shall be certified/licensed in the appropriate applicator category in accordance with section 2.4.3 of this IPMP. All contractors who will apply pesticides shall, prior to the start of work, supply a copy of the certificate(s)/license(s) in accordance with contract specifications. Pesticide business licenses and pesticide applicator certificates are included in appendix E of this IPMP.

3. Pesticide Approval: Pesticides used by contractors must be approved and added to the installation pesticide AUL, before use, by the NAVFAC Atlantic PPMC as described in section 2.2. The list of proposed pesticides shall be included in the CWP or submitted to the designated Government representative using the format designated in the contract specifications. The pesticide AUL is in appendix D of this IPMP.

4. Pesticide Mixing, Storage, and Disposal: Contractors shall not store, mix, or dispose of pesticides or clean pest control equipment on the installation unless an approved pesticide storage and mixing area is specified in the contract and authorized by the KO. One exception to this is soil treatment for termite prevention during building construction;

the contractor must mix the termiticide on-site while the PMPAR or IPMC is there to witness.

5. Pesticide Applications: Only pesticides listed on the pesticide AUL shall be used and applied in a manner consistent with the pesticide label.

6. Pest Management Reporting: Contractors shall submit reports in accordance with the reporting requirements in section 2.3.3.

7. Contractor Vehicles:

    a. Safety equipment: Vehicles used to transport pesticides shall be equipped with a fire extinguisher and a spill and decontamination kit, and be capable of cleaning up the maximum amount of pesticide transported at any given time. Clean water shall be carried for use in emergency personal decontamination.

    b. Security: All pesticides carried on the vehicles shall be secured in locked compartments at all times. Vehicles shall not be left unattended at any time unless properly locked and secured.

    c. Identification: Vehicles will be clearly marked as pest control vehicles.

    d. Appearance: All vehicles shall be maintained with a clean and orderly appearance, free from observable pesticide spills, residues, or build-up.

    e. Transporting pesticides: Pesticides shall not be transported in the cab or occupied part of any vehicle. They shall always be carried in a separate compartment from the occupied cab.

8. Compliance Assessment: All contractors are subject to regulatory compliance assessments by the PMPAR, IPMC, environmental compliance staff, and other authorized government personnel. Pest control vehicles, pesticide applications, and administrative requirements are subject to inspection. Authorized government personnel may also require the contractor to stop work if the work is not being performed in a safe manner.

2.5.5. Contract Performance Assessment

Contracts shall be assessed by a trained PMPAR to ensure environmental and contractual compliance. For FSC/BOS contracts, Functional Assessment Plans (FAPs) for pest control and grounds maintenance should be developed and implemented. Functional Assessment Plan templates are available from the KO or NAVFAC Atlantic Applied Biology. Periodic assessments for pests prior to, during, or after pest control operations should be conducted to ensure efficacy of the services. Pest survey methods for contract performance assessments are found in chapter 8 on each of the Integrated Pest Management Sheets. Periodic assessment of the contractors during pesticide application should also be conducted to ensure appropriate safety measures are being taken. The contractors' vehicles and equipment must be made available for inspection when requested. In the absence of a PMPAR, a preventive medicine technician can provide information on the efficacy of pest control in some facilities. The PMT conducts monthly inspections that include pest surveys of food service facilities and child development centers. The PMPAR and the IPMC should liaison and coordinate performance assessment activities with the PMT.

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Chapter 3. Operations

3.1. INTEGRATED PEST MANAGEMENT

United States Code (7 U.S.C. § 136r-1) states, “Federal agencies shall use Integrated Pest Management techniques in carrying out pest management activities and shall promote Integrated Pest Management through procurement and regulatory policies, and other activities.” Department of Defense policy is to, “Incorporate sustainable Integrated Pest Management (IPM) philosophy, strategies, and techniques in all aspects of DoD and Component vector control and pest management planning, training, and operations, including installation Integrated Pest Management Plans and other written guidance to reduce pesticide risk and prevent pollution” (OPNAVINST 6250.4C).

3.1.1. Integrated Pest Management Defined

Integrated pest management is, “a planned program incorporating education, continuous surveillance, record keeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, materiel, or the environment. IPM uses targeted, sustainable (effective, economical, environmentally sound) methods including habitat modification, biological, genetic, cultural, mechanical, physical, and regulatory controls, and when necessary, the judicious use of least hazardous pesticides” (OPNAVINST 6250.4C, paragraph 2). There are significant differences between IPM and traditional pest control methods. Table 3-1 lists some of the differences.

In IPM programs, treatments are not made according to a predetermined schedule. Rather, treatments are made only when and where monitoring has indicated that the pest will cause unacceptable economic, medical, or aesthetic damage. Treatments are chosen and timed to be most effective and least hazardous to non-target organisms and the general environment.

Pest Management	Traditional Pest Control	IPM
Program Strategy	Reactive	Preventive
Customer Education	Minimal	Extensive
Potential Liability	High	Low
Emphasis	Routine pesticide application	Pesticides used when exclusion, sanitation, and other non-chemical methods are inadequate
Inspection and Monitoring	Minimal	Extensive
Pesticide Application Frequency	By schedule	By need
Pesticide Application Target	Area-wide spraying	Spot treatment of areas where pests are found
Customer Involvement in Preventing Pests	Minimal	Extensive

Table 3-1. Comparison of traditional pest control and integrated pest management methods.

Under an IPM program, execution of individual pest management practices involves the following steps:

1. Identify pests.
2. Establish action thresholds that are sufficient to warrant treatment. In determining threshold levels, the amount of public health, aesthetic, or economic threat that can be tolerated must be correlated with the population size of pests, natural enemies, time in the season, and/or life stage of the pest or host.
3. Develop plans/strategies through an integration of treatment methods that are effective against the pest, least disruptive to natural controls, and least hazardous to human health and the environment.
4. Monitor pest population before and after treatment. Monitoring is an ongoing activity.
5. Implement pest control measures if economic damage or public health threat are above the established action threshold.
6. Document results.
7. Evaluate/redesign plan to determine the outcome of treatment actions.

Controlling pests has traditionally been the responsibility of the pest control operator. Using IPM, preventing and controlling pests is the responsibility of all personnel on the installation.

3.1.2. Integrated Pest Management Compliance

All pesticide applicators are trained in IPM techniques during initial and refresher licensing or certification training. Government representatives shall assess the PMSP's compliance with IPM. This may include:

1. Reviewing the approved pesticide list for use of less toxic pesticides, baits with sustainable control, short-residual and pest-specific products, and products used for spot treatment rather than broadcast application
2. Ensuring contractor work plans and partner pest management plans incorporate IPM
3. Reviewing pest management records to ensure that only approved pesticides are used, spot applications are performed, non-chemical methods are used, and routine surveys are being performed
4. Observing pest control service calls to ensure pest control operators identify conditions conducive to pest infestations, provide information to building occupants on how they can prevent pests, use only approved pesticides, perform spot treatments, properly apply baits, conduct routine surveys, and monitor baits/bait stations/traps.

3.1.3. Integrated Pest Management Sheets

The IPM sheets in chapter 8 provide general guidelines for the integrated control of pests. They may be used as a reference for surveillance and non-chemical and chemical control alternatives.

3.2. CURRENT PEST MANAGEMENT OPERATIONS

Nuisance and health-related pests and vegetation are managed on the installation. Table 3-2 illustrates the relative frequency and counts of pest management issues based on the pest management records from fiscal years 2016 to 2018.

Pest	Responses
Ants, nuisance	6,790
Mice	1,394
Fleas	1,302
Broad-leaved Weeds	773
Mixed Grasses and Weeds	746
Rats	699
Spiders	615
Bees	420
Cockroaches	354
Grasses	299
Gophers	189
Ornamental & Turf Diseases	134
Mosquitoes – Larval/pupal	130
Woody Vegetation	121
Ground Squirrels	97
Wasps and Hornets	65
Bed Bugs	52
Squirrels	43
All others	58
TOTAL	**14,281**

Table 3-2. Counts of pest management issues from 2016 to 2018.

3.2.1. Inspections

Routine inspections provide early detection of pests. Pest inspections should be conducted routinely at all food service, sales, and storage facilities. Preventive medicine technicians conduct periodic food safety inspections including surveys for pests and pest signs at the galleys and food facilities. They also inspect the child development center, exchanges, and barber shops. The preventive medicine department provides monthly and quarterly sanitation inspection reports and, if necessary, immediate recommendations to facility managers when contractor-administered pest control operations are needed to control pests. United States (U.S.) Army Veterinarian food inspectors conduct food quality inspections that include examining food items for pests at the commissary and at food service and sales locations.

3.2.2. General Household and Nuisance Pests

Nuisance pests, such as cockroaches and ants, often account for the most significant pest problems indoors. Non-chemical practices which limit pest access to food, water, and shelter

are the primary sustainable means of control. Sanitation, trapping, and pest exclusion are all prime examples of such non-chemical control measures. Low-toxicity insecticidal baits are also used effectively against cockroaches and ants. Most pesticide applications can be effective in immediate reduction of pest populations, but have short residual efficacy and are not sustainable in the long term.

In buildings that are most susceptible to pest infestation, such as Child Development Centers, these measures are performed on a scheduled basis through preventive maintenance contracts. Common use areas and food consumption areas of other buildings, such as restrooms, coffee messes, lounge areas, and vending machine rooms, are serviced on either a monthly or quarterly basis, depending on the preventive maintenance contract for that building, with response to call-backs as necessary. This also includes common use areas of the barracks, warehouses, and administration buildings. Buildings where there is no food and where problems occur only occasionally such as shops and storage buildings are handled on a service call basis. Pesticide treatments in food handling areas shall be confined to crack and crevice placement when using residual aerosol or dust formulations. Insect growth regulators and baits are used to complement other control measures. Self-contained light traps may also be utilized in these areas. Low-odor formulations are used in offices and in other spaces where a pesticide odor would be objectionable.

3.2.3. Grounds Maintenance

Grounds maintenance is performed on improved or landscaped grounds. Pest management during grounds maintenance may involve weed control; control of pests and disease on plants, trees, and turf; and control of vertebrate animals (e.g., squirrels, moles) that may destroy plants and turf. Mechanical removal of weeds and mowing are routinely performed. Grounds maintenance also includes weed control in drainage ditches that may contribute to mosquito control and bird habitat removal. Weed control is performed along roadways, fence lines, and at fuel farms where they pose fire and visibility concerns.

3.2.3.1. Turf and Ornamental Pests

Turf and ornamental pests include insects and diseases. White grubs and ants infest the soil and roots of plants. Japanese beetles, bagworms, tent caterpillars, sod webworms, and armyworms feed on the leaves of plants. Leafhoppers, scale insects, and aphids are referred to as plant sucking insects and feed on the fluids inside of plants. Oak borers and bark beetles are insects that bore into plants or trees and disrupt the plants' ability to transport nutrition and water. Various plant diseases including brown patch and dollar spot are also possible turf diseases that may be encountered. Ornamental diseases can cause leaf spots, blights, mildews, and wilts from fungi, bacteria, and viruses.

3.2.3.2. Weed Control

A wide variety of herbicides are available for controlling unwanted vegetation. Extreme care should be taken when using herbicides around waterways. Herbicides can be used around mowing obstacles such as signs, fire hydrants, and manholes. Herbicides are used to control weeds along cracks in sidewalks and asphalt parking areas, along fence lines, around buildings, and along ditch banks. Selective herbicides are used to control various weeds that occur in lawns on the installation. Various cultural and chemical controls can be used to deal with these and other weed control problems. When using chemical controls, both selective and non-selective herbicides may be used.

3.2.3.3. Aquatic Weed Control

Aquatic weed control work should be conducted in accordance with the Integrated Natural Resource Management Plan. The policy is to control and limit the spread of invasive species of plants, and to protect aquatic plant species. Each pesticide must be approved prior to use to prevent harm to the natural resources that feed in the ponds.

3.2.4. Golf Course and Athletic Fields

Pest management operations include the following:

1. Weed, fungus, and insect control on golf course grounds
2. Weed control on ball fields
3. Weed control in miscellaneous MCCS facilities.

The golf course includes 181 acres of greens, fairways, and rough with *Poa annua* on the greens and kikuyu grass on the fairways and rough. Undesirable vegetation in the turf grass are controlled by using pre- and post-emergent selective herbicides.

3.2.4.1. Nematode Control

Root knot nematodes can be serious golf course pests in California. Nematodes are difficult to control and are often responsible for large amounts of turf damage. The best management practices for golf courses with nematode problems are:

1. Avoid other stresses on the grass as much as possible
2. Monitor nematode populations by sampling frequently
3. Apply nematicides when needed.

Historically, most nematicides have been toxic at low levels and water soluble in order to move into the soil profile and get to the nematodes. Many of the effective nematicides used in the past have been withdrawn from the market during the last 25 years for environmental and health reasons until only a handful remain. When using any nematicide, the product label must be strictly adhered to in order to minimize human and environmental health impacts and to avoid liability. It is a NAVFAC Atlantic Applied Biology policy that the presence of nematodes must be verified by a soil test before a nematicide can be used. The soil samples should be taken and the results forwarded to the NAVFAC Atlantic PPMC before approval can be given for the purchase of nematicides.

3.2.4.2. Other Golf Course Pests

Other insect pests include black turfgrass ataenius and California ground squirrels. Significant damage to the turf can often be avoided by inspecting the turf daily during the periods when pest and disease problems are likely to occur. Disease occurrence is often decreased or avoided through cultural control, such as proper fertilization and watering. Natural controls are maximized when chemical control operations are based on need instead of a schedule. This careful use of chemical control can help avoid environmental and pest resistance caused by overuse of pesticides. The only exemptions to need-based control are the preventive treatments for pythium and dollar spot.

3.2.5. Structural Pests

Structural pests which have an impact on activity operations include termites, powder post beetles, wood borers, and wood destroying (decay) fungi. Of these, subterranean termites and wood destroying fungi cause the most damage. A well-managed structural pest control program includes inspection, prevention, and chemical treatments when needed.

3.2.5.1. Structural Pest Inspections

All susceptible structures that contain wood or wooden structural members should be inspected on a prescribed basis. Wooden structures that are in areas where termites occur should be inspected annually regardless of previous preventive measures. Semiannual inspections are required in regions where Formosan termites or Asian subterranean termites exist. Buildings that do not contain wooden structural elements may still require inspection and treatment because termite colonies may infest any cellulose containing material in the building, such as wooden door frames and doors, trim, cardboard boxes, and paper goods in storage. Record when the building was inspected, the location of any infestation found, and the description of any treatment performed on a DD Form 1070, a copy of which is included on the CD accompanying this plan.

Priority for inspection should be given to facilities such as:

1. Historical buildings or other cultural resources where termite damage may necessitate repairs out of character for the building or loss of that resource
2. Buildings made of wood
3. Buildings that did not receive a preconstruction termite soil treatment
4. Medical treatment facilities and child development centers, where swarming termites may be a nuisance or compromise sanitation.

Subterranean termites are usually located in soil with tunnels connecting the nest to sources of wood. Early detection and control are necessary to prevent damage to wooden structures and cellulose-containing materials inside buildings. Because contact with air dehydrates termites, they tunnel through wood, often undetected, or travel inside mud tubes. Significant damage can occur even though the wood appears intact on the surface.

Things to look for during termite inspections:

1. Existence of termite swarmers
2. Existence of mud tubes (these are most visible around the foundation or inside a crawl space); termite galleries will be filled with excrement and other debris
3. Small dark spots (mud plugs) on interior walls
4. Buckling or bubbling of paint (the surface of a severely damaged piece of wood may appear blistered or peeled)
5. Damaged or rotting wood (infested wood may be discolored/darkened and can often be easily punctured by a knife or screwdriver)
6. Sound of hollow timbers or wood

7. Elevated moisture readings.

Conditions favorable to termites should also be observed and corrected:

1. Wood in contact with soil
2. Form boards left in concrete or in contact with soil
3. Wood members set in concrete floor
4. Wood steps in contact with soil
5. Wood steps without shields
6. Wood siding in contact with soils
7. Pipes in contact with soil and wood
8. No shields on foundation
9. Faulty termite shield
10. Poor ventilation under building
11. Water collection under building or adjacent
12. Plants against building
13. Leaky plumbing in building
14. Wood scrap piled under building
15. Loose wire in contact with soil.

With proper inspection, very little termite damage should result before discovery. Termites typically work slowly and can be detected and controlled before causing structural weakness to the timbers. Once an infestation is discovered, treatment should be applied within a few months. More information on drywood and subterranean termites can be found in the IPM sheets in chapter 8 of this plan (section 8.3 Structural Pests).

3.2.5.2. Termite Control

Corrective chemical treatments should be performed when termites are found actively damaging wood. All wood that is damaged by termites or wood rot fungi should be replaced with treated wood to prevent future damage.

Various control techniques as part of an integrated approach to structural pest control include:

1. The use of construction practices which protect wood from attack
2. The control of moisture through proper drainage and ventilation
3. The use of termiticides for barrier treatment of soil and hollow masonry units of building foundations
4. The use of termite bait systems

5. The use of treated wood and/or metal and concrete supporting structures

6. Fumigation for extensive drywood termite infestations.

Top priority is given to preventive control treatments, such as preconstruction termite soil treatments and the use of treated wood. Physical barriers can be breached by termites, and under certain circumstances insecticides may be ineffective. The continuity of the chemical barrier may be broken, and maintenance or repair personnel may leave a termite-prone condition after working underneath or around the structure. Once treated with termiticides, care must be taken to prevent disturbance of the soil barrier within one foot of the foundation (e.g. moved by gardening activity or covered when raised flower beds are installed against a building). This can be a serious problem in housing areas where people are encouraged to beautify their yards. Raised beds must be four-sided (i.e., not using the foundation as one side) and soil within one foot of the foundation should not be cultivated for planting.

Termites continuously forage, which is why it is vital to create a continuous barrier, as even small gaps in the treatment may eventually allow termites to bypass the chemical barrier. This problem is diminished with non-repellent termiticides, because termites do not avoid the treatment zone as they would with repellent termiticides. After the colony is eliminated, runways from soil to wood should be removed, the soil should be treated, and leaks that keep wood within the structure wet should be repaired. Possible re-infestation can be prevented by frequent inspections for signs of termites. Termiticide can be applied to carton and live termites in the structure.

3.2.5.3. Administration of Termite Treatment Contracts and Warrantees

Termite treatment contracts shall follow all of the requirements found in section 2.5.4. The NAVFAC Atlantic PPMC should review contract specifications for termite control. Termiticides, when needed, must be applied at the highest EPA-labeled concentration and application rate. Soil treatment for termite prevention will be conducted during building construction in accordance with the Unified Facilities Guide Specifications (UFGS) 31 31 16 (DoDI 4150.07, section E.4.7.15.1). In accordance with UFGS 31 31 16, the contractor shall provide a warranty of no less than five years. This ensures that if termite activity is discovered during the five-year warranty period, the contractor will re-treat the soil and repair or replace any damage that has been caused by termite infestation. Termiticides used for termite control must be non-repellent, such as pesticides with the active ingredient of fipronil, imidacloprid, chlorfenapyr, or chlorantraniliprole. DoD-certified pesticide applicators or PMPARs trained in pest control shall inspect applications of pesticides by contractors to control termites or other wood-destroying organisms.

3.2.5.4. Cultural Resources

Pest control operations should be checked for consistency with the Integrated Cultural Resources Management Plan. Pest management operations requiring alteration of historic buildings or structures, including exclusion modifications and significant changes in landscapes, will require consultation with the cultural resources manager (CRM) through the IPMC.

Termites damage wooden structures and incidental wood in steel and concrete buildings, such as trim, molding, paneling, and door and window frames. Annual termite inspections can detect termite infestations before significant damage occurs. Any termite inspections of historic buildings or structures should be documented using DD Form 1070 and reported immediately to the CRM.

3.2.6. Invasive and Non-Indigenous Species Management

Executive orders (EOs) 13112 and 13751 are implemented at DoD installations through DoDI 4150.07 (section E4.7.6) which requires that installations prevent, detect, and monitor invasive species. Guidance on the use of available control techniques may be obtained from the installation's NAVFAC Atlantic PPMC.

Among the 1,015 plant species on MCB Camp Pendleton, 308 are nonnative species, introduced since the late 1700s when European settlement began. While many of these nonnative plants cause little impact to the environment, others can be invasive and damaging to natural ecosystems. A comprehensive list of the native and nonnative plant species is in the INRMP on the CD that accompanies this plan.

Although most of the fish and wildlife species on MCB Camp Pendleton are considered native to the region, many fish and wildlife species are exotic. Some are invasive and may be causing the decline or local extirpation of native species as a result of competitive exclusion, habitat alteration, predation, nest parasitism, etc. Examples of wildlife species on the installation include beaver, brown-headed cowbird, bullfrog, red swamp crayfish, Argentine ants, and several exotic fish species such as carp, black bullhead, and green sunfish. A comprehensive list of the native and nonnative wildlife species is in the INRMP on the CD that accompanies this plan.

3.2.7. Stored Product Pests

Stored product pests are a potential problem at any installation. Inspection upon receipt of products and rejection of obviously infested materials generally prevents heavily infested material from being placed in the storage area.

3.2.7.1. Dermestid Beetle

If dermestid beetles (Dermestidae:*Trogoderma, Desmestes,*etc.) are found in a commodity, the whole lot of food must be condemned. The pointed hairs on the larvae will cause digestive problems if the contaminated food is eaten. An accurate identification of dermestids is required to condemn the lot. For the most part, sanitation (keeping storage areas clean) and stock rotation minimize or prevent pest infestation. If an infestation is found, the most effective way to control dermestids is through deep cleaning, vacuuming, and discarding or segregating the infested product while surveying adjacent areas.

3.2.7.2. Tribolium Beetles

Tribolium species commonly infest grain products and flour. Infested flour turns gray in color. The beetles secrete benzoquinones causing odors and poor taste. The tolerance level is three insects per pound of product. Anything more must be discarded.

3.2.7.3. Storing Meal, Ready-to-Eat Rations

More stringent controls are required for prevention of stored products pests when storing meal, ready-to-eat (MRE) rations. Guidance on this program can be found in AFPMB Technical Guide No. 38, Protecting Meals, Ready-to-Eat Rations (MREs) and Other Subsistence during Storage.

3.2.8. Health-Related Pests

In accordance with OPNAVINST 6250.4C (paragraph 4c), the NMRTC Preventive Medicine Department is responsible for conducting inspections and surveys aboard the installation to

determine the species, source, location, and density of medically-important arthropods and provides the results to the public works and facilities departments for use in planning pest control operations. Mosquitoes, biting flies, and filth flies constitute the most important insect pests for both disease transmission and general annoyance. Controlling these insect pests should be based on a thorough knowledge of the target pest, actionable surveillance data, and compelling evidence of an infestation that poses an emergent public health risk.

3.2.8.1. Mosquito Biology and Medical Importance

There are over 3,000 mosquito species worldwide and about 150 species in the U.S. All mosquitoes have the same life cycle and are similar in their biology and habits. However, differences in breeding habitats and host preference occur between the species and these subtle differences affect how we survey and control them. Mosquitoes can be separated into two groups, depending on where they lay their eggs. The flood-water mosquitoes lay their eggs in temporary bodies of water such as artificial containers, tree holes, tidal marches, etc. Eggs of flood-water mosquitoes are laid on moist substrate just above the surface of the water; this group includes *Aedes* and *Psorophora* species. Permanent-water mosquitoes lay their eggs in permanent or semi-permanent water such as ponds, lakes, marshes, ditches, etc. Eggs of permanent water mosquitoes are laid on the water's surface; this group includes *Anopheles* and *Culex* species. It is only the female mosquito that bites; female mosquitoes require a blood-meal before they can lay viable eggs. The male mosquito feeds on plant sugars such as nectar, and does not bite. The Navy Bureau of Medicine and Surgery entomologists, centered at the Navy Entomology Center of Excellence (NECE) and the Navy Environmental and Preventive Medicine Units (NEPMUs), are responsible for providing professional guidance, recommendations, and on-site assistance on all technical matters relating to disease vectors and other medically important pests (OPNAVINST 6250.4C, paragraph 4c).

Mosquitoes are both a major nuisance and a medically important pest. Protozoan pathogens (e.g., Malaria), nematode worms (e.g., dog heartworm), and a number of different viruses (e.g., West Nile Virus, Zika Virus), can all be transmitted by mosquitoes. The NECE West Nile Virus Surveillance and Control Guide for U.S. Navy and Marine Corps Installations can be found at: http://www.med.navy.mil/sites/nmcphc/Documents/nece/WNV-Surveillance-and-Control-Guide-2014.pdf.

Dengue, Chikungunya virus (CHIKV), and Zika virus are all known to be transmitted by *Aedes aegypti* and *Aedes albopictus* mosquitoes, which are common in tropical and subtropical areas throughout the world. *Aedes aegypti* can also transmit Yellow Fever. *Aedes* mosquitoes breed in containers and generally bite during the day. Humans are the reservoir for Dengue, CHIKV, and Zika virus. These diseases can be introduced into an area by persons infected during travel in areas where these diseases are found. Local transmission can occur if the vector mosquito species is present in the area, and the vector mosquito becomes infected after biting an infected person. Transmission of Zika virus through blood and sexual contact has also been reported. *Aedes* mosquitoes are an invasive species whose eggs, which remain viable when dried, are easily transported throughout the world in shipping containers, equipment, and vehicles. They are daytime and nighttime biters with crepuscular (dawn and dusk) peak feeding activity. Surveillance activities should be performed during peak times of activity. *Aedes* mosquitoes are not effectively controlled by standard nighttime ultra-low volume (ULV) applications. Dawn or dusk ULV applications are recommended against these species. Additional information on *Aedes* vector surveillance, control, and the viruses they transmit can be found on the website for the Navy and Marine Corps Public Health Center (NMCPHC), the Armed Forces Pest Management Board (AFPMB), and the Center for Disease Control (CDC).

3.2.8.2. Mosquito Surveillance and Control

Routine mosquito surveys are the responsibility of preventive medicine technicians. However, if a PMT is not available, a pest control provider can conduct mosquito surveillance. If additional assistance is needed, Navy entomologists from NECE or the NEPMUs can provide assistance in establishing mosquito surveillance programs. Survey operations are essential to determine the species present, the population level involved, and the potential risk of disease transmission. Surveys also serve as a valuable tool in evaluating control operations. Mosquito surveillance includes conducting both larval and adult surveys. Larval surveys are important because they determine exactly where mosquitoes are breeding, providing the information necessary to manage or eliminate mosquitoes at the source. Larval surveys involve regular dipping stations that are selected, noted on a map, and inspected periodically throughout the mosquito season. In areas where mosquito control is conducted, random larval sampling should be made to check the effectiveness of the control program.

Adult mosquito surveys may be conducted by either collecting mosquitoes from resting sites or using traps. Traps should be placed near where the mosquitoes are expected to be found, during the periods they are active. Two adult mosquito traps that are available with National Stock Numbers (NSNs) are the CDC light trap and the Biogents (BG) Sentinel trap. Traps should be baited with CO_2 from dry ice, when available or, in the case of the BG traps, with the manufactures' recommended lure. The BG-Sentinel™ trap is specifically designed to collect daytime-feeding mosquitoes, and has been found to collect *Ae. aegypti* and *Ae. albopictus* (Zika vectors) more effectively than the standard CDC light trap. Adult collections are then counted, identified to genus or species, and then may be submitted to a regional Army or Air Force public health laboratory for testing, so that the disease transmission risk can be assessed. Adult surveys focus on collecting female mosquitoes because they are the only ones that bite. A high proportion of adult males in a trap collection usually will indicate a nearby larval habitat, and a survey of the area should be done to locate possible breeding sites.

PMTS and installation pest control operators assigned to NMRTC conduct mosquito surveillance from May to September after complaints are received. CDC light traps and BG Sentinel traps are used. Traps are placed at NMRTC, Stepp Stables, and the Lake O'Neill Recreation Center. Specimens are frozen and are sent to NEPMU-5 for identification. Employee and resident mosquito complaints can be made through the local service desk and then forwarded to preventive medicine.

Mosquito control methods are either permanent (e.g., eliminating the water source) or temporary (e.g., chemical control) in nature and may be directed against larvae or adults. The most effective way to control mosquitoes is to target the larval stage. Larvicides, pesticides specifically labeled to control mosquito larval stages, should be applied to areas where water stands for longer than 7 days when results of mosquito dip counts exceed 1-2 larvae per dip.

Mosquito fish (*Gambusia* sp.) can provide biological control and are in many of the suitable perennial waters on MCB Camp Pendleton. *Gambusia* have the ability to outcompete other species and harm endangered and threatened species found on the installation, so pest control personnel will not introduce or move *Gambusia* fish on MCB Camp Pendleton. To decrease the amount of standing water, it is important to have a drainage system allowing proper runoff of rain water from roadways. Ditches should be maintained free of weed growth. This increases water flow in the ditch allowing access of natural mosquito predators. It is also important to educate the public on source reduction when the problem mosquitoes originate from artificial containers (e.g., bird baths, gutters, flower pots) found around homes and other buildings.

This installation performs ultra-low volume (ULV) pesticide applications to control adult mosquitoes on an as needed basis via the in-house pesticide applicators. When female adult mosquito counts exceed 25 per night per trap, it is recommended that chemical control be initiated upon approval from preventive medicine. These recommended thresholds may vary depending on location of the installation and preventive medicine guidance. If local transmission of a disease is confirmed, thresholds will likely decrease. If a trap count exceeds the threshold, the area surrounding that trap should be surveyed to identify and treat the active breeding site. For many species, mosquito activity is greatest from dusk to dawn. However, as mentioned in the above mosquito biology section, *Aedes* mosquitoes are important vectors that continue to bite during the day. Ultra-low volume treatments must be made during peak mosquito activity when weather conditions are optimal; therefore, for control of non-*Aedes* mosquitoes, ULV pesticide applications should be conducted in the early morning hours before the sun warms the ground or in the evening after the ground has cooled (when temperature inversion usually occurs). Control operations for *Aedes* mosquitoes should be targeted in the early morning or late afternoon rather than daytime because weather conditions are more favorable for the treatment.

Regular testing of ULV aerosol droplet dispersal is required to assure maximum control, minimum insecticide use, and prevention of automobile finish spotting caused by droplets that are too large. This testing must be done at the beginning of each spray season and for every 50–100 hours of operation, or when the pesticide is changed. More information is included in AFPMB TG No. 13, Ultra Low Volume Dispersal of Insecticides by Cold Aerosol and Thermal Fog Ground Equipment. Government personnel can obtain slides for aerosol droplet size testing from the Testing and Evaluation Department at the Navy Entomology Center of Excellence, Jacksonville, Florida. Additionally, application of residual insecticides labeled for mosquito control in relatively small areas near the source of the mosquitoes has been shown to be highly effective. Automated pesticide misting devices are not allowed according to DoDI 4150.07 (section E4.10.3).

If mosquito populations are extremely high or infestations occur in hard to reach areas, aerial application of adulticides or larvicides by helicopter or fixed-wing aircraft may be the only effective treatment method available. Contractors aerially apply larvicides about four times a year on the installation. Refer to section 3.2.8.10 for requirements regarding aerial spraying.

3.2.8.3. Filth Fly Management

Performing routine sanitation is the best method to manage filth flies (houseflies, blow flies, flesh flies, bottle flies, etc.). Removal of refuse and routine cleaning of garbage cans and dumpsters will minimize the problem. Garbage cans and dumpsters should be placed on concrete pads at least 100 feet from facilities to reduce breeding under and around the containers and to minimize access to the facilities. Continuous monitoring of sanitation conditions in and around food service areas helps assure that significant fly breeding will not occur.

Chemical control of filth flies is short-term and unsustainable. The choice of fly control techniques must be based on an on-site evaluation of the problem. Pest control personnel inspect areas where garbage is handled and treat these locations with approved insecticides when flies exceed control limits. Preventive medicine technicians also inspect these areas and report significant findings to facility managers for corrective action. Exclusion devices, such as screens and air curtains, help prevent the entrance of flying insects into buildings when installed and properly maintained. Aerosol insecticide treatments are provided when adult flies become a problem in indoor spaces. Automated pesticide misting devices are not allowed according to

DoDI 4150.07 unless approved by the appropriate pest management consultant (section E4.10.3). Light trap devices are also helpful for filth fly control in food handling areas, but only when they are placed inside of the building. Use only non-contaminating light traps with some way of containing the dead insects. For more information on filth fly management, see AFPMB TG No. 29, Integrated Pest Management In and Around Buildings.

3.2.8.4. Bed Bug Management

Bed bugs belong to a family of blood-feeding, ectoparasitic insects called *Cimicidae*. They have a number of features that make them very effective pests and difficult to control. Their small, flattened body allows them to hide in inconspicuous places such as cracks and crevices. A female can lay several hundred eggs during her lifetime. Bed bugs can survive a long time without feeding; and many insecticides have been rendered ineffective due to resistance development. The most common way bed bugs are introduced is by the movement of infested items (e.g., bedding, clothing, and luggage) from one place to another. The common bed bug is not known to transmit human disease. For most people, the bite of a bed bug is painless and will usually go unnoticed, though many people can have allergenic skin reactions, ranging in severity from local inflammation and itchiness, to asthmatic symptoms and anemia. Although the common bed bug seems to prefer human hosts, they are also capable of feeding on birds, rodents, or other mammals. Other cimicid species, like bat bugs and swallow bugs, mainly feed on bats or birds, but may incidentally bite people when their usual host abandons the nest or is eliminated from the building.

Bed bugs can be difficult pests to detect without a diligent survey strategy. Bed bugs typically feed at night when the host is asleep, and hide in cracks and crevices during the day. It is very important to thoroughly inspect areas where bed bug infestation is suspected. Typical harborage areas might include mattress seams, box springs, bed frames, night stands, picture frames, loose wallpaper, and curtains. Bed bugs typically travel 5–20 feet from their harborage area to feed. When populations are small, infestations may go unnoticed. Some tell-tale signs of a larger bed bug population include the presence of fecal spotting, shed skins, increased biting frequency, and in serious cases a distinct, obnoxiously sweet odor produced by the bugs. Persons conducting inspections and surveys should be properly trained on what to look for and where to look for infestations. The NECE and NEPMU personnel are available to provide training on bed bug inspections.

Bed bugs are a public health issue. PMTs monitor for bedbugs at temporary living quarters and the barracks but don’t validate complaints. In-house pest controllers treat for bed bugs. Bed bug control may be more difficult to achieve today with increased travel and more stringent limitations on available control materials. A successful control program will require a carefully planned and integrated approach. For more information on controlling bed bugs see AFPMB Technical Guide No. 44, Bed Bugs—Importance, Biology, and Control Strategies.

3.2.8.5. Rodent Management

Rodents are a special concern on MCB Camp Pendleton. The IPMC, Environmental Security Land Management Section staff, and all pest control personnel must balance the need to control rodents while preventing non-target impacts or secondary poisonings. Rodents that need to be controlled onboard the installation include commensal rodents (brown rats, black rats, and house mice) and others (pocket gophers, ground squirrels, deer mice, and wood rats).

Rodent control work is an ongoing program to eliminate the causes of rodent infestations. Major emphasis is placed on sanitation and exclusion to limit the amount of food and harborage

available to rodents. Tamper-resistant bait stations should be maintained in high infestation areas. There are specific EPA requirements for first generation anticoagulant products (warfarin, chlorophacinone, and diphacinone), second generation anticoagulant products (brodifacoum, bromadiolone, difenacoum, and difethialone), and non-anticoagulants (bromethalin, cholecalciferol, and zinc phosphide). Bait stations are required for all outdoor, above-ground placements and must be placed within 100 feet of man-made structures. Bait stations are also required indoors if exposure to children, pets, or non-target animals is possible. Mechanical traps (snap traps, glue traps, etc.) are another effective control method. Trapping is an effective way of quickly reducing a large mouse population.

All personnel can prevent commensal rodents from entering facilities by eliminating gaps around doors and utilities and by practicing good housekeeping by eliminating food sources. Signs of rodent infestations should be reported to pest control personnel.

Only pest control personnel are authorized to use rodenticides on the installation. The EPA completed a safety review in 2008 of rat and mouse poison products. Based on that review, EPA tightened safety standards to reduce risks to humans, pets, and non-target wildlife. Four pesticides that pose the greatest risk to non-target wildlife are brodifacoum, bromadiolone, difenacoum, and difethialone. These are called “second-generation anticoagulants” and are especially hazardous for several reasons. They are highly toxic and they persist a long time in body tissues. They are more likely to be toxic in a single feeding than earlier products, but since time-to-death is several days, rodents can feed multiple times before death, leading to carcasses that may be many times the lethal dose. Predators or scavengers that feed on those poisoned rodents may consume enough to suffer harm.

Environmental Security Land Management Section staff can assist pest control personnel in identifying rodents. Proper identification of rodents by pest control personnel is necessary because active ingredients contained within rodenticide products are restricted by the label to certain target pests.

Pest control personnel are required to contact Environmental Security Land Management Section staff when rodent control operations are conducted in Range 116, Edson Range, and San Onofre 1 and 2 Housing areas since these operations may impact endangered or threatened species.

3.2.8.6. Bird Management

Pigeons are the primary bird pests on most installations. Pigeons, English sparrows, and European starlings can be controlled without a permit because they are not covered under the Migratory Bird Treaty Act (MBTA). Other bird species require special permits before any control measures can be taken. Bird control methods vary according to the situation. Bird droppings pose a health hazard, as a possible cause of histoplasmosis and other respiratory problems when airborne. Bird ectoparasites, such as mites, can also fall on installation employees. Ultrasonic devices and plastic owls and snakes, etc. are not effective for bird control. The best alternative for bird control is bird-proofing or the exclusion of birds by closing up all openings. Because of its permanency, bird-proofing (e.g., the placing of hardware cloth and chicken wire over potential roosts) is considered the most cost effective means of control. Population reduction techniques (e.g., destruction of nests accessible by a ladder or cherry picker) can sometimes be used effectively. In order to ensure that nest removal does not inadvertently violate MBTA, contact the Environmental Division for nest species identification prior to removing nests. Repellent chemicals which produce alarm reactions and cause a flock to leave

or avoid an area are often used. Control personnel should continually monitor bird population levels and take appropriate control actions when required.

3.2.8.7. Bird/Animal Aircraft Strike Hazard

Wildlife populations on the airfield continually present a BASH concern and danger to human health and safety. Habitat that may provide food, cover, or water for various bird/wildlife species may need to be addressed. Corrective recommendations may include removing unused airfield equipment to eliminate perch sites, placing anti-perching devices on equipment to remain, wiring streams and ponds, brush/tree removal, the use of pyrotechnics, or changing the grass mowing program.

3.2.8.8. Feral Animal Management

Feral or free-ranging domestic cats and dogs are considered by the professional wildlife management community to be one of the most widespread and serious threats to the integrity of native wildlife populations (e.g., birds, reptiles, bats) and natural ecosystems in North America. Naval commands must prevent feral cat and dog populations, and ensure their humane removal from Naval lands through close coordination and cooperation between natural resources, pest management, security, veterinary, and housing personnel. In accordance with the Chief of Naval Operations Policy Letter Preventing Feral Cat and Dog Populations on Navy Property (10 Jan 2002) and OPNAV M-5090.1, chapter 12, Naval commands shall not allow trap-neuter-release or the release of unwanted house pets on their lands due to the potential of feral or free-ranging cat populations to act as disease reservoirs, threatening human health, native wildlife populations, and natural ecosystems.

Cats may occasionally be found near food handling areas or dwelling in crawl spaces under buildings where they can cause flea problems inside of the buildings. The elimination of available food by keeping garbage cans and dumpsters sealed will decrease the appeal of the area to the cats. Elimination of shelter is also a good means of control. The installation should discourage people from feeding stray cats. Guidance on feral cat management can be found in AFPMB Technical Guide No. 37, Integrated Management of Stray Animals on Military Installations.

3.2.8.9. Wildlife Conflict

Native and non-native wild animals can adapt to and thrive within human habitations. The animals may become a nuisance, damage buildings or property, or be a source of human disease transmission. Invasive native and non-native wild animals can also kill native animals and plants or disrupt their habitats. Animals that may be pests at MCB Camp Pendleton include bats, skunks, raccoons, and coyotes. Animal damage control efforts will emphasize the use of integrated pest management techniques such as sanitation, not feeding pets outdoors, and exclusion to mitigate damage rather than control populations whenever practical. MCB Camp Pendleton Game Wardens will be called for wildlife or carcass removal. In cases where they cannot be reached and personnel or equipment may be at risk, the certified pesticide applicator will remove the animal.

3.2.8.10. Aerial Spraying

Aerial spraying can be conducted to effectively control disease-carrying insects, pest insects, and undesirable vegetation over a large area. An environmental assessment (EA) for the installation has been prepared for aerial mosquito larvicide applications, and is provided on the CD of additional source documents included with this plan. Validation for aerial spraying must

be obtained from a category 11-certified pest management consultant with BUMED or NAVFAC Atlantic and clearance for aerial spray operations must be obtained from the Federal Aviation Administration. The validation statement and the execution of a requirements type contract should be done before they are required to minimize delays in initiation of control operations.

The DoD tasks the 910th Airlift Wing at Youngstown Air Reserve Station, Ohio to maintain the DoD's only large area fixed-wing aerial spray capability to control disease-carrying insects, pest insects, undesirable vegetation and to disperse oil spills in large bodies of water. Missions may be executed in combat areas, on DoD installations or in response to disasters/emergencies as declared by the President of the United States.

3.2.8.11. Red Imported Fire Ant

Fire ants are a significant health concern due to their aggressive nature when disturbed and the allergic reaction that occurs in some people. The fire ant's mound building and stinging behavior interferes with recreational and grounds maintenance activities. Bait and residual insecticides are available for control of fire ants. Infested areas should be treated with bait, followed by a drench of any mounds 6–8 weeks later. Any active mounds found in the interim should be retreated.

3.2.9. Pest Management in Housing

Housing areas on the installation are under a PPV partnership with Lincoln Military Housing. The PPV partner is responsible for providing pest management services and for upholding the agreements set forth in the Partner's Plan for Pest Control. General pest control and grounds maintenance services are provided by contract. Certificates for the PPV contract pesticide applicators are located in appendix E. Contractors providing services in the PPV areas must follow all state and local laws.

Pet dogs and cats released or lost by owners on base can become a pest problem. Feral cats and dogs are susceptible to and can carry disease, damage natural habitats, harm protected wild animals, become a vehicle strike hazard, and attack and injure personnel. Pet owners are encouraged to microchip their pets. Microchipping is a permanent pet identification system using a computer chip implant in the skin of the animal. This allows a lost pet to be identified even if the collar tag is missing.

3.2.10. Self-Help Pest Management

Self-help pest management programs on DoD installations are authorized by DoDI 4150.07 (section E4.7.7.3) when they are cost-effective and when IPM monitoring indicates the need for control. Self-help pest management allows uncertified personnel to use low-toxicity, ready-to-use (RTU) pesticides for small-scale pest control operations. Examples of self-help programs that may be available are: stinging insect pest control for maintenance personnel, venomous spider control, vegetation control using glyphosate, and barracks/office pest control. Requirements for self-help are:

1. The program shall be reviewed and approved by the IPM coordinator and then by the NAVFAC Atlantic PPMC

2. A program manager, who will be responsible for the program and be the primary point of contact, shall be designated

3. All personnel that will be applying pesticide must be trained and their training documented

4. Only RTU pesticides approved for use by the NAVFAC Atlantic PPMC shall be used

5. The area(s) to be treated should be small enough to be practically treated with RTU pesticides

6. All pesticides will be stored in a storage site as described on the pesticide label

7. All pesticide use will be reported.

Any personnel or departments conducting unauthorized pesticide applications should be directed to immediately cease applications. To request review of a proposed program and submit a statement of need, the IPMC must contact the NAVFAC Atlantic PPMC. The statement of need and sample training modules for various self-help programs are included in the CD accompanying this plan.

3.2.11. Prohibited Operations and Devices

Several operations and devices are prohibited by DoD and DON regulations.

Prohibited operations and devices include:

1. Occupied spaces—Installations shall not permit liquid spray and dust pesticide formulations in any space occupied by unprotected personnel. However, pesticides contained in gel or paste bait formulation may be applied in occupied spaces (OPNAV M-5090.1, paragraph 24-3.2).

2. Preventive or Scheduled Pesticide Treatments—DoD policy prohibits the use of regularly scheduled, periodic pesticide applications except in situations where the installation pest management plan clearly documents that no other technology or approach is available to protect personnel or property of high value (DoDI 4150.07, section E4.10.3).

3. Electrically-Operated Devices—“Electromagnetic exclusion or control devices, ultrasonic repellent or control devices, and outdoor devices for electrocuting flying insects are not approved for use on DoD installations” (DoDI 4150.07, section E4.10.1). This does not apply to indoor use of selected devices, carefully placed, for electrocuting flying insects. Pest surveillance traps and monitoring equipment, such as non-electrocuting mosquito light traps, may also be used by trained personnel.

4. Paints and Coatings Containing Pesticides and Other Biocides—DoD policy prohibits the use of paint containing insecticides on DoD property. This guidance applies to interior and exterior pesticide-containing paints intended for application to structural surfaces, such as walls, ceilings, and siding. It also applies to insecticides formulated and labeled for use as paint additives. Paints containing fungicides as mildew inhibitors may be used when application directions specify no special instructions due to the fungicide. Approved marine anti-fouling compounds or coatings may be applied to protect surfaces of watercraft (DoDI 4150.07, section E4.10.2).

3.3. REGULATORY COMPLIANCE

The Department of Defense’s policy is to ensure that DoD pest management programs achieve, maintain, and monitor compliance with all applicable executive orders and applicable federal,

state, and local statutory and regulatory requirements. When there is a conflict between federal and local regulations, the installation will comply with the more stringent of the two. This may occur with pesticides limited for use by the state, which are not necessarily restricted by the EPA. In this case, the installation must comply with state regulations.

3.3.1. Pesticide Regulation and Enforcement

The U.S. Environmental Protection Agency has the primary authority to regulate pesticides in the United States. The EPA delegates pesticide enforcement authority to states through cooperative agreements. Per OPNAVINST 6250.4C, Navy installations must comply with state and local pesticide use regulations.

The responsibility for compliance and enforcement lies with the installation's commanding general. As the installation CG's pest management advisor, the IPMC shall be familiar with federal, state, and local pesticide use regulations and ensure that all applicators conduct operations in compliance with these regulations. The Environmental Security Department should be familiar with these regulations as well due to the environmental hazards of pesticides. Regulatory enforcement for each of the PMSPs is provided.

1. Commercial contractor applicators: PMPARs shall provide assistance by monitoring contract PMSPs for compliance with all applicable regulations as specified in the contract and will recommend appropriate actions to the contracting officer if the contractor does not comply. Preventive medicine technicians conducting sanitation inspections of food service facility pest management programs can also ensure compliance for safe pesticide use and applicator licensing/certification. Inspection guidelines are found in NAVMED P-5010, chapters 1 and 8. The preventive medicine technicians will notify the IPMC of any potential pesticide application violations observed during the course of routine sanitation inspections.

2. DoD applicators: The pesticide applicator's immediate supervisor, with the assistance of the IPMC, shall also ensure that pesticide use is in compliance. Under the authority of DoDI 4150.07 and DoD Directive 5134.01, and per Department of Defense Manual (DoDM) 4150.07, Volume 1, DoD Pest Management Training and Certification Program, the DoD may deny, suspend, or revoke the certificate of any DoD employee who violates any provision of Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) or falsifies records under DoDM 4150.07, Volume 1. In accordance with DoDM 4150.07, Volume 1, the installation CG may initiate a formal review if FIFRA violations are suspected. Violations shall be reported through appropriate command channels to the NAVFAC Atlantic certifying authority for review. The certifying authority shall determine if further action is required. That action may include suspension of the applicator's certification.

Naval Facilities Engineering Command, Atlantic Applied Biology shall provide assistance to the installation IPMC with compliance and enforcement issues and clarification of regulations. The senior pest management consultant is the certifying official for DoD-certified pesticide applicators on the installation.

3.3.2. Pesticide Laws and Regulations

Primary pesticide regulations include:

1. Federal: U.S. Code of Federal Regulations (CFR) at 40 CFR Section E, 152-180: Pesticide Programs (http://www.access.gpo.gov/nara/cfr/waisidx_03/40cfrv21_03.html).

2. DoD and Marine Corps: DoDI 4150.07, DoD Pest Management Program; MCO 5090.2 Environmental Compliance and Protection Program.

3. California: The California Environmental Protection Agency's Department of Pesticide Regulation regulates the pest control industry (http://www.cdpr.ca.gov/).

3.3.2.1. The Pesticide Label

The primary source of pesticide regulations for the pesticide applicator is found on the pesticide label in accordance with 40 CFR § 156. California may add supplementary labels which are regulations that must be complied with in the state. It is a violation of federal and/or state law to use a pesticide in a manner inconsistent with the label. Note, however, that the pesticide label does not provide specific information for each site where the pesticide may be applied. For example, the pesticide label may allow application of an herbicide to unimproved grounds, but if those grounds are within a ringed map turtle habitat, then pesticide use may be restricted under the Endangered Species Act. Pesticide applicators should be aware of environmentally sensitive areas before beginning any new pesticide application and should consult the installation's environmental division. For more on pesticide labels, see the EPA's Pesticide Labels website.

Endangered Species Protection Bulletins set forth geographically-specific pesticide use limitations for the protection of endangered or threatened species and their designated critical habitat. If the pesticide label directs the applicator to the EPA Bulletins Live website (http://epa.gov/espp/bulletins.htm), they are required to follow the pesticide use limitations found in the Bulletin for the county, pesticide active ingredient, and application month.

3.3.2.2. Other Regulations

Other applicable directives, laws, and regulations concerning pesticide applicators and pest management operations are listed and described in appendix F.

3.4. PESTICIDE MANAGEMENT

Chemical control of pests using pesticides can be an integral part of an IPM program. Proper management of pesticides will ensure a safe and cost-effective pest management program. Management of pesticides includes the proper selection of pesticides, pesticide approval, procurement, storage, mixing, use of pesticide application equipment, and clean-up. The pesticide label provides most of the information needed to manage pesticide use and must be affixed to the container at all times.

3.4.1. Pesticide Selection

The following criteria should be used when selecting a pesticide:

1. Determine the need for a pesticide. Is a chemical pesticide really needed? In some situations, non-chemical control methods may be more effective or less costly and time-consuming in the long term. Will exclusion or habitat elimination take care of the problem?

2. Choose a pesticide with a low toxicity. Can the pest be sufficiently controlled with a pesticide that has a low toxicity to humans?

3. Choose pesticides and pesticide formulations with minimal environmental impact. Avoid using “Restricted Use” pesticides if possible. The environmental impact of pesticide spills is reduced when using a granular pesticide formulation rather than a liquid. Can attractant bait stations be used instead of broadcast application of a pesticide?

4. Choose pesticides that provide a long-term or sustainable solution. For example, contact insecticides applied to ant trails will only temporarily halt the infestation, and may cause the colony to bud and form new colonies, while baits can kill the entire colony including the queen.

3.4.2. Pesticide Procurement

Pesticides used by contractors are included in the cost of the contract and are procured through commercial sources. Pesticides used by DoD personnel may be purchased through the Federal Stock System. Contractors cannot purchase pesticides through the Federal Stock System. DoD approved pesticides listed in the Federal Stock System can be found on the Armed Forces Pest Management Board’s Pesticides and Equipment website. These are not the only pesticides that may be used on the installation. Pesticides listed on the installation’s pesticide Authorized Use List (AUL) (appendix D) may be purchased. All pesticide products and pest control services procured via government credit cards must also be pre-approved by the NAVFAC Atlantic PPMC according to DON eBusiness Operations Office Instruction (EBUSOPSOFFINST) 4200.1A, Department of Navy Policies and Procedures For the Operation and Management of the Government Commercial Purchase Card Program (chapter 6, paragraph 7). For information on requesting new pesticides to the installation pesticide AUL, see section 2.2, Pesticide Approval.

3.4.3. Pesticide Storage

Pesticide storage facilities, retail sales, and vehicles each have specific requirements in regards to pesticide storage.

3.4.3.1. Pesticide Storage Facilities

DoDI 4150.07, section E4.5.1, states that pesticide storage facilities “shall comply with all applicable regulatory standards and shall, where feasible, be modified to meet the minimum standards for new pesticide storage facilities.” The Department of Defense standards are described in AFPMB TG No. 17 Military Handbook, Design of Pest Management Facilities. The NAVFAC Atlantic PPMC should be consulted during the design phase of new pesticide storage facilities to ensure that the latest requirements are included.

At a minimum, all existing facilities shall meet the following standards:

1. An active ventilation system that provides a minimum of six air changes per hour

2. Backflow prevention on all water sources used for mixing/filling

3. No floor drains and a surrounding berm that provides containment of any pesticide spills

4. Warning signs

5. Surrounded by a climb-proof fence with access only through doors with locks.

The FMD Pest Control Shop stores pesticides in two storage facilities beside building 220109. Contractors for the Land Management Section store herbicides in a storage facility by the

Natural Resources Compound. The Land Management Section stores pesticides in a chemical locker in building 2649. The Marine Memorial Golf Course stores pesticides in a storage shed adjacent to building 180412. MCCS stores a few pesticides in a shed next to building 1230T for the Semper Fit Fields and Grounds. Other applicators and contractors are not permitted to store pesticides on the installation.

3.4.3.2. Retail Sale Pesticide Storage

Household, pet, and garden pesticides displayed and sold at the commissary, MCX, and Marine Marts shall be stored in their original, sealed containers and in accordance with OPNAVINST 6250.4C (paragraph 13c) and the AFPMB TG No. 45.

3.4.3.3. Vehicles

Pest control vehicles must carry pesticide spill kits in accordance with OPNAVINST 6250.4C (paragraph 13d). Pesticides shall not be transported in the vehicle's passenger compartment and pesticide containers shall be secured to vehicles to prevent spillage.

3.4.4. Pesticide Mixing

Pesticide mixing is conducted at each of the storage areas listed above. Additionally, for soil treatments for termite prevention during building construction, the contractor must mix the termiticide on-site while the PMPAR or IPMC is there to witness. Pest control operators must mix pesticides in accordance with the pesticide label in appropriate areas that minimize the risk of safety and environmental hazards. Contracted pest control operators must also mix pesticides in accordance with the contract specifications. Persons mixing pesticides with water shall protect the water supply from back-siphoning of the pesticide mixture. They shall also ensure accurate measurement of concentrated pesticide to ensure proper application rate. Precautions must be taken to minimize the risk of a pesticide spill. See section 5.3.4 for pesticide spill prevention measures. Spill kits must be maintained on pest control vehicles and must be available at the mixing site.

3.4.5. Pesticide Application

All pesticides shall be applied in accordance with federal, state, and label directions. In accordance with label directions, personal protective equipment should be worn during the application of pesticides. Application of pesticides should be timed to ensure contact with and maximum kill of the pest and to prevent use under adverse weather conditions that can cause drift of the chemical outside the target area. See section 4.2.2 for more information on timing and drift prevention.

3.4.5.1. Service Containers

Containers other than the original pesticide container that are used for transporting pesticides to the job site must have a copy of the label attached. Service containers used for the application of a pesticide must have the following information on a tag attached to the container: name of party responsible for the container, the identity of the chemical in the container, and the signal word of the chemical. Containers commonly used for food, drink, or household products shall not be used to hold pesticides.

3.4.5.2. Equipment

Only pest control equipment that is in good repair and safe to operate shall be used by PMSPs. The equipment should be in good condition, free from corrosion, clean, and free from leaks. The PMPAR shall inspect equipment used by contract applicators. Applicators shall also ensure that they use equipment suitable to ensure proper application of pesticides.

3.4.6. Pesticide Disposal

All pest control equipment shall be properly cleaned. Contract PMSPs are not allowed to dispose of excess pesticide, used containers, or residues on the installation per contract specifications; they must conduct all cleaning off-site. Spray tanks and pesticide containers must be triple-rinsed prior to storage or disposal. Disposal of pesticide spray tank rinse water should be performed by applying to a site listed on the pesticide label, used for future mixing of the same pesticide, or disposed of as hazardous waste. Rinse water shall not be allowed to enter storm drains.

3.4.6.1. Sprayer Clean-Outs

When cleaned, spray equipment will be triple rinsed in the field using 10 percent of the tank capacity divided into 3 doses. The rinse material will be sprayed on the application site in accordance with the pesticide label.

3.4.6.2. Empty Containers

OPNAV-M 5090.1 (paragraph 24-3.12) requires disposal of pesticide wastes be in accordance with 40 CFR § 262, EPA Regulations for Hazardous Waste Generators. The disposal of pesticides, their containers, and related wastes is strictly regulated. Empty liquid pesticide containers will be triple-rinsed with 10 percent of the container's capacity divided into 3 doses. Disposal of empty containers will be coordinated with the installation's Environmental Security Department. Empty containers will not be reused. If possible, pesticide containers shall be returned to the manufacturer for recycling.

3.4.6.3. Rinse Water

Water from rinsing out equipment will be used immediately. If it cannot be sprayed on the application site, rinse water should be stored in marked plastic containers and used as the diluent for the next time the same pesticide is formulated for application. Wastewater formulations that contain pesticides shall not be discharged into any storm or sanitary sewer system.

3.4.6.4. Excess Pesticides

Disposal or redistribution of excess pesticides shall be coordinated through the Environmental Security Department and the IPMC. The Environmental Security Department and the Consolidated Hazardous Material Reutilization and Inventory Management Program will determine whether the pesticide can be redistributed or if it needs to be disposed of. Excess pesticides shall never be disposed in any storm or sanitary sewer system.

3.5. MINIMUM RISK PESTICIDES

Minimum risk pesticides, such as those marketed under the EcoEXEMPT brand, may be used by pest management service providers as part of their IPM program. According to the EPA,

“Minimum risk pesticides are a special class of pesticides that are not subject to federal registration requirements because their ingredients, both active and inert, are demonstrably safe for the intended use.” These pesticides are exempt from federal registration under 40 CFR 152.25(f) and are not labeled with an EPA registration number. Since there is no federal review of these pesticides or their pesticide label, there is no federal review of the instructions for effective use of these products. Although these pesticides are exempt from federal registration, they still need to be approved prior to use on DoD property, primarily for efficacy and safety reasons.

3.6. CANCELED PESTICIDES

The EPA has canceled or restricted several common pesticides.

3.6.1. Organophosphates

Chlorpyrifos (e.g., Dursban, Lorsban) and diazinon were widely used pesticides that have been canceled. The following actions are allowed with these pesticides:

1. End users (e.g., PMSPs and private, residential users) should check with NAVFAC Applied Biology or state/local regulatory agencies for guidance. Some canceled pesticides are allowed to be used until stocks are depleted, while others are under a stop use order.

2. PMPARs should monitor the use of the pesticides by contractors to ensure that they are not using an increased amount of the pesticides as a means of using up their stock.

Fenamiphos (e.g., Nemacur), a systemic insecticide/nematicide commonly used for the control of turf nematodes, was canceled by the EPA on May 31, 2008 with an end use date on October 6, 2017.

3.6.2. Organic Arsenicals

The EPA is also canceling most organic arsenical pesticide registrations, which consist of monosodium methanearsonate (MSMA), disodium methanearsonate (DSMA), calcium acid methanearsonate (CAMA), and cacodylic acid and its sodium salt. All uses of DSMA, CAMA, and cacodylic acid and its sodium salt were canceled as of September 30, 2009.

All uses of MSMA except cotton, sod farms, golf courses, and highway rights-of-way, were canceled as of September 30, 2009. Use of MSMA on sod farms, golf courses, and highway rights-of-way was to have been prohibited after December 31, 2013, but because the EPA is considering newly-submitted information, these uses remain registered. These uses, in addition to the cotton use, will be considered in the pending registration review process for MSMA. Users can continue to apply MSMA on sod farms, golf courses, and highway rights-of-way until further notice, but thoughtful use and consideration of depleting stocks is highly encouraged. For golf courses and highway rights-of-way, the following restrictions currently apply:

1. For golf courses:

    a. Spot treatments only (100 square feet per spot), not to exceed 25 percent of the total golf course acreage per year

    b. One broadcast treatment for newly constructed courses only.

2. For highway rights-of-way:

a. Two broadcast applications only on highway rights-of-way

b. A 100-foot buffer around permanent water bodies.

Chapter 4. Health and Safety

4.1. PESTICIDE APPLICATOR SAFETY

To ensure the safe use of pesticides, pesticide applicators shall handle and apply pesticides in accordance with the product's label directions.

4.1.1. Potential Occupational Hazards

The following hazards may be encountered by pesticide applicators or government representatives that may be exposed while inspecting pest management operations. Occupational safety and health guidance is found in the OPNAVINST 5100.23G, The Navy Occupational Safety and Health Program Manual.

4.1.1.1. Direct Contact Chemical Exposure

Many chemicals used as pesticides are also harmful to humans. The three routes of exposure to applicators are dermal, inhalation and ingestion. For applicators, the most common route of exposure is dermal and is frequently due to not wearing the appropriate personal protective equipment. Severity of the harmful effects is determined by duration of exposure and toxicity of the chemical. The effects can be acute (rapid onset due to high-dosage, high-toxicity chemicals) or chronic (slow or delayed onset due to long-term exposure to low-dosage, low-toxicity chemicals). The highest risk for severe acute chemical exposure occurs during pouring and mixing of concentrated pesticide resulting in high-dose, rapid-onset chemical poisoning. Chronic exposure can occur when the applicator fails to use appropriate PPE during frequent pesticide applications and the chemical accumulates in the body of the individual over a period of time leading to delayed or gradual onset of illness or injury. Direct chemical exposure can result not only in pesticide poisoning, but also in skin burns due to corrosive chemicals.

4.1.1.2. Heat

The use of protective equipment such as a respirator, goggles, gloves, and coveralls increases the risk of heat injury especially in warm climates. Heat injury can occur during long periods of work outdoors during warm weather or in enclosed spaces where machinery or equipment may generate heat.

4.1.1.3. Noise

Some pesticide application equipment use gas-powered air compressors or pumps that produce noise hazards. Gas-powered backpack sprayers are particularly hazardous due to the proximity of the noise source to the ears.

4.1.1.4. Eye Hazards

Eye hazards may result from chemical splashed into the eyes causing corrosive, toxic, or impact injury. Some pesticides are labeled "Restricted Use" due to their corrosive nature. The highest risk occurs during pesticide pouring, mixing, and application. During pesticide applications, chemicals may enter the eyes through splash back when applying the chemical under pressure into a crack or crevice or when applying pesticides overhead. Injury may also occur during equipment cleaning.

4.1.1.5. Infectious Zoonotic Disease

Care should be taken when trapping and handling live or dead animals. Hantavirus may be transmitted from rodents to humans through body fluid exposure or when breathing aerosolized rodent excreta. Pest management providers may be exposed when handling rodent carcasses after trapping or handling traps contaminated with rodent urine and feces. Feral dogs, cats, skunks, raccoons, and bats may carry and transmit rabies through a bite.

4.1.1.6. Inhalation Hazards

Many pesticides release hazardous vapors and are particularly hazardous in enclosed spaces. Some pesticides are labeled “Restricted Use” due to the high risk of inhalation injury. Personnel may be exposed during mixing, application, and equipment cleaning.

4.1.1.7. Electrical and Fire Hazards

Spot and crack and crevice applications may require application of a pesticide to areas near motors of refrigerators, compressors, and other machinery where it can become an electrical shock hazard. They may also be applied to areas near pilot lights resulting in an explosion and/or fire hazard.

4.1.1.8. Head Impact and Sharp Hazards

Surveys and pest control procedures may be done in attics, crawl spaces, basements, and other areas with low overheads where head impact hazards exist. Some devices used for bird roosting exclusion and rodent control have sharp edges and can cause cuts, puncture wounds, and abrasions.

4.1.1.9. Trip and Fall Hazards

Trip hazards may occur when applicators are spraying without close attention to where they are stepping. Spraying around buildings where there are various obstacles (e.g., plants, utility boxes, plumbing) in the path of the applicator can be particularly hazardous. Pest control may also need to be performed from ladders, on roofs, in ceilings, and in trees. Wet surfaces on the ground or on elevated surfaces can increase the risk of trips and falls.

4.1.1.10. Exposure to Harmful Animals

Venomous animals such as bees, wasps, rattlesnakes, and spiders are potential hazards when attempting to control them. Some of these are very dangerous due to envenomation and allergic reactions. Feral dogs, cats, coyotes, raccoons, and other large pest animals can inflict serious bites or clawing wounds.

4.1.2. Hazard Abatement

Detecting and reporting unsafe or unhealthful working conditions as early as possible, and then promptly controlling the reported hazards, is essential to a successful safety and occupational health program.

4.1.2.1. Operational Risk Management

Operational risk management (ORM) is a decision-making tool to reduce the risk of mishaps, whether in military contingency or support operations Pest management operations pose risks to human health and the environment that affect the installation’s mission that can be reduced

and minimized through ORM. Pest management ORM uses the following process to minimize hazards:

1. Identify hazards—the hazards may involve the pesticide or the application equipment (see list of hazards in section 4.1.1).
2. Assess hazards—determine the degree of risk based on the probability and severity of these hazards. For example, the risk may be high if a highly-toxic pesticide is used daily.
3. Make risk decisions—develop risk control options. Decide whether benefits of control outweigh the risks involved.
4. Implement controls
5. Engineering controls—e.g., use a less-toxic pesticide for controlling the pest
6. Administrative controls—e.g., place warning placards around pesticide vehicles and pesticide storage areas.
7. Personal protective equipment—e.g., wear a respirator when an inhalation hazard exists.
8. Supervise—follow-up to determine effectiveness of controls and monitor changes to hazards.

For more information on ORM, go to the Naval Safety Center website at http://www.public.navy.mil/NAVSAFECEN/Pages/index.aspx.

4.1.2.2. Training and Education

Pesticide safety is a core requirement for DoD and civilian pesticide applicator certification and licensing programs. Topics included in the DoD training are listed in DoDM 4150.07, Volume 1, The DoD Plan for the Certification of Pesticide Applicators. Safety topics are also given during recertification courses. See section 2.4 for specific training information.

4.1.2.3. Read the Pesticide Label

Pesticide labels are found on all pesticide containers used by installation PMSPs. The pesticide label provides directions for mixing, applying, and disposing of pesticides safely. It also includes a list of hazards to humans and first aid treatment. It may also include a list of personal protective equipment that must be worn and user safety recommendations. The label should always be read completely and thoroughly by the applicator before purchasing and using a pesticide. The label is a legal document mandated by FIFRA.

4.1.2.4. Personal Protective Equipment

Personal protective equipment (PPE) should always be used when applying pesticides. The type and level of protection needed will be determined by the toxicity, formulation, and method of application of the pesticide. The pesticide label provides guidance on what PPE to use.

1. Respirator
2. Chemical-resistant gloves

3. Chemical-resistant coveralls or long-sleeve shirt and long pants
4. Chemical-resistant boots
5. Hard hat
6. Goggles
7. Apron
8. Face shield
9. Self-contained breathing apparatus (for fumigation).

Personal protective equipment must be appropriate for the type and application of the pesticide being used. It is the applicator's responsibility to maintain the PPE. Contractors must provide appropriate PPE to their applicators.

4.1.2.5. Pest Control Vehicle Safety Devices

Pest control vehicles should be equipped with safety devices and information.

1. Labels and SDSs for all pesticides in vehicle
2. Emergency medical information including nearest emergency treatment center
3. Fire extinguisher
4. Spill kit
5. First aid kit
6. Cell phone or radio
7. Drinking water supply
8. Rinse water supply for washing pesticide off skin.

4.1.2.6. Pesticides and Equipment

The risk of pesticide exposure can be reduced by selecting the appropriate pesticide and equipment for the job. Applying small amounts of low-toxicity pesticide using appropriate and properly-maintained equipment greatly reduces the risk of harm. Using pesticides that are formulated (e.g., contain emetics) or packaged (e.g., water-soluble packets) to minimize chemical exposure and increase safety should be considered when purchasing pesticides. Pesticide selection is addressed in section 3.4.1. Equipment should be tested with water prior to use to ensure proper application and that it is not leaking. Situational awareness, such as monitoring meteorological conditions and location, may also prevent harmful exposure to pesticides.

4.1.2.7. Protection from Infectious Zoonotic Diseases

Pest control personnel who handle trapped animals or dead animal carcasses should wear gloves to prevent exposure to potentially infectious body fluids. A respirator fitted with a high-efficiency particulate air filter should be worn when entering enclosed spaces with large

amounts of rodent feces that might be disturbed and become airborne. Additional protection from hantavirus can be provided by spraying dead rodents and rodent feces with a commercial disinfectant. This will kill hantavirus as well as wet the feces to prevent it from becoming airborne. Detailed guidance on rodent handling is found in AFPMB TG No. 41, Protection from Rodent-borne Diseases with Special Emphasis on Occupational Exposure to Hantavirus. It is also recommended that personnel who handle live mammals receive a rabies vaccination.

4.1.2.8. Hazard Communication

All pesticide applicators must receive Occupational Safety and Health Administration (OSHA) Hazard Communication training (29 CFR § 1910.1200). Contractors must carry safety data sheets in their vehicles or, as appropriate, at their on-base administration office. Applicators must understand all of the hazards associated with the chemicals they will use and be able to communicate those to the customer if necessary.

4.1.2.9. Medical Surveillance Program

Department of Defense pesticide applicators are required to be in a medical surveillance program depending on their hazard exposure. Applicators possibly facing exposure to organophosphate or carbamate pesticides should have their cholinesterase levels tested in accordance with the Medical Surveillance Procedures Manual and Medical Matrix. Medical surveillance is conducted by the occupational health clinic at the Naval Branch Health Clinic in accordance with Navy and Marine Corps Public Health Center Technical Manual (NMCPHC-TM) 6260.9A, Occupational and Environmental Medicine Field Operations Manual.

4.2. PUBLIC SAFETY

By their nature, many pesticides may pose some risk to humans, animals, or the environment because they are designed to kill or otherwise adversely affect living organisms. Safely using pesticides depends on using the appropriate pesticide and using it correctly.

4.2.1. Potential Hazards to the Public

A potential hazard is the risk of harmful effects from pesticides and the level of risk depends on the toxicity of the pesticide and the exposure a human will receive in any situation.

4.2.1.1. Direct Contact with Pesticides

Pesticide exposure can occur through dermal contact with a pesticide on a surface, inhalation of vapors, or ingestion of pesticide through contaminated food or eating utensils. This type of exposure can occur if a pesticide application is done while unprotected building occupants are present, occupants are allowed entry into buildings before the pesticide has dried, or food and food preparation and serving equipment are not properly protected or cleaned after an application.

4.2.1.2. Pesticide Drift

Pesticide drift occurs when a pesticide leaves the target area and affects unprotected persons outside the area. This commonly occurs outdoors when winds can carry the pesticide off-site. Drift can occur indoors if there is air movement or pesticides are drawn up through ventilation ducts. Pesticide applications that involve small pesticide droplets, such as fogging or ultra-low volume application, or dusts are most susceptible to drift.

4.2.1.3. Contact with Contaminated Water

Some pesticides can move through soil and contaminate groundwater used for drinking. Others, if applied in or close to surface water, can cause contamination of recreational waterways.

4.2.1.4. Injury Due to Animals

The use of an inappropriate pesticide may cause collateral injury due to an insufficient knockdown of the target pest. This can occur with bees and wasps. Some insecticides do not knockdown the insects rapidly and may actually excite them causing them to become more aggressively defensive in behavior. Unprotected persons blocks away from the pesticide application may become the target of their aggression. Injury can also occur when persons get too close to or try to release a trapped animal or try to capture feral animals by themselves.

4.2.1.5. Fumigation Exposure

Fumigants are highly toxic and can cause immediate death upon exposure. Fumigations can be performed in the housing area where it poses a potential hazard to neighbors and pets. During fumigation the chemical is injected into a tarped structure and allowed to remain for 24 hours. The highest risk of injury or death occurs if a person or animal were to enter the tarp during this period or after the tarp is removed, but before the building is completely ventilated. The fumigant, when exposed to air, dissipates rapidly and readily. Fumigation with aluminum phosphide can be performed to control burrowing rodents. Treatment sites are required by the label to have warning signs posted to them.

4.2.2. Hazard Abatement

Pesticide applicators should continually be aware of the hazards associated with pesticide use in order to protect the public from exposure.

4.2.2.1. Proper Timing of Pest Control Operations

Most indoor application of pesticides should be conducted when building occupants are not present. An exception to this is the application of pesticide baits that are enclosed in a tamper-resistant bait station that does not allow exposure to occupants or pets. The building occupants must remain out of the building to allow the liquid pesticide to dry. Some pesticide labels are specific about re-entry times (time after application that occupants are allowed back into the treated building). Some pesticides, such as fumigants, provide specific directions on aeration of spaces to remove pesticide prior to re-entry. Certain operations, such as bee and wasp control or removal, are best conducted after the area has been cleared of unprotected persons. Refer to the product label for specific information.

4.2.2.2. Preventing Pesticide Drift

Pesticide drift from target areas to areas where humans, animals, and plants can be affected can be reduced through the following means (adapted from University of Nebraska publication G1773, Spray Drift of Pesticides).

1. Select low or nonvolatile pesticides.
2. Read and follow the pesticide label. Apply a pesticide only if an application is warranted.
3. Use spray additives that decrease drift within label guidelines. This will increase the droplet sizes and pesticide effectiveness.

4. Use larger spray nozzle orifice sizes. This will give larger droplets and will increase the number of tank refills, but will improve coverage and effectiveness.

5. Avoid high pressure. High pressure creates finer droplets; 45 PSI should be considered maximum for conventional broadcast spraying.

6. Use drift-reduction nozzles. These will produce larger droplets when operated at low pressures.

7. Use wide angle nozzles and low boom heights, and keep the boom stable.

8. Drift is minimal when wind velocity is less than 10 mph. Do not spray when wind is greater or blowing towards sensitive crops, gardens, dwellings, livestock, or water sources.

9. Use shielded spray booms. When banding, use shroud covers to keep chemical from drifting.

10. For indoor applications, turn off ventilation and close doors to prevent air currents.

4.2.2.3. Preventing Water Contamination

In addition to other best management practices highlighted throughout this document, pesticide contamination of surface and groundwater sources can be reduced through the following means:

1. Follow the directions on the pesticide label. Many pesticide labels contain use instructions or precautions designed to avoid surface and groundwater contamination.

2. Evaluate the need, method and frequency of chemical control. Use pesticides only when necessary and only in amounts that will control pests adequately. Pesticides that are applied in low concentrations and less frequently are less likely to leach into the groundwater.

3. Identify the vulnerability of the soil. Well-drained or sandy soils low in organic matter have a high potential for groundwater contamination. Consider the location of the pesticide application in relation to ground and surface water. Web Soil Survey, operated by the USDA Natural Resources Conservation Service, provides soil data and information that may be useful in evaluating the soil conditions on your installation (see https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).

4. Become familiar with pesticides that may leach. Pesticides with a high potential for leaching (high solubility, low adsorption, persistent) are more likely to contaminate groundwater. Check the pesticide label for warnings about potential to leach to groundwater.

5. Apply the pesticide at the appropriate time. Pesticides are most susceptible to runoff from heavy rains or irrigation during the first several hours after application. Do not apply to saturated or frozen ground. Also, fewer applications are required if they are carefully timed in relation to appropriate stages in the pest's life cycle.

6. Avoid spills and back-siphoning. Avoid spills, especially near wells or other water sources. Only mix pesticides where adequate containment is available. Prevent back-siphoning of pesticide-contaminated water into the water source by keeping the end of

the fill hose above the water level in the spray tank. Install a backflow device (such as an air gap or check valve) on the filling pipe to prevent backflow problems.

4.2.2.4. Prevent Tampering with Animal Traps

Caged animals can be very aggressive. Traps should be placed in areas where they will not be tampered with by humans or pets. Warning signs can be placed on the traps and area occupants can be warned of the risk of injury. Live and dead rodents in traps can also be a hazard for hantavirus. Traps should be placed in areas where humans or domestic animals will not be exposed to the rodents.

4.2.2.5. Protection for Fumigation Sites

Warning signs should be posted at the fumigation site warning of the hazards. Some installation contracts require the contractor to provide a 24-hour roving watchperson to patrol the fumigation site to prevent entry by unauthorized personnel.

4.2.3. Special Safety Considerations

Certain areas require special considerations due to the sensitive nature of the area or the people contained in that area.

4.2.3.1. Child Development Center

Children can be sensitive to pesticides and other chemicals. Parents are also concerned about potential hazards that their children may be exposed to and have a right to know about these hazards. Best practice is to minimize pesticide use in and around child development centers and schools, use only enclosed baits and low-toxicity pesticides, do not apply pesticides when people are present, and inform staff and parents of any pesticides used on the property. Integrated pest management methods should be used to reduce the health risks of pesticides to children.

The State of California requires annual pesticide notification to parents or guardians as well as notification at least 120 hours prior to a pesticide treatment at a child care center. Exemptions apply for self-contained baits and traps as well as gels or pastes used for crack-and-crevice treatments. More information can be found on the California Environmental Protection Agency's Department of Pesticide Regulation at: http://apps.cdpr.ca.gov/schoolipm/childcare/.

4.2.3.2. Navy Medicine Readiness Training Command Camp Pendleton

Persons undergoing medical treatment may be highly sensitive to pesticides and pesticide odors in the environment. Additionally, medical equipment and supplies may be contaminated during pesticide applications. Alternative IPM methods must be considered prior to using pesticides in medical treatment areas. If pesticides must be used, then only crack and crevice treatments with low toxicity pesticides or enclosed baits can be used. Application of any liquid or dust formulation must only be done when the area is unoccupied. Guidance for pest management operations in medical treatment facilities can be found in AFPMB TG No. 20, Pest Management Operations in Medical Treatment Facilities.

4.2.3.3. Food Service Areas

Food contaminated with pesticides can lead to pesticide poisoning. Sanitation and exclusion should be the primary means of preventing and reducing pest infestations. Pesticide use in food

service areas should be limited to low-toxicity pesticides, applied to cracks and crevices, and baits. The area should be properly prepared for treatment by putting away utensils and equipment and covering food preparation services. After treatment, the area should be thoroughly cleaned to prevent contamination.

4.3. PEST CONTROL ACCIDENTS

In the case of a pest control accidents, applicators should be trained in first aid procedures and identify the nearest medical services.

4.3.1. First Aid

First aid for pesticide accidents is included on the pesticide label. The applicator should be familiar with first aid procedures required for the pesticide they are using. A copy of the label must be available at the application site. For some pesticides, immediate first aid and medical treatment may be required.

4.3.2. Medical Emergencies

Pesticide applicators experiencing an acute exposure to hazardous pesticides or significant injuries sustained in control operations should immediately go to the nearest emergency room capable of treating their emergent condition. Pesticide applicators that are government employees enrolled in a medical surveillance program with the occupational health department should schedule a follow-up appointment after their condition has subsided. The name, address, and telephone number of an emergency medical care facility should be posted in the commercial applicator's vehicle. For pesticide poisonings, a copy of the pesticide label should be given to the medical first responders or taken to the emergency medical facility.

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Chapter 5. Environmental Considerations

5.1. ENVIRONMENTAL MANAGEMENT SYSTEM FOR PESTICIDES

This IPMP puts pesticide management within the framework of the DoD and the Marine Corps Environmental Management System (EMS). This plan provides the tools and products to include pesticide management in the installation's overall EMS program.

5.1.1. Department of Defense Policy

Department of Defense policy states, "The Department of Defense shall integrate EMS into missions, activities, functions, contracts, and installation support agreements as a business practice for improving overall performance. EMS is a vital supporting component of the DoD mission and is therefore the responsibility of all DoD personnel. It is not just an environmental function responsibility, but requires active participation from all functions and organizations." The remainder of this policy and details on the EMS program are found in DoDI 4715.17, Environmental Management Systems.

5.1.2. Definition of an Environmental Management System

According to the Council on Environmental Quality, Instructions for Implementing Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management, March 29, 2007, "Environmental Management System means a set of processes and practices that enable an organization to increase its operating efficiency, continually improve overall environmental performance and better manage and reduce its environmental impacts, including those environmental aspects related to energy and transportation functions. EMS implementation reflects accepted quality management principles based on the "Plan, Do, Check, Act," model found in the ISO 14001:2004(E) International Standard and using a standard process to identify and prioritize current activities, establish goals, implement plans to meet the goals, evaluate progress, and make improvements to ensure continual improvement."

5.1.3. Conformance of the Pest Management Program to the Environmental Management System

An EMS is composed of five basic components. The components and how the pest management program conforms to these components are:

5.1.3.1. Policy

The installation has established an environmental policy to support mission readiness and providing access to training environments through effective and efficient environmental management. Pest management environmental objectives to meet this policy are:

1. Reduce pesticide pollution that affects the installation's neighbors through the use of IPM to prevent adverse impact on air, water, land, and wildlife resources

2. Use IPM to preserve aspects of the natural environment by managing and controlling invasive and nuisance pests and preventing pesticide pollution

3. Ensure and maintain the competence of pest management personnel through certification and training to ensure that effective operations and technologies are used to

control pests that minimize waste, prevent air and water pollution, minimize health and safety risks, and dispose of waste safely and responsibly

4. Enable the IPMC to maintain effective oversight and coordination of the program and liaison with local agencies in order to ensure regulatory compliance.

5.1.3.2. Planning

This IPMP is the installation's primary planning document. Specific planning items included in the IPMP are:

1. Legal and other requirements as identified in section 3.3, appendix F, and throughout the plan.

2. General objectives and targets as included in section 1.3.2 and specific pest management objectives included in the IPM sheets in chapter 8.

5.1.3.3. Implementation

Implementation of the EMS is addressed in the following sections of the IPMP:

1. Roles and responsibilities—section 2.1.

2. Pest management personnel training and awareness—section 2.4.

3. Program documentation includes record keeping, reporting, and IPMP updates—sections 2.3 and 1.1.4.

4. Operational requirements—section 1.3.2. Operational control is the responsibility of the pest management service providers and is maintained through their contract. Integrated pest management is the operation used for reducing environmental impacts and supporting mission priorities.

5. Safety considerations—chapter 4.

5.1.3.4. Checking and Corrective Action

The success of an EMS depends on the ability of an installation to assess and correct itself. The self-assessment checklist (appendix C) provides the basis for a self-assessing and self-correcting system.

5.1.3.5. Management Review

The review of the program is conducted during environmental audits by Marine Corps Installations West.

5.1.3.6. Emergency Management System Definitions

The following are common terms used in EMS:

1. Practice—any activity conducted by an installation or its tenants in performing their missions that has an actual or potential impact on the installation's assets. The term practice includes equipment, processes, and facilities. It includes both business and management practices.

2. Practice owner—the person, unit, or organization that operates, conducts, controls, or is otherwise responsible for a practice.

3. Environmental aspects—elements of an organization's activities, products, or services which can interact with the environment.

4. Impact—the positive or negative effects on assets of conducting business and management practices.

5. Vulnerable assets—A resource on which the installation depends or for which it has some responsibility, and which may be impacted by the conduct of practices. Vulnerable assets may include environmental, historic, and cultural areas on and off the installation; personnel health and safety; mission effectiveness; military training lands; real property; financial resources; and public relations status.

5.2. ENVIRONMENTAL CONSIDERATIONS ON THE PESTICIDE LABEL

If the pesticide is potentially harmful to the environment, information will be provided in the following sections of the label:

1. Directions for Use—If pesticide drift is a potential environmental hazard, the directions may require certain application equipment and/or the addition of an anti-drift agent to the tank mix.

2. Environmental Hazards—This section may indicate the pesticide is particularly hazardous to specific animals (e.g., bees, fish). It will also provide information on how to avoid environmental damage.

5.3. MANAGING ENVIRONMENTAL IMPACT

Air, water, and soil risk contamination from pesticides. Pesticide drift to outside the target application area is the primary reason for contamination. Pesticides that pose the highest risk of contamination are herbicides applied to improved and unimproved grounds. Despite being applied in water, pesticides to control mosquito larvae pose a minimal risk due to the target-specific nature of the pesticide (e.g., the biopesticide, *Bacillus thuringiensis israelensis* (Bti), and insect growth regulators). Many procedures to reduce the impact of pest management practices on vulnerable assets are already in place.

5.3.1. Pesticide Pollution

A pesticide is unique as a potential environmental pollutant. When it is applied properly for the correct target pest and to the target location, it is not considered a pollutant. When a pesticide is applied or it drifts outside of the target area, it becomes a pollutant. Pollution can occur during most pest management practices as the result of accidental spills, air and water emissions, and container disposal. Pollutants can be in the form of pesticide residues from equipment and container cleaning or be waste containers.

5.3.1.1. Synthetic Pyrethroids

Pyrethroids are insecticides that are widely used for household, garden, and agricultural pest control. Most were replacements for more toxic and environmentally-hazardous organophosphate and carbamate insecticides. Surveys have indicated that some pyrethroids

are being detected in urban stream sediment and at least one chemical has been shown to be toxic to sediment dwelling organisms. Specific pyrethroids of concern include:

1. Bifenthrin (e.g., Talstar)
2. Cyfluthrin (e.g., Cykick, Tempo)
3. Beta-Cyfluthrin (e.g., Tempo Ultra)
4. Cypermethrin (e.g., Demon, Cynoff)
5. Deltamethrin (e.g., Deltadust)
6. Lambda-Cyhalothrin (e.g., Demand)
7. Permethrin (e.g., Permanone)
8. Tralomethrin

Outdoor operations pose the greatest risk for pyrethroid contamination of surface water and stormwater runoff. Increased risk operations that may use pyrethroids include landscape plant insect control, agricultural insect control, and uniform repellent treatment.

5.3.1.2. Pollinator Protection from Pesticides

The Office of the Under Secretary of Defense distributed a memorandum on the DoD Policy to Use Pollinator-Friendly Management Prescriptions dated 5 Sep 2014 (located in additional source documents). This memorandum is issued in accordance with and references DoD Instruction 4150.07 on DoD Pest Management and DoD Instruction 4715.03 on Natural Resources Conservation Programs. In response to this memorandum, NAVFAC Applied Biology put together the "Pollinator Friendly Pesticide Applicator Best Management Practices" fact sheet (located in additional source documents).

Pollinators, such as bees, bats, birds, and butterflies, are essential to the majority of the flowering plants in the environment and to the production of more than 130 different food crops. Protection of both managed bee colonies that are used in the agricultural outleases and feral bees must be considered in pest management operations. Pollinators are highly sensitive to many pesticides, especially insecticides. Best management practices to protect pollinators include:

1. Read the pesticide label for any precautions for bees and apply the product in a manner consistent with the label directions.
2. Use less hazardous insecticides. Certain classes of insecticides, such as organophosphates, carbamates, and neonicotinoids (i.e., imidacloprid), are highly toxic to bees.
3. Choose the least hazardous insecticide formulation if possible. Granules are the least hazardous. Dusts are the most hazardous because they are similar in size to pollen, stick readily to the hairs on the insect, and can be carried back to the nest.
4. Use insecticides with short residuals. The label will include a residual toxicity (RT) time that is the time after application until there is minimal toxic effect on bees.

5. Avoid applying any bee-toxic pesticides on blooming plants that attract bees.

6. Do not apply insecticides when temperatures are forecast to be unusually low or when the evening forecast is for dew. These conditions extend the period in which the insecticide residue remains toxic.

7. Apply pesticides that are toxic to bees at night when most honeybees have stopped foraging and returned to their hives.

8. Use ground applications instead of aerial applications to reduce pesticide drift out of the target area.

Efforts should be made to conserve bee colonies. If the situation allows, bee swarms and hives should be removed and relocated rather than destroyed. For more on protecting bees and other pollinators from pesticides go to the EPA Pollinator Protection website: http://www2.epa.gov/pollinator-protection.

5.3.1.3. Pollution Prevention

The following pollution prevention best practices should be used on the installation:

1. Determine the need for pesticide use by conducting surveillance.

2. Apply pesticides and clean equipment away from storm drains to prevent storm water contamination.

3. Do not pour pesticide container rinsate into drains. Apply rinsate to a site listed on the pesticide label, store rinsate to use for future pesticide mixing, or dispose of according to local regulations.

4. Use less-toxic and target-specific pesticides

5. When applying permethrin repellent to uniforms outdoors, do not mix or apply near storm drains or where water run-off will result in storm water contamination, avoid overspray of pesticide onto the ground, and apply spray tank rinsate to uniforms.

6. Minimize outdoor applications of pyrethroid pesticides.

7. Use targeted spot spraying or crack and crevice applications rather than broadcast or baseboard spraying.

8. Minimize pesticide storage on the installation through proper inventory management and by not allowing contractors to store pesticides on the installation.

9. Use rodent traps rather than rodenticides.

5.3.2. Natural and Cultural Resources Protection

Natural resources on the installation have the potential to be impacted by pest management operations or have an impact on these operations. These pest management operations include, but are not limited to, surveys, trapping, weeding, biological control, and pesticide use. The installation's INRMP provides detailed information on the natural resources found on the installation. The INRMP also lists management objectives and recommendations to protect and enhance the installation's natural resources programs.

Any archeological sites on the installation are at low risk for damage due to pest management operations. Certain historic buildings may require special treatment depending on the pest management activity. The installation's ICRMP provides detailed information on the cultural resources found on the installation as well as the areas considered historic and cultural vulnerable assets.

5.3.2.1. Environmentally-Sensitive Areas

Sensitive habitats are declared in the installation INRMP. The IPMC is responsible for knowing the boundaries and restrictions of sensitive habitat(s) on their respective sites and communicating this information to any pest control or grounds contractors via the PMPAR. Although the IPMC should have a general knowledge of these areas, any proposed application of pesticides in any of these areas must first be coordinated and approved by the Land Management Section. Applications of pesticides to wetlands or other environmentally sensitive sites, such as vernal ponds, tidal marshes, and beaches, or around these areas should be carefully planned. Strict adherence to both the pesticide label and the clearances described in the INRMP are required.

5.3.2.2. Invasive Species Prevention

Invasive species can cause damage to native habitats and introduce diseases to native plants and animals. All military vehicles and materials that have been in contact with foreign soil and returning from foreign locations including Hawaii are required to be cleaned by the deployed unit and inspected by the U.S. Department of Agriculture Plant Pest Quarantine Officer prior to disembarkation onto U.S. soil per SECNAVINST 6210.2A, Quarantine Regulations of the Armed Forces. The purpose of these inspections is to prevent the introduction of disease-causing organisms and plant pests. Although the inspections are generally thorough, the equipment of recently redeployed units should be monitored to ensure that any introduced pests are destroyed properly. Any pests found on this equipment should be reported to the environmental division.

Construction vehicles used by contractors shall be cleaned before traveling to sites on the installation.

5.3.2.3. Threatened and Endangered Species

Section 7(a) of the Endangered Species Act (ESA) (16 U.S.C. § 1536(a)-(d)), as amended, requires federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat. Regulations governing this interagency cooperation are included in 50 CFR § 402.

A comprehensive list of endangered and threatened species is listed on the U.S. Fish and Wildlife Service (USFWS) website. Listed species habitats are also protected as critical habitat under the ESA. Critical habitat information can be found through species information found at the USFWS website.

Most species of mammals (including bats, raccoons, and skunks) and all but a few birds are protected by state or federal law. Federally protected species, their nests, or their eggs may not be taken without obtaining permits from the U.S. Fish and Wildlife Service. Control of state-protected species may require permits from the state. All attempts shall be made to solve the problem through habitat alteration, exclusion, fright techniques, or similar approaches before attempting to obtain permits for control.

There are 18 species of animals and plants on MCB Camp Pendleton that are currently designated as federally listed endangered or threatened. A comprehensive list and discussion can be found on the installation's INRMP, which is found on the CD accompanying this plan.

5.3.2.4. Cultural Resources

Pest control operations should be checked for consistency with the Integrated Cultural Resources Management Plan. Pest management operations requiring alteration of the historic building or structure, including exclusion modifications and significant changes in landscape, will require consultation with the cultural resources manager (CRM) through the IPMC.

Termites damage wooden structures and incidental wood in steel and concrete buildings, such as trim or molding, paneling, or door and window frames. Annual termite inspections detect termite infestations before significant damage occurs. Any termite inspections of historic buildings or structures will be documented using DD Form 1070 and reported immediately to the CRM.

The cultural resources being managed at the base are archaeological sites, historic buildings, structures, and landscapes. Eight hundred and forty archaeological sites exist on MCB Camp Pendleton. Of those, 744 are prehistoric, 60 are historic, and 36 are multicomponent. Among the important cultural resources on the installation, six are recommended for inclusion in the National Register of Historic Places. These include the Santa Margarita Ranch House complex, the Las Flores Adobe, the 1st Marine Division Headquarters (building 1133) and the San Onofre Beach Club (building 51811). The Santa Margarita Ranch House complex and the Las Flores Adobe include historic associated landscapes.

5.3.3. National Pollutant Discharge Elimination System

Water pollution degrades surface waters making them unsafe for drinking, fishing, swimming, and other activities. As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The permit is available to operators who discharge to waters of the United States from the application of either biological pesticides or chemical pesticides that leave a residue when application is for one of four use patterns:

1. Mosquito and other flying insect control
2. Aquatic weed control
3. Aquatic nuisance animal control
4. Forest canopy pest control.

If pesticide applications for the above use patterns are expected to exceed thresholds, a Notice of Intent (NOI) and preparation of a Pesticide Discharge Management Plan (PDMP) (PDMP template included in appendix G) may be required. Practicing integrated pest management, recordkeeping, and monitoring are also requirements under the NPDES permits.

MCB Camp Pendleton submitted an NOI for mosquito control operations and conducts self-monitoring reporting as required by NPDES California General Permit number CAG 990004. The NOI, the self-monitoring report, and the California General Permit are included on the CD accompanying this plan.

5.3.4. Spill Prevention and Management

Installation spill prevention guidelines shall be followed. The following spill prevention actions shall be taken:

1. Spill kits shall be readily accessible in all pest management vehicles, mixing sites, and pesticide storage facilities.

2. Pesticides shall only be stored in an area with containment to hold a spill and without a floor drain.

3. Portable mixing pads shall be used when appropriate.

4. All pesticide applicators shall be familiar with the Spill Prevention, Control, and Countermeasure Plan and who to notify in case of a spill.

All pesticide applicators are trained on spill response procedures as part of their initial pest management certification/licensing training. In accordance with OPNAVINST 3440.17 “Navy Installation Emergency Management Program”, spills will be managed as described in the installation Integrated Contingency Plan (located on the CD accompanying this plan). Further information on preventing and controlling pesticide spills is contained in the AFPMB TG No. 15, Pesticide Spill Prevention and Management.

5.3.5. Hazardous Materials and Hazardous Waste Management

Pesticides, being hazardous materials, shall be managed in accordance with the applicable hazardous materials regulations, instructions and installation specific orders/procedures. Proper inventory management and planning will prevent waste generation. The appropriate use of pesticides produces very little hazardous waste. Rinse water containing pesticide residues usually has very small quantities of chemical and is often applied to the target pest site. Not permitting contractor storage of pesticides and on-site disposal of pesticide waste eliminates the need for hazardous material and waste management. In general, pesticides that are not applied must be disposed of as hazardous waste. Large quantities of hazardous waste may be produced when a pesticide is not used by its expiration date. It may also be produced if a pesticide is not used up before the registration for that pesticide is canceled and the stop-use date has occurred. These pesticides may be disposed of as universal waste only when allowed by the standards for universal waste management found in 40 CFR § 273. Any excess pesticides or absorbent material used for spill clean-up requiring disposal requires evaluation by the hazardous waste coordinator in the environmental division to ensure proper disposition.

5.4. PUBLIC PERCEPTION

The misuse of pesticides that lead to animal or human injury can lead to negative publicity for the installation. This is also the case with accidental pesticide spills, especially if they occur off-base or cause contamination of a local natural or cultural resource.

Chapter 6. Emergency Pest Management

6.1. PUBLIC HEALTH EMERGENCIES

Pests create a public health emergency when the pests increase in number and/or are found to carry human disease pathogens. A public health emergency, or potential emergency, requiring pest management action may be indicated in several ways.

6.1.1. Natural or Manmade Disaster

Usually pest problems do not develop immediately after a disaster, such as earthquakes, wildfires, floods, vehicle accidents and terrorist attacks. Public health pest problems may be the result of increased amounts of refuse, collapse of local infrastructure (e.g., lack of garbage pick-up), decay of human and animal bodies, and accumulation of standing water. The potential pest-related consequences are vector-borne or zoonotic disease outbreaks and increased contact with rodents and feral animals that may cause injury.

6.1.2. Vector-Borne or Zoonotic Disease

The report of human cases of vector-borne or zoonotic disease or the detection of infected mosquitoes or sentinel animals is an indicator of a public health emergency or potential emergency and often warrants an increase in pest management activities.

1. Reports of human cases—Many human cases of vector-borne and zoonotic disease identified in local medical facilities are reportable to the local and/or state health agencies. A report of a human case of West Nile virus or other vector-borne disease may initiate an investigation and result in alerts going out to other hospitals and clinics if it appears that the case was locally acquired. Immediate vector control may be necessary to prevent further transmission.

2. Detection of infected mosquitoes or sentinel animals—Routine surveillance for mosquito-borne diseases are conducted by local and State health agencies. These agencies report testing results through the public health system. This surveillance program is an early warning system that indicates when vector control should be initiated or increased to prevent human disease. The CDC's ArboNET Maps, provide mosquito-borne disease information by state.

3. Plague is endemic in the mountains in San Diego County. San Diego County's Department of Environmental Health (Vector Control Program) and the California Department of Public Health track plague infections closely. Special care should be taken to avoid rodent nesting sites. More information can be found on the Disease Vector Ecology Profile for California that is included on the CD of supporting documents provided with this plan.

4. Up to date information on West Nile virus, Zika virus, Plague, Hantavirus, Tularemia, Lyme Disease, and other vectored diseases can be found on the San Diego County Vector Control Program website at: https://www.sandiegocounty.gov/deh/pests/vector_disease.html.

6.1.3. Animal Attack

Attacks on humans by vertebrate animals almost always require an emergency medical response. If a person is bitten or scratched by a mammal such as a dog, cat, skunk, coyote, fox, raccoon, opossum, or bat, they are at risk of contracting rabies and should begin a treatment program. If the animal that was involved can be positively identified and safely captured, it should be held for testing to determine if it is infected with rabies or other zoonotic diseases.

Bites by venomous snakes are always emergencies, and the victim should be immediately transported to the nearest medical treatment facility. If the snake can be identified or killed/captured, it may help in the selection of the proper antivenin for treatment.

Certain ants, bees, and wasps can cause painful stings and, in some cases, severe allergic reactions. The local fire department is usually the primary responder to bee sting incidents. Fire department personnel have been trained to protect and manage bee sting victims. A stinging incident is not considered a pest control response issue, but rather, an emergency response and any and all appropriate bee control measures can be used. If fire department response is delayed, installation first responders should be trained how to protect themselves and victims from bee stings.

6.2. AGRICULTURAL EMERGENCIES

Agricultural emergencies are the result of the introduction of insects or other animals that can cause extensive damage to agriculture or forestry in the state. Examples of introduced agricultural pests include the Mexican fruit fly and gypsy moth. Military installations can be a conduit for the introduction of these pests due to the movement of military equipment and personnel in and out of the state and the country. The military's role in preventing introduction of these pests is described in OPNAVINST 6210.2A, Quarantine Regulations of the Navy and SECNAVINST 6210.2A, Quarantine Regulations of the Armed Forces. Inspections to prevent importation of pests are normally conducted at the port of debarkation in the foreign country.

6.3. EMERGENCY PEST MANAGEMENT RESOURCES

Installation PMSPs maintain pesticides and equipment to manage most emergencies. Contract PMSPs can be used for emergencies if it is written in the contract specifications NMRTC should develop an EVDCP to manage public health emergencies and include additional Navy and local government contingency vector surveillance control resources. Entomologists at NEPMU-5 can assist the NMRTC Prevent Medicine staff. After the EVDCP is written, it will be included in appendix H.

Chapter 7. Program Resources

MCB Camp Pendleton has access to the following support agencies and organizations for pest management assistance. Contact information specific to the installation is included in appendix A.

7.1. NAVAL FACILITIES ENGINEERING COMMAND, ATLANTIC APPLIED BIOLOGY

Naval Facilities Engineering Command, Atlantic Applied Biology is currently staffed by full-time, civilian DoD professional pest management consultants certified in DoD pesticide applicator categories 3, 5, 6, 7, 8, and 11. These personnel are assigned the following responsibilities:

1. Review and approve installation IPMPs in accordance with DoD and Navy policies
2. Provide technical assistance to the installation IPMCs, environmental managers, safety officers, medical officers, and other regional and installation personnel regarding pest management and pesticide regulatory compliance
3. Review and approve or reject pesticides and equipment to be used on installations
4. Conduct on-site program reviews and environmental compliance program external assessments to ensure compliance with the regulations and IPMPs
5. Compile and report actual pesticide use and pest management operations to appropriate DoD agencies
6. Provide IPM recommendations and pest identification
7. Assist installations with writing or re-writing IPMPs
8. Provide recertification training for DoD-certified applicators as well as initial and recertification training for PMPARs/IPMCs.

The NAVFAC Applied Biology website is on the Naval Facilities Engineering Command intranet and is only available to NAVFAC, CNIC, and U.S. Marine Corps personnel who have an account. To request an account, personnel must have a sponsor with access to approve the request through the initial single sign-on page.

7.2. NAVY ENTOMOLOGY CENTER OF EXCELLENCE

The Navy Entomology Center of Excellence (NECE) is a subordinate command of Navy and Marine Corps Public Health Center (NMCPHC) and is staffed by full-time, active duty U.S. Navy entomologists. The entomologists are certified in DoD pesticide applicator categories 3, 5, 6, 7, 8, and 11. The unit's Vector Control Department provides the following products and services:

1. Act as BUMED's professional pest management consultants to provide BUMED review of IPMPs
2. Provide technical assistance on the surveillance and control of vectors on installations

3. Provide vector-borne disease risk assessments and disease prevention recommendations when requested

4. Provide disease vector management consultation and identification services

5. Provide contingency pest management in the event of a disaster or disease outbreak (see the Emergency Vector-borne Disease Control Plan in appendix H)

6. Provide initial certification for DoD-certified pesticide applicators

7.3. NAVY ENVIRONMENTAL AND PREVENTIVE MEDICINE UNIT FIVE

The Navy Environmental and Preventive Medicine Unit FIVE (NEPMU-5) is staffed by two full-time, active duty Navy entomologists. The entomologists are certified in DoD pesticide applicator categories 3, 5, 6, 7, 8 and 11 and are assigned the following responsibilities:

1. Acts as BUMED's professional pest management consultants to provide BUMED review of Emergency Vector-borne Disease Control Plans

2. Provides technical assistance on the surveillance and control of vectors on installations

3. Provides vector-borne disease risk assessments and disease prevention recommendations when requested

4. Provides disease vector management consultation and identification services

5. Provides contingency pest management in the event of a disaster or disease outbreak.

The NEPMU-5 (San Diego, CA) website is at: http://www.med.navy.mil/sites/nmcphc/nepmu-5/Pages/default.aspx.

7.4. UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

The University of California Cooperative Extension responds to the needs of individuals and organizations in California by providing information and guidance in the areas of agriculture, natural resources, and consumer sciences.

The website is at: http://ucanr.edu.

The University of California Cooperative Extension, San Diego County Cooperative Extension Office is the local extension office that serves the county where MCB Camp Pendleton is located. Pest management service providers can obtain soil sample kits from the office and send them in for analysis. Extension agents can also visit the base to help in diagnosing problems.

The San Diego County Cooperative Extension website is at: http://cesandiego.ucanr.edu. The office can be contacted at (858) 822-7711 or by e-mail at: cesandiego@ucanr.edu.

7.5. CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

The California Department of Pesticide Regulation, part of the California Environmental Protection Agency, regulates pesticides for the state. The main office is located in Sacramento and is staffed with personnel that can provide information regarding state and local pesticide regulations.

7.6. CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

Public health biologists provide vector surveillance and control assistance throughout California. They are state-certified in public health pest management and provide assistance to counties that either do not have or only have limited vector surveillance programs.

The California Department of Public Health, Mosquito-Borne Viral Diseases Web site is at: https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/MosquitoesandMosquitoBorneDiseases.aspx.

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Chapter 8. Integrated Pest Management Sheets

The following sheets provide general guidance for control of common pests and are not installation specific. They should be used as a basis for pest management action, but should not be considered “regulations” for the job. Management sheets should be used as guidelines to help implement reasonable, cost effective, safe, environmentally responsible control of pests. The integrated pest management coordinator (IPMC) or other pest control personnel may choose to establish different thresholds and use IPM methods that are more appropriate to their local circumstances. Write in any new ideas or programs to maintain a document that will remain applicable over time. Any suggested pesticides from these sheets are required to be approved before use.

8.1. NUISANCE PESTS

8.1.1. American Cockroaches	
TARGET PEST(S)	American cockroaches (*Periplaneta americana*) 
TARGET SITE(S)	Office buildings, warehouses, residences, storm sewers
PURPOSE	Control cockroaches that may cause damage through food contamination, affect human health through allergic reactions or "entomophobia", or be an aesthetic or morale nuisance.
RESPONSIBILITY	• All Personnel: Ensure proper sanitation in all living and working spaces. • Preventive Medicine Technicians: Conduct facility sanitation inspections, enforce food-handling regulations, and provide pest management recommendations. • Pest Management Service Provider: Conduct integrated pest management to control pest infestations. • Integrated Pest Management Coordinator: Oversee all pest management operations and ensure the use of IPM. • Pest Management Performance Assessment Representative: Ensure contracted PMSPs perform work in accordance with contract specifications. • Facilities Maintenance Provider: Perform facility repairs and improvements that prevent and minimize pest infestations as requested.
SURVEILLANCE	
METHODS	• Visual inspections (visual surveys of low to moderate infestations may require visiting the facility at night) o Observation of pests in harborages o Inspect floor drains o Inspect areas with heat and moisture • Application of a flushing agent to suspected harborages • Sticky trap surveys • Vacuum surveys of harborages • Personnel complaints: including information on when, where, and how many pests were observed • Conduct pre- and post-treatment surveys to determine whether control operation was effective

FREQUENCY	• Daily observation by building occupants • Monthly observation and/or sticky trap monitoring by cognizant pest management or preventive medicine personnel
RECOMMENDED ACTION THRESHOLD	• Visual sighting of one or more cockroaches (all life stages) per room per survey—flushing agents or sticky traps may be used • Sighting of one egg capsule per survey
NON-CHEMICAL CONTROL	
SANITATION	• Thoroughly clean potential food sources in buildings, especially coffee messes and food preparation areas. • Clean spills up as soon as possible. • Clean out floor drains by rinsing with hot water or using cleaners specifically designed to remove sludge from pipes. • Store food in pest-proof containers. • Empty trash cans daily or avoid putting food items in trash. • Do not eat at desk; eat in a designated coffee mess or dining area.
ELIMINATE HARBORAGE	• Seal cracks and crevices with caulk. • Remove corrugated cardboard and other materials that can serve as harborage.
ELIMINATE STANDING WATER	• Fix leaking plumbing especially around sinks, faucets, and dishwashers. • Remove standing water from floors after daily cleaning.
PREVENTION	Inspect food boxes before bringing them into a building.
MECHANICAL REMOVAL	Vacuum cockroaches from their harborages. Use a wet/dry vacuum cleaner filled with water or empty and dispose of vacuum bag immediately.
PEST PROOFING	• Seal holes in walls and ceilings and other areas that may serve as cockroach harborage as required. Request support from facilities maintenance provider if necessary. • Screen floor drains if possible.
EDUCATION	Proper storage of food and sanitation to prevent infestations.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	Pyrethroids, fipronil, hydramethylnon, indoxacarb, imidacloprid, abamectin, boric acid, insect growth regulators.

METHODS	• Flushing Agents: The pest management service provider may use aerosol contact pesticides directed into potential harborage areas to flush out and kill pests as needed. • Crack and Crevice/Spot Treatment Residuals: The pest management service provider may apply a residual pesticide spray to all known or suspected harborages, feeding sites, or passageways (such as under dishwashers and refrigerators or behind stoves). • Baits: Cockroach baits (station containing solid bait or injectable style gel baits) will be used as much as possible. Gel bait can be applied to a sheet of hardware cloth and hung in manholes. Proper bait placement is critical to the success of treatment. Do not apply other insecticides around bait treatment areas. • Dusts: Boric acid dust is an effective low-toxicity insecticide that can be applied to wall voids and into manholes of storm sewers. The treatment area should remain dry after the application to avoid washing the dust away. • Growth Regulators: Affect the growth of the insect and prevents them from developing into egg-laying adults. Insect growth regulators will always be mixed with knock-down pesticides.
CONSIDERATIONS	
SENSITIVE AREAS	• Exposed food products, food containers, counter tops, any surface where food may be stored or prepared, or any food storage area. • Minimize application of pesticides directly into drains. • Use care in selecting pesticides for use in storm sewers as this can lead to storm water pollution problems. Applications should be made when dry and storm water is not anticipated within a week.
PROHIBITED PRACTICES	• Do not do preventive baseboard spraying in the absence of a pest. • Do not apply liquid or dust formulations to occupied spaces or in the presence of exposed food. • In food service areas, use only insecticides specifically labeled for those areas.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Most insecticides used for indoor pest control are low in toxicity (signal word “Caution”), but care should be taken to prevent exposure to humans and domestic animals. • Outdoor treatments with pyrethroids are susceptible to runoff and contamination of storm water. • Disposing of pesticides in a drain or storm drain is strictly prohibited.

8.1.2. Cockroaches in Food Preparation Areas

TARGET PEST(S)	Cockroaches (primarily German cockroach, *Blatella germanica*) 
TARGET SITE(S)	• Food service facilities • All government dining facilities including galleys, sculleries, bakeries, storage, and mess decks. • All MCCS facilities including clubs, restaurants, and storage. • All commercial lessees. • Coffee messes and snack bars in administrative areas.
PURPOSE	Control cockroaches that may cause food contamination, allergic reactions, or a nuisance.
RESPONSIBILITY	• Food Service Personnel: Ensure compliance with food handling regulations that prevent pest infestations. • Installation Preventive Medicine Technicians: Conduct food service inspections, enforce food handling regulations, provide quality assurance for pest control, and provide pest management recommendations. • Pest Management Service Provider: Conduct integrated pest management to control infestations. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Facilities Maintenance Provider: Perform facilities repairs and improvements that exclude and minimize pest infestations as requested.
SURVEILLANCE	
METHODS	• Visual inspections o Observation of pests in harborages o Application of a flushing agent • Sticky trap surveys • Vacuum surveys of harborages • Personnel complaints: including information on when, where, and how many pests were observed. • Conduct pre- and post-treatment surveys to determine whether control operation was effective. • Surveys should identify environmental conditions conducive to infestation.

FREQUENCY	• Daily observation by food service personnel. • Monthly observation and/or sticky trap monitoring by cognizant preventive medicine personnel.
ACTION THRESHOLD	• Visual sighting of 3 or more cockroaches (all life stages) per room per survey. Flushing agents or sticky traps may be used. • Sighting of 1 egg capsule per survey.
NON-CHEMICAL CONTROL	
SANITATION	• Cleaning of floors and all surfaces to include debris and grease removal. • Clean up spills. • Store food in sealed containers. • Remove cardboard boxes from storage areas. • Keep garbage in containers with tight-fitting lids and use liners.
ELIMINATE STANDING WATER	• Fix leaking plumbing especially around sinks, faucets, and dishwashers. • Remove standing water from floors after daily cleaning.
MECHANICAL REMOVAL	Vacuum cockroaches from their harborages. Use a wet/dry vacuum cleaner filled with water or empty and dispose of vacuum bag immediately.
PEST PROOFING	Seal holes in walls, ceilings, and other areas that may serve as cockroach harborage as required. Request support from facilities maintenance provider if necessary.
EDUCATION	• Proper storage of food and sanitation to prevent infestations and increase effectiveness of pesticide applications • Understanding of how baits work
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• Fipronil, hydramethylnon, boric acid, indoxacarb, imidacloprid and abamectin baits; boric acid dust; pyrethroids
METHOD OF DISPERSAL	• Flushing Agents: The pest management service provider may use aerosol contact pesticides directed into potential harborage areas to flush out and kill pests as needed. • Crack and Crevice Residuals: The pest management service provider may apply (by crack and crevice technique) a residual pesticide spray to all known or suspected harborages, feeding sites, or passageways. • Spot Treatment Residuals: A residual pesticide may be applied as a spot treatment to indicated areas (such as under dishwashers and refrigerators or behind stoves). • Baits: Cockroach baits (station or injectable style gel baits) will be used as much as possible. Gel baits can be more effective than dry baits due to the moisture in the bait and because it can be applied to more areas. • Growth Regulators: Insect growth regulators will always be mixed with knock-down pesticides.
RESTRICTIONS/ REGULATIONS/ PERMITS	• Do not do spot treatments indoors. • Do not apply to baseboards as a preventive residual spray. • Do not apply liquid or dust formulations of insecticides in occupied spaces.

CONSIDERATIONS	
SENSITIVE AREAS	• Exposed food products, food containers, counter tops, any surface where food may be stored or prepared, or any food storage area. • Ensure that insecticides do not enter drains, streams, lakes, or other surface water.
PROHIBITED PRACTICES	• Do not use ultrasonic pest repelling devices. • Do not use aerosols, dusts, and other insecticide formulations that can become airborne in occupied spaces or when food is exposed; baits may be applied when spaces are occupied • Do not do preventive baseboard spraying in the absence of a pest.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Allow for ventilation of spaces after liquid insecticides have been applied. • Clean food preparation surfaces after treatment. • Applicators must wear personal protective equipment as required by the product label. • Environmental impact is minimal since applications are performed indoors

8.1.3. Drain Flies

TARGET PEST(S)	Drain flies (*Psychoda* sp.); sometimes called moth flies, sewage flies, or filter flies. 
TARGET SITE(S)	Buildings where adult flies may become a nuisance. These flies may be very common around sewage treatment facilities, where they are considered beneficial decomposers of organic matter.
PURPOSE	Control flies that may be both a nuisance and a health hazard due to respiratory problems that can be associated with the inhalation of fly hairs and body parts. Drain flies are also able to mechanically transfer bacteria and other microorganisms from their breeding sites to places where humans live and work.
RESPONSIBILIES	• All personnel: Ensure proper sanitation in all living and working areas to avoid conditions that are attractive to flies. • Facilities Maintenance Service Provider: Periodically clean drain pipes to prevent buildup of organic matter where drain flies breed. • Pest Management Service Provider: Conduct integrated pest management to control infestations. • Pest Management Performance Assessment Representative: Ensure contracted pest management service provider performs work in accordance with contract specifications.
SURVEILLANCE	
METHODS	• Visual sighting: Adult drain flies will congregate on walls and windows of rooms containing drains where drain flies are breeding. Adults are weak fliers, and usually make a series of short, erratic flights to move from one area to another. The body and wings are hairy, and the wings are held roof-like over the body when at rest, giving the fly a moth-like appearance. Adult coloration is yellow, gray, or black. • Source drain: An attempt should be made to locate the drain(s) from which flies are emerging so that the breeding sites can be targeted. Sealing the suspected drain opening with a glue board, masking tape, or inverted plastic cup overnight should trap adult flies if they are present.
FREQUENCY	Scheduled surveys are not typically required. The presence of flies resting on walls in restrooms and other areas with drains will typically prompt a request for pest control.

ACTION THRESHOLD	Sufficient numbers of flies to constitute a nuisance indicate the need for treatment.
NON-CHEMICAL CONTROL	
HABITAT REMOVAL	• Drain cleaning: Drain flies breed in accumulated organic matter inside drainpipes. This material may be removed with over-the-counter drain cleaners. A stiff brush may be necessary to remove heavy buildup. • Bacterial drain cleaners: Products containing a specialized complex of bacteria can be used to digest the organic matter in which drain fly larvae breed and should then be followed by rinsing with very hot water. These products cannot be used in conjunction with other cleaning products, and are only available to pest control operators.
EDUCATION	• Educate building occupants on sanitation, and proper food disposal.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	Pyrethrum-based
METHOD OF DISPERSAL	Pyrethrum-based aerosols may be used to kill adult flies. However, the breeding site must be eliminated to prevent additional flies from emerging.
RESTRICTIONS/ REGULATIONS/ PERMITS	• Do not apply liquid or dust formulations in occupied spaces.
CONSIDERATIONS	
SENSITIVE AREAS	• Chemical pesticide use inside hospitals should be minimized as much as possible to avoid exposing patients. Control should focus on drain cleaning, which will provide better control and reduce the health risks associated with pesticides. • Ensure that insecticides do not enter drains, streams, lakes and other surface water.
PROHIBITED PRACTICES	• Do not use ultrasonic pest repelling devices. • Do not apply aerosols, dust, and other insecticide formulations that can become airborne to occupied spaces or when food is exposed.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Allow for ventilation of spaces after liquid insecticides have been applied. • Clean food preparation surfaces after treatment. • Applicators must wear personal protective equipment as required by the product label. • Minimal

8.1.4. Fruit Flies

TARGET PEST(S)	Small flies in the family Drosophilidae, commonly called fruit flies or vinegar flies. 
TARGET SITE(S)	Refuse containers, offices with windows facing the loading docks, galleys, and other areas that may have ripening fruit.
PURPOSE	Control flies that reduce the quality of life.
RESPONSIBILITY	• All Personnel: Ensure proper sanitation in all living and working areas to avoid conditions that are attractive to flies. • Janitorial Personnel: Ensure that refuse containers are emptied daily. Also, periodically clean refuse containers to prevent the buildup of organic matter where flies breed. • Facilities Maintenance Provider: Provide necessary building repairs and modifications needed for pest exclusion. • Pest Management Service Provider: Conduct integrated pest management to control infestations. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications.
SURVEILLANCE	
METHODS	• Flies are attracted to ripening and rotting fruit, as well as other decaying organic matter. • Flies can be seen hovering around refuse containers and resting on walls and cabinets near refuse containers. Fruit flies can be distinguished from other small flies by their tan or yellow colored bodies and red eyes.
FREQUENCY	• Scheduled fly surveying is generally not necessary. • Scheduled sanitation should prevent infestations.
ACTION THRESHOLD	The presence of flies in numbers constituting a nuisance for personnel indicates a need for control.
NON-CHEMICAL CONTROL	
SANITATION	• Refuse removal: Waste baskets and other refuse containers should be emptied daily to prevent the buildup of decaying matter that will attract flies. • Refuse container sanitation: Fruit flies are attracted to moist fermenting foods. All they need for breeding is a moist film of decaying organic matter. They will lay their eggs in garbage disposals, empty bottles and cans, trash containers, mops and cleaning rags. Keep all these items

	clean. Over time organic debris builds up on the bottom and sides of waste containers, particularly large dumpster and other trash bins. Refuse containers should be periodically steam-cleaned or washed to remove organic matter.
ELIMINATE FOOD SOURCES	Fruit bowls: Fruit flies are attracted to volatiles produced by ripening fruit. Store fruit in the refrigerator in order to avoid attracting fruit flies and other pests.
PEST PROOFING	Exclusion: Flies may migrate indoors from breeding sites located outdoors. Tight fitting screens and weather proofing around doors and windows (caulking, weather stripping, etc.) may delay entrance.
CHEMICAL CONTROL	
METHOD OF DISPERSAL	• For chemical controls to work, all breeding sites must be found and cleaned first. Potential breeding sites which are inaccessible (e.g., garbage disposals and drains) can be inspected by taping a clear plastic food storage bag over the opening overnight. If flies are breeding in these areas, the adults will emerge and be caught in the bag. • Adults may be killed with pyrethrum-based aerosol insecticides applied as a space spray or surface residual.
CONSIDERATIONS	
SENSITIVE AREAS	• Fruit fly infestations often occur in food-preparation areas. Ensure that the insecticide is labeled for use in food preparation areas, and that foods are not contaminated during application. • Ensure that insecticides do not enter drains, streams, lakes, and other surface water.
PROHIBITED PRACTICES	• Do not use ultrasonic pest repelling devices. • Do not use aerosols, dusts, and other insecticide formulations that can become airborne in occupied spaces.

8.1.5. Nuisance Ants

TARGET PEST(S)	Pharaoh ants, Argentine ants, black ants, crazy ants, and other nuisance species that invade structures 
TARGET SITE(S)	Offices, food preparation and storage areas, living spaces, playgrounds, patios, barracks, medical treatment facilities, and other spaces invaded by ants
PURPOSE	Control ants that are a nuisance in offices, eat and contaminate food, and can make spaces uninhabitable or unusable.
RESPONSIBILITY	• All Personnel: Ensure proper sanitation in all living and working spaces. • Preventive Medicine Technicians: Conduct facilities sanitation inspections, enforce food-handling regulations, and provide pest management recommendations. • Pest Management Service Provider: Conduct integrated pest management to control pest infestations. • Integrated Pest Management Coordinator: Oversee all pest management operations and ensure the use of IPM. • Pest Management Performance Assessment Representative: Ensure contractor PMSP performs work in accordance with contract specifications. • Grounds Maintenance Provider: Control aphids and similar insects on ornamental plants that attract and feed ants. • Facilities Maintenance Provider: Perform facility repairs and improvements that prevent and minimize pest infestations as requested.
SURVEILLANCE	
METHODS	• Visual inspections o Observation of foraging scout ants or ant trails o Follow ant trails to building entryways and to food source o Follow ant trails to nests • Personnel complaints: including information on when, where, and how many pests were observed. • Conduct pre- and post-treatment surveys to determine whether control operation was effective
FREQUENCY	• Daily observation by building occupants • Monthly inspections outdoors around buildings to identify ant nests

RECOMMENDED ACTION THRESHOLD	• Visual sighting of ants indoors • Food service areas: 3/room • Living areas: 5/room • Medical treatment facilities: 1/room • Grounds: 2 mounds/yard
NON-CHEMICAL CONTROL	
SANITATION	• Thoroughly clean potential food sources in buildings, especially coffee messes and food preparation areas. • Thoroughly clean food preparation surfaces, countertops, and stoves. • Remove and discard food that is attractive to ants. • Clean up food and drink spills as soon as possible. • Do not leave dirty dishes on countertops or in sinks. • Some ants are attracted to moisture. Fix leaky plumbing and remove other sources of water.
MECHANICAL REMOVAL	• Use a wet sponge or cloth to wipe up ants. • Spray ant trail with household cleaner or soap water then wipe up.
PEST PROOFING	• Put food in tightly sealed containers. • Seal holes in walls with caulk or, temporarily, with petroleum jelly.
CONTROL OF PLANT INSECTS	• Ants live in cooperation with some plant-infesting insects such as aphids. • These insects produce sugars that are food for the ants, while the ants provide protection for the plant-sucking insects. • Control aphids and other plant-sucking insects on plants
EDUCATION	• Proper storage of food and sanitation to prevent infestations. • Use of soapy water to control ants indoors.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• Arsenic trioxide, abamectin, borate-based products, fipronil, hydramethylnon, sulfuramid; pyrethroids (e.g., bifenthrin, lambda cyhalothrin)
METHOD OF DISPERSAL	• Baits: Bait stations can be used indoors or outdoors. Granular baits can be applied outdoors near nests. Baits are very specific to the species of ant, and effective in killing the egg-producing queen of the colony, but may require 2–3 days for complete control. • Barrier Spraying: Application of a residual outdoors around a building may be necessary if there are many nests and entryways into the building. May also be necessary if nests are difficult to find. Usually requires periodic reapplication if ant nests are not destroyed. • Dusts: Boric acid dust is an effective low-toxicity insecticide that can be applied to wall voids where ants may be nesting. The treatment area should remain dry after the application to avoid washing the dust away. • Granular insecticide: Acute toxicant in granular form. Only effective if applied directly to the nest.

CONSIDERATIONS	
SENSITIVE AREAS	• Exposed food products, food containers, counter tops, on any surface where food may be stored or prepared, or any food storage area. • Outdoors where children or pets may be exposed to pesticides. • Medical treatment facilities. • Streams, lakes, and other water sources. Avoid stormwater runoff of insecticides and do not apply directly to water. Many insecticides are highly toxic to aquatic organisms.
PROHIBITED PRACTICES	• Do not do spot treatments indoors. • Do not do preventive baseboard spraying in the absence of a pest. • Do not apply liquid or dust formulations of insecticides in occupied spaces.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Liquid and dust insecticides should not be applied to occupied spaces or when food is exposed; baits may be applied when spaces are occupied. • Allow for ventilation of spaces after liquid insecticides have been applied. • Clean food preparation surfaces after treatment. • Applicators must wear personal protective equipment as required by the product label. • Pyrethroid insecticides can be highly toxic to aquatic organisms.
COMMENTS	
For most people, ants become a problem and require action when they enter a building. Sometimes ants may nest in walls, especially if there is moisture in those areas; particularly bathrooms and kitchens. Surveys need to determine if the source of the infestation is indoors or outdoors. Control of ant nests outdoors during the spring and early summer may reduce ant problems later in the season. The most effective ant baits are slow acting to give worker ants enough time to carry small amounts of bait back to the nest where they will feed other ants and eventually kill the entire colony. For this reason, it may take several days to see results.	

8.1.6. Stored Products Pests in Food Storage Areas

TARGET PEST(S)	Beetles and moths that infest food products 
PURPOSE	Control stored product pests (SSPs) that may cause food contamination, medical problems, or be unsightly.
RESPONSIBLE PARTY	• Food Service Personnel: Ensure compliance with food handling regulations that prevent pest infestations; report infested food items to appropriate authority. • Installation Preventive Medicine Technicians: Conduct food service inspections, enforce food handling regulations, and provide pest management recommendations. • Pest Management Service Provider: Conduct integrated pest management to control infestations. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • U.S. Army Veterinary Services: Perform food quality inspections of storage facilities including surveys for SPPs.
SURVEILLANCE	
METHODS	• Visual inspections of food items before and during storage. Conduct in accordance with MILSTD 904B. • Attractant traps may be used to monitor movement and spread of SPPs in storage areas. They are inefficient as a means of control. Guidelines for the use of traps are found in AFPMB TG 27, Stored Product Pest Monitoring Methods • Personnel complaints
FREQUENCY	• Particular attention should be given to animal feed which are a common source of infestation. • Daily observation by food service personnel • Monthly observation by cognizant preventive medicine personnel. • Routine food inspections by US Army veterinary technicians.
ACTION THRESHOLD	• Observation of any number of SPP (whole insect, webbing, droppings, skins) inside or immediately outside of package. This should initiate a more thorough survey and control if necessary. • Observation of one SPP on a monitoring trap.
NON-CHEMICAL CONTROL	
SANITATION	• Maintain thorough sanitation of food storage area • Clean up all spills immediately

PACKAGING AND STORAGE	• Ensure all packages are intact. Place in sealed insect proof containers if available • Repair any torn packages • Rotate food items: "first-in-first-out"; do not allow food to remain stored for long periods of time • Store on pallets off the floor. • Maintain adequate ventilation and lighting in storerooms.
ISOLATION	Remove infested items from the storeroom if they can't be disposed of immediately.
MECHANICAL REMOVAL	Vacuuming, sweeping, mopping of floors on which SPPs are found may be used. Ensure that a wet/dry vacuum filled with water is used or remove, empty, and dispose of vacuum bag immediately.
FREEZING/ HEATING	SPPs may be killed by freezing or cooking. Insects can be removed from food item by sifting
SURVEY (DISPOSAL)	Dispose of infested food items (see MIL-STD-904C, Detection, Identification, and Prevention of Pest Infestation of Subsistence for guidance)
CHEMICAL CONTROL	
METHOD OF DISPERSAL	• Since many infestations are confined to the food packages, non-chemical methods are the preferred control method. • Crack and Crevice Applications: The pest management service provider may apply (by crack and crevice technique) a contact or residual pesticide spray to areas in storerooms where insects may be found after leaving infested packages. • Insect Growth Regulators: Insect growth regulators (IGR) prevent immature insect larvae from developing into mature adults. IGRs may be useful for chronic SPP problems, but cannot be applied to food or cause immediate kill of the pest. It must be used in conjunction with other forms of control. • Fumigation: Consult a NAVFAC pest management consultant before considering fumigation. Fumigation can be performed on pallets of food items. It will penetrate most materials to kill insects inside the food without harming or making inedible the food item.
CONSIDERATIONS	
PROHIBITED PRACTICES	• Do not use aerosols, dusts, and other insecticide formulations that can become airborne in occupied spaces. • Do not do preventive baseboard spraying in the absence of a pest.
SENSITIVE AREAS	• Exposed food products, food containers, counter tops, on any surface where food may be stored or prepared, or any food storage area. • Ensure that insecticides do not enter drains, streams, lakes and other surface water.
COMMENTS	
Review TG 29, Integrated Pest Management In and Around Buildings. Review TG 27, Stored Product Pest Monitoring Methods.	

8.2. HEALTH-RELATED PESTS

8.2.1. Bed Bugs	
TARGET PEST(S)	Bed Bugs (*Cimex* spp.) 
PURPOSE	Control bed bugs that can cause bites or allergic reactions, be a nuisance, and affect morale and quality of life. Can be carried on board ship from infested barracks.
RESPONSIBLE PARTY	• Berthing Quarters Managers: o Establish rules and regulations to prevent establishment and propagation of pests. o Prevent movement of furniture between rooms if bedbugs are identified • Berthing Quarters Residents: o Comply with quarter's rules and regulations. o Maintain sanitation and cleanliness of personal items such as bedding. • Cognizant Military Unit Leadership: The command leadership, from the commanding officers to the non-commissioned officers, is responsible for their personnel and must enforce public health measures to protect their health and well-being. Sanitation and other pest prevention measures should be enforced through room inspections if necessary. • Installation Preventive Medicine Technicians: o Conduct berthing inspections o Enforce berthing regulation per NAVMED P-5010 o Provide informal quality assurance for pest control o Provide pest management recommendations • Pest Management Service Provider: Conduct integrated pest management to control infestations. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Facilities Maintenance Provider: Perform facilities repairs and improvements that exclude and minimize pest infestations as requested.

SURVEILLANCE	
METHODS	• Personnel complaints: Complaints are commonly received when a patient goes to medical complaining of itching or dermatitis due to bites. • Visual inspections o Look for pests in mattresses, box springs, bed frames, and headboards. Less commonly found on baseboards and on walls behind furniture. o Application of a flushing agent to cracks and crevices • Sticky trap surveys • Vacuum surveys of harborages • Conduct pre- and post-treatment surveys to determine whether control operation was effective • Dry ice/CO_2 attractant traps • Bed-bug sniffing dogs are available.
FREQUENCY	• Daily observation by residents. • Observation during zone inspections by unit command leadership personnel. • Monthly observation and/or sticky trap monitoring by PMT of spaces post-treatment. • In visitor's quarters, lodges and other hotel rooms, housekeeping should perform inspections during cleaning.
ACTION THRESHOLD	Detection of 1 bed bug, cast skins, or fecal stains should initiate survey and control.
NON-CHEMICAL CONTROL	
SANITATION	• Thorough cleaning (field day) shall be performed in each room. • Remove all clutter particularly from under and around beds to reduce harborage. Removal of clutter also enables easier inspection of furniture and mattresses. • Note: When removing materials from an infested room, either treat the material or place in bags then seal before taking out of room to prevent spread of the bugs.
WASHING/ CLEANSING	• Thoroughly wash bedding • Clean mattresses, box springs, frames, headboards with soap and water.
MECHANICAL REMOVAL	Vacuum bedbugs from their harborages on mattresses, headboards and other surfaces where they are found. Use a wet/dry vacuum cleaner filled with water or empty and dispose of vacuum bag immediately.
ISOLATION AND EXCLUSION	• Prevent removal of furniture from rooms found to be infested until they are cleaned. • Remove debris from around outside of buildings • Repair cracks in walls • Caulk windows and doors • Caulk cracks and crevices in bed frames and furniture • Specially designed mattress encasements without seams will prevent bed bugs from getting on mattresses and leaving mattresses to infest other areas.

HEAT	• Heat infested articles and/or areas through to at least 113 °F (45 °C) for at least one hour. The higher the temperature, the shorter the time needed to kill bed bugs at all life stages. • A pesticide barrier around doorways may be necessary to prevent spread of fleeing bed bugs to adjacent spaces. • Infested bedding and clothing can be placed in a clothes dryer on high heat. • Note: Heat may damage sprinkler systems and will require protective measures before treatment of rooms.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• Pyrethrin, pyrethroids (cyhalothrin, bifenthrin, deltamethrin), hydroprene (IGR), chlorfenapyr, dichlorvos strips, silica gel, boric acid • Chemicals that leave a residual are preferred.
METHOD OF DISPERSAL	• Chemical control using insecticides alone will not control/prevent a bed-bug infestation. • Flushing Agents: The pest management service provider may use aerosol contact pesticides directed into potential harborage areas to flush out and kill pests as needed. • Crack and Crevice Residuals: The pest management service provider may apply (by crack and crevice technique) a residual pesticide spray to all known or suspected harborages. • Spot Treatment Residuals: A residual pesticide may be applied as a spot treatment to indicated areas. • Mattress Treatment: Infested mattresses can be treated. Using a residual insecticide will prevent future infestations. • Slow-release vapor strips: A plastic strip impregnated with Dichlorvos slowly releases an insecticide vapor that will control flying and crawling pests. Treatment times are 48–72 hours for adults and nymphs and 7–10 days for eggs. Any room/area where strip is placed must be vacated by people and pets during the treatment. This can also be placed in containers or bags to treat infested materials. • Insect Growth Regulators (IGRs): Affect the development and reproduction of predators. When properly applied, IGRs have essentially no effect on vertebrate metabolism because of their mode of action and low application rates, but they have a significant impact on bed-bug molting, fertility, and egg hatching success.
RESTRICTIONS	• Insecticide resistance may cause treatment failure • Use of aerosols, dusts, and other insecticide formulations that can become airborne shall not be applied in occupied spaces. Spaces must be vacated before treatment and then ventilated and the insecticide allowed to dry before personnel are allowed to occupy the space.
CONSIDERATIONS	
SENSITIVE AREAS	• Some persons may be sensitive to some pesticides. Pesticide applications should be avoided if possible and be made only to areas where pests have been observed. • The insecticide on treated mattresses should be allowed to dry and then should be covered with a mattress cover before use. • Ensure that insecticides do not enter drains, streams, lakes, or other surface water.

PROHIBITED PRACTICES	• Do not use ultrasonic pest repelling devices. Do not apply aerosol, dust, or other insecticide formulations that may become airborne in occupied spaces. • Do not do preventive baseboard spraying in the absence of a pest.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Minimal

ADDITIONAL INFORMATION

Treatment failure may be due to incomplete surveys for the pest, improper application, and insecticide resistance. Follow-up inspections and control are crucial to eliminating the bugs.

Review AFPMB TG-44, Bed Bugs: Importance, Biology, and Control Strategies.

8.2.2. Filth Flies

TARGET PEST(S)	House flies (*Musca domestica*), face flies (*Musca autumnalis*), stable flies (*Stomoxys calcitrans*), little house flies (*Fannia* spp.), and other fly species that breed in garbage, compost, manure, or other organic debris. 
TARGET SITE(S)	• Animal kennels or stables • Refuse storage areas • Any places where organic debris may accumulate • Dumpsters • Garbage dumps and recycle centers
PURPOSE	Reduce populations of flies that are a nuisance and may mechanically transmit pathogens.
RESPONSIBILITY	• Food Service Personnel: Ensure compliance with food handling regulations that prevent pest infestations • Installation Preventive Medicine Technicians: Conduct food service inspections, enforce food handling regulations, provide quality assurance for pest control, and provide pest management recommendations • Pest Management Service Provider: Conduct integrated pest management to control infestations. • Janitorial Personnel: Ensure that refuse containers are frequently emptied and sanitized. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Facilities Maintenance Provide: Perform facilities repairs and improvements that exclude and minimize pest infestations as requested.

SURVEILLANCE	
METHODS	• Visual sighting o Flies that enter buildings will congregate around windows. o Flies may be seen crawling on or flying around organic debris. o Flies are active during the daytime in warm weather. o Flies may be seen flying and landing on dumpsters and trash cans. o Visual surveys of adult flies should also identify where flies are entering a building and where they are breeding. • Bites o Adult stable flies will painfully bite humans, dogs, and livestock. o Stable flies may be surveyed by counting the flies on all four legs of livestock animals. o Most filth flies do not bite. • Trapping o Light traps: traps can be used to control adult flies as well as monitor populations. Flies are attracted to ultraviolet light and trapped on a sticky pest strip. o Sticky traps: Traps can be placed around areas where filth flies are known to be a problem. Many types contain visual lures. o Pheromone traps: Use a fly pheromone (muscamone) to attract flies to a container. Directions for constructing a baited jug trap can be found at http://ohioline.osu.edu/b853/b853_4.html. • Spec counts o Index cards (3×5) may be placed around areas to be monitored. Flies that land on the cards will leave vomit or fecal specs that can be counted. Though inexpensive and simple, this technique gives no indication of fly species and may overestimate fly numbers since a single fly may leave multiple specs. o Note: Identification of adult flies is important in determining where flies are breeding in order to target control at the source of the infestation. If you can't find the breeding locations of the flies, then collect some flies and identify or send to an entomologist for identification.
FREQUENCY	• Visual observations should be made around likely breeding sites (e.g., dumpsters). • Traps should be inspected weekly. More frequent inspection may be necessary if sticky traps are placed in areas where they will quickly become covered with dust, insects, or other debris. • Counts of flies on animals should be conducted weekly.
ACTION THRESHOLD	• The presence of biting flies in numbers constituting a nuisance for people or animals indicates a need for control within 24 hours if the presence is interfering with the mission or activities. • For counts on livestock, an average of 10 stable flies per animal indicates a need for control. • For counts on sticky traps, 100 flies per week indicates a need for control.

NON-CHEMICAL CONTROL	
BIOLOGICAL CONTROL	• Several species of parasitic wasps can be purchased for use against filth flies. • Biological control agents do not kill adult flies. Wasps lay their eggs in fly pupae, where the wasp larvae consume the developing fly, preventing it from emerging. • Biological control agents will not sting or otherwise harm humans or animals. • Biological control agents are not compatible with chemical insecticides. • Release timing, climatic conditions, release frequency, and number of agents released are all critical for biological control success. • Contact pest management consultants for additional information before instituting a biological control program.
TRAPPING	• Ultraviolet light traps may be used to reduce adult fly populations in buildings invaded by flies. • Exercise caution when placing traps; if the trap is visible from outside the structure, it may attract flies into the building. • Traps by themselves are unlikely to control heavy fly infestations. • Do not use bug zappers that electrocute flies in food-preparation areas or eating facilities. Use attractant light traps that collect flies on sticky traps.
SANITATION TO ELIMINATE BREEDING SITES AND FLY ATTRACTANTS	• Eliminating breeding sites is critical for effective filth fly control. • Filth flies often breed in neglected refuse containers. • Cover outdoor trash containers with tight-fitting lids. • Empty trash containers frequently. • Sanitize trash containers that have accumulated organic material. • Steam clean dumpsters regularly. • Do not allow animal manure to build up. • Maintain compost piles to promote rapid decay of organic material. • Do not place compost piles near areas where flies are likely to become a nuisance. • Hydrated lime may be applied to stable floors to speed manure decomposition and render stables less suitable for fly breeding.
PEST PROOFING	• Seal cracks and other openings around doors and windows. • Use tight-fitting screens. • Air-screens/air-curtains may be installed in commercial facilities.
EDUCATION	• Educate building occupants on sanitation, excluding flies by closing doors and maintaining screens, and proper food storage.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• Pyrethroids, dichlorvos (in insecticide strips), methomyl, and others

METHOD OF DISPERSAL	• Non-residual space spray or aerosol: may temporarily control adult fly populations in buildings; will not provide long-term control unless breeding sites are eliminated. • Residual insecticides: may be applied to areas outside where adult flies rest; will not provide long-term control unless breeding sites are eliminated. • Baits: may be used around refuse containers and other places to which flies are attracted. Do not use baits indoors or in other areas where flies are not already present. Baits may attract flies to an otherwise fly-free area. • Impregnated strips: Plastic/paper strips impregnated with insecticides will kill adult flies that contact the strips. Useful when placed inside trash cans or other unoccupied spaces. • Insect repellents: may be used on humans or animals for temporary prevention of stable fly bites. Will not provide long-term control of fly populations, and must be frequently re-applied. • Oral larvicides: may be administered to livestock; will render manure unsuitable for fly breeding.
RESTRICTIONS/ REGULATIONS/ PERMITS	• Do not apply liquid or dust formulations in occupied spaces. • Dichlorvos is a carcinogen and cannot be placed in occupied spaces.
CONSIDERATIONS	
SENSITIVE AREAS	• Filth fly infestations often occur in food-preparation areas. Ensure that the insecticide is labeled for use in food preparation areas, and that foods are not contaminated during application. • Emphasize non-chemical control in areas frequented by children (e.g., child development centers). • Ensure that insecticides do not enter drains, streams, lakes, and other surface water.
PROHIBITED PRACTICES	• Do not use ultrasonic pest repelling devices. • Do not use aerosols, dusts, and other insecticide formulations that can become airborne in occupied spaces.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Take precautions when using pesticides around food service areas and the child development center. • Applicator should use personal protective equipment as required by the product label. • Avoid contaminating water with pesticides. • Space spraying outdoors can result in drift and have impact on non-target organisms.
COMMENTS	
The numbers of products available for filth fly monitoring and control is overwhelmingly large. The efficacy of a given product often depends on local climatic characteristics, the severity of the infestation, the species comprising the infestation, and other localized conditions. Also, many products are available that do not work or whose efficacy is unproven. Pest management consultants or county or state extension personnel can assist with choosing fly control methods that are most appropriate for a given area.	

8.2.3. Fire Ants

TARGET PEST(S)	Fire ants 
TARGET SITE(S)	Outdoors and inside buildings
PURPOSE	Control fire ants that can cause painful stings or allergic reactions, be a nuisance, and short circuit electrical circuits.
RESPONSIBILITY	• Pest Management Service Provider: Respond to trouble calls and conduct routine inspections during seasonal outbreaks. Thorough inspections will be made prior to any control operation. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Grounds Maintenance Provider: Control aphids and similar insects on ornamental plants that attract and feed ants. • Facilities Maintenance Provider: Perform facilities repairs and improvements that exclude and minimize pest infestations as requested.
SURVEILLANCE	
METHODS	• Visual inspections o Observation of foraging scout ants; ants aggressive when mound is disturbed o Aboveground mounds • Personnel complaints: including information on when, where, and how many pests were observed.
FREQUENCY	• As needed • Areas designated by customer complaints, or with a history of infestation.
ACTION THRESHOLD	• Visual sighting of fire ants.
NON-CHEMICAL CONTROL	
SANITATION	• Remove indoor plants which are attractive to ants and/or aphids • Trim trees and shrubs touching buildings
OUTSIDE BARRIER	• Keep a vegetation-free, clear area approx. 24” wide (often filled with gravel or coarse sand) around foundations to inhibit pest movement to structures and facilitate barrier treatments.

PEST PROOFING	• Reduce moisture • Replace outside hollow core doors with solid doors.
CONTROL OF PLANT INSECTS	• Ants live in cooperation with some plant-infesting insects such as aphids. These insects produce sugars that are food for the ants, while the ants provide protection for the plant-sucking insects. • Control aphids and other plant-sucking insects on plants
CHEMICAL CONTROL	
METHOD OF DISPERSAL	• Baits: Improved areas should be treated with a granular bait annually in the late summer or early fall. Bails are slow-acting and require weeks to months to achieve 80 to 90% control. • Drench, Dust, or Granular Insecticide: Three to five days after initial broadcast application, specific nuisance mounds should be treated with a drench, dust, or granular application labeled for fire ant mounds. Nuisance mounds are those located in sensitive or high traffic areas.
CONSIDERATIONS	
SENSITIVE AREAS	• Exposed food products, food containers, counter tops, any surface where food may be stored or prepared, or any food storage area. • Outdoors where children or pets may be exposed to pesticides.
PROHIBITED PRACTICES	• Do not apply liquid or dust formulations of insecticides in occupied spaces. • Do not do preventive baseboard spraying in the absence of a pest.
SAFETY PRECAUTIONS	• Treatment of child development centers and schools will be scheduled at night of the last day during the work week if practical. Pesticides will be allowed to dry and air out for at least 36 hours before children are allowed to enter treated spaces. • Additional re-entry interval time requirements specified by the product label must be strictly adhered to. • If a liquid, dust, or aerosol is used, treatments will be made after hours or at other times when the spaces are vacant.
COMMENTS	
Baits should not be applied if heavy rains are expected within 24 hours. Baits work best when they are fresh and are applied when ants are foraging, usually in the late afternoon and evening.	
NOTES REGARDING FIRE ANTS	
The red imported fire ant (RIFA) is a very destructive pest that is well established along the southern tier of the United States. These ants are reddish brown and 1/8" to 1/4" long. RIFA nests are generally constructed in open, sunny areas such as lawns and around yard plants and trees. These ants can invade utility vaults and structures. The sting from the RIFA is very painful and, in certain cases, may require medical attention. Never use gasoline to burn out any ant nest. Gasoline is a soil and groundwater contaminant, and is very hazardous. For more information on red imported fire ants, contact your pest control service provider or go to http://fireant.tamu.edu/.	

8.2.4. Fleas In and Around Buildings

TARGET PEST(S)	Dog, cat, and rodent fleas 
TARGET SITE(S)	Military family housing, administrative and industrial buildings that harbor feral cats and other animals, and dog kennels
PURPOSE	Control fleas that are a biting nuisance and pose the potential for transmission of diseases such as murine typhus.
RESPONSIBILITY	• Veterinary Services: Prescribe pet treatments for flea control • Pet owner/Dog handlers: Treat animals for flea infestations. • Installation Preventive Medicine Technicians: Conduct surveys and inspections of pests of public health importance to assess health risk. • Pest management service provider: Conduct integrated pest management to control infestations. • Pest Control Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Facilities Maintenance Provider: Perform facilities repairs and improvements that exclude and minimize pest infestations as requested.
SURVEILLANCE	
METHODS	• Observe for fleas on pets or while grooming and washing pets • Walk around a room with light colored pants • Pull a white cloth across the floor • Concentrate on areas where pets animals frequent or rest • Survey for feral cats and buildings under which they may be harboring; survey in crawl spaces
FREQUENCY	• Flea infestations are usually reported by housing residents or building occupants. Survey should be conducted by the PMSP to determine where to treat.
ACTION THRESHOLD(S)	• One flea per room • One flea-infested animal in or under a building
NON-CHEMICAL CONTROL	
VACUUMING	Using a vacuum cleaner with a rotating brush on an infested carpet will remove a majority of the adults, larvae, and eggs. This should be done even if an insecticide will be applied. Hard surfaces should also be vacuumed if they contain cracks and crevices.

CARPET CLEANING	Steam cleaning or cleaning with a carpet cleaner, especially after vacuuming, may be sufficient to remove remaining fleas from carpet.
CLEAN PET BEDDING	Launder in soap and water all pet bedding and any other materials upon which dogs or cats sleep
CONTROL AND EXCLUDE FERAL CATS	• Feral cats are a common source of fleas in industrial and office buildings and are often encouraged by uninformed cat lovers to harbor under buildings. • DoD policy requires removal of feral animals from installations; neutered cats still carry fleas. • Cat harborages under buildings should be cleaned and treated with an insecticide. • Openings to crawl spaces should be sealed to exclude animals.
GROOM AND WASH PETS	• Flea combs can be used on pets to extract fleas. • Washing pet with soap and water is very effective at killing fleas.
EDUCATION	• Teach pet owners about ways to prevent fleas and treat pets for fleas • Provide awareness to installation personnel about the risk of flea infestations caused by feral cats. • Pre-treatment awareness of the need to clean/treat pets and pet bedding concurrently with the PMSP's insecticide treatment of the premises.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	Pyrethroids, methoprene and pyriproxyfen (insect growth regulators), fipronil, imidacloprid, lufenuron, spinosad, and others
METHODS OF DISPERSAL	• On-pet Treatments: o Spot-on treatments, such as Frontline (fipronil) and Advantage (imidacloprid) are convenient and easy to use and very effective at preventing fleas when monthly treatments are maintained throughout the season (late spring to early fall). o Oral treatments, such as Program (lufenuron) are effective and useful on pets that frequently swim or are bathed frequently. • Indoor Treatment: These treatments target areas where pets rest or on carpets and other surfaces that might hold adult and immature fleas. The most effective treatments contain IGRs which are often mixed with a contact insecticide (such as a pyrethroid). The contact insecticide will kill any existing adult fleas while the residual IGR will prevent larvae from becoming biting adults. • Outdoor Treatment: This is rarely necessary in residential situations if indoor and on-pet treatment is done correctly. Outdoor dog kennels and crawl spaces where feral cats were harboring should be treated if infested. Again, an IGR / contact insecticide treatment is most effective.
CONSIDERATIONS	
SENSITIVE AREAS	Medical treatment facilities, child development centers
PROHIBITED ITEMS	Do not use ultrasonic pest repelling devices.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	Applicators should use personal protective equipment as required by the product label.

ADDITIONAL INFORMATION
Successful control of fleas in a building requires room cleaning (vacuuming and carpet cleaning, cleaning pet bedding), pet treatment or washing, and insecticide treatment be done within 12 hours of each other. Some of the products and devices that aren't effective for flea control are indoor aerosol foggers, (otherwise known as bug bombs), ultrasonic devices, herbal collars, vitamin B1, brewer's yeast, and flea repellents.

8.2.5. Mites

TARGET PEST(S)	Mite parasites of animals (especially birds and rodents) 
TARGET SITE(S)	Office buildings, industrial buildings, outbuildings, and residences
PURPOSE	Control mite infestations that may cause a biting nuisance.
RESPONSIBLE PARTY	• Pest Management Service Provider: Conduct integrated pest management to control infestations • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications • Installation Preventive Medicine Technicians: o Conduct surveys when pests pose a health threat o Provide pest management recommendations.
SURVEILLANCE	
METHODS	• Personnel complaints: o Most often mite infestations are recognized when personnel complain of bites associated with specific work spaces or areas of a building; the mite may or may not be observed. o Have the personnel who are being bitten keep transparent tape nearby. When they feel like they are being bitten, tap the area of the biting with the sticky side of the tape. Personnel should take the tape to preventive medicine to have it identified. • Workspace investigations: o Have personnel being bitten identify the specific areas in which they are being bitten. o Ask if any bird or rodent problems have occurred in the building and, if it has, ask if control has been performed recently. o Look for evidence of rodent or bird infestation in false ceilings, under floor boards, in rafters, inside walls, and outside of the building. o Observe light colored surfaces for mites. o Identify other sources of nonliving material that may cause a biting sensation such as visible particles especially those coming from ventilation ducts. • Sticky traps: place sticky traps around the area of infestation. • Identification of the mite will indicate whether the source is from a bird or rodent. Precise identification may require an entomologist. Contact NECE or NAVFAC Applied Biology.

FREQUENCY	When notified of a potential problem.
ACTION THRESHOLD	Identification of mites collected from a person(s) or from a sticky trap.
NON-CHEMICAL CONTROL	
RODENT AND BIRD MANAGEMENT	• Preventing birds and rodents from entering a building will prevent mite problems. • See commensal rodent and nuisance bird pest management fact sheet for more information.
NEST REMOVAL	• Nests are the usual source of most mites. • Apply a pesticide to the nest to kill any mites (see below). • Remove nesting material and place in a double plastic bag. Clean area around nest with soap and water.
MITE REMOVAL	• Use soap and water to wipe up mites observed on surfaces. • Use a wet/dry vacuum filled with water to vacuum area where mites are found.
CHEMICAL CONTROL	
METHOD OF DISPERSAL	• Aerosols: Apply to cracks and crevices and other areas where mites are seen. • Dusts: Use in enclosed spaces where mites have been found.
CONSIDERATIONS	
SENSITIVE AREAS	Childcare facilities
PROHIBITED PRACTICES	• Do not do preventive baseboard spraying in the absence of a pest.

8.2.6. Adult Mosquitoes

TARGET PEST(S)	Flying adult pest mosquito species. 
TARGET SITE(S)	Industrial and residential areas
PURPOSE	• Control adult mosquitoes that are a nuisance or may transmit disease.
RESPONSIBILITY	• Housing Residents: o Use personal protective measures to prevent mosquito bites. o Ensure maintenance of window and door screens. o If screens are not available, keep doors and windows closed when mosquitoes are present. • Installation Preventive Medicine Technicians: o Conduct adult mosquito trapping to identify problem areas and mosquito species. o Map locations of trapping sites. o Conduct disease risk assessments including pathogen testing if available. o Provide information to housing residents on how to prevent mosquito biting. • Mosquito Control Provider: o Conduct surveys to verify presence of adult mosquitoes at site to be treated. Treat only when and where adult mosquitoes are present. o Use pesticides in accordance with the label. • Pest Management Performance Assessment Representative: o Ensure contractor pest management service provider performs work in accordance with contract specifications. o Conduct pre- and post-treatment surveys to monitor efficacy of control measures • Natural Resources Manager: Review and approve mosquito control operations conducted adjacent to sensitive areas to ensure minimal impact on the environment. • Housing Director: o Ensure that residents keep premises clear of clutter that can hold water and become breeding sites. o Ensure distribution of mosquito prevention and control information to residents. • Integrated Pest Management Coordinator: o Coordinate with PMTs, control provider, PMPAR, and natural

<table>
<tr><td></td><td>resource manager to identify mosquito-breeding sites that can be permanently eliminated by non-chemical methods.
o Maintain mosquito control operation records.</td></tr>
<tr><td colspan="2">SURVEILLANCE</td></tr>
<tr><td>METHODS</td><td>• Conduct surveys using visual assessments (i.e., landing counts) and/or traps at sites where personnel complain about mosquito bites to verify presence of mosquitoes.
• Record sites of verified complaints on a map. Use GPS receiver if available.
• Use traps weekly at same locations to reveal seasonal trends in mosquito abundance. Surveys can be used in subsequent years to plan mosquito control program.
• Trap mosquitoes for virus testing.
• PMTs will continue to conduct adult mosquito surveys.</td></tr>
<tr><td>FREQUENCY</td><td>• Ongoing surveys by residents.
• Survey prior to application of adulticide. For visual surveys, post-treatment surveys may be conducted immediately after the treatment. For traps, survey within 24 hours after application.</td></tr>
<tr><td>ACTION THRESHOLD</td><td>• Light traps or BG-Sentinel™ traps: 5 Aedes mosquitoes or 25 biting females (non-Aedes sp.) or 1 vector species in an un-baited light trap
• Disease emergencies declared: light traps: 1 female of a species which has been identified as carrying disease within 5 miles of base caught in a trap

NOTE: Action thresholds can be changed on advice of a BUMED entomologist
<table>
<tr><td>Vector species of concern</td><td>Primary diseases of concern</td></tr>
<tr><td>Aedes aegypti, Ae. albopictus</td><td>Dengue, Chikungunya, Zika</td></tr>
<tr><td>Culiseta melanura</td><td>Eastern equine encephalitis (EEE),West Nile Virus (WNV)</td></tr>
<tr><td>Culex spp.</td><td>EEE, Western equine encephalitis (WEE), St. Louis encephalitis, WNV</td></tr>
<tr><td>Culex nigripalpus</td><td>EEE, St. Louis encephalitis, WNV</td></tr>
</table></td></tr>
<tr><td colspan="2">NON-CHEMICAL CONTROL</td></tr>
<tr><td>PERSONAL PROTECTION</td><td>• Encourage use of repellents when outdoors in mosquito-infested areas. The CDC recommends us of EPA-registered insect repellents with one of the following active ingredients: DEET, picaridin, IR3535, oil of lemon eucalyptus, or para-menthane-diol.
• Avoid outdoor activities at dusk and during the evening hours to lessen chances of being bitten.
• Wear long-sleeved shirts and pants when outdoors in mosquito infested areas.</td></tr>
<tr><td>EXCLUSION/PEST PROOFING</td><td>• Window and door screens
• Remove tall weeds and overgrowth to remove possible resting areas for mosquitoes.</td></tr>
</table>

TRAPS	Propane-powered trapping devices that use heat and a chemical attractant have been shown to be effective for small to moderate area control of certain species of mosquitoes.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• Organophosphates (i.e., malathion, naled): Some chemicals may be corrosive. Resistance to organophosphates is widespread. • Pyrethrum and Pyrethroids: Safer for humans and mammals. May be toxic to non-target insects and fish.
METHOD OF DISPERSAL	• Organophosphates (i.e., malathion, naled): Apply with ULV or fog-generating equipment. • Pyrethrum and Pyrethroids: Apply with ULV equipment.
SENSITIVE AREAS	All ULV-applied pesticides may affect aquatic organisms especially fish. Care should be taken to ensure proper insecticide droplet size, timing of application, environmental conditions, and calibration of equipment. The installation environmental department should be consulted regarding sensitive areas.
COMMENTS	
Emergency control operations as the result of a disease outbreak may require large area application of an adulticide. Aerial spraying using an appropriately labeled pesticide and application equipment may be used. However, all aerial spraying operations must be reviewed and approved by a pest management consultant from NAVFAC Applied Biology. Aerial spray operations must also be reviewed and approved by the installation's operations officer. See AFPMB Technical Guide 13 for more information on ULV application of pesticides.	

8.2.7. Larval Mosquitoes

TARGET PEST(S)	Mosquito larvae 
TARGET SITE(S)	• Permanent: Catch basins, culverts, ponds, planters, gutters, drainage ditches, and freshwater marshes • Temporary: Any containers that collect water, trash piles, tires, flower pots, boats, rain gutters, bird/backyard pond.
PURPOSE	Control larval mosquitoes that are a nuisance or that may transmit diseases.
RESPONSIBILITY	• Housing Residents: o Eliminate backyard mosquito breeding sites. o Keep gutters and backyard ponds clean. • Preventive Medicine Technicians: o Survey and identify larval breeding sites o Map locations of breeding sites o Conduct disease risk assessments o Provide information to housing residents and installation personnel on how to prevent mosquito breeding and biting. • Mosquito Control Provider: o Conduct surveys to verify presence of larvae at site to be treated o Use integrated pest management methods to control mosquito larvae o Use pesticides in accordance with the label. • Pest Management Performance Assessment Representative: o Ensure contractor pest management service provider performs work in accordance with contract specifications o Conduct pre- and post-treatment surveys to monitor efficacy of control measures. • Natural Resources Manager: Review and approve mosquito control operations conducted adjacent to sensitive areas to ensure minimal impact on the environment.

	• Housing Director: o Ensure residents keep premises clear of clutter that can hold water and become breeding sites o Ensure distribution of mosquito prevention and control information to residents. • Integrated Pest Management Coordinator: o Coordinate with preventive medicine technicians, mosquito control provider, performance assessment representative, and natural resources manager to identify mosquito-breeding sites that can be permanently eliminated by non-chemical methods o Maintain mosquito control operation records.
SURVEILLANCE	
METHODS	• Maps should be used to identify non-residential water-holding sites; verify presence of sites. • Record all water-holding sites on a map or on a GPS receiver regardless of the presence or absence of mosquito larvae. • Survey water-holding sites for larvae. Use a dipper to take water samples. Dip as follows: o 1 dip/10 ft in linear sources o 1 dip/100 ft^2 in wide sources o 2 dips/source when small source (i.e., catch basin) o For the first two sources, dip until larvae are found, then record number of dips after that; do not count negative dips prior to this. • Record quantity as number of larvae/dip. Record negative sources. • Mark locations for treatment or treat immediately. • All positive sites will be identified on the map as larval sampling stations. These stations will be used in the ongoing surveillance program to detect the presence of mosquitoes after a high tide and when the action threshold for that site is exceeded, then control will be initiated. • PMTs will continue to look for and identify additional non-residential water-holding and breeding sites.
FREQUENCY	• Ongoing surveys by residents. • Weekly survey of permanent or semi-permanent sites. • Survey prior to application of larvicide and within 24 hours after application. (Method cannot be used after application of methoprene.)
ACTION THRESHOLD	• One or more larvae per dip
NON-CHEMICAL CONTROL	
SOURCE REDUCTION	• Ponds may be drained to eliminate breeding sites. • On base residential housing, water-holding containers (ex. pet food dishes, garbage cans, garden pots, boats, flower pots, and wheel barrels) should be emptied of water and prevented from collecting water. • Trash or tire piles identified within the installation should be cleared immediately.
VEGETATION REMOVAL	• Aquatic vegetation encourages mosquito breeding by slowing down water movement in ditches and streams and by providing larvae with protection from predators. Emergent and floating vegetation can be removed mechanically.

PROPER IRRIGATION	• Lawn and landscape should be irrigated properly to prevent over watering and run-off that can collect and produce mosquitoes.
MOSQUITO FISH	• Mosquito fish, or *Gambusia affinis*, feed on mosquito larvae and other small aquatic animals and can eliminate and prevent mosquito breeding. • *Gambusia* have the ability to outcompete other species and harm endangered and threatened species found on the installation, so pest control operators will not introduce or move *Gambusia* fish on MCB Camp Pendleton.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• *Bacillus thuringiensis israelensis* (Bti), *Bacillus sphaericus,* methoprene, temephos, insect growth regulations (e.g., s-hydroprene, s-kinoprene), mineral oils, monomolecular films
METHODS OF DISPERSAL	• Bti.: Apply by hand (granules), hand-compressed or hydraulic sprayer (liquid), as briquettes, or by manual or powered granule spreader. Liquid cost-effective when applied to open water; granules effective when water is covered by heavy vegetation. • Methoprene: Apply by hand or manual or powered granule spreader (granules and pellets), as briquettes, or by hand-compressed or hydraulic sprayer (liquid). Methoprene slow-release briquettes can be applied as a pre-flood application to dry water-holding areas that have been surveyed and are known to produce mosquitoes. • Surface Films: Apply by hand compressed sprayer.
SITE PREPARATION	• Survey treatment site prior to application of Bti and methoprene to ensure that majority of mosquitoes are in larval stage. Both are not effective on pupae.
CONSIDERATIONS	
SENSITIVE AREAS	• Some catch basins and culverts drain into environmentally-sensitive habitats and pesticide use may have adverse effects. • Some permanent and semi-permanent water sources may be habitats for birds, fish, and other animals. Alterations, such as vegetation removal or drainage, introduction of fish, or herbicide application may have significant impact on these habitats. • Some drainage channels drain into environmentally-sensitive habitats and pesticide use may have adverse effects.

8.2.8. Spiders

TARGET PEST(S)	Various spiders. Medically important spiders such as the black widow (*Latrodectus hesperus*), the brown widow (*Latrodectus geometricus*), the desert recluse (*Loxoceles deserta*), the brown recluse (*Loxoceles reclusa*), and the hobo spider (*Tegenaria agrestis*). 
TARGET SITE(S)	Housing and child development centers where young children may be at risk for spider envenomation, especially under playground equipment. Other areas where spiders are unwanted.
PURPOSE	• Control spiders that may cause envenomation or painful, serious bites. • Reduce discomfort or fear associated with the presence of spiders. • Webs are a nuisance.
RESPONSIBILITY	• All Personnel: Ensure proper sanitation of all living and working spaces as spiders harbor in areas that are rarely disturbed. • Installation Preventive Medicine Technicians: Conduct sanitation inspections. Provide control recommendations. • Pest Management Service Provider: Conduct integrated pest management to control infestations. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications.
SURVEILLANCE	
METHODS	• Visual inspections: look for spiders and webbing in areas where people may be at risk for spider bites. • Personnel complaints: including information on when pests were observed, where, and how many. • Conduct pre- and post-treatment surveys to determine whether control operation was effective
FREQUENCY	• Daily observation by building occupants • Monthly inspections outdoors around buildings by PMSP to identify spiders.
ACTION THRESHOLD	Visual sighting of one medically-important spiders indoors/room.

NON-CHEMICAL CONTROL	
VIGILANCE TO PREVENT BITES	Be cautious when entering areas that are infrequently visited and disturbed such as storage sheds, wood piles, attics, utility sheds, etc.
SANITATION	• Routinely clean out storage areas. • Vacuum carpets and furniture routinely. • Remove webbing from ceilings.
MECHANICAL REMOVAL	• Smash the spider. • Place a jar over the spider and slip a piece of paper under the opening. Relocate the spider outdoors. • Vacuum spiders and webs while cleaning. Use a wet/dry vacuum filled with water or carefully empty bag when done.
PEST PROOFING	• Avoid attracting flying insects to buildings with exterior lighting. Reducing flying insects near buildings will deny spiders of their food. Save energy and turn off lights, or use motion detectors or colored lamps that do not attract insects readily. • Seal cracks in the foundation and other parts of the structure and gaps around windows and doors.
EDUCATION	• Emphasize the importance of sanitation in preventing spiders. • Education and awareness to reduce the fear of spiders and to highlight the benefits of spiders
CURRENT NON-CHEMICAL CONTROL PRACTICES	• Sanitation: in indoor storage areas, place boxes off the floor and away from walls to reduce harborages. Seal boxes with tape. • Vigilance
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• Pyrethroids, silica gel, and other insecticides
METHOD OF DISPERSAL	• Pesticides are a last resort for recurring problems, since non-chemical control methods, particularly mechanical, are very effective. • Residual application: Pesticide applications should be done only as a last resort for recurring spider problems. • Liquid Aerosol: Most indoor-use insecticides do not leave a residual and require direct application to the spider. • Dust: Sorptive dusts, such as silica gel, that are formulated with pyrethrin can provide residual control. Preventive baseboard spraying in the absence of a pest is prohibited.
SENSITIVE AREAS	• Outdoors where children or pets may be exposed to pesticides. • Ensure that insecticides do not enter drains, streams, lakes and other surface water.
CONSIDERATIONS	
PROHIBITED PRACTICES	• Do not use ultrasonic pest repelling devices. • Do not use aerosols, dusts, and other insecticide formulations that can become airborne in occupied spaces.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Applicators must use personal protective equipment as required by the product label. Insecticide liquid and dusts shall not be applied to occupied spaces. • Minimal. Avoid contamination of water with pesticides.

COMMENTS
The greatest problem posed by spiders is arachnophobia, the fear of spiders. Most spiders are harmless and are very beneficial in controlling insects around buildings. Education of the public is an important part of control. Brown recluses—Many of the purported bites attributed to brown recluses are probably other arthropod bites, skin infections, or allergic reactions misdiagnosed as brown recluse bites. For general information on brown recluse identification, go to https://spiders.ucr.edu/recluseid.html. Brown widow—venom is more potent than black widow venom. However, they do not inject as much venom as a black widow, are very timid, and do not defend their web so their bites are rare.
ADDITIONAL INFORMATION
Spiders in and around homes, http://ipm.ucanr.edu/PMG/PESTNOTES/pn7442.html

8.2.9. Stinging Insects

TARGET PEST(S)	Bees, wasps, and yellow jackets 
TARGET SITE(S)	Outdoors
PURPOSE	• Control stinging insects that can cause painful stings, massive envenomization, or serious allergic reactions. • Remove bee hives that can cause property damage and attract other unwanted pests.
RESPONSIBILITY	• Installation Preventive Medicine Technicians: Evaluate medical threat of stinging insects if necessary • Pest Management Service Provider: Conduct inspections and integrated pest management to control infestations through killing or removal. Arrange for removal of beehives in buildings. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Facilities Maintenance Provider and Grounds Maintenance Provider: Report any stinging insect nest sightings.
SURVEILLANCE	
METHODS	• Observation of insect nesting or swarming. • Routinely examine buildings for openings where bees or other stinging insects appear to be entering and exiting. • Personnel complaints: including information on when pests were observed, where, and how many. • Identify whether bees are swarming or nesting. (see remarks below)
FREQUENCY	As observed by personnel.
ACTION THRESHOLD	• Nesting bees, wasps, or yellow jackets near populated areas require immediate response. • Swarming bees, especially near areas where few people are found, should be left alone. • Swarming bees in areas that cannot be avoided by people and appear to be a threat should be controlled. • Individual bees are foraging and are docile, but may be nesting nearby.

NON-CHEMICAL CONTROL	
DISCOURAGE AND ELIMINATE NESTS	Nests should be removed by trained personnel
AVOIDANCE	Stay away from stinging insects if possible.
ELIMINATE FOOD SOURCES	• Keep pet foods indoors. • Cover trash cans.
ELIMINATE STANDING WATER	• Some stinging insects are attracted to water. • Repair leaking outdoor faucets and other mechanical water sources. • Eliminate standing water.
TRAPS	• Wasps and yellow jackets: o Trapping should start in the spring and be continued through the summer. Early elimination of queen will reduce the size of populations later in the year. o Lure traps—baited with a chemical attractant or with meat. o Water traps—Meat hung on a string hung 1-2 inches over a bucket of soapy water. Cover bucket with mesh to exclude other animals. • Bees: Swarming bees can be lured into a trap that mimics a nesting site.
MECHANICAL REMOVAL	Wet/dry vacuums may be used to remove bees, but should only be done by trained personnel.
PEST PROOFING	• Seal holes in exterior walls of buildings. Request support from facilities maintenance provider if necessary. • Remove debris that can serve as nesting areas. • Cover tree holes.
CHEMICAL CONTROL	
METHOD OF DISPERSAL	• Aerosol knockdown agents: High pressure aerosols that can be applied from a long distance can be used. Application of these insecticides results in a rapid knockdown of the insects. • Dusts: Dusts can be applied to nesting areas. • Baits: Baits mixed with a toxicant can be used for wasps and yellow jackets
CONSIDERATIONS	
SENSITIVE AREAS	• Personnel that may be harmed by bees or pesticide application. • Buildings that may be damaged by hives. • Ensure that insecticides do not enter drains, streams, lakes and other surface water.

NOTES REGARDING AFRICANIZED HONEY BEES (AHB)

Africanized Honey Bees (AHBs), or killer bees have colonized most of the southwestern United States. Most feral colonies of bees are considered to be AHB colonies.

AHB are often mistaken to be more venomous than their European counterparts that are raised for honey production and pollination. The venom that AHB produce is not more toxic. In fact, AHBs inject less venom than EHBs because they are smaller. AHB are more dangerous than EHB because they exhibit a more aggressive response to a disturbance of their nest or colony. An “attack” usually involves a large number of bees resulting in a large number of stings; often ranging into the hundreds. Injuries in these types of attacks are the result of massive envenomation. Massive envenomation for small children, elderly and disabled persons and pets can be very serious and sometimes fatal.

Precautions that should be taken when dealing with any feral bee colony include:

1. Hiring a professional pest controller to kill or remove the bees.
2. Be aware of hives in the area. AHB are easily disturbed by loud noises or vibrations caused by lawn mowers and other machinery.
3. Warn people not to disturb hives or swarming bees.
4. Do not leave pets tied up in areas where they may be attacked by bees.
5. If attacked by bees, run and/or cover yourself up with a coat or heavy blanket or seek shelter in a building or a car immediately. Do not stop to swat at the bees or jump into water.
6. Call 911 or other emergency phone number in the event of an aggressive bee attack on a human.

Refer to Technical Information Memorandum (TIM) 34 "Bee Resource Manual with Emphasis on the Africanized Honey Bee."

8.2.10. Ticks

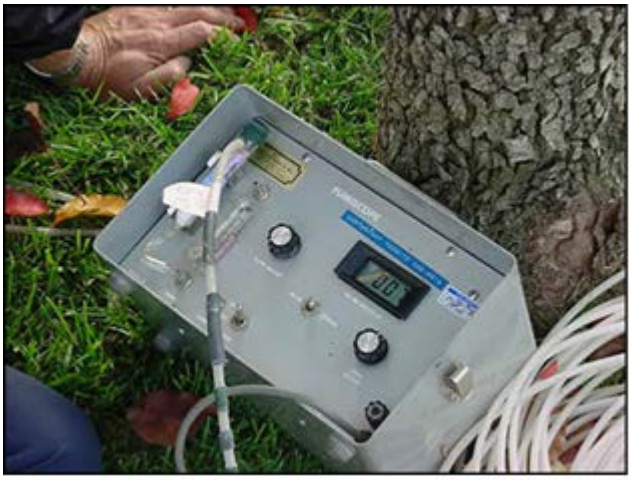
TARGET PEST(S)	Ticks 
TARGET SITE(S)	Outdoors, especially near or in wooded areas
PURPOSE	Prevent the spread of tick-borne diseases.
RESPONSIBLE PARTY	• Pest Management Service Provider: Pesticide applications. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Installation Preventive Medicine Technicians (PMT): o Conduct surveys when pests pose a health threat. o Identify any collected ticks o Contact point for disease emergencies o Respond to complaints of tick bites. • Environmental Division: Recommendations and approval for land modifications near improved areas to eliminate tick harborage • Grounds Maintenance Provider: Vegetation removal.
SURVEILLANCE	
METHODS	• Cloth drag surveys (conducted by PMTs) • CO_2 ground traps (conducted by PMTs) • Customer complaints
FREQUENCY	When notified of a potential problem.
ACTION THRESHOLD	• 5 or more adult vector species captured in a 5 minute drag near training or encampment areas • During disease emergencies declared, one or more adults or nymphs that have been identified as carrying the disease within 5 miles of base NOTE: Action thresholds can be changed on advice of a BUMED entomologist
	Vector species of concern: *Dermacentor variabilis*, *Ixodes scapularis*, *Amblyomma americanum* Primary diseases of concern: Rocky mountain spotted fever (RMSF), Lyme Disease, Ehrlichiosis

NON-CHEMICAL CONTROL	
HABITAT MODIFICATION	Eliminate brush and high grass from improved and high traffic area
CHEMICAL CONTROL	
METHOD OF DISPERSAL	Barrier spray: Vegetation surrounding training areas and encampments may be sprayed with a pesticide that leaves a residual barrier to ticks. Dispersal is accomplished via a truck mounted power sprayer.

8.3. STRUCTURAL PESTS

8.3.1. Drywood Termites	
TARGET PEST(S)	Several species of termites in the family Kalotermitidae, particularly *Incisitermes minor.* 
TARGET SITE(S)	Structures containing wood
PURPOSE	Control termites that reduce the aesthetics and integrity of real property
RESPONSIBILITY	• All Personnel: Report termite damage and signs to the Pest Management Coordinator. • Pest Management Service Provider: Conduct integrated pest management to control infestations. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications.
SURVEILLANCE	
METHODS	Visual inspections • Inspect wood in crawl spaces that is touching or near the soil surface. • Pay particular attention to wood that is damp. • Termite galleries will be filled with excrement and other debris. • Infested wood may be discolored (darkened) and can often be easily punctured by a knife or screwdriver. • The surface of a severely damaged piece of wood may appear blistered or peeled.
FREQUENCY	Annually
ACTION THRESHOLD	Presence of termites indicates a need for treatment.
NON-CHEMICAL CONTROL	
SANITATION	Remove scrap and decaying wood from yards.
HEATING	• Items that may be damaged by high temperatures are removed from the building. • Building is then tented using nylon tarpaulins, and propane heater is used to pump hot air into and around the building, bringing the temperature of all parts of the structure to 120°F or 35 minutes. • Temperatures as high as 130°F for 50 minutes may be used.

FREEZING	• Liquid nitrogen is pumped into infested areas. • Termites are killed by the extreme cold.
MICROWAVES	• Microwave generators are placed against walls and structures to be treated. • The resulting heat kills termites.
ELECTRICITY	• Electro-gun is used to apply low-amperage, high voltage current to infested wood. • Termites are killed by the electrical shock.
EDUCATION	• Water-damaged wood is attractive to termites and residents and GMPs should be educated on avoiding landscape irrigations that cause water to contact wood. • Recognition of termite infestations • Flying termites near buildings do not necessarily indicate an infestation; they are attracted to light.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	Sulfuryl fluoride (Vikane) fumigant, borates
METHOD OF DISPERSAL	Borate dust or liquid application for spot treatment or wood protection Chemical fumigation
RESTRICTIONS/ REGULATIONS/ PERMITS	Sulfuryl fluoride is a restricted-use pesticide.
CONSIDERATIONS	
SENSITIVE AREAS	Gases used for fumigation are potentially lethal to humans. A 24-hour guard should be posted outside to ensure that no people enter the building before it has been cleared for re-entry by the pest management service provider.
PROHIBITED PRACTICES	Do not use of ultrasonic pest repelling devices.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Whole structure fumigation is a dangerous operation. DoD-specific safety requirements are required including securing doors, warning signs on building and on tarp, a barrier with warning signs, and contractor personnel on-site during the duration of the fumigations. • Impact minimal. Sulfuryl fluoride dissipates into the air rapidly and does not leave a residual. Borates are low toxicity for non-target animals, but contamination of water should be avoided.
Comments	
Navy policy is to spot-treat unless infestations are spread throughout the structure. Fumigation is expensive and not cost-effective to use on limited infestations. Though several treatment options exist for drywood termites (see NON-CHEMICAL CONTROL), chemical fumigation is by far the most common and currently the most effective method of control. Non-chemical control methods may be indicated in certain situations, such as highly-localized infestations or infestations in very large buildings where the logistics and cost of fumigation are prohibitive. Some of these methods may cause structural damage. Any termite treatment should include a warranty that includes follow-up inspections. Note that pre- or post-construction soil treatments are not effective in preventing drywood termite infestations. Inspections are critical to the success of drywood termite control to identify where	

infestations exist and the extent of the infestations. Post-treatment inspections are critical to ensuring effectiveness of the treatment. Consult with the NAVFAC pest management consultant about specific situations where non-chemical control methods may be indicated.	
	**Fumiscope for monitoring fumigant gas in structure.**
	**Drywood termite damage.**

8.3.2. Subterranean Termites

TARGET PEST(S)	Several species of termites in the family Rhinotermitidae, particularly the western subterranean termite, *Reticulitermes hesperus* 
TARGET SITE(S)	Structures containing wood
PURPOSE	Control termites that reduce the aesthetics and integrity of real property.
RESPONSIBILITY	• All Personnel: Report termite damage and signs to the Pest Management Coordinator. • Pest Management Service Provider (PMSP): Conduct integrated pest management to control infestations. • Facilities Maintenance Provider (FMP): Provide facility repairs and modifications needed for termite exclusion. • Pest Management Performance Assessment Representative (PMPAR): Ensure contractor pest management service provider performs work in accordance with contract specifications.
SURVEILLANCE	
METHODS	• Inspect wood that is touching or near the soil surface. • Pay particular attention to wood that is damp • Look for shelter tubes in crawl spaces and in walls. • Termite galleries will be filled with excrement and other debris • Infested wood may be discolored (darkened) and can often be easily punctured by a knife or screwdriver. • The surface of a severely damaged piece of wood may appear blistered or peeled.
FREQUENCY	• Annually in most regions • Biannually in arid regions
ACTION THRESHOLD	Presence of termites indicates a need for treatment

NON-CHEMICAL CONTROL	
BUILDING DESIGN AND MAINTENANCE	• Several design and construction techniques can help prevent subterranean termite infestations o Use wood species that are resistant to termite attack o Keep all wooden components at least 12-inches above the surface of the soil o Replace soil around the foundation of the building with sand (particle size ranging from 10 to 16 mesh) o Provide adequate ventilation in crawl spaces to keep wood dry. o Before pouring slab, install termite-resistant mesh and eliminate openings around plumbing and other utilities protruding from slab. • Reduce excess moisture in the building by correcting leaky plumbing and moisture associated with air conditioning condensate
PEST PROOFING	• Use screening over vents and other openings to discourage entry by winged reproductives. • Remove scrap wood from around structures.
SAND BARRIER	Replace soil around foundation and in crawl spaces with sand. Sand particles should be 10 to 16 mesh. Termites are unable to tunnel through sand.
EDUCATION	Difference between a winged ant and a termite swarmer.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• Fipronil, sulfuramid., diflubenzuron, hydramethylnon, chlorantraniliprole, and others.
METHOD OF DISPERSAL	• Chemically Treated Lumber: Lumber to be used near the soil surface is impregnated (pressure treated) with a variety of repellent/fungicidal/insecticidal chemicals prior to construction. Some of these products are also available to topical application to wood after construction. These products are not effective for controlling pre-existing termite infestations. • Pre-Construction Soil Treatment: The soil under and around the perimeter of a slab is treated with an insecticide prior to construction. The insecticide acts as a barrier, either by killing termites that contact the treated soil or repelling foraging termites. Only non-repellent termiticides should be used. • Soil Insecticide Injection: This is the most common method for controlling termites if a pre-construction chemical barrier fails or was never applied. Holes are drilled through the foundation of the building, and insecticides are injected into the soil. Insecticides will kill termites already infesting the building and prevent future infestations for several years. A licensed professional is recommended; applying pesticide to the wrong place can cause contamination in the pluming or heating ducts. • Baits: Bait stations containing a slow acting insecticide are placed around the building. Termites feed on the bait, and then return to the colony where they share the bait with other members of the colony. Some baits are available to the general public whereas others are available only to licensed pest management personnel. Proper bait placement is critical to the success of the procedure, and is therefore best performed by pest management personnel with experience in termite baiting.

CONSIDERATIONS	
SENSITIVE AREAS	• If properly applied, insecticide pre-treatments and injections should pose little risk of unwanted insecticide exposure. • Bait stations should be placed to minimize the chances that children or facilities maintenance personnel will disturb them. • Ensure that insecticides do not enter drains, streams, lakes and other surface water.
PROHIBITED PRACTICES	Do not use ultrasonic pest repelling devices.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Applicators must use personal protective equipment as required by the product label. • Termiticides leave a long residual in soil. Care must be taken when applying to prevent contamination of non-target areas.

ADDITIONAL INFORMATION

Formosan Subterranean Termites:

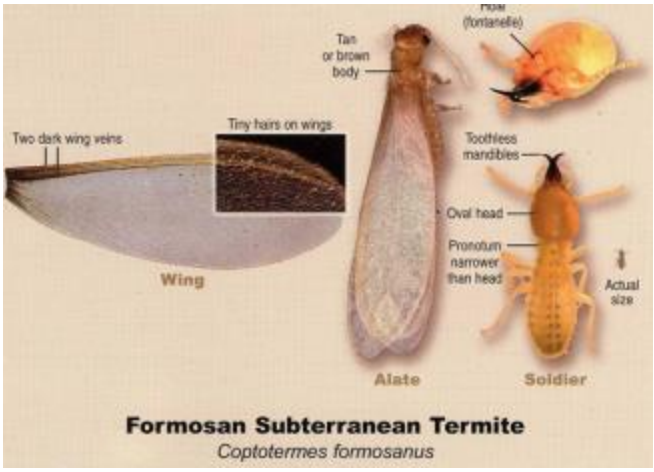
Formosan subterranean termites (FST) are a more destructive species of termite due to its colony size and foraging range. A single FST colony can contain several million termites compared to several hundred thousand for the native subterranean termite species. FST species share interconnected forage galleries in the soil and can forage up to 300 ft, posing a threat to nearby structures. Their distribution includes the southeastern United States and Hawaii. Other differences between an FST colony and a native subterranean colony include:

1. FST colonies contain more termite soldiers (have a hardened head capsule) in the colony (10–15% compared to 1–2%) and swarmers are larger
2. They form a material called “carton” in structure voids which allows them to obtain moisture without returning to ground (photo on right).
3. They can readily form aerial colonies by going the top of the structure to obtain moisture which makes controlling them difficult or impossible.

A more aggressive treatment program for FST colonies is required, using the same treatment options as above. Any cartons in voids should be located and removed.

Formosan Subterranean Termites

Subterranean termite shelter tubes.



8.4. TURF AND ORNAMENTAL PESTS

8.4.1. Ornamental Plant Pests	
TARGET PEST(S)	Insects and mites attacking ornamental plants 
TARGET SITE(S)	All interior and exterior areas with ornamental plants
PURPOSE	• Prevent damage to real property (valuable ornamental plants) • Prevent unsightly honeydew and mold accumulation on vehicles and structures
RESPONSIBILITY	• All Personnel: properly care for houseplants in working areas • Pest Management Service Provider: conduct integrated pest management to control infestations. • Pest Management Performance Assessment Representative: ensure contractor pest management service provider performs work in accordance with contract specifications • Grounds Maintenance Provider: maintain the health of ornamental plants • Landscape Designer: ensure use of plants well adapted for the given areas in landscaping; ensure placement of plants in areas where their health can be maintained • Integrated Pest Management Consultant: identify unknown pests and recommend control measures.
SURVEILLANCE	
METHODS	• Visual sighting of pests: o Caterpillars: immature forms of moths and butterflies. These insects chew on leaves and are often found on the undersides of leaves. o Aphids: small (usually about 1/16-inch or smaller) globular, pear-shaped insects. Color is usually green, but may be pink, yellow, blue-green, or black. Almost always with two dorsal tubular structures on the posterior end of the body (cornicles). Wingless and winged forms may be present. Typically found on the undersides of leaves, but may also be present on stems. o Scales: flattened sessile insects that suck plant juices from leaves or, more often, stems. Usually appear as oval, waxy shells; no legs or body divisions are visible. Size and color vary depending on age and species. o Mealybugs: oval insects that superficially resemble small sowbugs. Exude loose cottony wax that may obscure the body of the insect. May be found on almost any part of the host plant, including the roots.

	o Whiteflies: adults usually appear as minute white flies that hold their wings roof-like over their bodies at rest (though these insects are not true flies). Dark spots or patterns are visible on the wings of some species. Adults typically rest on the undersides of leaves, but fly readily if disturbed. Immature whiteflies are sessile, flattened, oval insects that are almost always found on the undersides of leaves. They suck plant juices and can severely reduce plant vigor. o Mites: minute, globular arachnids very diverse in habit and form. Some are pests of plants. Adult mites will have eight legs, distinguishing them from insects which have six legs. Spider mites are the most common mite pests of ornamentals. Immature spider mites are usually yellowish or straw-colored and the adults are yellowish or green. In severe infestations, a fine web, similar to spider web will coat the plant's foliage. Bright red, fast moving, velvety mites are often present on plant foliage. These mites are predaceous and, therefore, considered beneficial. o Nematodes: microscopic, eel-like roundworms. Many species are root-feeding. They are difficult to control and can be easily spread from garden to garden on tools, in soil, or on boots. o Other pests: other insects, including cicadas, psyllids, leaf-feeding beetles, and gall-forming insects may be pests of ornamentals. Contact a pest management consultant if unsure of the identity of a pest. • Signs of pest infestation: o Leaves: chewed, spotted, curled, or otherwise disfigured leaves can indicate an insect or mite infestation. Plant pathogens, nutrient imbalances, and uptake of toxic substances can cause similar disfigurements of leaves. Consult with the pest management consultant when in doubt of the origin of plant damage. o Branches: girdled twigs are an indication of infestation by certain types of beetles. o Trunks: holes in the trunk or globules of plant resin can indicate infestation by certain types of boring beetles. o Ants: ants scurrying about the foliage of a plant may be a sign of infestation by certain plant feeding insects, especially scales, aphids, and mealybugs. These insects exude sugary waste products that ants feed upon. In return, the ants protect the plant feeding insects from predators and parasites.
FREQUENCY	Ornamental plants should be inspected weekly for pests or signs of pests.
ACTION THRESHOLD	Variable, depending on pest. A low-level of infestation is to be expected on outdoor plants. Natural controls (predators, parasites, and plant defenses) typically prevent these low-level infestations from significantly harming the plant. Infestations that significantly reduce plant health or seriously affect plant aesthetics are candidates for chemical control. Unnecessary or excessive pesticide application can compromise natural control by killing beneficial organisms and may lead to pesticide resistance.
NON-CHEMICAL CONTROL	
BIOLOGICAL CONTROL	• Bti: Several formulations of the bacterial agent, *Bacillus thuringiensis israelensis* are available for use against certain pests, particularly caterpillars. • Fungi: some fungal pathogens of insects have been isolated and

	formulated for use against insect pests. • Natural control: Many pests of ornamentals are maintained at low, undamaging levels by the actions of natural enemies. Applying chemical pesticides only when necessary can help conserve these natural enemies. In some cases, universities and government agencies may be actively importing, rearing, and releasing natural enemies for control of particular pests.
SANITATION	• Removing, burning, or chipping dead wood and other plant debris can reduce certain pest populations, particularly beetles. • Keep gardening tools clean so as not to carry pests from one plant to the next. • Only buy plants from reputable sources. Ensure that plants don't harbor ants, nematodes, invasive plants, or other problems.
MECHANICAL REMOVAL	• Minor infestations: simply picking pests off of plants can sometimes control small infestations. This technique is typically not practical for large infestations or infestations on outdoor landscaping. • Severe infestations: in some cases, a plant may be so severely infested that there is little chance of control, or the cost of control is not justified by the value of the plant. These plants should be removed, and their tissues destroyed (chipping or burning) so that they do not serve as a source of pests for other plants.
IMPROVE AND MAINTAIN PLANT HEALTH	• The best defense against pest infestations is maintenance of healthy, vigorous plants. Healthy plants will be able to tolerate low levels of infestation and prevent pest outbreaks. • Ensure proper watering, fertilizing, and pruning schedules. Do not over water or over fertilize. • Place plants in areas where they receive the appropriate quality and quantity of light.
USE OF NATIVE VEGETATION LANDSCAPING	• Native plants are usually less susceptible to pests because they are well adapted to survival in the area. Consider using native vegetation rather than exotic vegetation in landscape design. • Grow a diversity of plants. Plant a variety of sequentially flowering species to provide natural enemies with nectar, pollen, and shelter throughout the growing season.
EDUCATION	• Education on natural enemies
CURRENT NON-CHEMICAL CONTROL PRACTICES	Maintain health of ornamental plants through proper watering and pruning.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• A number of soap and oil insecticides are available. Many of these are "25(b)" or EPA minimum-risk pesticides and are exempt from registration due to the low toxicity of the active and inactive ingredients in the product. For a list of these active ingredients, go to http://www.epa.gov/oppbppd1/biopesticides/regtools/25b_list.htm.
METHOD OF DISPERSAL	• Contact pesticides: may be sprayed directly onto infested plants. The pesticide must directly contact the pest for control. The applicator should concentrate on the undersides of leaves for most types of pests. Insecticidal soaps are a particular class of contact pesticide with very low toxicity to non-target organisms. These can be particularly effective against some scale, mealybug, and mite infestations.

	• Systemic pesticides: these chemicals are absorbed by the plant and ingested by the pest when it feeds on the plant. Some systemics are applied to the foliage; others are applied to the soil and absorbed by the plant's roots.
SENSITIVE AREAS	• Use non-chemical controls whenever possible around playgrounds and childcare centers. • Avoid exposing natural areas containing endangered or threatened species. • Ensure insecticides do not enter drains, streams, lakes and other surface water.
RESTRICTIONS/ REGULATIONS/ PERMITS	• None.
CONSIDERATIONS	
PROHIBITED PRACTICES	Do not use ultrasonic pest-repelling devices.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Applicators must use personal protective equipment as required by the product label. • Take precautions to prevent pesticide exposure to personnel when spraying near buildings or other populated areas. • Avoid contaminating water. Do not apply before rain or irrigation to prevent runoff.

8.4.2. Snails and Slugs

TARGET PEST(S)	Snails and slugs, particularly the brown garden snail (*Helix aspersa*) and the gray garden slug (*Peroceras reticulatum*), the banded slug (*Limax poirieri*), and the greenhouse slug (*Milax gagates*) 
TARGET SITE(S)	Landscaped areas around buildings
PURPOSE	• Prevent damage to real property (landscaping plants) • Reduce the presence of unsightly snails and slugs on and around buildings
RESPONSIBILITY	• Pest Management Service Provider: conduct integrated pest management to control infestations. • Pest Management Performance Assessment Representative (PMPAR): ensure contractor pest management service provider performs work in accordance with contract specifications. • Landscape Maintenance Provider: maintain the health of ornamental plants.
SURVEILLANCE	
METHODS	• Visual sighting of pests: o Snails: conspicuous, shelled slow moving animals found in moist habitats. Most active at night and on cloudy or foggy days. During hot dry periods, dormant snails may be seen attached to walls, fences, or tree trunks. o Slugs: similar to snails, but without shell • Signs of pest infestation: o Trails: snails and slugs leave silvery mucus trails wherever they crawl. Trails may be present on the ground, on the foliage of plants, or on buildings. o Plant damage: chew irregular holes with smooth edges in leaves of succulent and herbaceous plants. Prefer plants that are close to the ground, but will climb to feed on fruits and leaves of fruit trees.
FREQUENCY	Survey during normal landscape maintenance
ACTION THRESHOLD	Populations densities sufficient to cause a nuisance or significant damage to plants warrants control

NON-CHEMICAL CONTROL	
BIOLOGICAL CONTROL	• Decollate snail: a predaceous snail that feeds on young plant feeding snails and slugs. These snails pose a risk to endangered native snail populations, so they may not be released on the installation.
DRIP IRRIGATION	• Replacing sprinklers with drip irrigation will reduce unnecessary moisture and therefore reduce the habitat for snails and slugs to hide
HABITAT REMOVAL	Remove debris, such as boards, flat stones, dead vegetation, and low hanging limbs that provide moist cover for snails and slugs during dry periods.
MECHANICAL REMOVAL	• Picking: snails and slugs can be picked out of landscaped areas, placed in plastic bags, and disposed of in refuse containers. This method is not likely to be practical in large landscaped areas • Trapping: a board with two rails on opposite edges will serve as an attractive site for snails and slugs to hide during dry periods. The board can be periodically lifted and the snails and slugs removed.
PEST PROOFING	Barriers: consist of copper foil or screens. Copper foil can be wrapped around the bases of potted plants. Copper screen can be used to create barriers around gardens and landscaped areas.
IMPROVE PLANT VIGOR	Healthy plants will be less likely to succumb to damage by pests.
CHEMICAL CONTROL	
METHOD OF DISPERSAL	• Baits: products containing metaldehyde or iron phosphate are effective for slug and snail control. Apply baits in the evening. Baits applied during hot dry conditions are less likely to be effective because snails and slugs will be inactive and therefore less likely to come in contact with the bait. **Note:** Do not use salt to kill snails and slugs. This will damage the soil and render it unusable for landscaping or gardening.
CONSIDERATIONS	
SENSITIVE AREAS	Products containing metaldehyde can be hazardous to children or pets. Emphasize non-chemical control and iron phosphate baits in areas frequented by children or pets.
PROHIBITED PRACTICES	Do not use ultrasonic pest repelling devices.

ADDITIONAL INFORMATION
Snails and slugs information: http://ipm.ucanr.edu/PMG/PESTNOTES/pn7427.html

8.5. VERTEBRATE PESTS

8.5.1. Bats	
TARGET PEST(S)	Bats 
TARGET SITE(S)	Buildings where bats may roost
PURPOSE	• Prevent damage to real property and unsanitary conditions resulting from the buildup of bat guano (feces) • Reduce the risk of disease transmission from infected bats • May be a source of bat bugs, which are in the same genus as bed bugs
RESPONSIBILITY	• Installation Preventive Medicine Technicians: Conduct surveys if bats pose a health hazard and provide pest management recommendations. • Pest Management Service Provider: Conduct integrated pest management to control bats in structures when necessary. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Land Management Section: Implement a bat management plan developed by the contracted biological consultant and conduct bat removal from workspaces. • Facilities Maintenance Provider: Perform facilities repairs and improvements that exclude and minimize pest infestations as requested. • All Personnel: Report bat problems, especially when they pose a health hazard.
SURVEILLANCE	
METHODS	• Visual inspections o Observation of bats roosting or entering a building. o Observation of signs of bat roosting such as guano • Personnel complaints: including information on when, where, and how many pests were observed.
FREQUENCY	Daily observation by all personnel and pest management service providers.
ACTION THRESHOLD	• When bats pose a health hazard, become a nuisance, or deface property. • Bats in human living quarters or food preparation areas should always be removed.
NON-CHEMICAL CONTROL	

EXCLUSION	Seal openings to attics and other areas where bats may enter and roost
BAT REMOVAL	• One-way valves: Devices that allow bats to leave a building, but not return, can be installed on buildings already infested. Leave such devices in place for 7 to 10 days before permanently sealing the opening. • Do not install devices on roosts where mothers are nursing immature bats.
MECHANICAL REMOVAL	Bats that accidentally enter a room can be captured and released outside. To reduce stress on the animal, use the following procedure: 1. Close doors to confine the bat to a single room. 2. Allow the bat to become exhausted and land. Do not attempt to catch a bat in flight. 3. Once the bat has landed (usually on curtains or a piece of furniture), allow it to rest for 20 to 30 minutes. 4. Place a bowl, can, or other suitable container over the bat. 5. Trap the bat in the container by sliding a piece of cardboard or other rigid material between the bat and the surface on which it is resting. Wear thick leather gloves for this procedure, and avoid touching the bat. 6. Release the bat outside. The bat may not fly immediately, so release it in an area where it can remain undisturbed for several hours. If the bat is still present the next day, report it to a preventive medicine technician or pest control service provider.
PROVIDE ALTERNATIVE ROOSTS	Bat houses can provide an alternative to buildings as roosting sites. Houses must be correctly built and placed for acceptance by bats.
EDUCATION	Public education on both the benefits and the risks associated with bats.
CONSIDERATIONS	
PROHIBITED PRACTICES	Do not use ultrasonic pest repelling devices.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Use care when handling bats and wear proper PPE when necessary. • Contact the natural resources manager for restrictions and guidance on bat management.
CHEMICAL CONTROL	
There are no chemical pesticides registered for use against bats. Deliberately poisoning bats or other wildlife is a violation of federal law.	
COMMENTS	
Bats are generally considered beneficial organisms that reduce insect populations. Although they provide vital environmental and economic services, bat populations are declining around the globe, largely as a result of human activity. Several species are listed as threatened or endangered (e.g. Pallid bat, Indiana Bat, and Northern Long-eared Bat). Control is only necessary if the bats are causing a nuisance or public health concern.	
ADDITIONAL INFORMATION	
How to build and place bat houses and bat eviction devices can be found at http://www.batcon.org/.	

8.5.2. Nuisance Birds

TARGET PEST(S)	Nuisance birds (including pigeons, English sparrows, European starlings, gulls, etc.) 
TARGET SITE(S)	• Office buildings, warehouses, aircraft hangars, and parking lots • Light posts and signs • Ledges, window ledges, and rooftops
PURPOSE	Manage birds that cause safety hazards (Bird/Wildlife Aircraft Strike Hazard), deface buildings, vehicles, and equipment, and provide a potential source of disease and mites. Bird droppings which accumulate over several years may harbor spores of fungus that cause histoplasmosis, ornithosis, and cryptococcosis.
RESPONSIBILITY	• Installation Preventive Medicine Technicians: Conduct surveys if birds pose a health hazard and provide pest management recommendations. • Pest Management Service Provider: Conduct integrated pest management to control birds. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Facilities Maintenance Provider: Perform facilities repairs and improvements that exclude and minimize pest infestations as requested. • BASH Manager: Manage birds in and around airfields and aircraft facilities to prevent bird aircraft strike hazards (BASH). • Natural Resource Manager: Coordinate management of birds and other wildlife with USDA Wildlife Services and be the POC for depredation permits. • All Personnel: o Report bird problems especially when they pose a health hazard. o Do not feed pest birds (except for residential bird feeders) o Keep lids closed on dumpsters and other receptacles

SURVEILLANCE	
METHODS	• Visual inspections o Observation of birds roosting or nesting or entering into a building o Observation of signs of bird roosting and nesting such as feces o Observation of bird mites in buildings infested with birds. • Personnel complaints: including information on when, where, and how many pests were observed.
FREQUENCY	Daily observation by all personnel and pest management service providers.
ACTION THRESHOLD	When birds pose a health hazard, become a nuisance, or deface property.
NON-CHEMICAL CONTROL	
REMOVAL OF FOOD SOURCES	• Cover trashcans and dumpsters which attract birds such as crows and gulls • Avoid feeding birds, especially pigeons • Sanitation
EXCLUDE ENTRY INTO BUILDINGS	• Close windows and doors to buildings • Place netting over windows and doors that must remain open; netting needs to be checked on a regular basis, as birds/animals will get caught in it and need to be removed. • Place wood, metal, glass, masonry, rust-proofed wire mesh (1/4" thick), or plastic/nylon screen/netting or other barriers over openings or areas of buildings that might be used for nesting
ELIMINATE ROOSTING	• Design structures that prevent bird roosting. For example, place a board over ledges at a 45˚ angle. Make sure the ends are closed to prevent entry. • Remove structures that allow roosting. • Attach anti-roosting devices such as Nixalite bird strips • Apply a chemical repellent such as Hot Foot. • Thinning or pruning trees to remove protective cover can discourage roosting.
SHOOTING	• If allowed, a low-caliber rifle can be used indoors to eliminate birds. • Outdoors, pyrotechnics and propane canons can also scare birds. • This method should only be used by personnel trained in the use of firearms and approved by the natural resources manager. There are tight restrictions on bringing firearms onto an installation.
HABITAT MODIFICATION	• Modify habitats to make them less attractive to birds (especially around airfields) • Vegetation maintenance • Fill in areas that hold water
TRAPPING	• Pigeon traps have proven to be effective in some situations. • "Australian crow traps" collect a wide variety of birds, but may require a permit to use. • Pigeons should not be relocated as they will likely return to their roosting and feeding areas. They may need to be euthanized. • Traps should be checked regularly to ensure that non-target bird species are not harmed or killed by accidental trapping.

NEST REMOVAL	• Remove bird nests. Nuisance bird nests can be removed with eggs or chicks. Other bird nests cannot be removed unless abandoned or empty. • Cliff swallows: remove mud nests while they are still under construction and do not contain eggs or hatchlings. Once the nest has been established, it is illegal to destroy the nest until it is abandoned. • Contact the Base Game Wardens to confirm species identification before taking action that could be in violation of federal law.
SCARE DEVICES	• Acoustical devices, such as propane-fired cannons, are known as bird bangers. The cannons that work most effectively are those that randomly fire at different times and are multidirectional. It is the unpredictable nature of the noise that frightens the birds. • Visual repellent devices such as scare-eye balloons, bird effigies, laser lights, and streamers and flashtape. • Timing is important. It is easier to scare birds if the site has been occupied for a short period of time rather than used for many nights. Scare tactics require at least three to five evenings to be effective. • Raptor Models—strategic placement of owl decoys or raptor silhouettes may be used to discourage roosting. Models must be relocated frequently and have only a short-term effectiveness. • Contact the natural resources manager to confirm species identification before taking action that could be in violation of federal law. • Both visual and auditory frightening devices are only effective for short periods of time.
EDUCATION	Understanding of how baits and repellents work. Importance of not feeding birds and keeping trash receptacles closed.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• 4-aminopyridine, polybutene, methyl anthranilate
METHOD OF DISPERSAL	• Bait: One type of chemically-treated bait causes birds that ingest the toxicant to emit distress and alarm cries and visual displays that frighten the rest of the flock causing them to leave the site. (e.g., Avitrol) • Chemical repellent: Chemical repellents are non-toxic to the birds and are available for direct application to turf and other surfaces where birds feed or roost. (e.g., 4 The Birds, Hot foot, Tanglefoot, Roost No More, Bird-Proof). Another application method available is a ULV formulation that is allowed to drift directly onto the birds (e.g., Fog Force). • Contact the natural resources manager to confirm species identification before taking action that could be in violation of federal law.
RESTRICTIONS/ REGULATIONS/ PERMITS	• Nuisance birds are not protected under the Migratory Bird Treaty Act, but control of the birds may require a depredation permit. • The NRM should always be consulted when managing non-nuisance birds.

CONSIDERATIONS	
SENSITIVE AREAS	• Areas where endangered or threatened species occur. • The use of toxicant bait can elicit a negative public response. Public education, timing, and placement of the bait are important in preventing negative publicity.
PROHIBITED PRACTICES	Do not use ultrasonic pest repelling devices.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Firearms safety if shooting • Noise hazards with auditory scare devices. • Fall hazard when working on roofs or ledges • Adverse impact on non-target bird especially when using chemicals.
COMMENTS	
All birds except rock doves (pigeons), English sparrows, and European starlings are protected under the Migratory Bird Treaty Act (MBTA) and require a depredation permit to control. This also includes nests occupied by birds protected by the MBTA. Contact the installation Environmental Security Department regarding a permit before beginning new bird control operations.	

8.5.3. Feral Cats

TARGET PEST(S)	Feral Cats 
TARGET SITE(S)	Buildings where cats frequent
PURPOSE	• Control feral cats that may contribute to flea infestations, increase the risk of rabies and other diseases, and prey on local wildlife.
RESPONSIBILITY	• Army Veterinary Detachment: Conduct surveys if cats pose a health hazard and trap cats when necessary. • Pest Management Service Provider: Conduct integrated pest management to control cats near buildings when necessary. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Facilities Maintenance Provider: Perform facilities repairs and improvements that exclude and minimize pest infestations as requested.
SURVEILLANCE	
METHODS	• Visual inspections • Customer complaints
FREQUENCY	Daily observation by all personnel.
ACTION THRESHOLD	• Any wild/feral animals capable of transmitting rabies and acting sick or aggressive, or damaging property shall be managed. • Any animal (capable of carrying rabies) that has bitten or scratched someone shall be managed and analyzed for rabies.
NON-CHEMICAL CONTROL	
LIVE TRAPS	Cats that require extensive care will be taken to the local humane society or Society for the Prevention of Cruelty to Animals (SPCA), cats that are rejected by the SPCA will be euthanized.
SANITATION	• Remove food source • Cover trash cans/dumpsters
EDUCATION	Keep personnel from feeding the feral cat population.
HABITAT MANAGEMENT	Remove available harborage sites
COMMENTS	
Personnel should contact the Camp Pendleton Animal Shelter for help with feral cats. Trap-neuter-release is not effective and is not authorized. Toxic baits shall not be used for feral cat management.	

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8.5.4. Raccoons

TARGET PEST(S)	Raccoons. 
TARGET SITE(S)	Areas near buildings or populated areas where raccoons become a pest.
PURPOSE	• Control raccoons due to danger when they are cornered and become aggressive, pathogens they carry (such as rabies and raccoon roundworm, which can be fatal to humans), and severe damage they cause to buildings and other structures.
RESPONSIBILTY	• Installation Preventive Medicine Technicians: Conduct surveys where raccoons pose an adverse health or safety risk, such as inside buildings • Pest Management Service Provider: Conduct integrated pest management to control raccoons. • Pest Management Performance Assessment Representative: Ensure contractor PMSP performs work in accordance with contract specifications. • Facilities Maintenance Provider: Perform facilities repairs and improvements that exclude raccoons from buildings. • Base Operation Support: Ensure that dumpsters and trashcans are emptied on schedule and that they are securely covered to prevent raccoon entry. • All Installation Personnel: Practice good sanitation and do not feed wild animals to prevent attracting raccoons from becoming a pest.
SURVEILLANCE	
METHODS	• Visual sighting of raccoons or signs of raccoons. • Raccoons are nocturnal, so visual surveys are usually conducted at night. • Verify personnel reports of raccoon activity.
FREQUENCY	As needed.
ACTION THRESHOLD	Any verified sighting of a raccoon where it enters a building or poses a safety or health hazard.
NON-CHEMICAL CONTROL	
EXCLUSION	Use lids/covers that can be secured on dumpsters and trashcans.

SHOOTING	• Shooting with a .22 caliber rifle may be used to control small populations in areas where: o shooting is legal o shooting can be safely conducted o approved by the installation natural resources manager • Qualified marksmen should do shooting. • Not generally practical for large populations
TRAPPING	• Live cage-type traps should be used • Use cat food containing fish or canned tuna for bait. To avoid catching cats use marshmallows, grapes, prunes, peanut butter, or sweet rolls. • Ensure that the raccoon cannot reach through the back or side of the trap to steal the bait. • Secure trap to the ground to prevent the raccoon from tipping it over.
FOOD REMOVAL	• Deny access to trash and other sources of food, including pet food fed outside. • Prevent personnel from feeding raccoons.
CHEMICAL CONTROL	
Chemicals are not available for the control of raccoons. Toxic baits shall not be used for raccoon management.	
CONSIDERATIONS	
PROHIBITED PRACTICES	• Use of ultrasonic pest repelling devices is prohibited. • Relocation of trapped animals away from sites nearby.
ADDITIONAL INFORMATION	
Contact the installation Game Wardens for guidance. Raccoon biology and management http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74116.html Information on raccoon roundworm infection http://www.cdc.gov/parasites/baylisascaris/index.html	

8.5.5. Rodents

TARGET PEST(S)	• Commensal: Norway rats, roof rats, house mice • Peridomestic: Field mice (e.g., deer mice) • Landscape: groundhogs, squirrels 
TARGET SITE(S)	Buildings, utility vaults, other structures, and landscaped areas
PURPOSE	Control rodents that may cause food contamination, disease transmission, property damage or be a nuisance.
RESPONSIBILITY	• Building Occupants: Ensure sanitation and other measures to prevent introduction and propagation of pests. • Installation Preventive Medicine Technicians: o Conduct surveys where rodents pose an adverse health or safety risk o Provide informal quality assurance for pest control o Provide pest management and disease prevention recommendations. • Pest Management Service Provider: Conduct integrated pest management to control infestations. • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Facilities Maintenance Provider: Perform facilities repairs and improvements that exclude and minimize pest infestations as requested. • Grounds Maintenance Provider: Perform removal of potential food sources (e.g., fruit on trees) and creation of barriers (e.g., vegetation removal) around buildings that promote rodent invasion. • Game Wardens: Provide guidance when rodent control operations may impact endangered or threatened species or species of concern, especially in Range 116, Edson Range, and San Onofre 1 and 2 Housing Areas.
SURVEILLANCE	
METHODS	• Visual inspections: observations of rodents or signs of rodents, such as nests, rub marks, gnawing, earth mounds, holes, etc. • Use of tracking powder • Personnel complaints: including information on when pests were observed, where, and how many. • Conduct pre- and post-treatment surveys to determine whether control operation was effective

	• Use of ultraviolet inspection lights (rodent urine and hair will fluoresce under UV light)
FREQUENCY	• Daily observation by building occupants. • Routine facilities inspections by cognizant PMT or pest control service provider.
ACTION THRESHOLD	Sighting of any rodent or sign of rodent in or immediately surrounding the building.
NON-CHEMICAL CONTROL	
SANITATION	Remove or prevent access to all potential food and harborage sources inside and outside of buildings.
ELIMINATE STANDING WATER	Fix leaking plumbing around buildings
PEST PROOFING	• Trim ornamental plants and trees to prevent harborage. • Seal holes in exterior walls that may serve as entryways. • Trim tree limbs so that they are at least 6 feet from the building. • Trim vegetation around buildings. • Clean up debris from inside and around buildings. • Request support from facilities maintenance and/or grounds maintenance provider if necessary.
HABITAT MODIFICATION	• For field mice: vegetation removal and disking of soil in a barrier 50 ft around buildings will prevent rodent invasion. This is usually done after area-wide rodenticide application. • Use of native landscaping will tend to reduce peridomestic and landscape rodent infestations. Avoid heavy ground covers that provide harborage and cover for rodents to move into buildings from unimproved grounds.
TRAPPING	Glue boards, snap traps, or other mechanical trapping devices. (see health precautions below)
EDUCATION	• Awareness of the importance of sanitation on preventing rodents. • Understanding and preventing diseases associated with rodents.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• Second generation anti-coagulants: brodifacoum, bromadiolone, difenacoum, difethialone • First generation anti-coagulants: diphacinone, chlorophacinone, warfarin • Others: zinc phosphide, cholecalciferol, bromethalin • Fumigant: aluminum phosphide
METHOD OF DISPOSAL	• Anticoagulant bait: Multi or single dose blocks or pellets; toxicant effect is delayed. • Single dose acute toxicant bait: Acute toxicant effect; often broadcast outdoors on ground. • Liquid bait: Used in areas where water sources are scarce. • When used in occupied spaces or outdoors where there is a risk of exposure to humans and non-target animals, the bait should be contained in a tamper-resistant bait station. • Baits can be applied directly into burrows. • Fumigation: Used for control of rodents in burrows. Consult a NAVFAC pest management consultant if necessary.

RESTRICTIONS/ REGULATIONS/ PERMITS	• All rodenticide baits are required to be applied in tamper-resistant bait stations.
CONSIDERATIONS	
SENSITIVE AREAS	• Areas where humans and non-target animals may come into contact with the rodenticide, particularly childcare centers. • Areas where endangered or threatened rodent species occur and may consume bait or animal that has consumed bait. • Areas where rodents may be primary food source for an endangered or threatened animal. • Habitat destruction to reduce food sources or harborage may also be destructive to critical habitats of endangered or threatened species. • The pest management coordinator shall consult the natural resources manager before any pest management operations are conducted outdoors.
PROHIBITED ITEMS	• Do not use ultrasonic pest repelling devices. • Myth: Allowing cats to live around buildings controls rodent population. Reality: Cats are inefficient at rodent control especially when they are already being fed. In many situations, cats pose greater hazards than rodents.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Active ingredients in rodenticides are highly toxic to humans and precautions must be taken to prevent human exposure. • Applicators must wear proper protective equipment as required by the product label. • Rodenticides can adversely impact non-target animals through direct poisoning or secondary poisoning. • Traps, such as stick traps, may catch non-target animals such as reptiles and birds. These shall only be used indoors.
COMMENTS	

1. Precautions on indoor rodent control:

    a. Most rodents are infested with ectoparasites (fleas, mites, lice) that may also infest or transmit disease to humans. Ectoparasite control should be conducted prior to eliminating (trapping or rodenticides) rodents.

    b. Rat control indoors using rodenticides should be avoided. The most commonly used rodenticide baits have a delayed toxic effect that do not kill the rodent until hours (or days for multidose) after they have consumed the bait. Rodents may die in walls and other voids where the carcass is difficult to retrieve leading to odor problems due to the decaying carcass.

2. Disease Prevention:

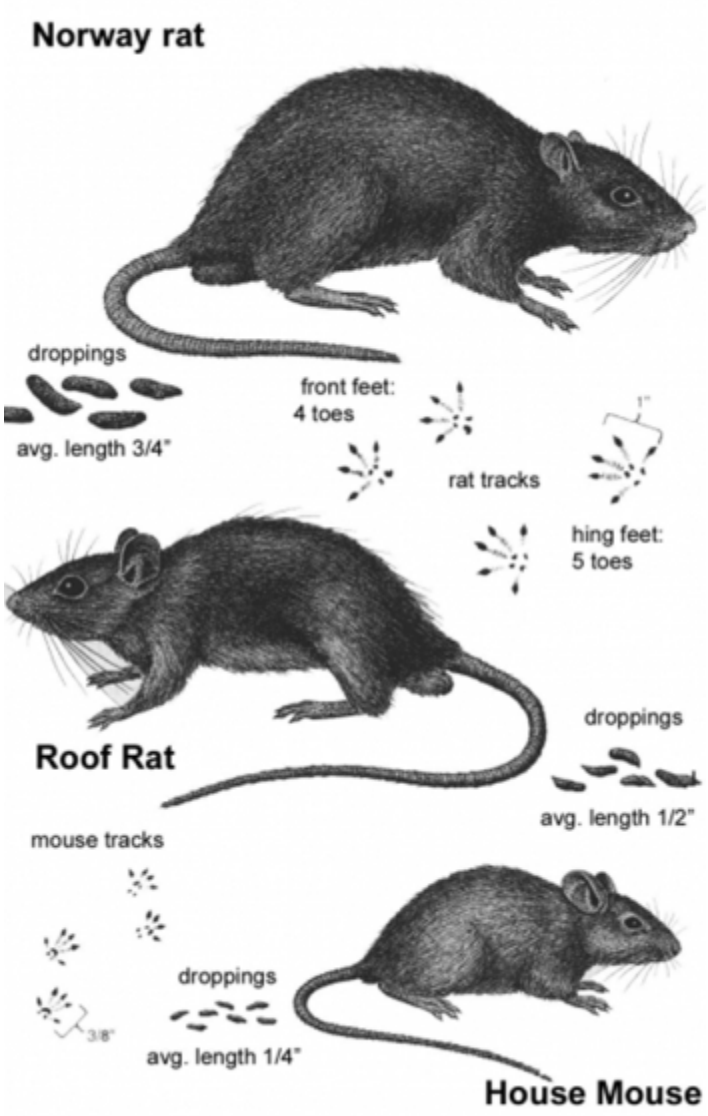
    Rodents can harbor a number of human disease agents; among them are hantavirus and plague. Precautions must be taken when working in rodent infested areas. Rodent feces and dried urine may contain hantavirus that is transmitted when these waste materials are inhaled. Precautions should also be taken when handling dead rodents in traps and when found after rodenticide use. Specific guidance can be found on the CDC website here: https://www.cdc.gov/rodents/cleaning/index.html . The following general precautions should be taken:

    a. Avoid disturbing feces and other rodent waste when entering enclosed spaces. Use a fitted

respirator with high efficiency particulate air (HEPA) filter if necessary.

b. Soak rodent waste and dead rodents with a household disinfectant or bleach solution before removing.

c. Wear gloves when cleaning or picking up rodent carcasses. Put material in a double plastic bag and dispose of in regular trash.



8.5.6. Nutria

TARGET PEST(S)	Nutria 
TARGET SITES(S)	Wetlands, waterways, ponds, and estuaries where nutria are present.
PURPOSE	Control nutria to prevent damage and degradation to wetlands and aquatic habitats caused by feeding and burrowing behaviors.
RESPONSIBILTY	• Pest Management Service Provider: Conduct integrated pest management to control nutria. • Pest Management Performance Assessment Representative: Ensure contractor PMSP performs work in accordance with contract specifications. • Natural Resource Manager: Provide guidance when nutria control is needed to protect aquatic and semi-aquatic areas. • All Installation Personnel: Do not feed wild animals.
SURVEILLANCE	
METHODS	• Visual sighting of nutria, nutria carcasses, or signs of nutria damage. • Nutria tend to be crepuscular and nocturnal, so visual surveys are best conducted at night with a spotlight. • Verify personnel reports of nutria sightings.
FREQUENCY	As needed.
ACTION THRESHOLD	Dependent on site. The threshold should be determined by natural resources personnel.
NON-CHEMICAL CONTROL	
EXCLUSION	Fencing with a buried apron of at least 6 inches may be used to exclude nutria from small bodies of water.
SHOOTING	• Shooting can be an effective control measure, especially when done at an established bait station. However, nutria quickly become wary so effectiveness decreases over time. • Shooting with a .22 caliber rifle may be used to control populations in areas where: o shooting is legal o shooting can be safely conducted • Qualified marksmen should do the shooting.

TRAPPING	• Live cage-type traps may be used. Lethal traps and locking snares may be used in areas where they will not capture pets or other non-target animals. • Sweet potatoes and carrots are commonly used as bait. • Trap should be secured to the ground.
CHEMICAL CONTROL	
TOXIC BAITS	• Nutria may be effectively controlled with carrot or sweet potato baits treated with zinc phosphide. Pre-baiting at a set site for at least two successive nights is required to assure that the bait will be consumed by nutria and not non-target species. • Zinc phosphide is highly toxic and should be used with appropriate caution.
CONSIDERATIONS	
LOCAL LAWS	• Nutria control operations must comply with state or local wildlife laws, and may require a permit in some states. • Nutria are an emerging threat in California. Report any Nutria installation natural resources staff immediately.
PROHIBITED PRACTICES	• Relocation of trapped animals is prohibited by most states.
ADDITIONAL INFORMATION	
The Internet Center for Wildlife Damage Management - Nutria http://icwdm.org/handbook/rodents/nutria.asp	

8.6. VEGETATION MANAGEMENT

8.6.1. Invasive Plants in Natural Areas	
TARGET PEST(S)	Non-native plants that are widespread and adversely affect the habitats they invade economically, environmentally, or ecologically. 
TARGET SITE(S)	Natural areas, ranges, riparian areas, training areas, and encroachment buffers threatened by invasive plants
PURPOSE	• Control invasive plants in natural areas since it is required by law and for the following reasons: • Impacts access to and use of training areas and ranges • Interferes with mission operations • Degrades natural habitats; impacts endangered and threatened species habitats • Preserve natural heritage • Reduce health and safety risks; may increase wildfire hazard • Reduce training costs
RESPONSIBILITY	• Pest Management Service Provider: Conduct integrated pest management to control weeds. • Pest Management Performance Assessment Representative: Ensure contractor invasive plant management provider performs work in accordance with contract specifications. The PMPAR may be the natural resources manager. • Grounds Maintenance Provider: Remove weeds during regular landscape maintenance to prevent establishment; maintain the health of desirable plants. • Natural Resources Manager: Oversee weed program coordinating detection and control. • Invasive Plant Management Provider: Manage weeds as required by the installation • Integrated Pest Management Coordinator: Ensure environmental compliance of the program.
SURVEILLANCE	
METHODS	Visual inspection and mapping

FREQUENCY	Yearly inspection, especially in the spring and summer when plants are easy to identify by their blooms.
ACTION THRESHOLD	Areas of installations where ordnance or other flammable/explosive materials are stored have zero tolerance for weeds due to fire hazard. Consequently, visual sighting of any weed warrants control.
STRATEGY	Develop a plan. Determine what resources need protection against invasive species and which plants pose an actual threat. For planning and measuring success, use a map to determine problem areas. Place highest priority on the most destructive weeds. Use the state's Noxious Weed List to help prioritize. The plan should include solid knowledge on the target plant, such as growing habit, how often it sets seed, months of seed production, etc. and a solid knowledge of the native species whose populations need to be maintained. Strategy options are generally to eradicate or to control and maintain invasive species at an acceptably low threshold. One strategy is to map the infestation then break the map into sections depending on the density of the invasive plant. Some areas will be dense and completely over-run, while other patches are relatively free of it. Removal efforts should begin in outlier areas that are only lightly infested. Efforts should move gradually from the easiest areas to the more densely infested areas. The densest patches should be eliminated last. Refer to the Bradley Method referenced below. At each step of the way, the areas targeted for clean-up must be of a size and quality that goals are achievable within one growing season. Because of the bank of seeds stored in the soil, weeds will re-sprout for years after the plants have been removed. In the case of some weeds, the seeds can survive for decades. It is important to return and maintain cleared areas until the seed bank has been exhausted. Maps and records can assist in targeting which areas to concentrate on. After weeds have been removed it is important to recover the area in native plants to crowd out and help stop the reinvasion of invasive species.
REPORTING	• Report all pest management operations to the IPMC. • Report invasive plant control operations to the natural resources personnel in cases where weeds are being removed to protect or restore natural habitats. • Reporting of herbicide use and application monitoring to the local water regulatory agency is required when the operation is covered under a NPDES Aquatic Pesticide Permit.
ACTION THRESHOLDS	• Priority of control of weeds is based upon the Federal and State Noxious Weeds list and the impact on the mission. • Areas of installations where ordnance, or other flammable/explosive materials, is stored have zero tolerance for weeds due to the fire hazard. Consequently, visual sighting of any weed warrants control.

PREVENTION	Preventing just one new invasive plant is of greater conservation benefit in the long run and is far less costly than controlling a widespread rampant pest. Block the transport of seeds from invasive plants onto relatively clean sites or sites that are actively being cleaned. Common means of importing seeds are: • Tire tread from bicycles and vehicles • Vehicle undercarriages • Boot treads • Dung from horses or other ruminants • Top soil; seeds are often brought in with imported soils • Seed mixes; invasive species are often included in planting mixes • Potted plants; seeds are sometimes transported in the potting soil • Hay and other animal feed Check plants that are intentionally brought in to ensure none of them are invasive. Keep vehicles, tire treads, and boots clean of dirt and seeds before entering a sensitive area. If horses or other plant-eating animals are brought on the property, make sure they are moving from an infested area to an un-infested area. Import soils only from areas that do not have invasive plant problems.
GENERAL CONTROL	• Minimize soil disturbances. Soil disturbances include creating patches of bare soil or mixing and loosening soil. Many invasive plants rapidly move into disturbed areas; particularly in those areas that haven't experienced much disturbance. Choose control techniques that make the minimum amount of disturbance possible. • Anticipate unavoidable disturbances and minimize them. For example, removing a large area of plants can result in erosion issues. Landscape fabrics or mulch can reduce erosion. Some activities may disturb wildlife. Also, do not mow grasslands or remove trees during bird nesting season unless action has been cleared by natural resources manager.
NON-CHEMICAL CONTROL	
TOOLS	Hand pulling invasive plants can be a daunting task. However, steady and persistent hand weeding over time can lead to dramatic success. There is a large variety of hand tools designed specifically for weed removal. Many of these tools can be found in online stores or ordered through the mail.
PULLING	Tools are available that help pull weeds. When pulling plants, bring as much of the root as possible out of the ground since many plants can re-sprout from even a small amount of root.
DIGGING	Digging can be used along with pulling to lift the entire plant from the soil.
CUTTING	Cutting works well with woody plants that do not re-sprout. Especially if those plants are cut as close to the ground as possible. If the plant is likely to re-sprout, chemical herbicides can be painted on top of the cut stump. For invasive trees the herbicide needs to come in contact with the cambial ring between the wood and bark of the trunk. The cambial tissues will transport the herbicide to the roots.

FLAMING	Flaming does not involve incinerating the plant, rather to heat it just long enough to produce visible wilting. Heat causes cell walls to burst, which interrupts the flow of water and nutrients. Flaming is most effective when plants are in very early stages of growth. Older plants with significant stored reserves will require repeat applications and/or concentrating enough heat on the root crown to produce mortality. Flaming is generally used as a way of coping with the huge flush of seedlings which is often triggered by the removal of parent plants. This technique is most effective and best done when the ground and vegetation are too wet to carry fire. Avoid conditions that may lead to injury or wildfire.
SOLARIZATION	Weeds and insect pests can be killed by covering the ground with layers of clear plastic allowing the sun to create enough heat to destroy all living things.
LARGE MACHINES	Large machines can remove weeds as well. Machines can clear large areas of weeds, but also tend to cause soil disturbances which encourage the invasion of weeds and sometimes pathogens.
PRESCRIBED FIRE	Prescribed fire can be effective in removing fire-sensitive invasive species from communities that evolved with fire. Blowtorches and flamethrowers can also be used to burn individual plants or small areas.
COMPETITION AND RESTORATION	Use native plants to outcompete invasive plants. To do so, natives must be planted and cared for until they are well established. When choosing seed mixes choose seeds that are from adjacent sites and well adapted to the climate. Choosing plants from far away sources is a common cause of failure. Be careful of seed mixes that include other invasive plants.
GRAZING	Grazing animals can selectively control or suppress weeds. Cattle, sheep, goats, geese, and chickens have been used to graze undesirable species. Grazing must be continued until the weed's seed bank is exhausted. It is important never to move the animals from an infested to an un-infested site since seeds can be spread in the animals' droppings.
BIOLOGICAL CONTROL	Beneficial organisms can reduce a few certain plants. For example, two species of leaf beetle have been very effective in wiping out populations of purple loosestrife. To be effective, the insect or pathogen must be host-specific and not pose a threat to other plants.
PLANT DISPOSAL	• Avoid leaving plant remains onsite. Many plants can re-root themselves if left in piles and grow anew. • If the invasive plants have seed heads, remove them from the site in sealed bags to ensure that the seeds aren't spread to new areas on the way out.

CLEANING OF VEHICLES AND EQUIPMENT	• In order to prevent the introduction and spread of invasive plants, all vehicles and equipment used on a base (especially those used for weed control) must be cleaned of dirt, mud, and visible plant material prior to being brought on base (if coming from off-base) or prior to coming on site (if coming from another location on base). • Vehicles and equipment must also be cleaned after construction, prior to being used elsewhere on base. • When moving vehicles/equipment from site to site when doing weed control, they should also be inspected and cleaned in order to prevent further spread. • Equipment may include things like weed whackers, shoes, shovels, etc. • Before leaving a site, workers should brush off shoes in order to prevent tracking seeds on the way to other sites.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• Glyphosate, triclopyr, 2, 4D, imazapyr, and others
METHOD OF DISPERSAL	• Selective Broadcast Herbicides. These herbicides usually selectively kill one class of plants and are safe on other classes of plants. The herbicide is applied evenly over a large area of land usually through a boom sprayer. Boom sprayers can be mounted on a tractor, ATV, truck, airplane, or helicopter. Relatively small areas can be treated with a backpack sprayer or hand-compressed sprayer. • Non-selective Spot Treatment Herbicides. This method directly targets individual plants. Non-selective herbicides are used and are applied directly to the target and are less likely to affect non-target plants. Care must be taken to reduce drift that could harm non-target plants. Direct application is sometimes used in conjunction with non-chemical treatments especially when removing invasive trees and shrubs which require root kill to prevent re-sprouting. • Foliar Spray • Cut Stump Treatment Note: Correct timing of the herbicide application is often essential for effective weed control. Timing will depend on the species of weed, the mode of action, and persistence of the herbicide; non-chemical practices in use; soil conditions; and climate.
RESTRICTIONS/ REGULATIONS/ PERMITS	• When applying herbicide to riparian areas or other sites near water, use only formulations labeled for aquatic sites. • Herbicide applications to, over, or near waters of the United States may require coverage under a NPDES Aquatic Pesticide Permit. • Contact the natural resources manager before conducting invasive plant control in any natural area.

CONSIDERATIONS	
SENSITIVE AREAS	• Areas frequented by children—use mechanical controls instead of chemical controls whenever possible around playgrounds and childcare centers. • Sensitive habitats—Use non-chemical methods in natural areas containing endangered or threatened plant or animal species or use herbicides with care. • Use drift-reduction methods to prevent damage to non-target plants and organisms and sensitive sites. • Prevent pesticide drift into sensitive areas.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Applicators must use personal protective equipment as required by the product label. • Since this operation is conducted in natural areas, care must be taken to prevent adverse impacts to the environment through control measures, vehicles, and workers.
SPECIAL APPLICATOR QUALIFICATIONS	• Contractors and personnel conducting invasive plant control must be knowledgeable about identifying and controlling the target plants. They must also be knowledgeable about preventing the spread of invasive plants. • They should also be able to produce maps (preferably using GPS and GIS) and write detailed reports. • All personnel applying herbicides must be licensed/certified pesticide applicators.

ADDITIONAL INFORMATION

Management of invasive species
http://www.cal-ipc.org/ip/management/ipcw/mois.php

The Bradley Method for Control of Invasive Plants
http://courses.washington.edu/ehuf462/462_mats/bradley_method.pdf

Federal and State Noxious Weed Lists
http://plants.usda.gov/java/noxiousDriver

Database of herbicide labels
http://www.greenbook.net/

Center for Invasive Plant Management
http://www.weedcenter.org/

DoD Strategic Management of Invasive Species in the Southwestern United States
http://www.weedcenter.org/DoDworkshop/2009/index.html

8.6.2. Terrestrial Weeds

TARGET PEST(S)	Grass-like, broadleaf, and woody weeds growing on land 
TARGET SITE(S)	• Landscaped areas • Natural areas threatened by invasive plants
PURPOSE	• Reduce fire hazards • Remove vegetation coverage for rodents and other pests • Control the spread of invasive species
RESPONSIBILITY	• Pest Management Service Provider (PMSP): Conduct integrated pest management to control weeds. • Pest Management Performance Assessment Representative (PMPAR): Ensure contractor pest management service provider performs work in accordance with contract specifications. • Grounds Maintenance Provider (GMP): Remove weeds during regular landscape maintenance to prevent establishment; maintain the health of desirable plants.
SURVEILLANCE	
METHODS	Visual sighting
FREQUENCY	• Daily inspection of areas with extreme fire hazard • Weekly inspection of landscaped areas. Can be done in conjunction with regular landscape maintenance. • Yearly inspection of natural habitats targeted for ongoing weed-abatement programs
ACTION THRESHOLD	Areas of installations where ordnance or other flammable/explosive materials are stored have zero tolerance for weeds due to fire hazard. Consequently, visual sighting of any weed warrants control.

NON-CHEMICAL CONTROL	
MECHANICAL REMOVAL	• Pulling or hoeing: pulling can be done either by hand or with tools such as the weed wrench which works well on large plants. Try to pull up as much root as possible as roots can sprout new shoots. Digging or hoeing is sometimes used in conjunction with pulling to remove the entire root. Follow up work will be necessary until desired plants become well established. • Mulching: mulch shades the soil surface and kills sprouting weeds. Mulching also keeps lawn mowers away from ornamentals. • Mowing: Mow unwanted plants before they have a chance to set seeds. • Chaining: chains are dragged across the top of target weeds, destroying the canopy and reducing weed density. • Root plowing: horizontal blades beneath the surface of the ground sever the root system of target weeds
STEAM	Steam applied to foliage will often kill plants. This technique is unlikely to be cost effective for most weed-control situations
IMPROVE PLANT VIGOR	• Landscaping plants that are healthy will be better able to compete with weeds, thereby slowing the rate of weed invasion. • Maintain proper watering, fertilizing, and pruning schedules for desirable landscaping plants. This is particularly important for managing crabgrass in turf.
MULCH	• Organic mulches include wood chips, sawdust, yard waste, and bark chips. Course textured mulches should be applied up to 4 inches deep. Fine textured mulches should be applied to a depth of about 2 inches. • Inorganic mulches include sand, gravel, and pebbles. Use a porous landscape fabric underneath to prevent mulch from sinking into soil. • Synthetic mulches include geotextiles and landscape fabric. Synthetic mulches can be used in conjunction with organic and inorganic mulches.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	• Glyphosate, 2,4-D, diuron, dicamba, sethoxydim, bromacil, diquat, surflan, and others

METHOD OF DISPERSAL	• Pre-emergent: herbicide is applied to the soil before the weed emerges, preventing the weed from developing. The chemical should be applied to the soil just before seed germination. Selective pre-emergents must be used so that desirable landscape plants are not harmed. • Foliar-sprayed Post-emergent: herbicide is sprayed directly onto the foliage of the weed. Post-emergents should be applied after the weed emerges, but before seed set. Foliar application is most effective when weeds are young. • Soil-applied Post-emergent: herbicide is applied to the soil around the weed. The herbicide is absorbed by the plant through its root system. • Stump Treatment: herbicide is applied to stumps immediately following cutting. For trees, the herbicide needs to cover the cambium which is located between the bark and wood. The herbicide prevents the tree or weed from growing stump-sprouts in the next growing season. • Weed and Feed Products: Some fertilizers are formulated with herbicides to prevent the growth of weeds. Note: Correct timing of the herbicide application is often essential for effective weed control. Timing will depend on the species of weed, the mode of action and persistence of the herbicide, non-chemical practices in use, soil conditions, and climate.
CONSIDERATIONS	
SENSITIVE AREAS	• Use mechanical controls instead of chemical controls whenever possible around playgrounds and childcare centers. • Avoid exposing natural areas containing endangered or threatened plant or animal species. Contact the Environmental Security Land Management Section before conducting invasive plant control in any natural areas. • Prevent pesticide drift into sensitive areas and onto desirable landscape plants.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Applicators use personal protective equipment required by the product label. • Prevent drift of herbicides to non-target areas and prevent contact with desirable plants. Avoid contaminating water.
ADDITIONAL INFORMATION	
Non-chemical methods are preferred.	

8.6.3. Weeds in Rights-of-Way

TARGET PEST(S)	Grasses and broadleaf and woody weeds 
TARGET SITE(S)	Fence lines, road shoulders, parking lots, around fuel storage tanks, and sidewalks.
PURPOSE	• Decrease fire hazard • Prevent damage to paved surfaces • Decrease rodent and other pest infestations in dense weeds • Decrease the risk for vehicle and animal collisions due to weeds along roadways hiding wildlife • Increase sight lines along security fences • Improve aesthetics.
RESPONSIBLE PARTY	• Pest Management Service Provider: Conduct integrated pest management to control weeds • Pest Management Performance Assessment Representative: Ensure contractor pest management service provider performs work in accordance with contract specifications. • Grounds Maintenance Provider: Mowing to reduce height of weeds. May be the PMSP.
SURVEILLANCE	
METHODS	• Visual observation and identification during routine inspections. Annual surveys of roadways and fence lines.
FREQUENCY	• Daily inspection of area with extreme fire hazard. • Weekly inspection of landscaped areas. Can be done in conjunction with regular landscape maintenance.
ACTION THRESHOLD	• Areas of installations where ordnance or other flammable/explosive materials are stored have zero tolerance for weeds due to fire hazard. Consequently, visual sighting of any weed warrants control.

NON-CHEMICAL CONTROL	
MECHANICAL REMOVAL	• Pulling or hoeing: pulling can be done either by hand or with tools such as the weed wrench which works well on large plants. Try to pull up as much root as possible as roots can sprout new shoots. Digging or hoeing is sometimes used in conjunction with pulling to remove the entire root. Follow up work will be necessary until desired plants become well established. • Mowing: Mow unwanted plants before they have a chance to set seeds. • Chaining: Chains are dragged across the top of target weeds, destroying the canopy and reducing weed density. • Root plowing: Horizontal blades beneath the surface of the ground sever the root system of target weeds.
STEAM	Steam applied to foliage will often kill plants. This technique is unlikely to be cost effective for most weed-control situations
PLANT COMPETITION	Plant areas with desirable, low-height plants to outcompete weeds such as invasive grasses.
WEED CONTROL MAT	Comes in roll form and is composed of synthetic polyester fibers spun tightly together to prevent weed growth by blocking sunlight, yet still allowing water percolation for drainage, http://www.dot.ca.gov/hq/LandArch/roadside/detail-fwc.htm
MULCH	• Organic mulches include wood chips, sawdust, yard waste, and bark chips. Course textured mulches should be applied up to 4 inches deep. Fine textured mulches should be applied to a depth of about 2 inches. • Inorganic mulches include sand, gravel, and pebbles. Use a porous landscape fabric underneath to prevent mulch from sinking into soil. • Synthetic mulches include geotextiles and landscape fabric. Can be used in conjunction with organic and inorganic mulches.
CHEMICAL CONTROL	
COMMON ACTIVE INGREDIENTS	Imazapyr, dichlobenil, bromacil, diuron, pendimethalin, prometon, tebuthiuron, hexazinone, dicamba, 2,4-D, diflufenzopyr, glyphosate, triclopyr, metsulfuron methyl, paraquat, sulfometuron, and others.
METHOD OF DISPERSAL	• Pre-emergent: Herbicide is applied to the soil before the weed emerges, preventing the weed from developing. The chemical should be applied to the soil just before seed germination. Selective pre-emergents must be used so that desirable landscape plants are not harmed. • Foliar-sprayed post-emergent: Herbicide is sprayed directly onto the foliage of the weed. Post-emergents should be applied after the weed emerges, but before seed set. Foliar application is most effective when weeds are young. Use spot treatment of weeds on paved areas. • Soil-applied post-emergent: Herbicide is applied to the soil around the weed. The herbicide is absorbed by the plant through its root system. • Applications can be made to soil or paved surfaces. Herbicide treatments can also be made to graded surfaces prior to pouring asphalt or concrete during road or walkway construction. • Note: Correct timing of the herbicide application is often essential for effective weed control. Timing will depend on the species of weed, the mode of action and persistence of the herbicide, non-chemical practices in use, soil conditions, and climate.

CONSIDERATIONS	
SENSITIVE AREAS	• Use mechanical controls instead of chemical controls whenever possible around playgrounds and childcare centers. • Avoid exposing natural areas containing endangered or threatened plant or animal species. • Prevent herbicide drift onto desirable landscape plants.
SAFETY AND ENVIRONMENTAL PRECAUTIONS	• Applicators use personal protective equipment required by product label. • Prevent drift of herbicides to non-target area and prevent contact with desirable plants. Avoid contaminating water.

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Appendix A. Points of Contact

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A.1. Installation Pest Management

Name	Title	Phone Number (Area Code 760)	E-mail
Dr. Jeffery Paull	Environmental Security, Department Director	760-725-3561	jeffery.paull@usmc.mil
Mr. Andrew Entingh	Environmental Security, Compliance Director, IPM Board Chair	760-725-4557	andrew.entingh@usmc.mil
Mr. Gabe Goodman	Environmental Security P2 Section Head, IPM Coordinator	760-725-9757	gabriel.goodman@usmc.mil
Mr. Tom Edmonds	Environmental Security, Spill Prevention Head	760-725-9743	thomas.edmonds@usmc.mil
Dean Levi	Environmental Security, Conservation Director	760-725-9747	dean.levi@usmc.mil
Ms. Kelli Brasket	Environmental Security, Cultural Resources Head	760-725-9738	kelli.brasket@usmc.mil
Mr. Jim Asmus	Environmental Security, Land Mgt Ecologist	760-763-8544	james.asmus@usmc.mil
Mr. Mike Tucker	Environmental Security, Chief Game Warden	760-725-3360	michael.j.tucker@usmc.mil
Naval Officer	NMRTC, Prev. Medicine Department Head	760-725-1270	…
Naval Officer	NMRTC, Occupational Health Department Head	760-719-3582	…
Naval Officer	NMRTC, Public Health Director	760-719-3149	…
Naval Officer	NMRTC, Industrial Hygienist	760-725-3584	…
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Mr. Todd Lease	G-F Facilities, FMD Pest Control	760-725-3084	todd.lease@usmc.mil
Ms. Shannan Ward	G-F Facilities, FEAD Technical Writer	760-763-6625	shannan.ward@usmc.mil
Mr. John Acrie	G-F Facilities, PWD Contract Representative	760-500-2413	john.acrie@usmc.mil
Mr. Bob Marshall	G-F Facilities, Family Housing Director	760-763-4199	robert.e.marshall1@usmc.mil
Mr. Scott MacFarlane	MCCS, Department Director	760-725-5959	scott.macfarlane@usmc.mil

Name	Title	Phone Number (Area Code 760)	E-mail
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Mr. Hector Villareal	MCCS, Golf Course Superintendent	760-725-4704	villarrealhm@usmc-mccs.org
Ms. Shiella McNulty	MCCS, Business Analyst	760-725-5170	Shiella.Mcnulty@usmc-mccs.org
Ms. Debra Solley	MCCS, Safety Officer	760-725-5048	debra.l.solley@usmc-mccs.org
Mr. Chad Lepine	G-4 Logistics, Hazardous Materials Specialist	760-763-7953	chad.lepine@usmc.mil
Mr. Sean Slade	G-4 Logistics, Galley Area Facilities Manager	760-725-3383	sean.slade@usmc.mil
Ms. Regina Clifford	PPV Housing, Regional Environmental Manager	760-400-0072	rclifford@lpsi.com
Mr. Elmer Salgado	PPV Housing, Maintenance Director	…	esalgado@lpsi.com
Mr. Michael Johnson	DeCA Commissary, Camp Pendleton Director	760-430-3004	camppendleton.commissary@deca.mil
Mr. Ronaldo Cunningham	DeCA Commissary, Camp Pendleton Logistics	760-430-1701	ronaldo.cunningham@deca.mil
Ms. J. Jackson	Temporary Lodging Camp Pendleton	760-763-5730	pndl_billeting@usmc.mil
Ms. Amber Semrow	Orange County Vector Control	714-971-2421	asemrow@ocvcd.org
Mr. Chris Conlan	San Diego County Vector Control	858-694-2137	chris.conlan@sdcounty.ca.gov
Ms. Lana Nguyen	California State Parks Biologist	…	lana.nguyen@parks.ca.gov

A.2. Naval Facilities Engineering Command Atlantic Applied Biology

NAVFAC Atlantic Applied Biology		
Code EV51	6506 Hampton Blvd	Norfolk, VA 23508-1278

COMMERCIAL	DSN
Commercial: (757) 322-XXXX	DSN: 262-XXXX

NAME	TITLE	EXT	EMAIL
Sabra Scheffel	Applied Biology Dept Head	4320	sabra.scheffel@navy.mil
Chris Hohnholt	Pest Management Consultant	4735	chris.hohnholt@navy.mil
Steven Holmes	Pest Management Consultant	8295	steven.p.holmes@navy.mil
Chris Martin	Pest Management Consultant	4611	chris.d.martin@navy.mil
Steve Robertson	Pest Management Consultant	4796	steve.b.robertson1@navy.mil
Kirk Williams	Pest Management Consultant	4254	kirk.williams@navy.mil

A.3. Navy Entomology Center of Excellence

Navy Entomology Center of Excellence (NECE)		
Naval Air Station	P.O. Box 43 Bldg 937	Jacksonville, FL 32212-0043

COMMERCIAL	DSN
(904) 542-2424	942-2424

A.4. Navy Environmental Preventive Medicine Unit FIVE

Navy Environmental Preventive Medicine Unit FIVE (NEPMU-5)		
NEPMU-5	3235 Albacore Alley	San Diego, CA 92136

COMMERCIAL	DSN	FAX
619-556-7070	526-7070	619-556-7080

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nepmu5@med.navy.mil	http://www.med.navy.mil/sites/nmcphc/nepmu-5/Pages/default.aspx

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Appendix B. Maps

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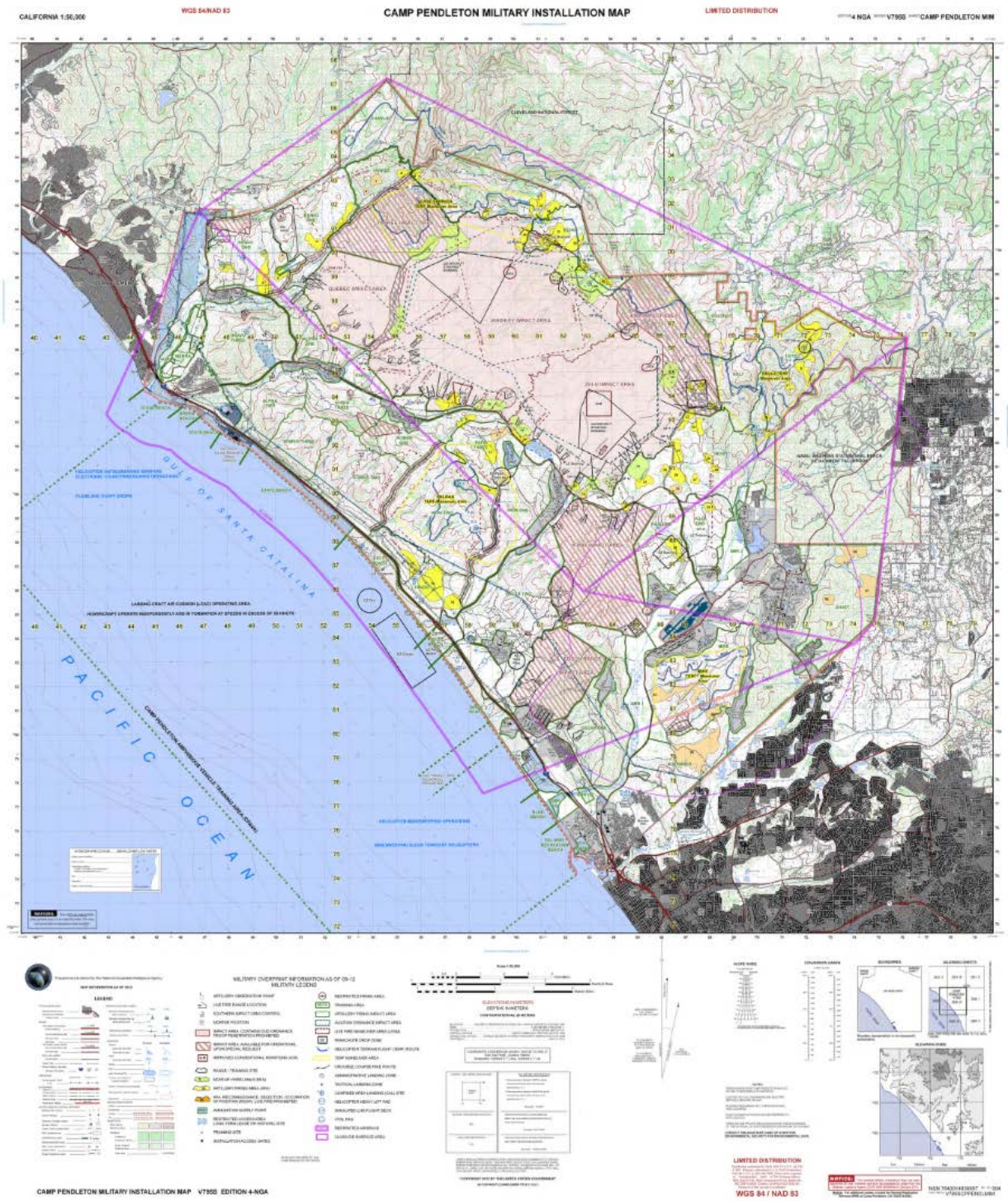
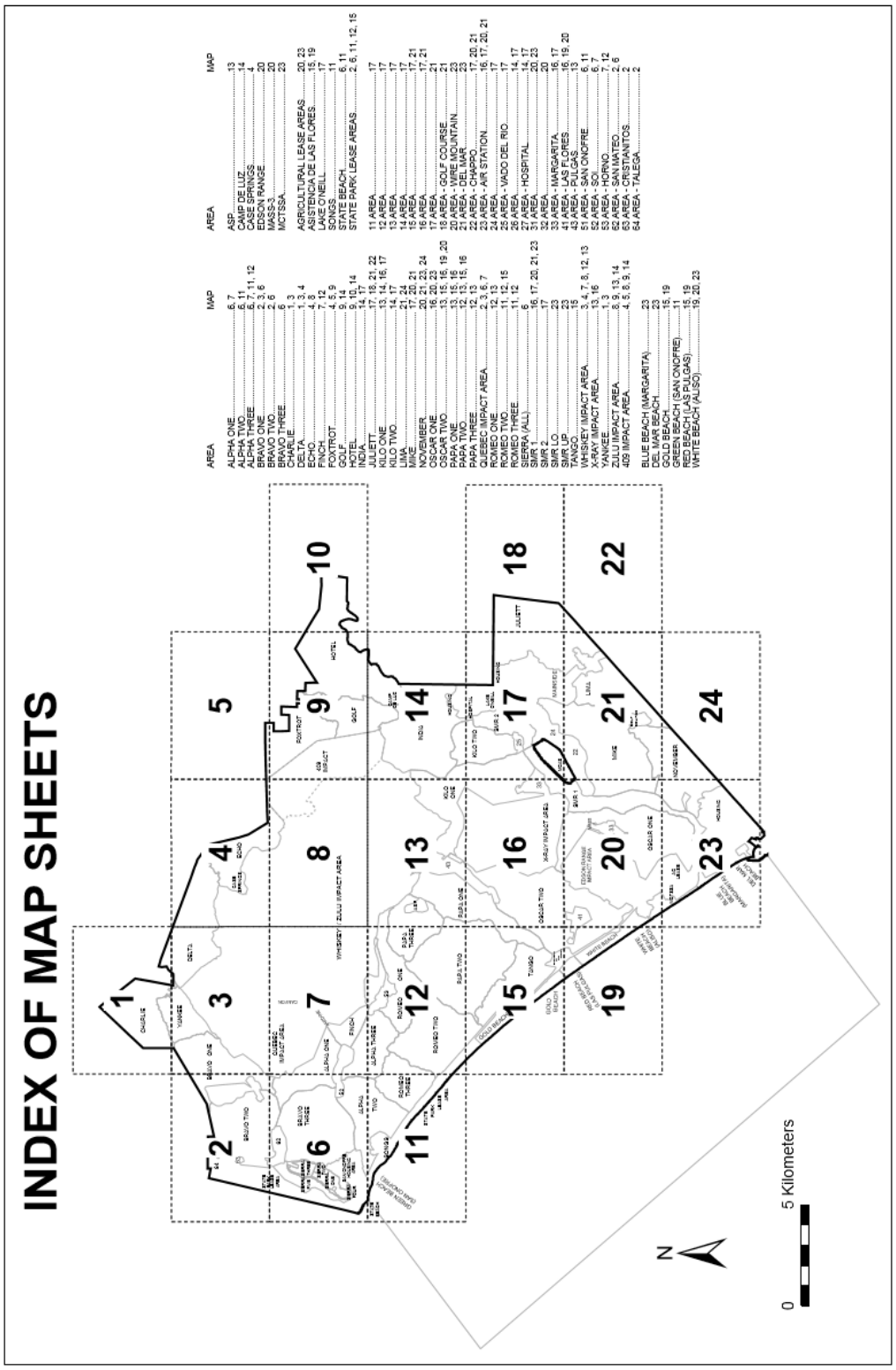
B.1. Installation Map



B.2. Map Index

Detailed maps for MCB Camp Pendleton, based on the index below, are on the CD accompanying this plan.



Appendix C. Program Review

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C.1. 2018 Program Technical Review Report

Review of Pest Management Program

Marine Corps Base Camp Pendleton
San Diego County, California

Date of Review: 7-13 December 2018

Reviewer: Christopher A. Hohnholt, Applied Biology Branch,
Naval Facilities Engineering Command, Atlantic

References:
(a) DoDI 4150.07, DoD Pest Management Program
(b) MCO 5090.2 Environmental Compliance and Protection Program, Volume 14, Integrated Pest Management
(c) DoDM 4150.07 Volume 1, DoD Pest Management Training and Certification Program: the DoD Plan for Pesticide Applicators.
(d) AFPMB Technical Guide 17, Military Handbook—Design of Pest Management Facilities

Personnel Contacted:

Mr. G. Goodman	Integrated Pest Management Coordinator
Dr. J. Paull	Environmental Security Director
Mr. B. Williams	Environmental Security Deputy Director
Mr. A. Entingh	Environmental Compliance Division Head
Ms. T. Sahagon	Environmental Inspection and Compliance Branch Head
Mr. K. Cook	Water Quality Section Head
CDR A. Varney	Public Health Department Head
Dr. J. Evans	Public Health Associate Director
HMC S. Leisinger	Public Health Chief
HM2 M. Swiatek	Public Health Leading Petty Officer
HM2 A. Rod	Public Health Assistant Leading Petty Officer
HM3 M. Tharp	Preventive Medicine Technician
Mr. J. Acrie	Pest Management Performance Assessment Representative
CS1 T. Luvisi	Naval Hospital Camp Pendleton Galley Supervisor
Ms. S. Ward	Facilities Support Contracting Technical Writer
SGT D. Graham	Veterinarian Technician Non-Commissioned Officer in Charge
Ms. D. Page	Resource Management Branch Head
Mr. V. Yoder	Game Warden
Mr. J. Asmus	Ecologist, Land Management Section
Mr. R. Marshall	Family Housing Director
Ms. K. Brasket	Cultural Resources Director
Ms. G. Barsotti	Gulf South Research Corporation Lead
Mr. C. LePine	Consolidated Material Service Center Point Lead
M. S. Slade	Area Facilities Manager
MSgt G. Smith	Provisioning Warehouse Staff Non-Commissioned Officer in Charge
Mr. T. Lease	Facility Maintenance Division Pest Control Lead
Mr. P. Champagne	Facility Maintenance Division Pest Control Operator

1 Enclosure (1)

Ms. S. McNulty	Marine Corps Community Services Business Analyst
Ms. D. Solley	Marine Corps Community Services Safety Officer
Ms. P. Pimental	Inns of the Corps Housekeeping Manager
Ms. D. Hammonds	Pacific Views Event Center Club Manager
Mr. J. Martinez	Marine Memorial Golf Course General Manager
Ms. D. Perez	Lake O'Neill Recreational Facility Manager
Mr. M. Schaer	Semper Fit Fields and Grounds
Mr. X. Castillo	Leatherneck Lanes Assistant Facility Manager
Mr. J. Antiolini	Browne Child Development Center Assistant Director
Ms. J. Jackson	Temporary Lodging Quarters Front Desk Supervisor

SUMMARY OF COMPLIANCE RECOMMENDATIONS

Recommendation #1: Obtain DoD pesticide applicator certification for the Land Management Section pesticide applicator and state certifications as "Operators" or "Field Representatives" for all contractors applying pesticides on the installation. [Ref (a) §E4.4.2.2.; Ref (b) §030502.C.; Ref (c) Encl 3 §2.f.(1)]

Recommendation #2: Report all pesticide use, which includes herbicides, in the NAVFAC Online Pesticide Reporting System and request additions to the pesticides authorized use list prior to use. [Ref (a) §E4.11.; Ref (b) §031002 and 030601.]

Recommendation #3: Use secondary containment at the Facilities Maintenance Department mixing facility. [Ref (d) §3.4.8]

Recommendation #4: Use secondary containment at the Gulf South Research mixing facility. [Ref (d) §3.4.8]

Recommendation #5: Install an emergency deluge shower and eyewash station at the Land Management Section mixing and storage area. (Ref (d) §3.5.2.12)

Recommendation #6: Use secondary containment and a backflow arrestor at the Land Management Section mixing facility. [Ref (d) §3.4.8]

SUMMARY OF BEST MANAGEMENT PRACTICE RECOMMENDATIONS

Recommendation #1: Close gaps around doors and cargo handling ramps to exclude pests at the Commissary.

Recommendation #2: Close gaps around doors to exclude pests at the Camp Pendleton Naval Hospital's Dining Facility.

Recommendation #3: Close gaps around doors and door frames to exclude pests at Leatherneck Lanes.

Recommendation #4: Use a daily, phased schedule to move large objects (appliances, food preparation stands, and storage racks) in the kitchen and food storage area to clean all floor surfaces and all vertical surfaces in food preparation areas at Leatherneck Lanes.

Recommendation #5: Close the gap around the back door to exclude pests at the Windmill Canyon Restaurant.

Questions or comments regarding this report should be addressed to the assigned Naval Facilities Engineering Command, Atlantic professional pest management consultant.

Name: Christopher A. Hohnholt
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INTRODUCTION

Periodic on-site reviews are required by references (a) and (b) to maintain the program and to ensure regulatory compliance with these references and federal, state, and local regulations. This review focused on pest control operations, pesticide safety, and pesticide program compliance at Marine Corps Base (MCB) Camp Pendleton.

PROGRAM STATUS

General

General pest control services are being provided by three DoD-certified pest control operators who work in the Facilities Maintenance Department (FMD). Vegetation management, which includes invasive species control, is contracted through Gulf South Research (GSR) Corporation; their contract is managed through the Land Management Section. A California state-certified applicator applies pesticides for the Land Management Section. Dewey Pest Control performs pest management for most of the Marine Corps Community Services (MCCS) activities. There is a DoD-certified pesticide applicator applying pesticides at the Marine Memorial Golf Course and a California state-certified pesticide applicator applying pesticides for the Semper Fit Fields and Grounds. Hummingbird Aviation applies aerial larvicides about 4 times a year to control mosquitoes; their contract is managed through the Facilities Engineering Acquisition Division. Payne Pest Management manages pests for most of the accompanied housing, and Corky's Pest Management services the Mesa District of accompanied housing. All accompanied housing on MCB Camp Pendleton is privatized in a Public Private Venture (PPV). Agricultural Pest Control Services performs pest management at the Commissary. Base Operating Support Contractor Chugach infrequently uses Western Exterminators on an indefinite delivery/indefinite quantity (IDIQ) basis to provide unique, large-scale pest control operations. Two examples of their use was for fumigation treatments for drywood termites on Quonset huts and for installation-wide bed bug knockdown in the barracks. The pest management performance assessment representative (PAR) reports that Western Exterminators hasn't been used in several years, but that the option exists.

Program Administration

The integrated pest management coordinator (IPMC) is the installation commanding officer's advisor on pest management issues and has the authority to oversee all pest management operations, including non-appropriated activities. The designated IPMC for MCB Camp Pendleton is Mr. Gabe Goodman. Mr. Todd Lease supervises the FMD pest controllers and has completed pest management PAR training. Mr. John Acrie is the PAR overseeing the pest control contract. IPMC certification for Mr. Goodman is valid through May 2021. Messrs. Lease and Acrie's certifications are valid through December 2021. The IPMC maintains and annually updates the MCB Camp Pendleton integrated pest management plan (IPMP), which is being rewritten concurrently with this review.

Training and Certification

Not all applicators on MCB Camp Pendleton are appropriately certified. Although Mr. Asmus in the Land Management Section is state-certified, he is required to be DoD certified. Reference (c) Enclosure 3 § 2.f.(1) requires DoD certification for DoD employees. Several of the contractors providing pest management services for MCCS are state-certified by California as "Applicators", which does not fulfill the DoD requirement for contractors. Contractors in California must have a license as an "Operator" or a "Field Representative" to apply pesticides on DoD property. Reference (a) §E2.16.1 defines a certified applicator as an individual who has completed an Environmental Protection Agency approved

training program that includes written examinations in core and specific application categories. Reference (a) §E2.3 forbids supervised application of pesticides by contractor applicators. Applicators do not take a core exam and are required to work under supervision in California.

Compliance Recommendation #1: Obtain DoD pesticide applicator certification for the Land Management Section pesticide applicator and state certifications as "Operators" or "Field Representatives" for all contractors applying pesticides on the installation. [Ref (a) §E4.4.2.2.; Ref (b) §030502.C.; Ref (c) Encl 3 §2.f.(1)]

Pesticide Records and Reporting

Not all pest management service providers report pest management records to NAVFAC Atlantic Applied Biology through the NAVFAC Online Pesticide Reporting System (NOPRS)—the preferred method of reporting. MCCS contractor Dewey Pest Control isn't reporting, and neither is the Semper Fit Fields and Grounds.

Not all pesticides found in storage are on the Authorized Use List (AUL). Among the units storing pesticides on the base, only the Marine Memorial Golf Course has every one of their pesticides on the AUL. Several pesticides at the FMD Pest Control Shop, GSR laydown area, and the Semper Fit Fields and Grounds are not on the AUL. An accurate AUL underpins accurate reporting. Personnel reporting pesticide use should note that the AUL is based on the pesticide EPA registration number, not the product name or active ingredient.

Compliance Recommendation #2: Report all pesticide use, which includes herbicides, in NOPRS and request additions to the AUL prior to use. [Ref (a) §E4.11.; Ref (b) §031002 and 030601.]

Pesticide Storage and Mixing Facilities

Facilities Maintenance Department Building 220109

The FMD Pest Control Shop stores pesticides in two storage facilities beside building 220109. Spill containment within the storage buildings is sound. Pesticides are stored neatly on metal shelves which sit atop a grated floor suspended over piers. A supply hose from an overhead water supply is used and a substantial air gap is in place to prevent backflow. An emergency deluge shower and eyewash are onsite. Laundry and showers are in place for the pest controllers. Secondary spill containment in the mixing area is a critical concern. There is no berm in place to prevent a spill from escaping, and the area slopes into a drain. Spill kits are in place in the storage and mixing areas, as well as in the pest control vehicles. Pest control vehicles were well-organized with locked compartments.

Compliance Recommendation #3: Use secondary containment at the FMD mixing facility. [Ref (d) §3.4.8]

Gulf South Research Corporation Laydown Area

GSR stores herbicides in a storage facility by the Natural Resources Department. Spill containment within the storage building is sound, with pesticides stored in plastic trays on shelves. Water to mix pesticides is stored in a large tank on a trailer. GSR does not have secondary containment in place for mixing. Spill kits are in place in the storage and mixing areas, as well as in pest control vehicles. Pest control vehicles were well-organized.

Compliance Recommendation #4: Use secondary containment at the GSR mixing facility. [Ref (d) §3.4.8]

Image 1: Pesticide and equipment storage at GSR laydown area

Image 2: Service containers and labels in GSR vehicle

Land Management Section

The state-certified Land Management Section applicator stores pesticides in a chemical locker in building 2649. Spill containment within the locker is sound. A hosebib provides water to mix pesticides but it lacks a backflow arrestor. Although a portable spill kit is available, neither an emergency deluge shower/eyewash station nor secondary containment for mixing are in place.

Compliance Recommendation #5: Install an emergency deluge shower and eyewash station at the Land Management Section mixing and storage area. (Ref (d) §3.5.2.12)

Compliance Recommendation #6: Use secondary containment and a backflow arrestor at the Land Management Section mixing facility. [Ref (d) §3.4.8]

Image 3: Pesticide mixing site at Land Management Section

Marine Memorial Golf Course

The Marine Memorial Golf Course stores pesticides in a storage shed adjacent to building 180412. Pesticides are stored on metal shelves. A hosebib with an engineered backflow arrestor provides water to mix pesticides. A three-walled area with a bermed curb provides ample secondary containment for mixing. A valve creates an easy-to-use pump-out in the event of a spill. Storage, mixing facilities, and AUL inclusion were the best seen to date for a golf course by this reviewer. The mixing facility on the golf course should be viewed by other storage/mixing facility users on the installation.

Image 4: Deluge shower, eyewash stand, and mixing pad at Marine Memorial Golf Course

Image 5: Pesticide storage and spill kits at Marine Memorial Golf Course

Semper Fit Fields and Grounds Building

A state-certified pesticide applicator stores a few pesticides in a shed next to building 1230T. Metal shelving houses pesticides. A large bucket provides secondary containment when mixing. An emergency deluge shower and eye wash station are in place.

Stepp Stables Building 15016

A few pesticides are stored in a chemical locker in a shed nearby building 15016. Since Stepp Stables uses Dewey Pest Control they neither need nor use pesticides of their own. MCCS personnel properly disposed of the pesticides during the review.

Mosquito Control

Preventive Medicine technicians assigned to Naval Hospital Camp Pendleton (NHCP) conduct mosquito surveillance from May to September after complaints are received. Center for Disease Control (CDC) Light Traps and Biogents (BG) Sentinel traps are used. Traps are placed at base housing, NHCP, Stepp Stables, and Lake O'Neill Recreation Center. Specimens are frozen and are sent to the Navy Environmental Preventive Medicine Unit 5 for identification and testing. Hummingbird Aviation performs larviciding operations and FMD pest controllers provide truck mounted ultra-low volume (ULV) applications.

Vegetation Management

Vegetation management is conducted by the Land Management Section mostly through a contract with GSR. A variety of techniques are used including prescribed fire, mechanical removal, and herbicide applications. GSR hand-pulls weeds in sensitive, recontoured vernal pool areas with endangered species. Mechanical removal of *Arundo* and *Tamarix* along the Santa Margarita River has prevented flooding on the airfield of Marine Corps Air Station Camp Pendleton and reduced mosquito breeding sites.

Image 6: Recontoured vernal pond

Nuisance Pest Control

Reviewers inspected the Browne Child Development Center, the Commissary, the Dining Facility in building 2204, the NHCP Dining Facility, the Inns of the Corps in building 202870, Leatherneck Lanes, Pacific Views Event Center, the Temporary Lodging Quarters in building 210440, Meals Ready to Eat (MRE) storage in Warehouse 22103, MRE storage in Warehouse 22112 and the Windmill Canyon Restaurant at the Marine Memorial Golf Course for nuisance pest problems. The most commonly reported nuisance pests were mice. Nuisance pests need only a small opening to enter a building. The first defense against pests is keeping doorways properly sealed. An efficient seal can also reduce energy costs over time. When weather stripping or seals on doors wear out, pests can gain entry into the facility. Rubber door seals warp more easily than bristled sweeps, so rubber door seals should be replaced with sweeps when possible. Additionally, gaps around pipes or electrical conduits, as small as 1/4 inch, can provide enough space for rodents to enter. Once pests are in the building, food droppings and grease provide food sources; any water leaks in equipment provide water sources; and any clutter, cracks, or holes provide harborage areas. Proper sanitation as well as prompt equipment and facility repair can decrease pest populations.

Browne Child Development Center

Staff at the Browne Child Development Center (CDC) in building 2052 reported occasional mice and spider problems. As a MCCS component, the CDC receives its pest control from Dewey Pest Control. The CDC abuts an unimproved natural drainage area. Mechanical exclusion for the building was sound and the fence around the grounds was reinforced with snake fencing. The combined fences offer robust exclusion. Mechanical exclusion also extended to the kitchen, where air curtains were in place. The

kitchen was clean, ensuring cultural control within. Glue traps provide surveillance. The CDC uses a barrier pesticide spray.

Commissary

The Commissary reported an infrequent problem with mice. The Commissary receives its pest control services from Agricultural Pest Control Services. Mechanical exclusion could be improved in the Commissary warehouse by closing small gaps in the doors and the cargo handling ramps. The Commissary developed its own integrated pest management program which led to enhanced communication between the pest control operators and Commissary personnel. Glue traps provide surveillance. A work order request to remove the shrubs around the facility's exterior has been submitted. The Army Veterinary Technicians report that they are pleased with the management of the Commissary.

Best Management Practice Recommendation #1: Close gaps around doors and cargo handling ramps to exclude pests at the Commissary.

Image 7: Door gap at Commissary

Image 8: Brush along exterior wall at Commissary

Dining Facility

The Dining Facility in building 2204 reported rare pest problems with mice, cockroaches, and drain flies. Mechanical exclusion for the building, including air curtains, was sound. Conscientious, well-implemented cultural practices are used that were learned from a rodent infestation in another area's Dining Facility. Cultural practices included not only spotless housekeeping, but also furniture design that allowed thorough cleaning as well as the reduction of refugia for rodents. The limited use of dropped ceilings in the dining room is noteworthy. Glue traps provide surveillance. The Dining Facility uses rodent bait stations around the outside perimeter of the facility.

Dining Facility Naval Hospital Camp Pendleton

The Dining Facility at NHCP reported occasional mice and ant problems. Mechanical exclusion could be improved by closing the small gaps in the space around the doors. The kitchen was clean. Glue traps provide surveillance. Ant bait stations are used in the dining room.

Best Management Practice Recommendation #2: Close gaps around doors to exclude pests at the Camp Pendleton Naval Hospital's Dining Facility.

Inns of the Corps

The Inns of the Corps in building 202870 reported issues with mosquitoes, mice, and bedbugs. As a MCCS component, the Inns receives its pest control from Dewey Pest Control. Staff personnel know how to request pest control services. The Inns has a small kitchen used to prepare food for its customers. Mechanical exclusion was sound and housekeeping was noteworthy for its cleanliness. Glue traps provide surveillance.

Leatherneck Lanes

Staff at Leatherneck Lanes reported cockroaches inside in early summer and mice outside throughout the year. As a MCCS component, the Leatherneck Lanes receives its pest control from Dewey Pest Control. Both mechanical exclusion and cultural practices can be improved. Several gaps exist around doors, and in some instances, door frames. The kitchen's cultural efforts could be improved by using a phased cleaning schedule in which appliances and food preparation stands are moved periodically and floors and walls thoroughly cleaned. Glue traps provided surveillance. The reviewer noted rodent bait stations outside and rat traps inside the facility.

Images 9 and 10: Door and doorframe gaps at Leatherneck Lanes

Best Management Practice Recommendation #3: Close gaps around doors and door frames to exclude pests at Leatherneck Lanes.

Best Management Practice Recommendation #4: Use a daily, phased schedule to move large objects (appliances, food preparation stands, and storage racks) in the kitchen and food storage area to clean all floor surfaces and all vertical surfaces in food preparation areas at Leatherneck Lanes.

Pacific Views Event Center

The Pacific Views Event Center has a coffee shop and a restaurant. As a MCCS component, the Pacific Views Event Center receives its pest control from Dewey Pest Control. The coffee shop is a new addition following a recent innovation, so mechanical exclusion is sound and it was clean. The restaurant reported mice issues occasionally during summer. Mechanical exclusion was adequate but will be difficult to perfect given the size of the facility. Culturally, the restaurant is clean. Glue traps provide surveillance. The Event Center's restaurant uses bait stations around its perimeter.

Temporary Lodging Quarters

Temporary Lodging is offered in building 210440. Staff reported issues with ants, bedbugs, and infrequent problems with mice. The reviewer noted a coyote in a parking lot outside the facility. Mechanical exclusion was sound and housekeeping was adequate. Mattresses and boxsprings are encased. Complaints of pests, including bedbugs, trigger responses from FMD pest controllers. Preventive Medicine technicians reported that they monitor for bedbugs (5 to 10 percent of the unoccupied rooms quarterly) but don't validate complaints since bedbugs aren't known to vector disease.

Warehouse 22103, Meals Ready to Eat Storage

Meals Ready to Eat (MREs) are stored in warehouse 22103. Mechanical exclusion was very tight. The warehouse is constructed with concrete block. Air vents were enclosed with hardware cloth to prevent rodent entry. No gaps existed in any of the door ways. Culturally, the warehouse is clean and first in, first out (FIFO) inventory control is employed. Glue traps provide surveillance. The Army Veterinary Technicians report that they are pleased with the management of the MRE storage warehouse.

Warehouse 22112, Meals Ready to Eat Storage

MREs are also store in warehouse 22112. Staff reported that mice occasionally enter the warehouse and consume the MREs from the bottom most box. Mechanical exclusion was sound but rollup doors are left open during the day to facilitate operations. Air vents were enclosed with hardware cloth to prevent rodent entry. Culturally, the warehouse is clean and FIFO inventory control is employed. MREs are stored on pallets with adequate spacing between one another and walls to facilitate inspections. A very high number of glue traps, snap traps, and bait stations provided both surveillance and control. A couple of the glue traps ensnared rattlesnakes, and the staff NCOIC voiced concern for his personnel's safety related to the snakes. Snakes enter the facility to prey upon the rodents so eliminating the rodents in the warehouse will prevent snakes from entering. Although the number of glue traps, snap traps, and bait stations were high they are warranted to eliminate the rodents. The control measures coupled with FIFO inventory control will control the rodents, preventing damage to the MREs, and keeping the snakes outside of the facility. The Army Veterinary Technicians reported that they were pleased with the management of the MRE storage warehouse.

Windmill Canyon Restaurant

The Windmill Canyon Restaurant at the Marine Memorial Golf Course was recently remodeled. As a MCCS component, the Windmill Canyon Restaurant receives its pest control from Dewey Pest Control. Mechanical exclusion can be improved by closing the gap in the back door. The restaurant had only been opened a few days when the reviewer saw it, and cleanliness for cultural control was flawless. Glue traps provide surveillance.

Best Management Practice Recommendation #5: Close the gap around the back door to exclude pests at the Windmill Canyon Restaurant.

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C.2. Pest Management Program Self-Assessment Checklist

Installation Name:_____Date:_____

Name of Person Completing Checklist:_____

Review Item	Reference	Verification and Documentation	Y	N	N/A
Pest Management Coordinator					
Is IPMC designated and appointed by CO/CG by letter?	6250.4C: Encl. (1), Para.4.h.(6) 5090.1: 24-5.3	Copy of appointment letter.			
Is IPMC properly qualified and trained? If an IPMC selects or applies pesticides, he or she must be certified as a DoD pesticide applicator.	6250.4C: Encl. (1), Para.6.	Copy of course completion certificate or DoD pesticide applicator certificate.			
Does the IPMC oversee the installation pest management program and pest management plan and remain aware of and familiar with all pest management operations on the installation?	4150.07: E2.11	Operations documented in the installation integrated pest management plan; IPMC has copies of pesticide approvals and pest management reports; IPMC is actively involved in pest management decision making.			
Pest Management Plan					
Does installation have a current comprehensive IPMP? IPMPs remain current for 5 years.	4150.07: E4.2. 6250.4C: Encl. (1), Para.9.a. 5090.1: 24-3.9. 5090.2A: 14203	Copy of IPMP.			
If installation does not have an IPMP, has command planned and budgeted for development and maintenance of an IPMP?	4150.07: E4.2.1.1.	Environmental division should have IPMP listed as a deficiency and submit an EPR.			
Is IPMP signed by CO/CG?	6250.4C: Encl. (1), Para.9.a.	IPMP signature page.			
Is IPMP reviewed and signed by IPMC, medical department, and BUMED and NAVFAC pest management consultants?	4150.07: E4.2.1.7 6250.4C: Encl. (1), Para.6.a.	IPMP signature page.			
Is IPMP updated annually by qualified personnel (trained or certified IPMC or PMPAR) and current (contains current POCs, contracts, applicator licenses, list of approved pesticides, etc.)?	4150.07: E4.2.1.2.	View applicator licenses, dates of pesticide approvals, and other items that indicate the information is not outdated.			

IPMP includes the following sections: • List of program objectives • Description of all pest management requirements and programs and staffing requirements (including in-house, contract, agricultural outlease, golf course, NAFI, GOCO, experimental, and natural resources) • Description of IPM procedures for all pest and disease vectors • Identification of program resources (facilities, equipment, etc.) to support program • List of pesticides approved by NAVFAC pest management consultant • Procedures for managing spills • Identification of planned measures to comply with DoD MOA and with state pesticide regulatory office regarding use or application of pesticides • Description of contracted pest management operations • Description of operations with special environmental considerations • Identification of animal control efforts • Identification of potential vector-borne diseases and collaboration with local health agencies • Applicable laws and regulations • Agricultural outlease operations	4150.07: E4.2.	IPMP contains information and sections as outlined in 4150.07, Encl.4.			
Section of IPMP pertinent to pest management in habitat(s) of endangered/threatened species is reviewed and comment provided by U.S. Fish and Wildlife Service.	4150.07: E4.8.1.	Correspondence from USF&WS that they have reviewed the IPMP is on file.			
All stakeholders (including IPMC, PMPARs, environmental division, medical department, pest control shops, NAFIs, agricultural outlease program manager, and golf course superintendent) have copy of or ready access to current IPMP.	BMP	IPMP readily available to stakeholders as hard or electronic copy.			
Program Maintenance					
Have BUMED and/or NAVFAC conducted program reviews in order for the installation to maintain program and IPMP?	6250.4C: Encl. (1), Para.10.a. 5090.1: 24-3.10. 5090.2A: 14204,1.c.	Program reviews on file.			
Have deficiencies and recommendations from past reviews been resolved or addressed in order to maintain and improve program?	6250.4C: Encl. (1), Para.10.a. 5090.1: 24-4.4 5090.2A: 14204,1.c.	Documentation of corrections on file and/or corrections made were noted in follow-up inspection or review.			

Do DoD pest management personnel remain current in IPM technologies?	BMP	Personnel attend training workshops, are provided in-service training and/or have access to pest control trade journals.			
Training and Certification					
Do all installation pest management personnel who apply or supervise the application of pesticides have current DoD certification or EPA-approved certification or license?	4150.07: E4.4.2. 5090.1: 24-3.19.	Copies of all licenses and certificates on file, preferably in IPMP, and applicators have cards while applying.			
If DoD applicator certification expired, has applicator received a six-month extension from a NAVFAC pest management consultant?	4150.07: E4.4.2.1.	Correspondence from NAVFAC approving extension.			
If DoD applicators are not certified (i.e., apprentices), are they under the direct supervision of a certified applicator while performing pesticide applications?	4150.07: E4.4.2.	Observe operations to ensure proper supervision, if necessary.			
Was evidence of contractor pesticide applicator licensing or certification provided to contracting officer prior to award?	4150.07: E4.4.2.2 6250.4C: Encl. (1), Para. 15.b.	Copies of all licenses and certificates on file, preferably in IPMP, and applicators have cards while applying.			
Are PMPARs trained in performance assessment evaluation and pest management technology?	6250.4C: Encl. (1), Para. 15.c.	Copies of training course certificates on file, preferably in IPMP.			
Do pest management personnel seek and attend continuing education courses?	BMP	Copies of course completion certificates on file.			
Staffing					
Is staffing sufficient to effectively control pests and manage program?	BMP	Interview applicators, supervisors, and managers.			
If personnel indicate that staffing is insufficient, then what indicators or data are being collected to show that staffing levels are insufficient?	BMP	View indicators or data.			
Pesticide Procurement					
Does installation use only pesticides approved by NAVFAC pest management consultant?	4150.07: E4.2.2.1. 5090.1: 24-3.16. 5090.2A: 14206.1.b.	IPMC maintains approved pesticide list. Inspect pesticides in pest control storage and on vehicles to ensure they are listed on the current pesticide approval list.			
Pest Management Records and Reporting					
Are records kept for <u>all</u> pest management operations conducted on the installation, including those by NAFIs and for agricultural operations and environmental protection?	7 U.S.C. § 136i-1(a)(1) 6250.4C: Encl. (1), Para. 23. 5090.1: 24-3.16. 5090.2A: 14210 4150.07: E4.11.1				
Are records retained indefinitely?	6250.4C: Encl. (1), Para.23.a. 5090.1: 24-3.4.				
Do personnel and regulatory agencies have ready access to records? (e.g., able to access records by location, pesticide, applicator, etc.)	7 U.S.C. § 136i-1(b)				

Is the installation using the NAVFAC Online Pesticide Reporting System?	BMP				
Are reports of pest management operations being sent to NAVFAC?	6250.4C: Encl. (1), Para. 23.b.				
Contracting					
Do properly trained PMPARs inspect the performance of contractors?	4150.07: E4. 6.4.(1)	Training certificates and contract monitoring documents are on file.			
Are all pest management contracts on the installation monitored by PMPARs?	4150.07: E4. 6.2.	Check also MCCS, MCX, NEX, and MWR contracted services.			
Do PMPARs measure efficacy and ensure safety and environmental compliance of contract pest control?	6250.4C: Encl. (1), Para.15.c.	Interview PMPARs to identify method and frequency of inspections. List methods of measurement.			
Are pest management contracts sent to NAVFAC for review?	5090.1: 24-3.16	Correspondence with NAVFAC.			
Are all contract pesticide applicators currently licensed in the state in which they operate?	4150.07: E4.4.2.2. 4150.07: E4.6.1.	Copies of current certificates or licenses are on file, preferably in IPMP.			
Is the pest control contractor currently registered with the Structural Pest Control Board or the equivalent state pest control business registration agency?	4150.07: E4.6.1.	Copy of current registration certificate on file, preferably in IPMP.			
Pest Control Shop					
Does pesticide storage area pose a hazard to personnel in adjacent areas or buildings?	4150.07: E4.5.1. 1028/8A: Para.2.4	Inspect building to see that exhaust vapors will not move into adjacent occupied areas.			
Does storage area have sufficient security to prevent unauthorized entry?	4150.07: E4.5.1. 1028/8A: Para.2.8	Conduct inspection to ensure doors can be locked, equipment storage areas can be secured, and that applicators lock doors when leaving premises.			
Does building have clean area for office?	4150.07: E4.5.1. 1028/8A: Para.3.1.3.1				
Are separate laundry facilities (designated only for cleaning of clothing potentially contaminated with pesticide) available for work clothing?	BMP				
Are shower facilities available for employees?	BMP				
Is separate space or cabinets provided for storage of PPE?	4150.07: E4.5.1. 1028/8A: Para.3.1.3.1.3				
Are pesticides stored off the floor and with sufficient access so that all labels are visible?	4150.07: E4.5.1. 1028/8A: Para.3.1.4.1.2				
In areas where pesticide concentrates are stored or mixed, are floor drains sealed or not present and is containment provided (bermed or sloped floors)?	4150.07: E4.5.11028/8A: Para.3.1.4.1.2 5090.1: Para.24-3.11				
Are all surfaces on which pesticides are stored and mixed and on which pesticide application equipment is serviced made of non-absorbent materials?	4150.07: E4.5.1. 1028/8A: Para.3.1.4.1.2				

Are pesticides stored in a dry room or building with a temperature between 50 °F and 100 °F?	4150.07: E4.5.1. 1028/8A: Para.3.1.4.1.2				
Are fire extinguishers provided and easily accessible to occupants?	4150.07: E4.5.1. 1028/8A: Para.3.1.4.1.2	Inspect inspection record and see that fire extinguishers are fully charged.			
For large pesticide containers with spigots, is a drip pan containing absorbent material placed below spigot?	4150.07: E4.5.1. 1028/8A: Para.3.1.4.1.2				
Are backflow prevention devices installed on faucets used to fill pesticide tanks?	4150.07: E4.5.1. 1028/8A: Para.3.5.2.10				
Are emergency decontamination facilities (i.e., eye wash, deluge shower) provided onsite and readily accessible?	4150.07: E4.5.1. 1028/8A: Para.3.5.2.12	Check to see that it is functional and that inspection records are up-to-date. Ensure that, in an emergency, personnel can easily access and operate the devices.			
Are ventilation fans available in storage and mixing areas and do they function and provide adequate ventilation (six changes of air per hour)?	4150.07: E4.5.1. 1028/8A: Para.3.5.4.2 5090.1: 24-3.11.	Operate fans. Check IH survey ventilation results (Copy may be available in shop or contact installation IH).			
Are identification signs clearly visible on building and fences to advise personnel of the contents and warn of their hazardous nature?	4150.07: E4.5.1. 1028/8A: Para.3.8				
Are only pesticides listed on approved pesticide list stored?	4150.07: E4.5.1. 5090.1: 24-3.16. 5090.2A: 14206.1.b.	Compare approved pesticides list with items stored on shelves.			
Do all pesticide containers have EPA-approved labels attached?	5090.1: 24-3.5.				
Are spill kits provided and readily accessible?	6250.4C: Encl. (1), Para. 13.d. 5090.1: 24-3.12(b)	Inspect to ensure contents are suitable for pesticide spills.			
Are MSDSs and labels for each pesticide stored and used maintained and readily accessible in the pest control shop?	5090.1: 24-3.5	Review MSDS/label book and compare with pesticides stored in shop and on vehicles.			
Pest control equipment					
Is equipment properly maintained and clean (no evidence of leakage and spillage)?	BMP				
Are different sprayers used for herbicides and insecticides?	BMP	Sprayers are properly marked.			
Is equipment routinely calibrated to ensure proper delivery of pesticide?	BMP	Calibrations, if needed, are recorded in a logbook or other recordkeeping system.			
Is application equipment stored in a secure area?	4150.07: E4.5.1. 1028/8A: Para. 3.4.6.				
Pest Control Vehicles (DoD and Contract)					
Are pesticides stored in a lockable compartment on the vehicle?	BMP				
Does applicator ensure that pesticides are not stored in passenger compartment of vehicle?	BMP				

Is the vehicle clean and maintained (no evidence of leakage and spillage)?	BMP				
Does the vehicle have a properly stocked spill kit?	6250.4C: Encl. (1), Para. 13.d.				
Is the vehicle properly identified to warn of pesticides on vehicle?	BMP				
Are all containers on vehicle, including service containers, properly labeled?	5090.1: 24-3.5.				
Is PPE properly stored on vehicle?	BMP				
Are SDSs (formally MSDSs) for pesticides carried on vehicle?	BMP				
Are appropriate wash racks provided for cleaning vehicles (i.e., does not drain into stormwater system)?	BMP				
Integrated Pest Management					
Is integrated pest management practiced in order to minimize pesticide use when non-chemical alternatives are available and cost effective?	7 U.S.C. § 136r-1 6250.4C: Encl. (1), Para. 3.c. (5) 5090.1: 24-3.8 5090.2A: 14202/14301.8. 4150.07: E4.2.	Pest management service providers have survey devices (i.e., sticky traps) and less toxic and sustainable pesticides (i.e., baits) in their inventory. Records include surveys and the application of less toxic pesticides and use of non-chemical methods.			
Does the installation pest management plan emphasize and describe the use of IPM to provide sustainable pest management?	7 U.S.C. § 136r-1 6250.4C: Encl. (1), Para. 3.c.(5). 4150.07: 4.2 5090.2A: 14202	Review IPMP sections that list pest control methods. Review installation instructions, orders, or policies, especially for housing, that encourage IPM practices.			
Does the installation use practices that demonstrate IPM?	7 U.S.C. § 136r-1 6250.4C: Encl. (1), Para. 3.c. (5) 4150.07: 4.4 5090.2A: 14202	Identify and list practices.			
Does the installation promote IPM?	7 U.S.C. § 136r-1 6250.4C: Encl. (1), Para. 3.c. (5) 4150.07: 4.1 5090.2A: 14202	Identify and list promotion practices.			
Pesticide Application					
Are pesticides applied in accordance with the label directions?	7 U.S.C. § 136(j) 4150.07: E4.5.3.	Interview applicators. Observe application if possible. Wear appropriate PPE.			
Are special precautions taken for operations at child development centers, housing, medical treatment facilities, and food preparation areas?	4150.07: E4.8.1, E4.8.2, and E.4.8.3.	Interview applicators and review records to see if steps are taken to minimize pesticide use or use less toxic pesticides in these areas.			
Are liquid and dust formulations of pesticides applied only when unprotected personnel are not occupying the work space to be treated?	5090.1: 24-3.2.	Interview applicators. Observe application if possible. Wear appropriate PPE.			

Are preventive pesticide treatments prohibited unless approved by a pest management consultant?	4150.07: 4.10.3.	Interview applicators regarding practices. Review pest management records to see if there is any indication of routine pesticide applications.			
Are all applicators familiar with the installation's spill response procedures?	6250.4C: Encl. (1), Para. 13.d.	Get copy of installation instruction on spill response procedures. Interview applicators.			
Are all feasible efforts and management controls used to avoid production of hazardous wastes and to ensure use of pesticides before shelf-life expiration?	6250.4C: Encl. (1), Para. 13.f.	Ask applicators how they clean equipment and dispose of rinsate. Interview shop supervisor to determine container disposal methods.			
Is the installation aware of and do they enforce pesticide "stop sale, use, or removal" orders issued by the EPA?	FIFRA	Check EPA website regarding the provisions of pesticide orders. Check records to see if pesticides that have a "stop sale, use, or removal" order are being used contrary to the provisions of the order.			
Aerial Pesticide Applications					
If conducted or proposed, has a plan for the aerial application of pesticides been reviewed and approved by a BUMED (medically-important pests) or NAVFAC (economic pests) aerial spray-certified pest management consultant?	6250.4C: Encl. (1), Para. 13.e.	Ask for and review signed validation statement.			
Safety					
Are applicators provided with the appropriate PPE?	5090.1: 24-3.7.	Ask applicators to show you PPE in shop and on vehicles.			
Do applicators maintain and wear appropriate PPE when applying pesticides?	6250.4C: Encl. (1), Para. 12.b.	Ask applicators to show you PPE in shop and on vehicles. Observe application, if possible.			
Do all applicators receive training on use of PPE? Are applicators physically qualified to wear respirators?	4150.07: 5.4.17.	Review training record or rosters. Ask to see respirator fit test cards.			
NAFI Operations (NEX/MCX/MCCS/MWR)					
Are all NAFI pest management operations described in the IPMP? This includes operations conducted at: • NEX/MCX retail stores • NEX/MCX and MWR/MCCS food service facilities • MWR/MCCS athletic fields and golf courses	4150.07: 4.2.	Review IPMP.			
Are pesticides used by NAFI pest control providers included on the installation approved pesticide list?	4150.07: E4.2.2.1. 5090.2A: 14206.1.b.	Pesticides used by NAFIs are included on pesticide approval list.			
Are pesticide use records maintained at each facility?	7 U.S.C. § 136i-1(a)(1) 6250.4C: Encl. (1), Para. 23.a. 5090.2A: 14210	NAFI maintains records.			
Are all pest management operations reported to the installation IPMC so that it can be reported to NAVFAC?	6250.4C: Encl. (1), Para. 23.b.	Records and reports contain operations conducted by NAFIs			

If NAFIs purchase pest control services with the DON purchase card, are the services in compliance with DoD and DON pest management requirements?	4200.1: Para.7.				
Pesticide Retail Sales in the Navy Exchange, Commissary, and Veterinary Clinics					
Are only pesticides that are <u>not</u> Category I pesticides labeled "Danger, Poison" displayed for retail sale?	6250.4C: Encl. (1), Para. 13.c.	Inspect pesticide display.			
Are pesticides properly displayed to prevent contamination of food, equipment, utensils, linens, and single-service and single-use articles? (i.e., separated by partition or located in an area not above items)	FOOD: 7-301.11	Inspect pesticide display.			
Are spill containment items available?	6250.4C: Encl. (1), Para. 13.d.	Inspect spill containment kits.			
Are employees familiar with spill procedures?	6250.4C: Encl. (1), Para. 13.d.	Ask employees to describe procedures.			
Is the retail store aware of and do they enforce pesticide "stop sale, use, or removal" orders issued by the EPA?	FIFRA	Check EPA website regarding the provisions of pesticide orders. Check retail shelves to see if pesticides that have a "stop sale, use, or removal" order are being displayed for sale contrary to the provisions of the order.			
Environmental Programs					
Does the installation have a program to comply with the Federal Noxious Weed Act that is also being implemented on state or private lands in the vicinity of the installation?	5090.2A: 14208.14.	Review any plans (INRMP) or contracts for noxious weed control. Identify and list specific control/prevention measures.			
If the installation has an active airfield, does the IPMP reference the BASH plan?		Review any plans, directives, or contracts for BASH. Identify and list specific control/prevention measures.			
Does the IPMP reference the INRMP? Are appropriate portions of the IPMP implemented in accordance with the INRMP?	5090.1: 24-3.9. 4150.07: 5.4.20.12	Review IPMP.			
Are pesticides used in invasive weed control, BASH, depredation and other environmental programs included in the installation approved pesticide list?	5090.1: 24-3.16. 5090.2A: 14206.1.b.	Review records or plans.			
Are pesticides used in these operations recorded and reported to the IPMC so that they can be reported to NAVFAC?	7 U.S.C. § 136i-1(a)(1) 6250.4C: Encl. (1), Para. 23.b. 5090.2A: 14210	Review records. Check to see that IPMC has records.			
Have pest management operations that may have an impact on natural resources been coordinated with and reviewed by the natural resources program manager?	6250.4C: Encl. (1), Paragraphs 20, 21, and 22. 5090.2A: 14301.18.h.	Review IPMP for environmental impacts of pest management operations and for environmental manager signature. Interview natural resources manager to ensure if he/she is aware of pest management impacts on natural resources.			
If feral cats and dogs are present or potentially present, does the installation have a program to capture and remove them from the installation?	6401.1A: Para.4-2c(4) CNO policy letter 5090 N456M/ 1U595820 of 10 Jan 2002	Visual observations. Review installation policies or directives. Identify and review procedures.			

Are installation pest management and environmental personnel and the installation commander aware of the CNO policy on feral animals?	CNO policy letter 5090 N456M/ 1U595820 of 10 Jan 2002	Does the installation have an instruction, order, or policy to prevent feral animals?			
Is the CNO feral animal policy communicated to installation personnel and enforced?	CNO policy letter 5090 N456M/ 1U595820 of 10 Jan 2002	Identify practices that support the presence of feral animals.			
Agricultural Outlease Program					
Does the IPMP describe the agricultural outlease pest management program?	4150.07: E4.2.	Review IPMP.			
Are agricultural pesticides included on the installation list of approved pesticides?	4150.7: E4.6.a.(2) 5090.1, 24-3.16 5090.2A: 14206.1.b.	Review records or plans.			
Are the pest management operations reported to the installation IPMC reported to the NAVFAC PPMC?	7 U.S.C. § 136i-1(a)(1) 6250.4C: Encl. (1), Para. 23.b. 5090.1, 17-4.2 5090.2A: 14210	Review records. Ensure IPMC has records.			
Is on-base agricultural pesticide storage in compliance with local and State regulations?	4150.07: 4.3	Obtain State regulations and Inspect pesticide storage or review agricultural commissioner inspection records.			
If lessee(s) use aerial pesticide application, has the aerial spray project been reviewed and approved by NAVFAC?	6250.4C: Encl. (1), Para. 13.e.	Review aerial spray validation letter.			
Pest Management Operations					
What are the installation's top five pests and what are their impacts on the installation?	BMP	Interview pest management service providers and complete pest management project sheets for each pest.			
What survey methods are used to detect, assess, and prescribe treatment for the top five pests?	BMP	Interview pest management service providers and complete pest management project sheets for each pest.			
What non-chemical control methods are used to prevent and control the top five pests?	BMP	Interview pest management service providers and complete pest management project sheets for each pest.			

Key to references:

- 7 U.S.C. § 136 FIFRA
- 4150.07: DoDI 4150.07, DoD Pest Management Program
- 1028/8A: MIL-HDBK-1028/8A, Military Handbook, Design of Pest Management Facilities
- 6401.1A: SECNAVINST 6401.1A, Veterinary Health Services
- 6250.4C: OPNAVINST 6250.4C, Navy Pest Management Programs
- 5090.1: OPNAV M-5090.1, Environmental Readiness Program Manual
- 5090.2A: MCO 5090.2A, Environmental Compliance and Protection Manual
- 4200.1: EBUSOPSOFFINST 4200.1 (DON EBusiness Operations Office Instruction), Department of the Navy Policies and Procedures for the Operation of the Government Commercial Purchase Card Program
- FOOD: U.S. Food Code 2013

C.3. Integrated Pest Management Plan Annual Update Form

Navy/Marine Corps Integrated Pest Management Plan Annual Update

Fiscal Year Submission Date

1. **Installation**: Please provide the following information about your installation.

Installation Name	State/Country	County(ies), if applicable	Year current IPMP was written

2. **Contact Information**: The following data provides information on installation resources and responsibilities in support of the pest management program. If not applicable, leave blank.

	Name	E-mail	Phone	Organization
Installation Pest Management Coordinator				
Lead Pest Controller				
Primary PMPAR				
Primary Grounds Maintenance Performance Assessment Representative				
Lead MCCS Golf Course Applicator				
Medical Dept. Representative				
Natural Resource Manager				
Cultural Resource Manager				
Public Works Officer				
Installation Environmental Program Manager				

3. **Certification and Training**: List all personnel who have DoD certification or training numbers at your installation. This may include Public Works, MCCS and/or Natural Resources personnel. Be sure to include all contractor personnel who apply pesticides (e.g., insecticides, herbicides, etc.) as a part of pest control or grounds maintenance contracts, including those contractor operations performed via credit card or small purchase contracts.

DoD or State Certifica-tion	**Type of Work***	**Organization or Contractor Name**	**Applicator Name**	**Applicator Certification/ License Number**	**License Class/Type (i.e., Commercial, Noncommercial, Government, Registered Technician)**	**Certification Category Number(s) or Letter(s)****	**Exp Date MM/DD/ YY**
DoD							
DoD							
DoD							
DoD							
DoD							
DoD							
DoD							
DoD							
DoD							
DoD							
DoD							
DoD							

*Specify the type of work (e.g., grounds maintenance, pest control, QAE/PMPAR, IPMC, Natural Resources, etc.)

**Provide a list of all categories of certification

4. **Plan Maintenance**: Please list any minor program changes (e.g., personnel changes, certifications, other programming changes or challenges, etc.) relative to the IPMP for the upcoming fiscal year. Major program changes require re-submittal of the entire updated plan for approval.

5. **Assistance**: Please indicate if you require on-site assistance from a NAVFAC Applied Biologist (Professional Pest Management Consultant) for your pest management program. Briefly describe the reason for such a visit. If you are planning aerial spray or other large scale pest management operations (such as large-scale weed control) please indicate the nature of the project below.

FOR OFFICIAL USE ONLY

IPMP Approved by NAVFAC Professional Pest Management Consultant ☐

Date of Approval: (FY approval)

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Appendix D. Pesticide Authorized Use List

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D.1. Pesticide Authorized Use List

The following pesticides are authorized for use at MCB Camp Pendleton as of February 2019.

The most current list of approved pesticides for each installation can be found on the NAVFAC Online Pesticide Reporting System at https://noprs.pestlogics.com/.

PestType	Formulation	Pesticide Name	EPA Number	Active Ingredient
Algaecide	Solution	Zerotol 2.0	70299-12	Hydrogen Dioxide / Peroxyacetic Acid
Algaecide/Fungicide	Dispersible Granules	Compass	432-1371	Trifloxystrobin
Fumigant	Fumigant - Solid	Fumitoxin Tablets	72959-1	Aluminum Phosphide
Fungicide	Dry Flowable	26/36 Fungicide	432-1414-1001	Iprodion / Thiophanate-Methyl
Fungicide	Solution	3336 F	1001-69	Thiophanate-Methyl
Fungicide	Concentrate	3336Plus	1001-78	Thiophanate-Methyl
Fungicide	Dispersible Granules	Affirm Wdg	68173-3-1001	Polyoxin D Zinc Salt
Fungicide	Wettable Powder	Affirm Wdg (No Packet)	68173-3-1001	Polyoxin D Zinc Salt
Fungicide	Emulsifiable Concentrate	Banner Maxx	100-641	Propiconazole
Fungicide	Solution	Banner Maxx Ii	100-1326	Propiconazole
Fungicide	Emulsifiable Concentrate	Banol	432-942	Propamocarb Hydrochloride
Fungicide	Suspension Concentrate	Briskway	100-1433	Azoxystrobin / Difenoconazole
Fungicide	Granules/Pellets	Chipco Signature	432-890	Aluminum Tris
Fungicide	Suspension Concentrate	Concert Ii	100-1347	Propiconazole / Chlorothalonil
Fungicide	Solution	Daconil Action Flowable Fungicide	100-1364	Chlorothalonil / Acibenzolar-S-Methyl
Fungicide	Liquid	Daconil Weather Stik	50534-209-100	Chlorothalonil
Fungicide	Solution	Daconil Weather-Stik	50534-209	Chlorothalonil
Fungicide	Solution	Fiata/Es Tc006A	432-1522	Phosphorous Acid
Fungicide	Wettable Powder	Fore 80 Wp	62719-388	Mancozeb
Fungicide	Dispersible Granules	Heritage	100-1093	Azoxystrobin

Fungicide	Wettable Granules	Insignia	7969-184	Pyraclostrobin
Fungicide	Suspension Concentrate	Insignia Sc	7969-290	Pyraclostrobin
Fungicide	Solution	Instrata	100-1231	Chlorothalonil / Propiconazole / Fludioxonil
Fungicide	Solution	Interface	432-1505	Iprodione / Trifloxystrobin
Fungicide	Solution	Legend	1001-85	Chlorothalonil
Fungicide	Suspension Concentrate	Lexicon	7969-350	Fluxapyroxad / Pyraclostrobin
Fungicide	Concentrate	Manzate Flowable T&O	70506-236	Mancozeb
Fungicide	Suspension Concentrate	Medallion Sc	100-1448	Fludioxonil
Fungicide	Emulsifiable Concentrate	Nufarm Propiconazole Spc 14.3 Mec	228-623	Propiconazole
Fungicide	Suspension Concentrate	Phoenix Raven	81943-13	Iprodione
Fungicide	Dry Flowable	Protect Df	1001-77	Mancozeb
Fungicide	Solution	Secure	71512-20-100	Fluazinam
Fungicide	Liquid	Subdue Maxx	100-796	Metalaxyl-M
Fungicide	Suspension Concentrate	Tartan Fungicide	432-1446	Trifloxystrobin / Triadimefon
Fungicide	Solution	Tebuconazole/Mirage	432-1529	Tebuconazole
Fungicide	Concentrate	Torque Fungicide	1001-87	Tebuconazole
Fungicide	Dispersible Granules	Tourney Fungicide	59639-144	Metconazole
Fungicide	Suspension Concentrate	Trinity	7969-257	Triticonazole
Fungicide	Suspension Concentrate	Triton Flo	432-1487	Triticonazole
Fungicide	Dispersible Granules	Velista	100-1534	Penthiopyrad
Herbicide	Concentrate	Alligare Diquat	81927-35	Diquat Dibromide
Herbicide	Solution	Aqua Neat	228-365	Glyphosate
Herbicide	Solution	Aquamaster / Roundup Custom	524-343	Glyphosate
Herbicide	Solution	Barricade 4Fl	100-1139	Prodiamine
Herbicide	Granules/Pellets	Barricade 65Wg Herbicide	100-834	Prodiamine

Herbicide	Wettable Powder	Bromacil 80	81927-4	Bromacil
Herbicide	Dry Flowable	Diuron 80Df	81927-12	Diuron
Herbicide	Solution	Ecomazapyr 2 Sl	81927-22	Imazapyr
Herbicide	Emulsifiable Concentrate	Fusilade Dx	100-1070	Fluazifop-P-Butyl
Herbicide	Emulsifiable Concentrate	Fusilade Ii	10182-393	Fluazifop-P-Butyl
Herbicide	Emulsifiable Concentrate	Fusilade Turf And Ornamental Herbicide	100-1084	Fluazifop-P-Butyl
Herbicide	Dry Flowable	Gallery 75 Dry Flowable	62719-145	Isoxaben
Herbicide	Solution	Garlon 3A / Element 3A	62719-37	Triclopyr
Herbicide	Solution	Garlon 4	62719-40	Triclopyr
Herbicide	Concentrate	Garlon 4 Ultra	62719-527	Triclopyr
Herbicide	Solution	Glyphosate 4 Plus	81927-9	Glyphosate
Herbicide	Concentrate	Glyphosate 5.4	81927-8	Glyphosate
Herbicide	Liquid	Glyphosate Pro 4	72112-4	Glyphosate
Herbicide	Solution	Habitat	241-426	Imazapyr
Herbicide	Solution	Kleenup Pro/Makaze	34704-890	Glyphosate
Herbicide	Dispersible Granules	Krovar I Df Herbicide	352-505	Bromacil / Diuron
Herbicide	Emulsifiable Concentrate	Lontrel Turf And Ornamental	62719-305	Clopyralid
Herbicide	Emulsifiable Concentrate	Mecomec 2.5	33955-483-2217	Mecoprop-P-Potassium
Herbicide	Concentrate	Milestone Herbicide	62719-519	Aminopyralid
Herbicide	Granules/Pellets	One Shot	2217-856-7001	2,4D / Mecoprop-P / Dicamba / Dithiopyr
Herbicide	Granules/Pellets	Oust Xp	352-601	Sulfometuron Methyl
Herbicide	Solution	Pathfinder Ii	62719-176	Triclopyr
Herbicide	Emulsifiable Concentrate	Pendulum 3.3 Ec Herbicide	241-341	Pendimethalin
Herbicide	Solution	Polaris	228-534	Imazapyr

Herbicide	Emulsifiable Concentrate	Prosecutor Pro	524-536-10404	Glyphosate
Herbicide	Emulsifiable Concentrate	Ranger Pro	524-517	Glyphosate
Herbicide	Concentrate	Remuda Full Strength	228-366-54705	Glyphosate
Herbicide	Solution	Reward	100-1091	Diquat Dibromide
Herbicide	Solution	Reward	10182-404	Diquat Dibromide
Herbicide	Granules/Pellets	Ronstar G Herbicide	432-886	Oxadiazon
Herbicide	Solution	Roundup	524-445	Glyphosate
Herbicide	Emulsifiable Concentrate	Roundup Pro	524-475	Glyphosate
Herbicide	Solution	Roundup Pro Concentrate	524-529	Glyphosate
Herbicide	Concentrate	Roundup Pro Max	524-579	Glyphosate
Herbicide	Solution	Roundup Ready-To-Use Plus	71995-33	Pelargonic Acid / Glysophate
Herbicide	Solution	Sfm 75	81927-26	Sulfometuron Methyl
Herbicide	Emulsifiable Concentrate	Speed Zone	2217-835	2,4-D / Dicamba / Mecoprop-P Acid / Carfentrazone-Ethyl
Herbicide	Dispersible Granules	Sureguard/Payload	59639-120	Flumioxazin
Herbicide	Solution	Surflan	70506-43	Oryzalin
Herbicide	Solution	Surflan As	70506-44	Oryzalin
Herbicide	Dust/Granule	Telar	352-522	Chlorsulfuron
Herbicide	Dry Flowable	Telar Xp	352-654	Chlorsulfuron
Herbicide	Concentrate	Triclopyr 4	81927-11	Triclopyr Bee
Herbicide	Concentrate	Triplet Sf	228-312	2,4-Dichlorophenoxyacetic Acid / 2-Methyl-4-Chlorophenoxy Propionic Acid / 3,6-Dichloro-O-Anisic Acid
Herbicide	Liquid*	Vessel	2217-656-72112	2,4-D / Mecoprop-P / Dicamba

Insect Growth Regulator	Briquets	Altosid Briquets	2724-375-50809	Methoprene
Insect Growth Regulator	Granules/Pellets	Altosid Pellets	2724-448	Methoprene
Insect Growth Regulator	Emulsifiable Concentrate	Archer Igr	100-1111	Pyriproxyfen
Insecticide	Suspension Concentrate	Acelepryn	352-731	Chlorantraniliprole
Insecticide	Suspension Concentrate	Acelepyrn	100-1489	Chlorantraniliprole
Insecticide	Bait Stations	Advion Ant Bait Arena	100-1485	Indoxacarb
Insecticide	Gel	Advion Ant Gel	100-1498	Indoxacarb
Insecticide	Gel	Advion Cockroach Gel Bait	100-1484	Indoxacarb
Insecticide	Solution	Catalyst	2724-450	Propetamphos
Insecticide	Aerosol	Cb-80 Extra	9444-175	Pyrethrin / Piperonyl Butoxide
Insecticide	Bait Stations	Combat Large Roach Bait	64240-34	Fipronil
Insecticide	Aerosol	Cy-Kick	499-470	Cyfluthrin
Insecticide	Encapsulation	Cy-Kick Cs	499-304	Cyfluthrin
Insecticide	Dust	Delta Dust	432-772	Deltamethrin
Insecticide	Bait Stations	Dual Choice Ant Bait	11540-20	Sulfuramid
Insecticide	Emulsifiable Concentrate	Exponent Insecticide Synergist	1021-1511	Piperonyl Butoxide
Insecticide	Gel	Invict Cockroach Gel	73079-10	Imidacloprid
Insecticide	Solution	Masterline	73748-7	Bifenthrin
Insecticide	Gel	Maxforce Ec Bait Gel	64248-21	Fipronil
Insecticide	Gel	Maxforce Fc Roach Bait Gel	432-1259	Fipronil
Insecticide	Gel	Maxforce Roach Killer Bait Gel	64248-5	Hydramethylnon
Insecticide	Granules/Pellets	Meridian 25 Wg	100-943	Thiamethoxam
Insecticide	Wettable Powder	Merit 75 Wp	3125-421	Imidacloprid
Insecticide	Wettable Powder	Merit 75 Wsp	3125-439	Imidacloprid
Insecticide	Wettable Powder	Merit 75 Wsp	432-1318	Imidacloprid

Insecticide	Suspension Concentrate	Onslaught	1021-1815	(S)-Cyano (3-Phenoxyphenyl) Methyl-(S)-4-Chloro-Alpha-(1-Methylethyl) Benzenacetate
Insecticide	Encapsulation	Onslaught Fastcap	1021-2574	Prallethrin / Esfenvalerate / Piperonyl Butoxide
Insecticide	Emulsifiable Concentrate	Permethrin Sfr	70506-6-53883	Permethrin
Insecticide	Solution	Phantom	241-392	Chlorfenapyr
Insecticide	Dust	Pt Alpine Dust	499-527	Dinotefuran / Diatomaceous Earth
Insecticide	Solution	Scourge Insecticide With Spb-1382/Piperonyl Butoxide 4% + 12% Mf Fii	432-716	Resmethrin / Piperonyl Butoxide
Insecticide	ULV Concentrate	Shockwave	1021-1810	Piperonyl Butoxide / N-Octyl Bicycloheptene Dicarboximide / Esfenvalerate / Pyrethrins / Pyriproxyfen
Insecticide	Suspension Concentrate	Suspend Polyzone	432-1514	Deltamethrin
Insecticide	Suspension Concentrate	Suspend Sc	432-763	Deltamethrin
Insecticide	Granules/Pellets	Talstar Gc Granular Insecticide	279-3167	Bifenthrin
Insecticide	Emulsifiable Concentrate	Talstarone / Talstar P	279-3206	Bifenthrin
Insecticide	Suspension Concentrate	Taurus Sc	53883-279	Fipronil
Insecticide	Solution	Termidor Sc	432-901	Fipronil
Insecticide	Suspension Concentrate	Termidor Sc	7969-210	Fipronil
Insecticide	Aerosol	Uld Bp-300	499-450	Piperonyl Butoxide / N-Octyl Bicycloheptene Dicarboximide / Pyrethrins
Insecticide	Granules/Pellets	Vectobac G Biological Larvicide Granules	275-50	Bacillus Thuringiensis
Insecticide	Granules/Pellets	Vectomax Fg	73049-429	Bacillus Sphaericus / Bacillus Thuringiensis Subsp. Israelensi

Insecticide	Aerosol	Wasp-Freeze	499-362	D-Trans Allethrin / Phenothrin
Insecticide	Aerosol	Whitmire P. I. Contact Insecticide	499-444	Piperonyl Butoxide / Pyrethrins
Insecticide	Emulsifiable Concentrate	Wisdom Tc Flowable	5481-520	Bifenthrin
Plant Growth Regulator	Emulsifiable Concentrate	Nufarm T-Pac Spc Mec	228-635	Trinexapac- Ethyl
Plant Growth Regulator	Emulsifiable Concentrate	Primo Maxx	100-937	Trinexapac-Ethyl
Plant Growth Regulator	Emulsifiable Concentrate	Proxy	432-1230	Ethephon
Plant Growth Regulator	Emulsifiable Concentrate	Regimax Pgr	228-635-10404	Trinexapac-Ethyl
Rodenticide	Bait - Solid	Contrac All Weather Blox	12455-79	Bromadiolone
Rodenticide	Bait - Solid	Eatons Answer Pocket Gopher Bait	56-57	Diphacinone
Rodenticide	Bait - Solid	Eatons Bait Blocks	56-42	Diphacinone
Rodenticide	Bait - Solid	First Strike	7173-258	Difethialone
Rodenticide	Bait - Solid	Generation Mini Blocks	7173-218	Difethialone
Rodenticide	Bait - Solid	Gopher Getter Ag Bait	36029-7	Strychnine
Rodenticide	Bait - Solid	Gopher Getter Type 2 Bait	36029-24	Diphacinone
Rodenticide	Bait - Solid	Kaput Doom	72500-19	Bromadiolome
Rodenticide	Bait - Solid	Martin'S Gopher Bait 50	53883-23	Strychnine Alkaloid
Rodenticide	Bait - Solid	Omega Gopher Grain Bait	5042-32	Strychnine Alkaloid
Rodenticide	Bait - Solid	P.C.Q. Pelleted Rodent Bait	12455-50003	Diphacinone
Rodenticide	Bait - Solid	Pcq	12455-81	Diphacinone
Rodenticide	Bait - Solid	Pcq Pelleted Rodent Bait	12455-50003	Diphacinone
Rodenticide	Bait - Solid	Ramik Oats Kills Ground Squirrels	61282-24	Diphacinone
Rodenticide	Bait - Solid	Ratimor	82744-2	Bromadiolone
Rodenticide	Bait - Solid	Talon-G Pellets	10182-38	Brodifacoum
Rodenticide	Bait - Solid	Wilco Ag Ground Squirrel Bait	36029-17	Diphacinone

Rodenticide	Bait - Solid	Wilco Gopher Getter	36029-1	Strychnine
Rodenticide	Bait - Solid	Wilco Ground Squirrel Bait	39029-17	Diphacinone
Rodenticide	Bait - Solid	Zp Rodent Bait	12455-18	Zinc Phosphide
Rodenticide	Bait - Solid	Zp Rodent Oat Bait Ag	12455-102	Zinc Phosphide

Appendix E. Certifications

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E.1. Table of Current Contractors

Contractor	Type of Work	Business License Number
AECOM Technical Services Inc.	Natural resources	PCM 41482
Agrichem	Natural resources	PCM 30589
Agricultural Pest Control Services	Commissary pest control	PCM 30744
Corky's Pest Management	Pest control in PPV housing	PCM 31164
Dewey Pest Control	Pest control for MCCS	PCM 31286
Ecolab	Pest control for MCCS independently owned restaurant	PCM 30033
Gulf South Research Corporation	Natural resources	PCM 38879
Hummingbird Aviation (Wolf Creek)	Mosquito control	PCM 31638
Innovative Inclosures, Apex	Natural resources	PCM 38403
Orkin	Pest control for MCCS independently owned restaurant	PCM 32074
Patriot JV	Natural resources	PCM 32120
Payne Pest Management	Pest control in PPV housing	PCM 37147
PestGon	Pest control for MCCS independently owned restaurant	PCM 31529
Truly Nolen	Pest control for MCCS independently owned restaurant	PCB 38460
Western Exterminators	IDIQ	PCB 39030
Western Pest	Pest control for MCCS independently owned restaurant	PCM 32444
Wheeler Pest Control	Pest control for MCCS independently owned restaurant	PCM 38379

E.2. Table of Applicator Certifications

DoD or State	Organization or Contractor Name	Name	Applicator Cert Number	Cert Category Number*	Expiration Date
State	AECOM Technical Services Inc.	Scott Rose	QAL 126884	BCF	12/31/2019
State	Agrichem	Graydon Dill	QAC 129476	B	12/31/2020
State	Agrichem	Ignacio Mondragon	QAC 123951	Q	12/31/2019
State	Agrichem	Miguel Moreno	QAC 123958	Q	12/31/2019
State	Agrichem	Gary Omori	QAL 100564	BCDEF	12/31/2019
State	Agrichem	Greg Omori	QAL 100196	ABD	12/31/2019
State	Agrichem	Ray Omori	QAL 100215	CDI	12/31/2019
State	Agrichem	Tracy Omori	QAL 13321	B	12/31/2019
State	Agrichem	Gilberto Reyes	QAC 144680	Q	12/31/2019
State	Agrichem	Erasmo Rivera	QAC 123956	Q	12/31/2019
State	Agrichem	Nicolas Rivera	QAC 138835	Q	12/31/2019
State	Agrichem	Regulo Ruiz-Bailon	QAC 123953	Q	12/31/2019
State	Agrichem	John Shockley	QAC 123238	Q	12/31/2019
State	Agrichem	Martin Vazquez	QAC 137845	Q	12/31/2019
State	Agrichem	Dean Woods	QAL 128138	B	12/31/2019
State	Dewey Pest Control	Christopher Rodriguez	56478	2,3	6/30/2021
State	Dewey Pest Control	Justin White	QAL 119932	B	12/31/2019
State	Ecolab	Dustin Day	53778	2	6/30/2020
State	Gulf South Research Corporation	Gabrielle Barsotti	QAL 145804	C	12/31/2020
State	Gulf South Research Corporation	Taylor Chase	QAC 144866	B	12/31/2020

State	Gulf South Research Corporation	Heather Hughes	QAC 144867	B	12/31/2020
State	Gulf South Research Corporation	Eric Matechak	QAC 145237	B	12/31/2019
State	Gulf South Research Corporation	Derrick Matthews	QAL 142604	CEF	12/31/2019
State	Gulf South Research Corporation	Ricardo Salido	QAC 144869	B	12/31/2019
State	Innovative Inclosures, Apex	Jesse Navarro	QAL 125381	BFN	12/31/2019
State	Orkin	Glen Lucas	42642	2	6/30/2019
State	Patriot JV	Glen Kinoshita	QAL 145457	C	12/31/2020
State	Patriot JV	Clayton Kraft	QAC 136107	C	12/31/2020
State	Patriot JV	Victoria Masjuan	QAC 145361	C	12/31/2019
State	Patriot JV	Ryan Mezaros	QAC 139450	C	12/31/2019
State	Patriot JV	Elias Potashov	QAl 146886	B	12/31/2019
State	Patriot JV	Anthony Santare	QAL 123998	BCF	12/31/2019
State	Patriot JV	Ryan Smith	QAC 145576	C	12/31/2018
State	Patriot JV	Grady Van Hooser	QAL 132124	BCF	12/31/2019
State	Payne Pest Management	Patrick Bell	20941	2	6/30/2019
State	Payne Pest Management	John Bellows	51273	2,3	6/30/2021
State	Payne Pest Management	Robin Carey	48811	2,3	6/30/2019
State	Payne Pest Management	Jonathan Childers	59949	2,3	6/30/2019
State	Payne Pest Management	Larry Copeland	32639	2,3	6/30/2021
State	Payne Pest Management	Jose Davalos	16229	2,3	6/30/2019
State	Payne Pest Management	Saul Flores	58553	3	6/30/2019
State	Payne Pest Management	Eric Garcia	39671	2	6/30/2020
State	Payne Pest Management	Eric Johnson	41832	2,3	6/30/2021
State	Payne Pest Management	Joseph Keller	29692	2	6/30/2021
State	Payne Pest Management	Abbas Klanmanesh	21789	2,3	6/30/2019
State	Payne Pest Management	Jesus Martinez	57200	2,3	6/30/2021

State	Payne Pest Management	Phillip McFadden	47708	2,3	6/30/2020
State	Payne Pest Management	Sinan Mulic	20860	2	6/30/2020
State	Payne Pest Management	Timothy Ostrowski	44206	2,3	6/30/2020
State	Payne Pest Management	Jason Payne	12274	2,3	6/30/2020
State	Payne Pest Management	Willie Payne	11316	1,2,3	6/30/2020
State	Payne Pest Management	Willie Payne	11316	1,2,3	6/30/2020
State	Payne Pest Management	Aaron Seaman	39775	2,3	6/30/2020
State	Payne Pest Management	Jeffrey Shinn	53066	2,3	6/30/2019
State	Payne Pest Management	Derwin Sanford	38467	2	6/30/2019
State	Payne Pest Management	Erick Solorzano	13596	2,3	6/30/2021
State	Payne Pest Management	Felton Turnage	51295	2,3	6/30/2021
State	PestGon	Jason Loukasis	32046	2	6/30/2020
State	Truly Nolen	Jorge Sanchez	43946	2	6/30/2020
State	Western Pests	Gavino Luere	42959	2	6/30/2019
State	Wheeler's	Ryan Wheeler	54546	2	6/30/2020
State	Wolf Creek (Hummingbird Aviation)	Robert Hoag	QAL 101382	CDK	12/31/2020
DoD	FMD Pest Control	Paul Champagne	NJ-001-02-1116	2,3,5,6,7,8	11/30/2019
DoD	FMD Pest Control	Tom Godoy	NA-070-94-1116	3,5,6,7,8	12/31/2021
DoD	FMD Pest Control	John Savage	NS-091-13-1116	3,5,6,7,8	11/30/2019
DoD	ES Land Management	Jim Asmus	NJ-005-2019	2,3	3/31/2022
DoD	MCCS- Golf course	Hector Villareal	NB-0237-97-1116	3,5,6	11/30/2019

State Certification Categories

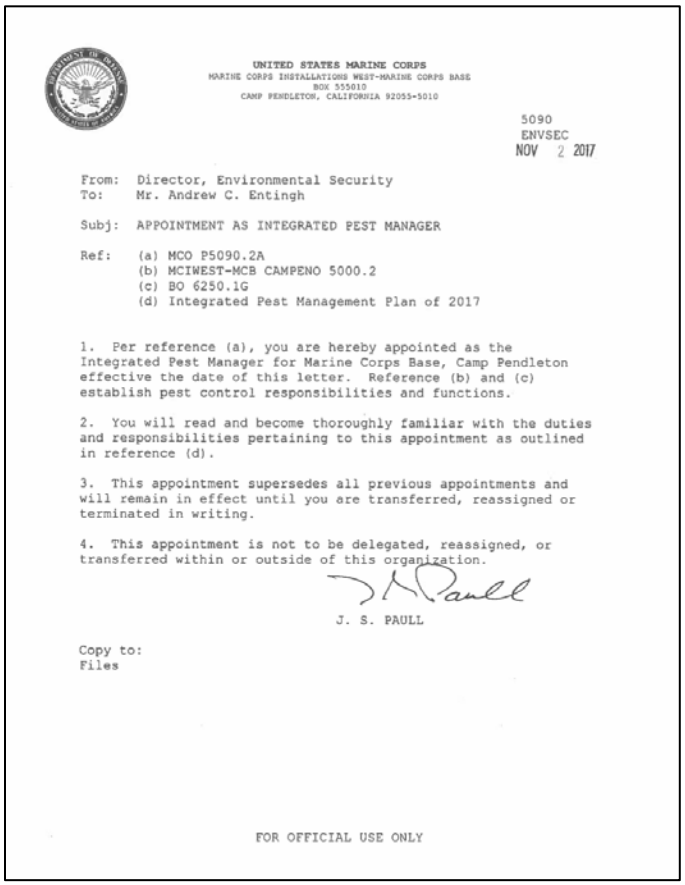
Certifications	I- Animal agriculture	Type
QAL – Qualified applicator license	J- Demonstration and Research	FR – Field representative
QAC – Qualified applicator certificate	K- Health Related	OPR - Operator
A- Residential, Industrial, and Institutional	L- Wood Preservation	RA – Applicator
B- Landscape Maintenance	M- Antifouling Paints or Coatings Containing Tributyltin	Structural Pest Control Branches
C- Right-of-Way	P- Microbial Pest Control	1- Fumigation
D- Plant Agriculture	Q- Maintenance Gardener	2- General pest
E- Forest		3- Wood destroying organisms

F- Aquatic G- Regulatory H- Seed Treatment		
DoD Certification Categories		
2 – Forest	3 – Ornamental and Turf	5 – Aquatic
6 – Right-of-Way	7 – Industrial, Institutional, Structural, and Health-Related	8 – Public Health
10 – Demonstration & Research	11 – Aerial Application	

E.3. Table of IPMC/PMPAR Certifications

Name	Function	Certification Date	Expiration Date
Andy Entingh	IPMC Appointed	12/6/2018	12/31/2021
Gabe Goodman	IPMC de facto	12/6/2018	12/31/2021
John Acrie	PMPAR	12/6/2018	12/31/2021
Jim Asmus	PMPAR	12/6/2018	12/31/2021
Todd Lease	PMPAR	12/6/2018	12/31/2021
Chad LePine	PMPAR	12/6/2018	12/31/2021
Shiella McNulty	PMPAR	12/6/2018	12/31/2021
Diego RojasSilva	PMPAR	12/6/2018	12/31/2021
Greg Seaman	PMPAR	12/6/2018	12/31/2021
Debra Solley	PMPAR	12/6/2018	12/31/2021

E.3.1. IPMC Appointment Letter



UNITED STATES MARINE CORPS
MARINE CORPS INSTALLATIONS WEST-MARINE CORPS BASE
BOX 555010
CAMP PENDLETON, CALIFORNIA 92055-5010

5090
ENVSEC
NOV 2 2017

From: Director, Environmental Security
To: Mr. Andrew C. Entingh

Subj: APPOINTMENT AS INTEGRATED PEST MANAGER

Ref: (a) MCO P5090.2A
(b) MCIWEST-MCB CAMPENO 5000.2
(c) BO 6250.1G
(d) Integrated Pest Management Plan of 2017

1. Per reference (a), you are hereby appointed as the Integrated Pest Manager for Marine Corps Base, Camp Pendleton effective the date of this letter. Reference (b) and (c) establish pest control responsibilities and functions.

2. You will read and become thoroughly familiar with the duties and responsibilities pertaining to this appointment as outlined in reference (d).

3. This appointment supersedes all previous appointments and will remain in effect until you are transferred, reassigned or terminated in writing.

4. This appointment is not to be delegated, reassigned, or transferred within or outside of this organization.

J. S. PAULL

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UNITED STATES MARINE CORPS
MARINE CORPS INSTALLATIONS WEST-MARINE CORPS BASE
BOX 555010
CAMP PENDLETON, CALIFORNIA 92055-5010

5090
ENVSEC
22 Jun 21

From: Deputy Director, Environmental Security
To: Mr. Gabe Goodman

Subj: APPOINTMENT AS INTEGRATED PEST MANAGEMENT COORDINATOR

Ref: (a) MCO 5090.2
(b) MCIWEST-MCB CAMPENO 6250.1
(c) Integrated Pest Management Plan of June 2019

1. Per reference (a) and (b), you are hereby appointed as the Integrated Pest Management Coordinator for Marine Corps Base, Camp Pendleton effective the date of this letter.

2. References (b) and (c) establish pest control responsibilities and functions. You will become thoroughly familiar with these duties and responsibilities. Some of the frequent duties are listed below.

a. Maintain frequent communication with pest management service providers and technical specialists.

b. Verify that pest operations are reported in the Navy Online Pesticide Reporting System (NOPRS).

c. Monitor certification and continuing pest management training for pesticide applicators and Pest Management Performance Assessment Representatives.

d. Maintain and keep current the Integrated Pest Management Plan.

e. Submit Self-help Statement of Need packages to NAVFAC for approval.

3. This appointment supersedes all previous appointments and remains in effect until you are transferred, reassigned, or terminated in writing.

S. B. WILLIAMS

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Appendix F. Laws, Regulations, Policies, and Guidance Related to Pesticides and Pest Management

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F.1. International

INTERNATIONAL		
Title/Reference	**Date**	**Relevant Requirements / Guidance**
DoD 4715.05-G, Overseas Environmental Baseline Guidance Document (OEBGD)	1 May 2007	For OCONUS installations that do NOT have an FGS, Chapter 11 – Pesticides. Contains criteria regulating the use, storage, and handling of pesticides, but does not address the use of these materials by individuals acting in an unofficial capacity in a residence or garden. The disposal of pesticides is covered in Chapter 6, "Hazardous Waste," and Chapter 7, "Solid Waste."
DoDD 3000.10, Contingency Basing Outside the United States	10 Jan 2013	Policy for integrating comprehensive risk management into pest management planning, design, and operations
Cuba: Final Governing Standards (FGS) for Environmental Protection by United States Forces in Cuba	Sep 1994	Chapter 11 – Pesticides. Contains standards regulating the use, storage and handling of pesticides, herbicides, and defoliants at DoD installations, but does not address the use of these materials by individuals acting in an unofficial capacity in a residence or garden. The disposal of pesticide residue and containers is covered in Chapters 6 and 7.
Andros Island: Final Governing Standards		
Bahrain: Final Governing Standards	13 Mar 2012	
Egypt: Final Governing Standards		
Greece: Final Governing Standards	6 Nov 2002	
Italy: Final Governing Standards	Jul 2008	
Spain: Final Governing Standards	6 Nov 2002	
Brown Tree Snake: MOA	3 Mar 1999	MOA among US Dept of Interior, US DoD, US Dept of Agriculture, US Dept of Commerce, US Dept of Transportation, Government of Guam, State of Hawaii, and the Commonwealth of the Northern Mariana Islands

F.2. Federal

Laws		
Title/Reference	**Date**	**Relevant Requirements / Guidance**
Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C 136 et seq.) (codified at 40 CFR Parts 152-180) Labeling Requirements for Pesticides and Devices (40 CFR 156) Pesticide Management and Disposal, (40 CFR 165) Exemption of Federal and State Agencies for Use of Pesticides under Emergency Conditions (40 CFR 166) Certification of Pesticide Applicators, (40 CFR 171)	1947, and amendments	Requires pesticide and applicator registration with the U.S. EPA, properly labeled containers, pesticide application records, adequate worker safety, and the proper disposal of unused products. Pesticides are also classified under this act as general use or restricted use. **Integrated Pest Management for Federal agencies** (7 USC § 136r-1) requires Federal agencies to use IPM techniques in carrying out pest management activities and promote IPM
Animal Damage Control Act (7 USC 426-426c) http://www.animallaw.info/statutes/stusfd7usc426.htm	1931, amended in 1987 and 1991	Gives the Secretary of Agriculture broad authority to investigate and control certain predatory or wild animals and nuisance mammal and bird species.
Clean Air Act (CAA) (42 USC 7401 et seq.) http://www.epa.gov/air/caa/	1955, amended in 1970, 1977, and 1990	Mandates the prevention and control of air pollution from toxic emissions including pesticides.
Clean Water Act (Amended the Federal Water Pollution Control Act of 1972) (33 USC 1251-1387) http://www.law.cornell.edu/uscode/text/33/chapter-26	1977, reauthorized in 1987	Calls for the restoration and maintenance of the chemical, physical, and biological integrity of our nation's waters, including sensitive environments like wetlands. This Act prohibits non-storm water discharges from entering surface waters.

Endangered Species Act (16 USC 1531-1544), (50 CFR Part 402) Federal list of endangered/ threatened plants and wildlife is at 50 CFR §§ 17.11 & 17.12 Interagency Cooperation (16 USC 1536) Interagency Cooperation—Endangered Species Act of 1973, as Amended (50 CFR 402)	1973, amended in 1978	Dictates that all federal agencies must protect listed plants and animals and their habitats from harm. Indicates that pesticide formulations and application methods be reviewed by the U.S. Fish and Wildlife Service to determine whether there could be adverse effects.
Endangered Species Protection Bulletins (ESPB)		Bulletins set forth geographically-specific *pesticide use limitations* for the protection of endangered or threatened species and their designated critical habitat.
Federal Food, Drug, and Cosmetic Act (FFDCA), (21 USC 301-399d)	25 Jun 1938, amended in 1951, 1962, 1990, 1994, 1997, 2007	Mandates tolerances and exemptions for pesticide chemical residues in food.
Federal Noxious Weed Act (7 USC 2814) incorporated into the Plant Protection Act	FNWA 1974 PPA 2000	Requires federal agencies to develop and implement noxious weed management programs on federal land. Federal Noxious Weed List
Food Quality Protection Act (FPQA), Section 303 – Integrated Pest Management (Public Law 104-170)	1996, amendment to FIFRA and FDCA	Mandates that federal agencies use IPM techniques in pest management activities and promote IPM through procurement and regulatory policies. Primarily established safety standards for pesticides applied to foods.
Migratory Bird Treaty Act (16 USC 703)	1918, with numerous amendments	Requires permits to take migratory birds.
National Environmental Policy Act (NEPA) (42 USC 4321-4347)	1969	Requires a detailed environmental impact statement for any major federal action that can significantly affect the environment. This may include pest management operations that involve large areas of land, application of chemicals to waterways and aerial application of pesticides.
National Oil and Hazardous Substances Pollutant Contingency Program (40 CFR 300)	15 Sep 1994	Provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

National Pollution Discharge Elimination System (NPDES)—EPA General Permit Covers the following states: MA, ID, NH, NM, DC, and federal facilities in WA, CO, DE, and VT.	31 Oct 2021	Operators that apply pesticides that result in discharges from the following use patterns may have to submit a notice of intent (NOI) and create a Pesticide Management Discharge Plan (PMDP) if they meet certain criteria: (1) mosquito and other flying insect pest control; (2) weed and algae control; (3) animal pest control; and (4) forest canopy pest control
Non-indigenous Aquatic Nuisance Prevention and Control Act (16 USC 4700 et seq.)	1990	Espouses taking preventive management measures nationwide to prevent and control unintentionally introduced non-indigenous aquatic species and prevent further distribution of these species.
OSHA Hazard Communication Standards (29 CFR 1910)	1970	Stipulates the requirements for applicable and adequate training of all employees regarding hazardous substances (including pesticides) and providing access to SDSs for all chemicals.
Recordkeeping on Restricted Use Pesticides by Certified Applicators; Surveys and Reports (7 CFR 110)	9 Apr 1993	Requirements for recordkeeping on restricted use pesticides by all certified applicators, both private applicators and commercial applicators
Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq.) (40 CFR § 260-265)	1976, amended in 1986	Requires proper disposal of waste pesticides and pesticide containers.
Sikes Act Improvement Act (SAIA) (16 USC 670)	31 Dec 2003	Authorizes the Secretary of Defense to develop cooperative plans for conservation and rehabilitation programs on military reservations and modify or improve habitat for endangered species and migratory birds. This includes authorizing the elimination of noxious weeds in efforts to rehabilitate native species.
Standards for Universal Waste Management (40 CFR 273)	11 May 1995	Establishes requirements for managing pesticides
Toxic Chemical Release Reporting: Community Right-to-Know (40 CFR 372)	30 Nov 1994	Requirements for the submission of information relating to the release of toxic chemicals under section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986
Toxic Substances Control Act (TSCA) (15 USC 2601 et seq.)	1976	Requires that new chemicals, including pesticides, be registered and that testing for human health and environmental hazards be performed.

Executive Orders		
Executive Order 13112, Invasive Species	3 Feb 1999	Institutes measures to prevent the introduction of invasive species, provide for their control using environmentally sound techniques, and minimize the economic, ecological, and human health impacts caused by invasive species.
Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds	10 Jan 2001	Federal agencies taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations are directed to develop and implement a Memorandum of Understanding with the Fish and Wildlife Service that promotes the conservation of migratory bird populations.
Executive Order 13693, Planning for Federal Sustainability in the Next Decade	19 Mar 2015	Promotes reducing or minimizing the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of.
Executive Order 13751, Safeguarding the Nation from the Impacts of Invasive Species	5 Dec 2016	Amends EO 13112 and directs actions to continue coordinated Federal prevention and control efforts related to invasive species. Incorporates considerations of human and environmental health, climate change, technological innovation, and other emerging priorities.
Other Codes		
United States Public Health Service (USPHS)/Food and Drug Administration (FDA) Food Code (FDA's Food Code website)	2013	Provides regulations on pest control methods, application of pesticides, removal of dead animal pests from food retail sales establishment, and display of pesticides for retail sale. It also provides food inspection guidelines and inspection forms. This is the primary guideline used by Defense Commissary Agency (DeCA) food inspectors for ensuring food safety in the Commissary.

F.3. Department of Defense

Pest Management		
Title/Reference	**Date**	**Relevant Requirements/Guidance**
DoD Instruction 4150.07, DoD Pest Management Program	29 May 2008	Sets policies, responsibilities, and procedures for implementing an environmentally sound IPM program to control pests and ensure installations develop, maintain, and review their pest management plans.
DoD Directive 4715.1E, Environment, Safety, and Occupational Health (ESOH) http://www.dtic.mil/whs/directives/corres/pdf/471501p.pdf	19 March 2005	Establishes the AFPMB which provides information, guidance, and publications related to pest and pesticide management. Also advocates implementing IPM into DoD acquisition, procurement, maintenance, and repair processes for systems, equipment, facilities, and land.
DoD Directive 5134.01 w/CH-1, Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L))	9 Dec 2005	Establish policies and procedures for the management of DoD installations and environment to support military readiness with regard to
Pesticide Applicator Certification		
DoD 4150.07-M, Volume 1, DoD Pest Management Training: The DoD Plan for the Certification of Pesticide	23 May 2008	Outlines the DoD procedures for pest management training and certification of pesticide applicators.
DoD 4150.07-M, Volume 2, DoD Pest Management Training and Certification Program: The DoD Plan for Non-FIFRA Pesticide Applicators	23 May 2013	Outlines the DoD procedures for pest management training of IPMCs and PMPARs.
DoD 4150.07-M, Volume 3, DoD Pest Management Training and Certification Program: The DoD Plan for FIFRA Pesticide Applicators	23 May 2013	Outlines DoD policy, assigns responsibilities, and provides procedures for the training and certification of DoD pest management personnel in pesticide application
MOUs, MOAs		
DoD /EPA MOU with Respect to IPM	March 1996	Adopts integrated pest management strategies to reduce the potential risks to human health and the environment associated with pesticides.
DoD D/USDA Master MOU	6 Jun 2003	Indicates that these agencies will work together and meet regularly to discuss such mutual interests as pest management, forestry, and wildlife activities.

DoD /USDA MOU—Animal Damage Assessment and Control	15 May 1990	Establishes procedures for planning, scheduling and conducting animal damage control activities exclusive of routine vertebrate pest control operations.

F.4. Navy

DEPARTMENT OF THE NAVY		
Title/Reference	**Date**	**Relevant Requirements/Guidance**
CNICINST 3750.1, Navy Bird and Animal Aircraft Strike Hazard (BASH) Program Implementing Guidance	9 Aug 2017	Establishes policy and procedures for implementing the Commander, Navy Installations Command (CNIC) Bird/Animal Aircraft Strike Hazard (BASH) Program
CNIC-M-BASH, Bird/Animal Aircraft Strike Hazard (BASH) Manual Appendix 1: BASH Self-Assessment Checklist (Annual)	1 Apr 2018	Supports Navy Bird/Animal Aircraft Strike Hazard (BASH) policy, identifies key BASH statutory and regulatory requirements, and provides advisory information for management of a BASH program at Navy airfields. The intent is to support the Navy mission by safeguarding air operations assets and flight crews by decreasing the probability of bird or wildlife strikes with aircraft.
eBusiness Operations Office Instruction (EBUSOPSOFFINST) 4200.1A, Department of Navy Policies and Procedures for the Operation and Management of the Government Commercial Purchase Card Program	2 Sep 2003	Government Purchase Card policy regarding the purchase of pesticides, pesticide application equipment, and pesticide application services
NAVFAC Online Pesticide Reporting System Tutorial		Guide on how to use the online pesticide reporting system
NAVMED P-5010, Manual of Naval Preventive Medicine Chapter 1—Tri-Service Food code	30 Apr 2014	Establishes standardized military food safety standards, criteria, procedures, and roles for the sanitary control and surveillance of food to mitigate risk factors known to cause foodborne illness
NAVMED P-5010, Manual of Naval Preventive Medicine Chapter 8—Navy Entomology and Pest Control Technology	9 Nov 2004	Guidelines and procedures on the prevention, surveillance, and control of medically important pests.
NMCPHC-TM 6260.9A, Occupational and Environmental Medicine Field Operations Manual	Apr 2017	Standardizes medical surveillance and job certification procedures of employees, the management of occupational injuries and illnesses, their reporting and recordkeeping requirements, and training and certification requirements for OEM service providers

NMCPHC-TM OM 6260, Medical Surveillance Procedures Manual and Medical Matrix (Edition 12) https://nmcpeh-simweb.med.navy.mil/Content/medMatrix/MedicalMatrix.pdf	Aug 2015 Revised 16 Nov 2016	Procedures for the systematic assessment of employees exposed or potentially exposed to occupational hazards
OPNAVINST 5090.1D, Environmental Readiness Program	10 Jan 2014	Overarching document implementing OPNAV M-5090.1.
OPNAV M-5090.1, Environmental Readiness Program Manual (Chapter 24—Pesticide Compliance Ashore) http://doni.daps.dla.mil/SECNAV%20Manuals1/5090.1.pdf	10 Jan 2014	Generally requires all pesticide applicators to be DoD- or state-certified. In addition, pest management records must be kept and a pest management plan developed, implemented, and maintained that stresses the importance of IPM.
OPNAVINST 5100.23G, Navy Occupational Safety and Health (NAVOSH) Program http://www.public.navy.mil/navsafecen/Documents/OSH/SafetyOfficer/5100.23G_CH-1_with_updated_links.pdf	11 July 2011	Requires that pest control operations be thoroughly evaluated to identify and quantify potential health hazards.
OPNAVINST 6210.2A, Quarantine Regulations of the Navy	22 Sep 2015	Delineates the Navy and Marine Corps responsibility to prevent the introduction of medically and economically important pests into the United States
OPNAVINST 6250.4C, Pest Management Programs	11 April 2012	The Navy policy that implements DoD's Pest Management Program. Provides policy specific to Navy operations. This includes record keeping, reporting, safety, management of contracted operations, pest management plans, and environmental protection. Provides responsibilities for preventive medicine.
Policy Letter Preventing Feral Cat and Dog Populations on Navy Property	10 Jan 2002	Clarifies the application of policy regarding the prevention of free roaming (also called wild, feral or stray) tat and dog populations on Navy installations
Marine Corps		
MCO 5090.2, Environmental Compliance and Protection Manual Volume 14: Integrated Pest Management	11 Jun 2018	Volume 14 establishes Marine Corps policy and responsibilities for complying with the legal use of pesticides at Marine Corps installations in accordance with the Department of Defense (DoD) pest management specifications outlined in DoD Instruction 4150.07
Unified Facilities Guide Specifications (UFGSs)		

UFGS-31 31 16.13 (USACE / NAVFAC / AFCEC / NASA), Chemical Termite Control	1 Aug 2016	This guide specification covers the requirements for termiticide treatment measures for subterranean termite control.
UFGS-31 31 16.19 (USACE / NAVFAC / AFCEC / NASA), Termite Control Barriers	1 Feb 2016	This guide specification covers the requirements for termite control barrier systems, including meshes and basaltic sand.

F.5. Armed Forces Pest Management Board

Technical Guides (TGs)		
Title/Reference	**Date**	**Relevant Requirements/Guidance**
TG-07: Installation Pesticide Security (CAC Access Only)	Aug 2003	Informs command and staff personnel on military installations about potential security problems related to pest management, including storage and transportation of pesticides (toxic substances), application of pesticides, sale and distribution of pesticides, and public health and agricultural implications
TG-11: Hydrogen Phosphide Fumigation with Aluminum Phosphide	Mar 2013	Provides guidance on hydrogen phosphide fumigation with aluminum phosphide, an effective method of eliminating insects in stored commodities
TG-13: Dispersal of ULV Insecticides by Cold Aerosol and Thermal Fog Ground Application Equipment	Jul 2011	Provides information on DoD policy and current practices for ground application in outdoor situations
TG-14:Personal Protective Equipment for Pest Management Personnel	Apr 2011	Provides supply and other data necessary to request and effectively use pest management protective equipment and contains a methodology that pest management supervisors may use to help determine personal safety equipment requirements
TG-15: Pesticide Spill Prevention and Management	Aug 2009	Basic guidelines for developing plans for pesticide spill prevention, control and cleanup
TG-16: Pesticide Fires—Prevention, Control and Cleanup		Provides guidance to assist installation personnel to deal with fires involving pesticides by presenting general standards of good practice
TG-17: Military Handbook—Design of Pest Management Facilities (CAC Access Only)	Aug 2009	Provides the best available technology for basic design guidance of pest management facilities on military installations
TG-18: Installation Pest Management Program Guide	Mar 2013	Describes the relationship between pest management objectives and the installation's military mission
TG-20: Pest Management Operations in Medical Treatment Facilities	Dec 2012	Assists in the review and conduct of pest management operations in medical treatment facilities (MTFs)

TG-20: Pesticide Disposal Guide for Pest Control Shops	Jul 2002	Guidance on managing hazardous and toxic substances in a manner that will minimizes threats to human health and damage to the environment
TG-22: Guidelines for Testing Experimental Pesticides on DoD Property	Jul 2001	Identifies actions that should, or must, be taken when designing and conducting research with experimental pesticides on Department of Defense (DoD) property
TG-26: Tick-Borne Diseases: Vector Surveillance and Control	Nov 2012	Familiarizes preventive medicine personnel with the various diseases transmitted by ticks and provides surveillance protocols to evaluate current and potential threats of tick-borne diseases at military installations
TG-27: Stored Product Pest Monitoring Methods	Nov 2015	Provides information that DoD personnel can use to establish a stored-product insect monitoring program with an emphasis on pheromone and food attractant traps
TG-29: Integrated Pest Management (IPM) In and Around Buildings	Aug 2009	Presents a sampling of techniques and procedures to illustrate the facilities management approach to pest control
TG-34: Bee Resources Manual with an Emphasis on the Africanized Honey Bee	Nov 2013	Guidance on the biology, medical importance, and control of honey bees with an emphasis on the Africanized honey bee
TG-36: Personal Protective Measures Against Insects and Other Arthropods of Military Significance	6 Nov 2015	Provides force health protection information and guidance to DoD personnel who have contact with arthropods (disease vectors and nuisance insects), or who are responsible for protecting the health of personnel
TG-37: Integrated Pest Management of Stray Animals on Military Installations (CAC Access Only)	25 May 2012	Provides Installation/Garrison commanders with an example of a Stray Animal Control Policy and identifies the responsibilities and resources required to implement this policy
TG-38: Protecting MREs and Other Subsistence During Storage	Nov 2015	Guidance for the protection of Meal, Ready-to- Eat (MRE) Combat Rations owned or under the custody of military installations and forces
TG-39: Guidelines for Preparing DoD Pest Control Contracts Using Integrated Pest Management	Feb 1997	Provides guidance to installation personnel preparing DoD pest control contract specifications. Specification writers should use this TIM as a tool for implementing Integrated Pest Management (IPM) practices and reducing pesticide use.

TG-40: Methods for Trapping and Sampling Small Mammals for Virologic Testing (CAC Access Only)	Mar 2013	Guidance for personnel performing ecologic and epidemiologic studies involving populations of rodents which are potentially infected with hantavirus but can also be used for studying small mammal populations that may harbor an infectious zoonotic agent capable of causing severe disease or death
TG-41: Protection from Rodent-Borne Diseases with an Emphasis on Occupational Exposure to Hantavirus	Dec 2013	Provides guidance on the protection of individuals from rodent-borne diseases
TG-42: Self-Help Integrated Pest Management	Apr 2015	Establishes guidelines and methods for implementing an effective self-help pest management program
TG-44: Bed Bugs—Importance, Biology, and Control Strategies	Mar 2012	Provides general information about the main pest species of bed bugs, including their importance, key aspects of their biology and behavior that can affect control efforts, and strategies and techniques that pest management professionals (PMPs) and others may wish to implement to achieve desired levels of control
TG-45: Storage and Display of Retail Pesticides (CAC Access Only)	Nov 2012	Provides basic information on storage and display of retail pesticides to help ensure the safety of employees and customers, protect the environment, and conserve DoD funds
TG-46: DoD Entomological Operational Risk Assessments (CAC Access Only)	Apr 2011	Provides a basis for performing entomological operational risk assessments for deployed locations in support of force health protection and combat effectiveness
TG-47: *Aedes* Mosquito Vector Control	2 Mar 2016	Consolidates information and procedures for surveillance and control of mosquitoes that transmit Zika, Dengue and Chikungunya viruses

F.6. State

California		
Title/Reference	**Date**	**Relevant Requirements/Guidance**
California Code of Regulations, Title 3. (Food and Agriculture) Division 6. Pesticides and Pest Control Operations		Chapter 1. Pesticide Regulatory Program Chapter 2. Pesticides Chapter 3. Pest Control Operations Chapter 4. Environmental Protection
California Code of Regulations, Title 16. (Professional and Vocational Regulations) Division 19. Structural Pest Control Board		Article 1. General Provisions Article 2. Administration Article 3. Licensing Article 3.5. Continuing Education Article 4. Fumigation and Pesticide Use Article 5. Wood Destroying Organisms Article 6. Enforcement

F.7. Installation

MCB Camp Pendleton		
Title/Reference	**Date**	**Relevant Requirements/Guidance**
Integrated Natural Resources Management Plan	March 2018	Provides information and procedures on the protection of natural resources including the removal of noxious weeds and animal damage prevention. Includes a species list of plants, insects, and animals.
Integrated Cultural Resources Management Plan	September 2017	Provides information and procedures on the protection of cultural resources.
Oil and Hazardous Substances Integrated Contingency Plan	December 2018	Provides contingency response structure, planning and reporting procedures for events such as pesticide spills.

F.8. Special Interest Items

Bird/Wildlife Aircraft Strike Hazard (BASH)		
Title/Reference	**Date**	**Relevant Requirements/Guidance**
Airport Wildlife Population Management, Airport Cooperative Research Program (ACRP) Synthesis 39 (sponsored by FAA)	March 2013	Provides airport managers and biologists with a working reference document that reviews the tools, methods, techniques, procedures, and considerations for reducing aircraft collisions associated with wildlife population control management on airports and in the immediate surrounding areas.
Airport Wildlife Handbook	July 2012	Assess an airport's wildlife hazards and to make recommendations to resolve any wildlife issues
Wildlife at Airports, USDA	Feb 2017	Focused on management efforts to reduce wildlife hazards at airports
Vector-Borne Diseases		
Title/Reference	**Date**	**Relevant Requirements/Guidance**
West Nile Virus Surveillance and Control Guide for U.S. Navy and Marine Corps Installations	2014	Explains the importance of WNV surveillance, describes the steps involved in establishing a surveillance and control program, and provides a threshold when control measures can be carried out, based on observed WNV infection in birds, mosquitoes and humans
Chikungunya Vector Surveillance and Control Plan for U.S. Navy and Marine Corps Installations	Jun 2014	Informs individuals about the disease and provides the knowledge and tools for the surveillance and control of the mosquito species that transmit CHIKV
Navy Installation Zika Action Plan	27 May 2016	Guide Department of the Navy and public health leaders regarding actions to consider in developing Zika action plans for their areas of responsibility
Zika Vector Surveillance and Control Guide for Navy Installations	May 2016	Assists pest management and preventive medicine personnel to prepare for and mitigate the risk of Zika virus transmission by mosquitoes on their installation
Aedes Surveillance and Control Plan for U.S. Navy and Marine Corps Installations	Feb 2016	Provide basic knowledge for the surveillance and control of *Aedes* mosquitos on military installations
Controlling *Aedes aegypti* and *Aedes Albopictus*: Information for Vector Control Programs	31 Mar 2016	CDC factsheet providing basic information about *Aedes* vectors

Surveillance and Control of *Aedes aegypti* and *Aedes albopictus* in the United States	31 Mar 2016	CDC factsheet providing basic information about the surveillance and control of *Aedes* vectors
Invasive Species		
Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species, US Dept of Interior Technical Memorandum No. 86-68220-07-05	Sep 2009	This manual provides guidance for inspecting and cleaning vehicles and equipment to help prevent the spread of noxious invasive species.
National Invasive Species Council Management Plan 2016-2018	11 Jul 2016	Identifies the interdepartmental actions that the Federal government and its partners can take to prevent, eradicate, and control invasive species, as well as recover species and restore habitats and other assets adversely impacted by invasive species.
Pesticide Application		
NebGuide G1773, Spray Drift of Pesticides	Nov 2013	Discusses conditions that cause particle drift and methods to reduce drift potential.
Pollinators		
Title/Reference	**Date**	**Relevant Requirements/Guidance**
Presidential Memorandum – Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators	20 Jun 2014	Develop a National Pollinator Health Strategy, which shall include explicit goals, milestones, and metrics to measure progress
DoD Policy to Use Pollinator-Friendly Management Prescriptions - Memo	5 Sep 2014	Expands DoD policy to use current best management practices, as appropriate, specifically to protect pollinators and their habitats, and establishes policy to coordinate with partners on pollinator issues
Pollinator Friendly Pesticide Applicator Best Management Practices	Oct 2014	NAVFAC guidance on proper pesticide use to avoid harming pollinators and their food sources, water, and habitats
National Strategy to Promote the Health of Honey Bees and Other Pollinators	19 May 2015	Identify and recommend, as appropriate, priority conservation needs for native plants and their habitats, and to coordinate implementation of programs for addressing those needs

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Appendix G. Environmental

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G.1. Sample Pesticide Management Program Environmental Impact Log

Practice	Practice Owner	Aspects	Impacts	Vulnerable Assets
Pesticide storage	Pest control shop supervisor	Potential spill	Degradation of water quality Human exposure to chemicals	Environmental resources Human health and safety
	Pest control shop supervisor	Fire	Risk of human injury due to fire and chemicals Degradation of air quality	Human health and safety Environmental resources
Pesticide transportation	Pesticide applicator / transporter	Potential spill due to container damage	Degradation of water and soil quality Property contamination	Real property Mission Human health and safety Public perception
	Vehicle owner	Air emissions from vehicle	Degradation of air quality	Environmental resources
Pesticide mixing	Pesticide mixer / applicator	Potential spill	Degradation of water and soil quality	Environmental resources
	Pesticide mixer / applicator	Hazardous waste generation	Cost of disposal	Mission
	Pesticide mixer / applicator	Chemical mixing	Exposure to toxic chemicals	Human health and safety
Pesticide application	Pesticide applicator	Potential spill	Degradation of water and soil Exposure to toxic chemicals	Natural resources Human health and safety
	Pesticide applicator	Pesticide drift	Killing of non-target plants and animals	Natural resources
	Pesticide applicator	Stormwater discharge	Degradation of water	Natural resources
	Pesticide applicator	Air emissions from gas powered application equipment	Degradation of air quality	Environmental resources
	Pesticide applicator	Vehicle use for pesticide application	Damage to plants and animal habitats if off road	Natural resources
	Pesticide applicator	Hazardous waste generation	Cost of disposal Exposure to toxic chemicals	Mission Human health and safety
	Pesticide applicator	Chemical usage	Exposure to toxic chemicals	Human health and safety Environmental resources

Practice	Practice Owner	Aspects	Impacts	Vulnerable Assets
Cleaning pesticide application equipment at application site and in pest control shop	Pesticide applicator	Waste water generation	Degradation of water quality Cost of treatment/disposal	Mission
Pesticide container disposal	Pest control shop supervisor	Solid hazardous waste generation	Cost of disposal	Mission
	Pest control shop supervisor	Waste water generation	Degradation of water quality Cost of treatment/disposal	Environmental Resources Mission
Non-chemical control: Mechanical weed removal	Grounds Maintenance workers	Root damage to native plants	Destruction of natural resources	Natural resources
Non-Chemical control: Animal trapping	Pest control operator	Animal relocation	Potential destruction of natural resources	Natural resources
	Pest control operator	Trapped animal	Human or domestic animal injury caused by trapped animal	Human and domestic animal health and safety

G.2. California NPDES Pesticide General Permit for Pesticide Discharges

California has four NPDES pesticide permits Those permits are:

- Aquatic Animal Invasive Species Control

- Spray Applications (restricted to California Department of Food and Agriculture and the U.S. Department of Agriculture Forest Service)

- Vector Control

- Weed Control

Information about the permits, including directions on standard provisions, when to submit a notice of intent, and what to include in a Pesticides Application Plan, can be found on the California State Water Resources Control Board website. The website is: http://www.waterboards.ca.gov/water_issues/programs/npdes/pesticides/

MCB Camp Pendleton received a permit by the State Water Resources Control Board of California to discharge biological and residual pesticides for vector control to the waters of the United States. A copy of the General Permit (number CAG 990004), the Notice of Intent (Water Quality Order 2016-0039-DWQ), and the 2017 Annual Self-Monitoring Report for Vector Control Operations is included in the CD accompanying this plan.

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Appendix H. Medical

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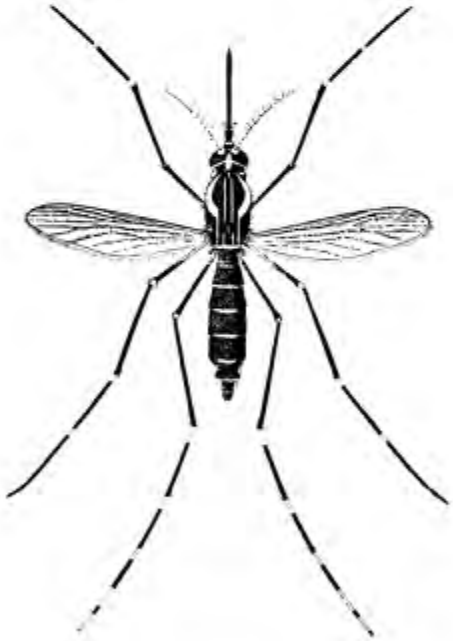
H.1. Emergency Vector-Borne Disease Control Plan for Installation

PREVMED will develop and maintain an emergency plan for vector control during a vector-borne disease outbreak.

Installation

Emergency Vector-Borne

Disease Control Plan



EMERGENCY VECTOR CONTROL PLAN FOR CAMP PENDLETON AND SUPPORTING INSTALLATIONS

Updated November 2019

Ref: (a) DoD Instruction 4150.07
(b) DoD Instruction 4150.07 Volume 2
(c) OPNAVINST 6250.4C, Navy Pest Management Programs
(d) BUMEDINST 6250.12D, Pesticide Applicator Training and Certification for Medical Personnel

Encl: (1) Points of Contact for Emergency Vector Control
(2) Pesticides and Equipment Available for Vector Control
(3) Disease Vector Ecology Profile, California
(4) Vectors Mosquitoes found on or near the Installation
(5) Mosquito-borne Arboviral Disease Risk / Response Matrix
(6) Suggested Disease Indicator or Case Responses for Mosquito-borne Encephalitis
(7) Suggested Disease Indicator or Case Responses for Flea-borne Typhus
(8) Suggested Disease Indicator or Case Responses for Plague
(9) Suggested Disease Indicator or Case Responses for Rabies
(10) Suggested Disease Indicator or Case Responses for Hantavirus
(11) Suggested Vector Management Responses in the Event of a Disaster

Purpose

To develop a plan of action to control vectors and disease hosts to prevent vector-borne or zoonotic disease in the event of a natural or man-made disaster, disease outbreak or other emergency.

Scope

This Plan covers Navy and Marine Corps installations that Naval Hospital Camp Pendleton provides medical support. This includes the following installations and subordinate activities:

- Marine Corps Base Camp Pendleton
  - 1st Marine Expeditionary Force
  - 1st Marine Division
  - 1st Marine Logistics Group
  - 3rd Marine Air Wing
  - School Of Infantry-West
  - Weapons Field Training Battalion-Marine Corps Recruit Depot
  - Assault Unit Craft-5
  - Naval Hospital Camp Pendleton
- Naval Weapons Station Seal Beach
  - Naval Weapons Station Fallbrook
  - Naval Weapons Station Norco
- Naval Base Ventura County
- Marine Corps Air Station Yuma
- Marine Corps Logistics Base Barstow
  - 1st Force Storage Battalion
  - Defense Logistics Agency
  - Production Plant Barstow-Yermo

Responsibility

Per reference (a), the Naval Hospital Camp Pendleton (NHCP) Preventive Medicine Department (PMD), with assistance from Navy Environmental and Preventive Medicine Unit FIVE (NEPMU-5), is responsible for developing the Emergency Vector Control Plan (EVCP). NHCP is responsible for implementing the plan upon the order of the Installation Commanding Officer (ICO).

Background

Areas in San Diego, Orange, San Bernardino, Ventura, and Yuma County provide suitable habitat for many of the vectors and zoonotic hosts of endemic and introduced diseases in California and Arizona. However, based on historical disease occurrence data, the risk of these diseases is generally low in metro areas. Manmade or natural changes in the environment can create habitats that are ideally suited for these disease-carrying organisms. Irrigation of lawns and landscaping can create "micro-habitats" capable of sustaining vector populations. Increased vector populations may also be a consequence of ecological and local public works infrastructure changes due to natural or manmade disasters or emergencies. An increase in vector and host populations may increase the risk of disease transmission.

Emergency Vector Control Planning

In order to implement an EVCP, an emergency must be declared. For the purposes of this plan, an emergency occurs when the risk of human disease transmission increases rapidly and is indicated by one or a combination of the following:

Outbreak of human disease

A single suspected human case of vector-borne or zoonotic disease may be sufficient to be designated as an outbreak due to the rare occurrence of these diseases in San Diego, Orange, San Bernardino, Ventura, and Yuma County. Patient travel history is the primary means for determining where the disease was acquired. If the disease appears to be locally acquired, then, depending on the disease, a vector risk investigation and assessment at the patient's residence, place of employment, or other frequented area should be conducted to determine if disease transmission to others in the area may occur. On military installations this should be done by PMD. If off-base, then the assessment should be conducted by the County Department of Health Services with cooperation of PMD. An emergency situation may exist when it appears that the human case was infected by vectors or exposure to hosts breeding or occurring in or around a residence or facility located on the installation.

Infected animal hosts

Animal hosts infected with zoonotic diseases transmissible to humans are usually detected post-mortem after the sudden death of a domestic, captive or wild animal. Other cases are found by lab diagnosis of a severely ill captive or domestic animal. San Diego and Orange County has an Animal Health Surveillance Group which provides an electronic means of disseminating information on suspicious animal deaths and surveillance information for animal diseases of medical and veterinary importance. This information is disseminated through the California Health Alert Network (CAHAN). The County Vector Control Program also maintains and tests sentinel flocks of chickens regularly from spring through fall for the detection of mosquito-borne encephalitis. They also actively collect wild and commensal rodents and test for rodent-borne human diseases and collect and test dead birds for West Nile Virus (WNV). An emergency situation may occur when investigations indicate that the host is in high density and close proximity to susceptible human hosts to increase the risk of transmission. A situation may also occur when the host is exposed to a large number of vectors that may increase the risk of biting for susceptible humans.

Arthropod vectors of infectious diseases

Infectious vectors are detected though the collection, identification and testing of potential arthropod vectors. County Vector Control Programs collects, identifies, and, depending on the

disease, tests arthropods for pathogens. An emergency is dependent on the vector of concern. Ticks and mites generally do not pose a threat that would initiate an emergency response due to their limited distribution. Mosquitoes, on the other hand, would initiate an emergency response due to their mobility and wide distribution. An emergency may exist when infectious vectors are found in high densities and in close proximity to susceptible humans.

Increased abundance of flying insects

A rapid increase in the number of houseflies after a natural or manmade disaster may pose an increased risk of disease transmission. Houseflies usually accompany a breakdown of sanitation infrastructure and services following a disaster. Enteric diseases can be transmitted and distributed through flies because of exposure to contaminated food and water from damage to the infrastructure, and the accompanying lack of hygiene. .

Disease Vector Ecology Profile, California

Enclosure (3) is the Disease Vector Ecology Profile (DVEP) for California. The document lists vector-borne and zoonotic diseases that have occurred or may occur in California and surrounding States. It provides general information on epidemiology, ecology of the vectors and hosts, and surveillance and control methods. It also provides information and local public health resources with which to determine disease risk and appropriate preventive measures for the installation.

Potential Vectors and Diseases:

San Diego and Orange County Vector Control Program conducts vector surveillance throughout the county. Their program includes vector surveys and disease risk assessments for ticks (Lyme Disease), rodents (plague, hantavirus, and arenavirus), mosquitoes (encephalitis) and other vectors and diseases as required. Current disease risk assessments and surveillance information can be seen at http://www.calsurv.org/.

San Bernadino (http://wp.sbcounty.gov/dph/?s=vector) and Ventura County (https://vcrma.org/vector-control-program) release an Annual Mosquito and Vector Control Program that lists all vector surveillance throughout the county. Yuma County Health Department has information on their Vector Control Program online. (https://www.yumacountyaz.gov/government/health-district/divisions/environmental-health-services/vector-control-mosquito-control-and-prevention)

Based on vector surveillance data the following vectors and/or hosts and the diseases they carry may occur on installations in San Diego, Orange, San Bernardino, Ventura, and Yuma County . Detailed descriptions of the listed diseases are found in enclosure (3).

1. *Culex* Mosquitoes / West Nile Virus. West Nile Virus is the primary mosquito-borne encephalitide in California and can cause serious illness and death in humans. The virus can be vectored by *Culex tarsalis* and *Cx. pipiens quinquefasciatus* mosquitoes that can breed in natural and man-made water sources. Birds that carry the virus can live throughout the installation and the surrounding community. The common raven and crow are found in the County and are a common host of WNV. WNV infections have resulted in thousands of human and equine cases and many fatalities since its introduction to North America in the late 1990s. Potential emergency response actions include increased surveillance for mosquitoes and human cases, area wide pesticide application for adult mosquitoes, implementing personal protective measures including distribution of repellents, and education of the public on mosquito bite avoidance.
2. Invasive *Aedes* Mosquitoes / Zika, Dengue, and Chikungunya viruses. The recent introduction of *Aedes aegypti*, *Ae. albopictus*, and *Ae. notoscriptus* into California has resulted in the potential introduction of and local transmission of diseases normally found in tropical areas of the world. These include Zika, dengue, and chikungunya viruses. Unlike the vectors of West Nile virus, these mosquitoes breed in containers, have very short flight ranges, and bite during the daytime. This makes surveillance and control of

these mosquitoes much different than for *Culex* mosquitoes. Because its close proximity to and frequent travel to and from Mexico there is an increased risk of introduction of these viruses and the climate and abundance of habitats will sustain the spread and establishment of invasive Aedes mosquitoes. Potential emergency response actions include increased surveillance for mosquitoes and human cases, targeted pesticide application for adult mosquitoes in and around buildings, implementing personal protective measures including distribution of repellents, and education of the public on preventing mosquito breeding in containers and mosquito bite avoidance.

3. Mice / Hantavirus Cardiopulmonary Syndrome (HCS). HCS is a serious respiratory disease that is fatal in about 40% of persons infected with the virus. Deer mice, *Peromyscus maniculatus*, which can be found on in rural areas of the County and on the installation, carry the virus. The virus is transmitted through the inhalation of dried mouse feces, urine and other excreta. Deer mice can occur in very large numbers when an abundance of food and water are available and, when allowed access, will readily enter buildings. Emergency response actions include may include increased hantavirus host and human case surveillance, indoor and outdoor mouse control if population density is high, implementation of sanitation and exclusionary measures to prevent entry of mice into buildings, extensive clean-up of rodent droppings, and education of the public on personal protective measures and recognition of disease symptoms.
4. Fleas, ground squirrels and commensal rats / Plague. The risk of plague in urban and suburban areas of southern California is low due to lack of historical plague transmission in the area and minimal exposure of personnel to rodent hosts and vectors. In the western U.S. plague most frequently occurs in rural or campestral settings. The primary hosts are ground squirrels. Transmission occurs through squirrel flea (*Oropsylla montana*) bite, contact with infected rodents, or pneumonic transmission from infected felines. The Oriental Rat Flea, *Xenopsylla cheopis*, is found on commensal rodents and has been the primary vector of urban plague in the 1800s and early 1900s in California. Emergency response may include increased surveillance for vectors, hosts and human cases; flea control on animal hosts and in burrows; restricting personnel from entering areas of increased plague risk; education of the public on personal protection; and avoidance and recognition of disease symptoms.
5. Mammals / Rabies. Rabies is a fatal human viral disease that is carried by wild animals, particularly canids (dogs), felids (cats), raccoons and bats, all of which may be found in and around the installation.
6. Fleas / Typhus: Flea-borne typhus has been detected in southern California. Fleas found on cats, dogs, raccoons, and opossums can carry the bacterium that causes typhus in humans. Outbreaks of typhus have occurred in suburban areas of Los Angeles, Orange, and San Diego County. The cat flea (*Ctenocephalides felis*) is the primary vector.
7. Filth Flies / Foodborne Gastrointestinal Diseases. Filth flies are ubiquitous after most natural disasters and are potential carriers of bacteria and other microorganisms that can contaminate food and cause gastrointestinal illness.

Potential Disasters / Emergencies

1. Flooding. Flooding due to heavy rains may occur. Mosquito breeding may begin several days to a week after floodwaters have receded.

2. Storm Surges. Storm Surges may cause flooding and the production of mosquito breeding sites. Flooding may also prevent access by pest controllers to breeding areas for treatment. Winds may cause structural damage resulting in the disruption of sanitation services. Consequently, filth fly, rodent, and cockroach populations may expand. Organic debris, generated from a storm, may provide excellent breeding sites for flies and other nuisance pests.

3. Wildfires. The main public health concern is the breakdown of infrastructure. Evacuation of homes may require establishment of temporary shelters under primitive conditions

increasing exposure to vectors. Fires may also drive wildlife into urban and suburban areas.

4. Disease Outbreak. A disease outbreak will first be identified in a local medical treatment facility and be reported to the local public health agencies. A disease alert will be sent out to the community and appropriate control measures will be initiated.

Emergency Vector Control Measures

When a disease of concern is reported in patients residing on the installation, immediate control and reduction of the animals that carry the disease are necessary. The following control measures are necessary depending on the disease:

1. Adult mosquito and fly control involving area-wide spraying of an insecticide using a vehicle-mounted mist generator (fogger, ULV) or hand-held mist generator for applications immediately around buildings.

2. Adult mosquito and fly control involving application of residual insecticides (i.e. emulsifiable concentrates and wettable powders) to resting sites.

3. Mosquito control in aquatic breeding sites using larvicides.

4. Rodent reduction using traps and/or rodenticides. Personal respiratory protection of persons entering buildings that are infested with rodents and exclusion of rodents from buildings.

5. Killing of and removal of carcasses of animals that may carry rabies.

6. Control of disease-carrying ectoparasites such as fleas, especially before rodent control and removal.

Resources

Human Disease Surveillance and Investigation

NEPMU FIVE maintains in-house disease surveillance capabilities including epidemiologists, infectious disease specialists, and environmental health specialists. NHCP and its satellite clinics provide the first line of detection for infectious diseases in the military, dependent and military retiree population throughout San Diego, Orange, San Bernardino, Ventura, and Yuma County. NHCP is also linked to civilian MTFs through the San Diego and Orange County emergency management network via California Health Alert Network (CAHAN) and the National Disaster Medical System (NDMS). Routine laboratory diagnostics are available at the Medical Center and advanced diagnostics are available through the County's Public Health Laboratory. Outbreak investigations are conducted by PMD with support from NEPMU FIVE.

Vector-borne and Zoonotic Disease Surveillance

The PMD is staffed with preventive medicine technicians (PMT) trained in vector and vector-borne disease surveillance. However, currently the resources to conduct extensive surveillance, such as vector trapping, are limited. San Diego, Orange, San Bernardino, Ventura, and Yuma County Departments of Public Health Vector Control Program conduct extensive surveillance and can provide surveillance data to the PMD. NEPMU FIVE has extensive surveillance capabilities and can be requested to conduct vector-borne and zoonotic disease risk assessments.

Vector Control

Public Works Facility management Department is the primary vector control provider for all installations. They are serviced by the Base Operating Support pest control contractor. The providers have the equipment, pesticides and personnel to conduct emergency vector control operations. NHCP's PMD PMTs are certified in public health pest control and can provide

additional support if necessary. Preventive Medicine Officers (PMO) and Environmental Health Officers (EHO) are available to coordinate public health efforts in emergencies. Additional vector control support, including personnel and technical expertise, is available from NEPMU FIVE, Local government agencies San Diego, Orange, San Bernardino, Ventura, and Yuma County and the State of California and Arizona, will also be available to respond to health threats that affect the entire community.

Emergency Coordination

The ICO is responsible for installation emergency response and coordination and will implement through the installation emergency manager. The NHCP Public Health Emergency Officer (PHEO) will coordinate public health efforts in emergencies.

Action

Pre-Emergency Preparations

1. PMD and pest control personnel should be familiar with vector-borne and zoonotic disease risk in the local area. To receive the necessary training and receive the most up-to-date information and training NEPMU-5 is the main resource to obtain this.

2. The PMD shall establish liaison with the local public health and vector control agencies with regard to preventing, reporting, and control of vector-borne and zoonotic diseases. This will include vector surveillance and disease occurrence information. If available, PMD should obtain training from these agencies on surveillance and control methods applicable to the local area.

3. PMD shall maintain communications with Emergency Medicine, the laboratory, and other appropriate clinical and ancillary support staff in order to obtain human surveillance information.

4. The installation pest management service provider (PMSP) shall determine whether sufficient equipment and pesticide quantities are available for vector control operations or whether additional support will be needed. Procure any necessary equipment. To avoid purchasing and storing large quantities of contingency pesticides, they should identify a source for the purchase of pesticides that can be delivered within 24 hours.

5. All DoD pesticide applicators, including DoD pest controllers and PMTs, will maintain DoD pesticide applicator certification in Category 8, Public Health and contractor applicators State license / certification in the appropriate categories (generally Category K for public health pests).

6. The PMD shall identify installation points of contact that will be needed to execute disease prevention and control operations in the event of an emergency and include in Enclosure (1).

Emergency Response Procedures

1. After the occurrence of the disaster or emergency that threatens public health, the ICO will initiate emergency response along with the emergency manager and PHEO. PMD may be tasked to initiate preventive measures in accordance with this Plan to prevent or control human disease outbreaks.

2. PMD shall coordinate prevention and control efforts with other installation departments including the security, public affairs, safety, public works and environmental as necessary.

3. PMD staff will provide disease specific information to the clinical staff to enable identification of human disease cases. The staff may contact NEPMU-5 for support if necessary.

4. If the disease involves domestic animals as well, then PMD should consult the U.S. Army Veterinary Services, Southwest.

5. NHCP shall submit a Medical Event Report (MER) via the Disease Reporting System Internet (DRSi) if a civilian, dependent, or military member is diagnosed with a vector-borne disease. For DRSi procedures, go to http://www.med.navy.mil/sites/nmcphc/program-and-policy-support/drsi/Pages/default.aspx. NHCP shall also coordinate reporting with the local health department.

6. The PMSP shall conduct appropriate vector control operations, as needed, to prevent disease transmission. If the emergency extends outside the installation, then operations should be coordinated with the County Vector Control Program. If additional vector control personnel are required, the PMSP should request PMTs certified in DOD Category 8 Pest from the MTF. Suggested disease indicators or case responses for potential zoonotic or vector-borne diseases are included in enclosures (5) and (6). Responses for disasters are found in enclosure (7).

7. The Medical Department will request support from the Navy and Marine Corps Public Health Center (NMPHC) if a contingency vector surveillance and control team is needed.

Post-Emergency Procedures

PMD shall prepare an after-action report to be sent to the NMCPHC containing the following information:

1. Diagnosis and summary of human disease cases

2. Implicated vector and contributing environmental factors

3. Survey and surveillance methods used and data identifying breeding sites and target locations for control operations

4. Preventive and control methods used including effectiveness of those methods

5. Names and agencies of personnel involved

6. Lessons learned and recommendations.

Points of Contact for Emergency Vector Control

NHCP Officer of the Day		(760) 725-1288
NHCP Public Affairs Officer		(760) 725-1271
NHCP Public Health Emergency Officer		(760) 719-3149
NHCP Preventive Medicine Department Head		(760) 725-1270
Public Works FMD Pest Control Shop Supervisor		(760) 846-3291
MCB Camp Pendleton IPM Coordinator	Mr. Gabriel Goodman	(760)725-9757
NBVC IPM Coordinator	Ms.Valerie Vartanian	(805) 989-4740
MCAS Yuma IPM Coordinator	Mr.Gilberto Guzman	(928)-269-2497
MCB Barstow IPM Coordinator	Mr. Jacob Taney Mr. Peter Barela	(760)-577-6230 (760)-577-6544
NEPMU-5	Fleet Support Officer	(619) 556-7070
Navy Marine Corps Public Health Center	Fleet Support Officer	(757)-953-0756
U.S. Army Regional Veterinary Services		(760) 725-4200
Naval Facilities Engineering Command Southwest Regional Pest Management Consultant	Mr. Michael Medina	(619) 532-1157
San Diego County Department of Public Health Vector Control	Mr. Chris Conlon	(858) 694-2603
Naval Facilities Engineering Command Atlantic Regional Pest Management Consultant	Ms. Sabra Scheffel	(757)322-4320

Pesticides and Equipment Available for Vector Control

(Provided by pest management service provider)

PUBLIC HEALTH PESTICIDES

Pesticide Common Name	Active Ingredient	Use / Location
Demand products	Lambda-cyhalothrin	Outdoor crawling arthropod and residual flying insect control
Demon WP	Cypermethrin	Residual flying insect control
Eaton's Bait Block Rodenticide	Diphacinone	Rodent control
Fastrac All Weather Blocs	Bromethalin	Rodent control
Fastrac Place Pacs	Bromethalin	Rodent control
Tempo 20 WP	Cyfluthrin	Crawling arthropod and residual flying insect control
ULD GP-300	Pyrethrin	Space spray for flying insects
Wilco Ground Squirrel Bait	Diphacinone	Rodent (Ground squirrels)
Talon-G-Pellets	Broifacoum	Rodent (Ground squirrels/rats)
Fumitoxin Tablets	Aluminum Phosphide	Rodent (Ground squirrels)
CB-80 Extra	Pyrethrin/piperonyl butoxide	Rodents (Mice)
Archer IGR	Pyriproxyfen	Rodents (mice)
Onslaught	(S)-cyano (3-phenoxyphenyl) methyl-(S)-4-chloro-alpha-(1-methylethyl) benzenacetate	Rodents (mice)
CONTRAC All Weather Blox	Bromadiolone	Rodents (mice/rats)
TALSTAR GRANULAR Insecticide	Bifenthrin	Rodents (mice)
Vectomax FG	Bacillus sphaericus / Bacillus thuringiensis subsp. israelensi	Mosquitoes – laval/pupal
Vectorbac G Biological Larvicide Granules	Bacillus Thringiensis	Mosquitoes – laval/pupal
Martin's Gopher Bait 50	Strychnine Alkaloid	Rodents (rats)

PUBLIC HEALTH PESTICIDES

Pesticide Common Name	Active Ingredient	Use / Location
Kaput Doom	Bromadiolone	Rodents (rats)
Speed Zone	2,4-D / Dicamba / Mecoprop-p acid / Carfentrazone-ethyl	Rodents (Squirrels)

VECTOR CONTROL EQUIPMENT

Equipment	Use	Location
2 back sprayers	Treat uniforms	NBVC
55 gal sprayers	Treat uniforms	NBVC

Disease Vector Ecology Profile, California

Vector Mosquitoes found on or near the Installation

SPECIES	LARVAL HABITAT	BITING TIME	FLIGHT RANGE	DISEASE CARRIED
Aedes aegypti	AC	D, C	500 ft	CF, DF, YF, ZV
Culex quinquefasciatus	AC, SCB, GRP	C, N	1/4−1/2 mi	WNV
Culex tarsalis	WP, GRP, DD	C, N	1−2 mi	SLE, WNV
Anopheles hermsi	LM, P, FS	N	1/4−5 mi	M

KEY TO HABITATS
AC−Artificial Containers
DD−Drainage Ditches
FS−Freshwater Swamps
FW−Floodwaters
WP−Woodland Pools
GP−Grassland Pools
GRP−Ground Pools

KEY TO HABITATS
LM−Lake Margins
RE−Rooted Emerged Vegetation
SCB−Sewage Catch Basins
SM−Salt Marshes
TH−Tree Holes
TRP−Temporary Rain Pools
P−Ponds

KEY TO DISEASES
CF- Chikungunya Fever
DF- Dengue Fever
EEE−Eastern Equine Encephalitis
M- Malaria
SLE- St Louis Encephalitis
WNV−West Nile Virus
YF−Yellow Fever
ZV- Zika Virus

KEY TO BITING TIMES
C−Crepuscular (dawn and dusk)
D−Day
N−Night

The data is derived from the Center of Disease Control.

Mosquito-borne Arboviral Disease Risk/Response Matrix

Definitions and stepwise response for risk categories for mosquito-borne arboviral disease outbreaks in the United States. Risk categories are tentative and approximate. Local and regional characteristics may alter the risk level at which specific actions must be taken.

Category	Probability of outbreak	Definition	Recommended response
0	Negligible or none	Off-season; adult vectors inactive; climate unsuitable	None required; may pursue source reduction and public education activities
1	Remote	Spring, summer, or fall; adult vectors active but not abundant; ambient temperature not satisfactory for viral development in vectors	Source reduction; use larvicides at specific sources identified by entomologic survey; maintain vector and virus surveillance
2	Possible	Focal abundance of adult vectors; temperature adequate for extrinsic incubation; seroconversion in sentinel hosts	Response from category 1 plus: Increase larvicide use in/near urban areas; initiate selective adulticide use; increase vector and virus surveillance
3	Probable	Abundant adult vectors in most areas; multiple virus isolations from enzootic hosts or a confirmed human or equine case; optimal conditions for extrinsic incubation and vector survival; these phenomena occur early in the “normal” season for viral activity	**Implement emergency vector control plan**: Response in category 2 plus: Adulticiding in high risk areas; expand public information program (use of repellents, personal protection, avoidance of high vector contact areas); initiate hospital surveillance for human cases
4	Outbreak in progress	Multiple confirmed cases in humans	**Continue with emergency vector control plan**: Concentrate available resources on strong adulticiding effort over areas at risk; hold daily public information briefings on status of epidemic; continue emphasis on personal protective measures; maintain surveillance of vector/virus activity, human cases

Adapted from CDC Guidelines for Arbovirus Surveillance Programs in the United States, April 1993

Suggested Disease Indicator or Case Responses for Mosquito-borne Encephalitis

Finding	Action to Take	Who to Contact
Bird positive for arboviral encephalitis (or mosquito pool, or sentinel flock)	• Expand dead bird surveillance. • Review mosquito vector information and provide information to IPMCs, pest control providers, and natural resources managers. • Initiate larval and adult surveillance in key areas. • Initiate larval and adult control in key areas if necessary. • Release bite prevention message to public. • Provide arboviral encephalitis clinical information to health care providers. • Conduct active case surveillance.	• NEPMU-5, local health agency, health care providers, installation pest management personnel, PAO
Horse case of arboviral encephalitis	• Notify U.S. Army Veterinary Service • Conduct active human case surveillance. • Release prevention message to public. • Initiate larval and adult control.	• NEPMU-5, USA Veterinary Service, local health agency, health care providers, installation pest management personnel, PAO
Human case of arboviral encephalitis	• Contact public affairs officer regarding release of information. • Conduct active case surveillance. • Initiate epidemiological and entomological investigation. • Initiate adult mosquito control and then larval control.	• NEPMU-5, local health agency, health care providers, installation pest management personnel, installation or regional commander, PAO
New mosquito vector species identified	• Expand mosquito surveillance to determine distribution. • Provide public information/education on habitat reduction and bite prevention.	• NEPMU-5, local health agency, installation pest management personnel

Adapted from Washington State Mosquito borne Disease Response Plan, November 2002; Washington State Department of Health

Suggested Disease Indicator or Case Responses for Flea-borne Typhus

Finding	Action to Take	Who to Contact
Human case of typhus	• Contact public affairs officer regarding release of information. • Conduct active case surveillance. • Initiate epidemiological and entomological investigation. • Distribute information on flea and rodent prevention and exclusion of feral animals such as opposums. • Initiate rodent and feral animal control.	• NEPMU-5, DOH, local health agency, health care providers, installation DoD pest management personnel, installation or regional commander, PAO

Adapted from Washington State Mosquito borne Disease Response Plan, November 2002; Washington State Department of Health

Suggested Disease Indicator or Case Responses for Plague

Finding	Action to Take	Who to Contact
Rodent die-off	• Collect and submit dead rodent(s) for plague testing. • Assess risk of possible plague transmission to humans and pets. • Restrict access to area if human risk is high and test results are unknown. • Notify U.S. Army Veterinary Service regarding potential plague transmission to pets in area. • Conduct flea control if necessary.	• NEPMU-5, USA Veterinary Service, local health agency, installation DoD pest management personnel
Positive plague serology for rodent or carnivore (through active surveillance program)	• Notify U.S. Army Veterinary Service regarding potential plague transmission to pets in area. • Test fleas collected from rodents for plague. • Initiate rodent and flea surveillance in home range of seropositive carnivore. • Conduct disease risk assessment in areas where seropositive animals are found. • Restrict entry into high-risk areas. • Begin flea control in high-risk areas. • Post warning signs and distribute plague prevention information. • Contact public affairs officer regarding release of information.	• NEPMU-5, USA Veterinary Service, local health agency, health care providers, installation DoD pest management personnel, PAO
Pet diagnosed with plague	• Notify U.S. Army Veterinary Service. • Contact public affairs officer regarding release of information. • Conduct active human case surveillance and follow-up on potential human and other animal contacts. • Coordinate prophylactic measures with local health department. • Conduct epidemiological and entomological investigation at residence of pet. • Conduct flea and rodent control in area if necessary.	• NEPMU-5, USA Veterinary Service, local health agency, health care providers, installation DoD pest management personnel, PAO
Human case of plague	• Contact public affairs officer regarding release of information. • Conduct active case surveillance and follow-up on potential human contacts.	• NEPMU-5, USA Veterinary Service, DOH, local health agency, health care providers, installation DoD pest management personnel, installation or regional commander, PAO

Finding	Action to Take	Who to Contact
	• Conduct epidemiological and entomological investigation at potential area(s) of suspected transmission. • Conduct flea and rodent control in area if necessary	

Adapted from Washington State Mosquito borne Disease Response Plan, November 2002; Washington State Department of Health

Suggested Disease Indicator or Case Responses for Rabies

Finding	Action to Take	Who to Contact
Rabid animal identified	• Notify U.S. Army Veterinary Service • Investigate human and animal contacts and coordinate with health care providers regarding prophylactic measures. • Release prevention message to public. • Assess risk to humans and animals. • Increase animal control measures. • Contact public affairs officer regarding release of information.	• NEPMU-5, USA Veterinary Service, local health agency, health care providers, installation pest management personnel, animal control personnel, installation or regional commander, PAO
Human case of rabies	• Contact public affairs officer regarding release of information. • Conduct active case surveillance. • Initiate epidemiological investigation. • Identify animal(s) that may have resulted in infection. • Increase animal control measures.	• NEPMU-5, local health agency, health care providers, installation pest management personnel, installation or regional commander, PAO

Adapted from Washington State Mosquito borne Disease Response Plan, November 2002; Washington State Department of Health

Suggested Disease Indicator or Case Responses for Hantavirus

Finding	Action to Take	Who to Contact
Positive rodent hantavirus serology (through routine surveillance)	• Conduct disease risk assessment in areas where seropositive animals are found. • Restrict entry into high-risk areas. • Initiate or increase rodent control and exclusion operations. • Initiate clean-up of rodent waste in buildings where risk for transmission may be high. • Distribute hantavirus clinical information to health care providers and prevention information to the public. • Contact public affairs officer regarding release of information.	• NEPMU-5, local health agency, health care providers, installation DoD pest management personnel, PAO
Human case of Hantavirus Pulmonary Syndrome	• Contact public affairs officer regarding release of information. • Conduct active case surveillance. • Conduct epidemiological investigation at potential area(s) of suspected transmission. • Conduct rodent control and exclusion in area if necessary	• NEPMU-5, USA Veterinary Service, DOH, local health agency, health care providers, installation DoD pest management personnel, installation or regional commander, PAO

Adapted from Washington State Mosquito borne Disease Response Plan, November 2002; Washington State Department of Health

Suggested Vector Management Responses in the Event of a Disaster

Disaster Event	Action to Take	Who to Contact
Storms/Hurricanes	• Identify potential areas of increased vector abundance. • Assess disease risks to humans. • For displaced persons that are berthed in tents, conduct vector assessments around those areas. • Initiate vector surveillance and control if necessary. • Implement personal protective measures (i.e. mosquito nets, insect repellent) if necessary.	• NEPMU-5, local health agency, installation pest management personnel
Flood	• Identify potential areas of increased vector abundance. • Assess disease risks to humans. • For displaced persons that are berthed in tents, conduct vector assessments around those areas. • Initiate vector surveillance and control, especially for mosquitoes, if necessary. • Implement personal protective measures (i.e. mosquito nets, insect repellent) if necessary.	• NEPMU-5, local health agency, installation pest management personnel

Adapted from Washington State Mosquito borne Disease Response Plan, November 2002; Washington State Department of Health

Suggested Disease Indicator or Case Responses for Zika Virus

Finding	Action to Take	Who to Contact
Human case of Zika Virus	• Contact public affairs officer regarding release of information. • Increase active surveillance in high population areas Larval surveillance to identify presence of breeding population and identify areas for source reduction. • Collected samples will be submitted at least weekly for testing. • Initiate epidemiological and entomological investigation. • Distribute information on mosquito prevention. • IPM will initiate source reduction, physical control, adult & larval control, and other appropriate control measures to reduce breeding habitat and feeding opportunities	• NEPMU-5, DOH, local health agency, health care providers, installation DoD pest management personnel, installation or regional commander, PAO

Adapted from Armed Forces Pest Management Board, Strategy for control of Zika Virus Transmitting Mosquitos on Military Installations and Housing Areas

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Appendix I. Glossary

Acaricide. An agent used to kill mites and ticks.

Applied Biology Program. A network of NAVFAC Pest Management Consultants (PMCs) in the Environmental Business Line that assist Navy and Marine Corps installations with FIFRA and Final Governing Standards-based compliance and provide Integrated Pest Management solutions that protect operations, war-fighters, quality of life, property, materiel and the environment from the adverse effects of living organisms.

Arachnid. An arthropod that has eight legs and two body segments in the adult stage.

Arthropod. Invertebrate animals (insects, arachnids and crustaceans) that have jointed appendages and a segmented body.

Avicide. An agent used to kill or repel birds.

Broad spectrum. A classification of pesticide that will kill a wide range of pests.

Broadcast application. The application of a pesticide to a wide area.

Crack and crevice treatment. Application of a pesticide to cracks and crevices where pests are known to live, feed, and/or breed.

DoD-certified pesticide applicator. Military or civilian personnel certified per the "DoD Plan for Certification of Pesticide Applicators" in the pest management categories that are appropriate for their type of work.

Drift. The movement of a pesticide through air, ground, or water out of the control target area.

Exclusion. A pest control method that prevents the entry of a pest into an area to be protected from the pest.

Functional area. Installation personnel, agencies, departments, contractors and facilities that use or store pesticides, conduct pest management operations, provide for safety or security of pest control operations, or have the responsibility of preventing pests.

Fungicide. An agent used to destroy or inhibit growth of fungi.

Herbicide. An agent used to destroy or inhibit plant growth.

Insecticide. An agent used to destroy insects.

Integrated pest management (IPM). A planned program incorporating education, continuous monitoring, record keeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, materiel, or the environment. IPM uses targeted, sustainable (effective, economical, environmentally sound) methods including habitat modification; biological, genetic, cultural, mechanical, physical, and regulatory controls; and, when necessary, the judicious use of least-hazardous pesticides.

Integrated pest management coordinator. The individual officially designated by the installation commander to coordinate and oversee the installation pest management program and installation IPM plan. IPM coordinators must be certified as pesticide applicators if their job responsibilities require them to apply or supervise the use of pesticides.

Integrated Pest Management Plan. A detailed document for the design, implementation, and maintenance of all pest management and pesticide storage and use on an installation or group of installations.

Invasive species. A species of animal, plant or organism that is not native to a geographic area and can potentially cause harm to native organisms and their habitats.

Leach. The movement of a pesticide through soil.

Molluscicide. An agent used to kill snails.

Noxious or invasive weed. A weed that, if introduced, into a habitat can cause damage or injury to other organisms in that habitat. They may cause deprivation of water to other plants, physical injury to animals, or increased risk for wild fire.

Personal relief. Pest management control efforts made by DoD personnel or their family members at their own expense for control of pests consistent with DoD and Navy policy.

Pest. Any organism (except for microorganisms that cause human or animal diseases) that adversely affects operations, preparedness, the well-being of humans or animals, real property, materiel, equipment or vegetation, or is otherwise undesirable.

Pest management performance assessment representatives (PMPARs). Installation personnel trained in contract performance assessment and pest management, whose duties include surveillance of commercial pest management services to ensure that the performance complies with contract specifications and legal requirements. [Formerly known as Pest Control Quality Assurance Evaluators (PCQAE).]

Pest management. The prevention and control of disease vectors and pest that may adversely affect the DoD mission or military operations; the health and well-being of people; or structures, materiel, or property.

Pesticide. Any substance or mixture of substances registered by EPA under FIFRA, intended to destroy, repel, or mitigate pests. Includes, insecticides, rodenticides, herbicides, fungicides, plant regulators, defoliants, desiccants, disinfectants, antifouling paints and biocides (such as water treatment chemicals). NAVFAC PPMCs do not approve disinfectants or biocides.

Pesticide applicator. Any individual who applies pesticides.

Pesticide cancelation. An action by EPA that may limit the use of a pesticide. EPA often issues instructions with the pesticide cancelations providing information on the disposition of canceled pesticides.

Pesticide facility. The building and areas designated for handling and storing pesticides.

Pre-treatment. A termiticide applied to the soil during the construction of a new building or addition.

Professional pest management consultant. Degreed technical specialists, such as NAVFAC civilian entomologists (Applied Biologist) and BUMED commissioned medical entomologists, who have command program oversight responsibilities and provides guidance and information on the management of pest management programs for commands and installations.

Registered pesticide. A pesticide registered by the EPA for sale and use within the United States.

Residual pesticide. The application of a pesticide that will remain effective on to the surface to which it is applied for a long period of time.

Rodenticide. An agent used to destroy rodents.

Safety Data Sheet. A document (OSHA form 174, or equivalent) that accompanies a pesticide product, providing the handler with chemical information on ingredients, handling instructions, potential hazards, and manufacturer address and emergency contact information.

Space spray. The application of a pesticide as a fine airborne mist to kill flying insects. This includes ultra-low volume application and fogging.

Stakeholder. A person, agency, organization, or department that has an interest in the installation's pest management program.

State-certified commercial pesticide applicators. Personnel certified in accordance with FIFRA by a State (in which the work will be performed) with an EPA-approved certification plan and certified in the category in which a pesticide will be applied.

Subsistence. Stored food items.

Surveillance. The use of surveys over a period of time to monitor the increase and decrease of pest populations over time. Often used as a means of "early warning" of increase in pests or risk of disease and as a means of determining efficacy of pest management operations.

Survey. Observing, collecting, quantifying, identifying and analyzing a pest population.

Ultra-low volume (ULV). A method of applying a pesticide as a space spray. This method involves applying fine droplets of concentrated pesticide.

Uncertified pesticide applicators. Individuals who have not successfully completed certification training. Uncertified military and DoD civilian personnel who are in training to become certified pesticide applicators may apply pesticides when under the direct line-of-sight supervision of a DoD-certified pesticide applicator. Uncertified personnel may apply self-help or personal relief pesticides when the operation has been approved by a command pest management consultant.

Vector/Disease Vector. Any animal capable of transmitting the causative agent of human disease; serving as an intermediate or reservoir host of a pathogenic organism; or producing human discomfort or injury, including (but not limited to) mosquitoes, flies, other insects, ticks, mites, snails, and rodents. It is recognized that certain disease vectors are predominantly economic pests that as conditions change may require management or control as a disease vector.

Vector-borne disease. A disease transmitted by a vector.

Zoonosis. A disease that normally occurs in animals that can be transmitted to humans.

Appendix J. List of Acronyms & Abbreviations

AFPMB	Armed Forces Pest Management Board
AHB	Africanized Honey Bee
APHIS	Animal and Plant Health Inspection Service
AUL	authorized use list
Bti	*Bacillus thuringiensis israelensis*
BUMED	Navy Bureau of Medicine and Surgery
CAMA	calcium acid methanearsonate
CFR	Code of Federal Regulations
CO	commanding officer
COR	contracting officer representative
CNIC	Commander, Navy Installations Command
CRM	cultural resources manager
CWP	Contractor Work Plan
DoD	Department of Defense
DoDI	Department of Defense instruction
DON	Department of the Navy
DSMA	disodium methanearsonate
E	endangered
EA	environmental assessment
EEE	Eastern Equine Encephalitis
EHS	extremely hazardous substance
EMS	Environmental Management System
EO	executive order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EVDCP	Emergency Vector-borne Disease Control Plan
FAP	Functional Assessment Plan
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FSC/BOS	Facilities Support Contract/Base Operation Support

GRX	GeoReadiness Explorer
IAP	Internal Assessment Plan
ICRMP	Integrated Cultural Resources Management Plan
IH	industrial hygiene
INRMP	Integrated Natural Resources Management Plan
IPM	integrated pest management
IPMC	integrated pest management coordinator
IPMP	Integrated Pest Management Plan
KO	contracting officer
LEPC	Local Emergency Planning Committee
MCCS	Marine Corps Community Services
MCO	Marine Corps Order
MCX	Marine Corps Exchange
MoM	measure of merit
MRE	meal, ready to eat
MSMA	monosodium methanearsonate
MWR	morale, welfare, & recreation
NAVMED	Navy Medical (Command)
NAFI	Non-Appropriated Fund Instrumentality
NAVSUBASE	naval submarine base
NECE	Navy Entomology Center of Excellence
NEPMU	Navy Environmental and Preventive Medicine Unit
NEX	Navy Exchange
NISH	National Institute of Severely Handicapped
NMCI	Navy and Marine Corps Intranet
NMCPHC	Navy and Marine Corps Public Health Center
NPDES	National Pollutant Discharge Elimination System
NOPRS	NAVFAC Online Pesticide Reporting System
NOSC	naval operational support center
OPNAVINST	Chief of Naval Operations instruction
OPNAV M	Chief of Naval Operations manual
ORM	operational risk management
OSHA	Occupational Safety and Health Administration
PAI	pounds of active ingredient

PMPAR	Pest Management Performance Assessment Representative
PMRS	Pest Management Record Spreadsheet
PMSP	Pest Management Service Provider
PMT	preventive medicine technician
POC	point of contact
PPE	personal protective equipment
PPMC	professional pest management consultant
PPV	public-private venture
RTU	ready-to-use
SDS	safety data sheet
SERC	state emergency response commission
SPAR	supervisory performance assessment representative
SPCCP	Spill Prevention, Control, and Countermeasures Plan
sq ft	square feet
T	threatened
TG	technical guide
T&ES	threatened and endangered species
UFGS	Unified Facilities Guide Specifications
ULV	ultra-low volume
U.S.	United States
U.S.C.	United States Code
USDA	United States Department of Agriculture
USDA-APHIS	United States Department of Agriculture-Animal and Plant Health Inspection Service
USF&WS	U.S. Fish and Wildlife Service
USN	United States Navy
WNV	West Nile Virus

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