THE VIRGINIA ARMY NATIONAL GUARD

INTEGRATED PEST MANAGEMENT PLAN

FIELD MANUAL

JANUARY 2018

Table of Contents

1 Purpose

This IPMP is a framework that defines how pest management is accomplished by the VAARNG. This version is abridged from the October 2017 version approved by National Guard Bureau. A full version is available from the Integrated Pest Management Coordinator upon request. The plan identifies elements of the program to include health and environmental safety, pest identification, and pest management, as well as pesticide storage, transportation, use and disposal. This plan is used as a tool to reduce reliance on pesticides, to enhance environmental protection, and to maximize the use of IPM techniques.

2 Responsibilities

2.1 Integrated Pest Management Coordinator (IPMC)

2.1.1 Prepare and maintain the IPMP with 5-year revisions.

2.1.2 Annually review and update the IPMP as needed.

2.1.3 Ensure all pesticides are approved by the ARNG PMC prior to their use at VAARNG Federally-owned (Appendix A) sites and all pesticide used at VAARNG sites are listed on the VAARNG State Pesticide Use List (SPUL) (Appendix C).

2.1.4 Coordinate with personnel conducting pest surveillance and/or control to ensure all applicable information is recorded and reported as required by National Guard Bureau.

2.1.5 Function as a point of contact between those individuals who store and apply pesticides (e.g., facility management, pest control contractors) and activities or individuals who document or are impacted by pesticide usage at VAARNG sites (e.g., Environmental Office, Safety Office, Fire Department, and Industrial Hygienist).

2.1.6 Coordinate with the VAARNG Natural Resources Manager (NRM) about pest control actions in semi-improved or unimproved grounds where there may be endangered, threatened or sensitive animals (including insects) or plants.

2.1.7 Coordinate with the VAARNG Cultural Resources Manager (CRM) when pest control actions might impact native plants, potentially of interest to Indian tribes with which VAARNG consults, or might impact landscape areas or materials, or other resources with cultural significance, or might affect a building greater than 50 years old that may be eligible for listing in the National Register of Historic Places.

2.1.8 Coordinate with the VAARNG Directorate of Plans, Training, Mobilization and Security (DPTMS) for all pest management performed on training or maneuver land.

2.1.9 Coordinate with local health officials to determine the prevalence of disease vectors and other public health pests in the area surrounding VAARNG sites. Oversee surveillance at

VAARNG sites for known vectors for diseases such as West Nile, Dengue, Chikungunya and Zika viruses.

2.1.10 Coordinate with the State Surgeon for any necessary measures for control of disease vectors and other public health pests at VAARNG sites.

2.1.11 Oversee the technical aspects of the Self-Help Program (Appendix E) with respect to pest control products and training of program participants.

2.1.12 Monitor certification and continuing pest management training for pesticide applicators at VAARNG sites. Maintain copies of current certifications in Appendix K of this plan.

2.1.13 Coordinate with the CFMO to ensure that contracts including pest management activities at VAARNG Federally-owned (Appendix A) sites are forwarded to the ARNG PMC for technical sufficiency review prior to solicitation of the contract. For contracted pre-construction treatment of soil to control termites at Federally-owned VAARNG sites, ARNG PMC review and approval of the termite management section of contracts is not required if the contract language is in accordance with the current Unified Facilities Guide Specification for chemical termite control.

2.1.14 Ensure that pest management contracts at VAARNG Federally-owned (Appendix A) sites with efforts that exceed 0.25 work-years are monitored by a certified PMQAE.

2.1.15 Coordinate with local, state and federal agencies, as necessary, to conduct the VAARNG IPM program in accordance with federal, state, and local laws and regulations that apply to pest management, pesticide use, applicator certification, record-keeping, and reporting.

2.1.16 Provide answers to questions concerning pest management from Commanders, ARNG Directorate, Headquarter Department of Army (HQDA), and interested state agencies.

2.1.17 Perform design review of new construction and landscaping projects to ensure that pest entry points and potential harborage sites have been eliminated and that proper preconstruction termite treatment is included in project specifications.

2.1.18 Prepare, with assistance from a PMC certified in DOD Category 11: Aerial Application Pest Control, an Aerial Spray Statement of Need (ASSON) for any potential aerial application of pesticides to Federally-owned (Appendix A) VAARNG sites.

2.1.19 Obtain IPMC certification within two years of being appointed to the position and maintain certification with refresher training every three years.

2.2 Pest Management Quality Assurance Evaluator (PMQAE)

2.2.1 Monitor pest management contracts at VAARNG Federally-owned (Appendix A) sites when total efforts exceed 0.25 work-years for a single location.

2.2.2 Obtain PMQAE certification and maintain certification with refresher training every three years.

2.2.3 If a single location's pest management contract efforts are less than 0.25 work-years, the presence of a trained PMQAE at the installation is not mandatory.

2.3 Pest Management Provider (PMP)

2.3.1 Use IPM techniques to the maximum extent possible.

2.3.2 Maintain current DOD or Virginia Department of Agriculture & Consumer Services, Office of Pesticide Services certification to apply pesticides in the category of pest control for work being initiated at Federally-owned VAARNG (Appendix A) sites and comply with all state and federal regulations. Non-restricted use pesticides may be applied by Registered Technicians at State properties (those not in Appendix A) without use of the Self-Help program. All others must use the Self-Help program (Appendix E). Send a copy of all certifications to the IPMC annually.

2.3.3 Control pests according to the provisions of this plan, in accordance with state and local laws and regulations, and DOD, Army and ARNG instructions, regulations and policies (DODI 4150.07, AR 200-1, ARNG Integrated Pest Management Program Policy Memorandum).

2.3.4 Conduct surveillance for mosquitoes, ticks, bed bugs, cockroaches, or other pests that could adversely affect the health and welfare of installation personnel.

2.3.5 Operate in a manner that minimizes risk to personnel and the environment.

2.3.6 When using pesticides, always read and follow the label. The label is the law.

2.3.7 Keep records of all pest surveillance and control efforts using the Pesticide Management Treatment Record and provide reports to the IPMC by the end of each month.

2.3.8 Maintain effective liaison with county, state, and federal health and environmental officials, as necessary.

2.4 Pest Management Contractors

2.4.1 Use IPM and conduct pest management in accordance with this plan, including ARNG PMC contract pre-approval of pesticides applied at VAARNG Federally-owned (Appendix A) sites.

2.4.2 Comply with all federal, state, and local laws and regulations.

2.4.3 When using pesticides, always read and follow the label. The label is the law.

2.4.4 Submit written records of all pest management activities to the Contract POC using the Pesticide Management Treatment Record (Appendix D) within one week of application.

2.5 Fort Pickett Department of Public Works (DPW) and CFMO Operations and Maintenance (O&M)

2.5.1 Determine the pest management requirements for the VAARNG sites and request appropriate funding to support contracted pest control operations.

2.5.2 Ensure that VAARNG personnel performing pest control as a part of their assigned duties receive adequate training in accordance with this plan, and achieve pest management certification, as required.

2.5.3 Ensure all pest management activities, including those that are part of the Self-Help Program, are recorded in accordance with this plan and reports are provided to the IPMC at intervals as specified in this plan. Maintain records of pest management operations as required.

2.5.4 Request and monitor contracted pest control operations.

2.5.5 Coordinate with the IPMC to ensure that contracts including pest management activities at VAARNG Federally-owned (Appendix A) sites are forwarded to the ARNG PMC for review for technical sufficiency prior to solicitation of the contract. For contracted pre-construction treatment of soil to control termites at VAARNG Federally-owned (Appendix A) sites, ARNG PMC review and approval of the termite management section of contracts is not required if the contract language is in accordance with the current Unified Facilities Guide Specification for chemical termite control.

2.5.6 Provide a copy of each finalized pest control contract to the IPMC.

2.5.7 Initiate requests for aerial application of pesticides, when necessary.

2.5.8 Stray animal control is coordinated and performed by the Fort Pickett Entomologist for requests within the installation using in-house personnel and through an agreement with local municipal animal control authorities. For animal control outside of Fort Pickett, contact local municipal animal control services.

2.6 Directorate of Plans, Training, Mobilization and Security (DPTMS)

2.6.1 Determine the pest management requirements for the VAARNG training and maneuver lands and request appropriate ITAM funding when pests are impeding training/maneuvers.

2.6.2 For management of pests that are not impeding training/maneuvers (e.g., hornet nests in bivouac areas, noxious/invasive weeds in maneuver areas, etc.), use all non-chemical pest control techniques as recommended in the IPM outlines (Appendix B) before requesting further assistance from DPW for in-house or contracted pest control.

2.6.3 Coordinate with the IPMC for any pest management activities occurring on VAARNG training and maneuver lands.

2.6.4 Ensure all pest management activities on training and maneuver lands, including those that are part of the Self-Help Program, are performed in accordance with this plan, including the records and reporting of pesticide usage.

2.6.5 Request and assist with the monitoring of contracted pest control operations.

2.6.6 Coordinate with the IPMC to ensure that contracts including pest management activities at Fort Pickett training and maneuver lands are forwarded to the ARNG PMC for review for technical sufficiency prior to solicitation of the contract.

2.6.7 Initiate requests for aerial application of pesticides to the IPMC no later than 12 months from the desired application date. Do not plan aerial spraying of defoliants or other pesticides within the northern long-eared bat active season.

2.7 Facility Managers and Maintenance Personnel

2.7.1 Apply good sanitary practices, landscape maintenance, and materials management to prevent pest infestations.

2.7.2 Use all non-chemical pest control techniques as recommended in the IPM outlines (Appendix B) before requesting further assistance from the O&M Office for in-house or contracted pest control.

2.7.3 Ensure all pest management activities, including those that are part of the Self-Help Program, are recorded in accordance with this plan and reports are provided to the IPMC at intervals specified in this plan.

2.7.4 Cooperate fully with pest management personnel in scheduling pest management operations, to include preparing the areas to be treated.

2.7.5 Have available on-site Safety Data Sheets (SDSs) for any pesticide stored or used on the premises.

2.8 Unit Commanders

2.8.1 Assure the proper use of the DOD Arthropod Repellent System and other personal protective measures while troops are exposed to potential disease vectors such as mosquitoes and ticks.

2.8.2 Brief troops on potential biological threats (such as poison ivy) before training exercises.

2.8.3 Appoint a field sanitation team for each company, troop, or battery-size unit. Assure that field sanitation teams are trained at resident courses, supplied, and mission capable prior to deployment to training areas.

2.9 Building Occupants

2.9.1 Apply good sanitary practices to prevent pest infestations. Areas need to be free of open food containers. Don't accumulate pest harborage materials such as empty boxes or dunnage.

2.9.2 Cooperate fully with contractors and billeting personnel in scheduling pest management operations, to include preparing the areas to be treated.

2.9.3 Report all pest management issues to the Maneuver Training Center (MTC) Fort Pickett Entomologist while on the installation and the appropriate Regional Armory Maintenance Manager for other facilities.

2.10 Self-Help Program Participants (generally maintenance workers, but Self-Help is available to all VAARNG members and employees)

2.10.1 Keep all areas clean, dry, and sanitary. Areas need to be free of open food containers. Don't accumulate pest harborage materials such as empty boxes or dunnage.

2.10.2 Determine if Self-Help is allowed for the pest problem using the IPM outlines in Appendix B.

2.10.3 If Self-Help is appropriate, follow the requirements found in Appendix E covering the Self-Help Program. Only pesticides that are pre-approved for Self-Help Program use and listed as such on the VAARNG SPUL (Appendix C) are allowed. All training, recording, reporting, handling and storage of pesticides must be done as specified under the Self-Help Program and in accordance with the pesticide label.

2.10.4 If Self-Help is not appropriate for the pest or level of the pest problem, fill out a work-order requesting assistance with your pest problem and submit it to the Facility Manager.

2.10.5 When using pesticides as part of the Self-Help Program, always read and follow the label. The label is the law.

3 Integrated Pest Management Operations

3.1 The four basic principles of IPM work together to provide long term control of pest populations at acceptable levels with the least detrimental impact on the environment. Although the use of the least-toxic pesticide is an integral part of IPM, non-chemical control is emphasized. Use of pesticides is almost always a temporary measure and often more expensive if used regularly. Non-chemical control may initially be more expensive, but will usually be more cost effective long-term with ongoing pest management. Non-chemical controls have the added advantage of being less toxic which reduces the potential risk to human health and the

environment. Surveillance and monitoring of pests are stressed in an IPM program since it is important to determine the cause of the pest infestation and the most effective management of the problem. Insect and vertebrate pests require food, water, and harborage (a place to rest or breed). Long term control is dependent upon eliminating or restricting pests' access to these requirements.

3.2 Mechanical and Physical Control: This type of control alters the environment where pests live, excludes pests, or traps and removes pests where they are not wanted. Examples of mechanical and physical control include: harborage elimination in structures through caulking or filling voids, screening, mechanical traps or glue boards, and nets and other barriers to prevent entry into buildings.

3.3 Cultural Control: Strategies in this method involve manipulating environmental conditions to suppress or eliminate pests. For example, judicious sanitation at dining facilities reduces the attractiveness of the area to flocks of birds that may cause increased air strike hazard. Replacing ornamental trees and shrubbery with native plants that are less attractive to defoliating pests is another cultural measure.

3.4 Biological Control: In this control strategy, predators, parasites or disease organisms are used to control pest populations. For example, the introduction of ragwort flea beetle, and the cinnabar moth have dramatically reduced the prevalence of tansy ragwort. Release of these biological controls in infested areas can eliminate tansy ragwort at that location. Introduction of new biological controls is the responsibility of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine, Biological Control Program.

3.5 Chemical Control: Pesticides kill living organisms, whether they are plants, insects or other animals. At one time, pesticides were considered to be the most effective control available, but pesticide resistance has rendered many ineffective. In recent years, the trend has been to use pesticides that have limited residual action. While reducing human exposure and lessening environmental impact, the cost has risen due to requirements for more frequent application. Since personal protection and special handling and storage requirements are necessary with the use of pesticides, the overall cost of control can be quite high when compared with non-chemical control methods. However, the use of chemicals may be warranted to control some pests and invasive species when other control methods are not sufficiently effective.

4 Health and Safety

4.1 Medical Surveillance of Pest Management Personnel

Pesticide applicators must read and follow all health and safety information on the label. If applying pesticides requires formal medical surveillance or respirators, VAARNG personnel must work with the VAARNG Safety Office to initiate medical surveillance physical exams, as appropriate. Contractors performing pest management services are responsible for their own medical surveillance program.

4.2 Hazard Communication

Safety Data Sheets (SDSs) for pesticides used are made available to all individuals who have contact with these chemicals. Hazard Communication (HAZCOM) training is mandatory for individuals working with hazardous materials, including pesticides.

4.3 Personal Protective Equipment

4.3.1 Personal Protective Equipment (PPE) as specified on the pesticide's label is provided to pest management personnel by the Safety Office. Submit purchase order requests when supplies of PPE become low.

4.3.2 Appropriate respiratory protection (High-Efficiency Particulate Air (HEPA) filter cartridges) should be used when working in enclosed areas infested with rodents and rodent waste, as well as additional measures like disposable gloves and the use of disinfectants. Rodent waste is associated with Hantavirus and Hantavirus pulmonary syndrome.

4.4 Fire Protection

The usual hazards presented by a fire are compounded in the case of a pesticide fire by the danger of pesticide poisoning and contamination. Fire protection of pesticides will be governed by the label and the VAARNG Hazardous Material, Waste and/or Spill Management Plans.

4.5 Pest Management Vehicle(s)

Whenever possible, designate a single vehicle to transport and apply pesticides. Large quantities of pesticides that meet thresholds for placarding must be transported in approved vehicles by appropriately licensed drivers. Pesticides are never transported in the cabs of vehicles, in personally-owned vehicles, or in vehicles generally used for non-pesticide related activities unless the pesticides are being used in the Self-Help program and constitute a small quantity with no human health risks for transportation. Whenever possible, pesticides are transported in a lockable storage compartment of an assigned vehicle. In addition, care is taken to secure pesticides to prevent damage to the containers and spillage of the chemicals. At no time are pesticides to be left unsecured in an unattended vehicle at an unsecure location.

4.6 Protection of the Public

Take precautions during pesticide application to protect the public, on and off VAARNG sites. Follow all precautions listed on the label. Pesticides are not applied outdoors when the wind speed exceeds label-specified levels. Whenever pesticides are applied outdoors, ensure that any drift is kept away from individuals, including the applicator. At no time are personnel permitted in a treatment area during pesticide application unless they are appropriately trained, have met the medical monitoring standards, and are protected in accordance with the pesticide label requirements.

4.7 Pesticide Shop Health, Safety, and Hazards

4.7.1 Personnel will follow all label precautions that deal with the storage of pesticides. Pesticides should be kept secure at all times. Pesticides should be under the applier's direct control or located in a secure locked facility or cabinet that is marked "Pesticide Storage" and posted with applicable "Danger", "Poison" and/or "Flammable" signs. Pesticides are a hazardous material and should be stored according to the SDS.

More information on pesticide storage can be found in the Armed Forces Pest Management Board (AFPMB) Technical Guide No. 17, "Design of Pest Management Facilities". This technical guide can be found on the AFPMB website (go to: http://www.acq.osd.mil/eie/afpmb/ search for "AFPMB") or obtained from the ARNG PMC.

4.7.2 Used pesticide aerosol cans must be turned-in to the Hazardous Waste Program Manager as hazardous waste. Other pesticide containers must be disposed of according to the label directions or turned-in as hazardous waste.

5 Environmental Considerations

5.1 Sensitive Areas

5.1.1 Special consideration is given prior to conducting pest control operations in sensitive areas that are identified on pesticide labels. No pesticides are applied directly to wetlands or water areas (lakes, rivers, etc.) unless their use is specifically approved on the label and in compliance with National Pollutant Discharge Elimination System (NPDES) regulations for application over or into waters of the United States. Separate NPDES permitting may be required in some instances and will require coordination with the VAARNG Environmental Office personnel.

5.1.2 In addition to aquatic and marine habitats, sensitive areas also include critical habitat of endangered, threatened, or rare flora or fauna species, and unique geological and other natural features.

5.1.3 All aerial application of pesticides to Federally-owned (Appendix A) VAARNG sites requires an Aerial Spray Statement of Need (ASSON) that has been approved by the ARNG PMC. The ASSON is prepared by VAARNG personnel with assistance from a PMC certified in DOD Category 11: Aerial Application Pest Control. Aerial application of pesticides to Federally-owned (Appendix A) VAARNG sites also requires additional environmental documentation.

5.2 Endangered or Protected Species and Critical Habitats

5.2.1 Protected migratory birds that occur on VAARNG property cannot be controlled without a permit. Migratory birds and their nests are protected. Neither migratory birds nor their eggs may be harmed. Birds may be scared or herded to encourage them to move (unless the birds are otherwise protected under separate authority such as the ESA). Nuisance nests may be destroyed

(not collected) before eggs are laid or after chicks have fledged unless protected under the ESA or the Bald and Golden Eagle Protection Act (BGEPA).

5.2.2 The IPMC periodically reviews, with assistance from the VAARNG Natural Resources Manager (NRM), ongoing pest control operations and also evaluates all new pest management operations to ensure compliance with the ESA, Migratory Bird Treaty Act, the BGEPA and state wildlife regulations. No pest management operations are conducted that are likely to have a negative impact on endangered or protected species or their habitats without prior approval from the ARNG PMC. Special consideration must be given when using pest management tactics in areas where endangered species and/or nesting/roosting eagles are found. Refer to the Fort Pickett and Camp Pendleton-specific Integrated Natural Resources Management Plans (INRMP) for special environmental concerns pertaining to endangered species and coordinate with the VAARNG NRM before performing any pest management operations that might affect endangered or protected species or their habitats.

5.2.3 Coordinate with the VAARNG NRM regarding pest control operations that could affect pollinators (such as insecticides or herbicides that kill flowering plants). All efforts should be made to reduce the use of pesticides that may affect pollinators. If pesticides must be used, apply the lowest toxicity pesticide available and apply pesticides at times of day and/or season when pesticide use will have the least impact on pollinators, but achieve pest contract objectives.

5.3 Cultural and Historical Sites

All IPM activities must be in accordance with the VAARNG Integrated Cultural Resources Management Plan (ICRMP). In case of an inadvertent discovery of cultural materials, follow the procedures and notifications specified in the ICRMP immediately upon discovering cultural materials, as set forth in the ICRMP Standard Operating Procedure No. 5 for Inadvertent Discovery of Cultural Materials. Prior to beginning pest control operations, the VAARNG Cultural Resources Manager will review any necessary ground disturbance or work requiring alteration of a building eligible for the National Register of Historic Places, or actions that might impact culturally significant landscape areas and materials. Sufficient time must be allowed to coordinate with the Cultural Resources Program in advance of implementing pest controls, as consultation outside VAARNG might be required.

5.5 Pesticide Spills and Remediation

An adequate pesticide spill cleanup kit is maintained wherever bulk pesticides are stored or used. All pesticide spills are reported to the VAARNG Hazardous Waste Program Manager. Spills are governed by the label and the VAARNG Hazardous Material, Waste and/or Spill Management Plans.

6 Program Administration

6.1 Pest Management Operations

6.1.1 Pest management operations are conducted in accordance with Appendix B, “Integrated Pest Management (IPM) Outlines”.

6.1.2 If the pest problem cannot be solved using the Self-Help Program (see Appendix E), then a request for pest control is sent to the Facility Manager or Department of Public Works.

6.1.3 All pesticides used at VAARNG sites will be approved prior to use by the ARNG PMC and listed on the VAARNG SPUL (Appendix C).

6.2 Pest Management Contracts and Contract Quality Assurance

6.2.1 VAARNG site personnel may use contracts when essential pest management services are not provided in-house. Contracts are administered in accordance with DODI 4150.07 for VAARNG Federally-owned (Appendix A) sites. The requesting office will contact the IPMC for guidance for any contracts that include pest management.

6.2.2 Pest management contracts for VAARNG Federally-owned (Appendix A) sites are forwarded to the ARNG PMC for technical sufficiency review prior to advertisement of the contract. For contracted pre-construction treatment of soil to control termites, PMC review and approval of the termite management section of contracts is not required for VAARNG Federally-owned sites if the contract language is in accordance with the current Unified Facilities Guide Specification for chemical termite control.

6.2.3 State contracting procedures and regulations are utilized to contract pest control on VAARNG State-owned sites.

6.2.4 Pest management contracts are initiated on an "as needed" basis. Regularly scheduled, monthly or periodic treatments will be eliminated unless deemed necessary after surveying and monitoring pest population levels. Regularly scheduled monthly or periodic treatments at VAARNG Federally-owned (Appendix A) sites must be approved by the ARNG PMC. Use of IPM techniques is encouraged in all contracts to decrease DOD’s use of toxic chemicals and pollutants. Pest problems threatening the health, safety, or welfare of installation personnel receive priority.

6.2.5 Contractors will conduct pest management in accordance with this plan and may only apply pesticides listed on the VAARNG SPUL at VAARNG sites. Contractors may request addition of pesticides to the VAARNG SPUL via the IPMC.

6.2.6 Once a contract is awarded, it is the responsibility of the originating office to establish a date and time for work to commence.

6.2.7 The IPMC is responsible for ensuring the requirements of this plan are implemented for contracted pest management and for assuring the quality of all pest management activities via the Facility Managers. Work performed by contracted pest management personnel is evaluated based on the adherence to the contract statement of work negotiated through the originating office, the requirements outlined in this plan, and the Facility Manager’s review of contracted

pest control work to determine the effectiveness of control efforts. Failure of a contractor to adequately control pests is reported to the IPMC. Ongoing contracts are evaluated annually or as necessary. An evaluation to confirm the satisfactory completion of all work is performed prior to payment being made.

6.3 Reports and Records

6.3.1 The VAARNG IPMC is responsible for the maintenance of pesticide use records for all in-house and contracted pest management operations.

6.3.2 Records of pesticide applicator certification must be retained by the applicator and available for review. Current in-house pesticide applicator records are provided to the IPMC.

6.3.3 All pest surveillance and control operations are recorded by the pesticide applicator or pest management provider (PMP). This includes pest management actions done in-house, by contractors, Self-Help Program participants, and as part of land management and forestry programs. These records must contain at a minimum:

a. Date and time of pesticide application
b. Target pest(s)
c. Specific pesticide application location(s)
d. Name of the person (and company, if contractor) applying the pesticide and their certification number (if applicable)
e. Name and manufacturer of pesticide
f. EPA registration number of the pesticide
g. Sufficient information to determine the amount (in pounds) of pesticide active ingredient applied (such as amount of undiluted pesticide used, total amount of concentrate used, or amount of diluted pesticide applied, and the dilution rate)

6.3.4 Pest surveillance and control operations are recorded using the Pest Management Maintenance Record (DD Form 1532-1), the VAARNG Pesticide Management Treatment Record (Appendix D) or an equivalent hard-copy or electronic form. These records are maintained indefinitely at the Natural Resources Entomology Office on Fort Pickett or by Regional Operations and Maintenance Manager Offices at Readiness Centers and are a permanent record of pest management activities.

6.3.5 Reports of pesticides used at VAARNG sites are compiled at the end of each fiscal year by the IPMC to compute total pounds of active ingredients used. PMPs provide reports to their respective Facility Manager to assemble the state-wide data for future reports. Facility Managers will forward all application reports from Contractors or PMPs for their properties to the IPMC at the end of each calendar month.

6.3.6 The IPMC calculates and provides the data required for the annual Plan Update Form (PUF). All pesticide usage will be reported in pounds of active ingredient (PAI) yearly via the PUF, or when requested by the ARNG PMC. The PUF is sent to the ARNG PMC. Only pest-management activities performed at VAARNG Federally-owned sites (Appendix A) are reported on the PUF.

6.3.7 For pest management activities at VAARNG State-owned sites (those not listed in Appendix A), the IPMC collects the data for annual recording as required by the Virginia Department of Environmental Quality.

6.3.8 The IPMC (or designee) provides the data required for the quarterly IPM Installation Status Report (ISR). This data is reported in square footage (indoor pest management) or acreage (outdoor pest management) treated and is reported to the State ISR Program Manager. Only Federally-funded pest management activities are reported in the ISR.

6.3.9 The IPMC (or designee) is responsible for answering all IPM-related data calls and submittal of information via the Army Environmental Database Environmental Quality/Headquarters Army Environmental System (AEDB-EQ/HQAES) or another electronic reporting system as specified by ARNG-IEZ.

6.4 Training and Certification

6.4.1 All individuals who apply pesticides at VAARNG Federal sites (Appendix A) are to hold current pesticide applicator certification in the appropriate categories for the pests being treated, unless the pesticide application is done under the Self-Help Program. In-house pesticide applicators are to be certified by the DOD or the Virginia Department of Agriculture & Consumer Services, Office of Pesticide Services. Individuals who apply non-restricted use pesticides at State properties must be Registered Technicians unless they are using pesticides that are covered in the Self-Help section. All contractors who apply pesticides must be certified by the Commonwealth of Virginia in order to apply pesticides at VAARNG sites. Initial training, apprenticeship periods and refresher training will be completed as required by the certifying agency to maintain current pesticide applicator certification.

6.4.2 The VAARNG IPMC must complete an initial DOD-taught PMQAE/IPMC training course within two years of being appointed IPMC and take refresher training every three years. HAZCOM training is also appropriate since exposure to pesticides may occur in the course of the job. The IPMC is not required to be a certified pesticide applicator if the IPMC will not apply pesticides as part of their duties.

6.4.3 Self-Help Program participants training will consist of reading the Self-Help Handouts for the applicable pest, signing the Training Use Agreement (page E-5), and following the directions of the label for each pesticide used. HAZCOM training is mandatory for personnel exposed to pesticides. When pest management actions are performed in accordance with the requirements of the Self-Help Program (Appendix E), participants are not required to be certified pesticide applicators.

6.4.4 PMQAEs must complete an initial DOD-taught PMQAE/IPMC training course and take refresher training every three years. PMQAEs are not required to be a certified pesticide applicator if the PMQAE will not apply pesticides as part of their duties.

6.5 Pesticide Security

Pesticides and pesticide equipment must be properly stored in facilities and safeguarded. Facilities must be well lighted with a secure perimeter. Video cameras, alarm systems, and self-locking doors are appropriate measures of security. Access to pesticides should be restricted with appropriate warning signs posted. Refer to the AFPMB Technical Guide No. 7, "Installation Pesticide Security" for more information on proper storage and security of pesticides. This technical guide can be found on the AFPMB website (go to: http://www.acq.osd.mil/eie/afpmb/ search for "AFPMB") or obtained from the ARNG PMC.

Appendix A – Federally-owned VAARNG Sites

1. Sandston Readiness Center
2. Sandston Army Aviation Support Facility (AASF)
3. Hampton Readiness Center
4. Fort Pickett MTC
5. Fort Belvoir (29th Infantry Division, 91st Cyber Command, and Field Maintenance Shop)
6. Fort AP Hill (Bowling Green Readiness Center)
7. Defense Supply Center Richmond (VA ARNG Joint Forces Headquarters, CSMS, and CIF)

Appendix B – Integrated Pest Management (IPM) Outlines

IPM Outline 1
American Cockroaches

Target Pest or Group	American cockroaches.
Target Area(s)	Office buildings, warehouses, residences; storm sewers
Impact on Mission	▪ May cause food damage through contamination. ▪ Affect human health through allergic reactions or "entomophobia". ▪ An aesthetic or morale nuisance. ▪ Large size often frightens people.
Scope	Base-wide in buildings and in sewers.
Responsibility	▪ All personnel: Ensure proper sanitation in all living and working spaces. ▪ Self-Help Program Participants: Conduct integrated pest management to control infestations indoors and in outdoor living areas and around the perimeter of buildings using approved Self-Help control methods. ▪ Food Service personnel (FSP): Ensure compliance with food handling regulations that prevent pest infestations. ▪ Pest Management Provider (PMP), In-House or Contract: Conduct integrated pest management to control infestations. ▪ Facilities Maintenance Provider (FMP): Perform facilities repairs and improvements that exclude and minimize pest infestations as requested.
Reporting	Record all pest management operations using the Pesticide Management Treatment Record and report usage to the IPMC every month

Survey

Survey Method(s)	▪ Visual inspections:
	  ▪ Visual surveys of low to moderate infestations may require visiting the facility at night.
	  ▪ Observation of pests in harborages.
	  ▪ Look around areas with heat and moisture.
	  ▪ Inspect floor drains.
	▪ Application of a flushing agent (or canned air) to suspected harborages.
	▪ Sticky trap surveys.

	▪ Vacuum surveys of harborages. ▪ 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.
Survey Frequency / Schedule	▪ Daily observation by building occupants ▪ Monthly observation and/or sticky trap monitoring by pest management personnel.
Action Threshold(s)	▪ Visual sighting of 1 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

Type	Method	Responsibility
Sanitation	▪ Thorough cleaning of potential food sources in buildings, especially coffee and food preparation areas. ▪ Clean up spills immediately. ▪ 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 break or dining area.	All personnel; Self-Help Program Participants; FSP
Mechanical Removal	▪ Vacuum cockroaches from their harborages. ▪ Used canned air to flush cockroaches from their harborages. ▪ Then use a wet/dry vacuum cleaner filled with water or empty and dispose of vacuum bag immediately.	Self-Help Program Participants; FSP; PMP
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.	Self-Help Program Participants; FSP; FMP
Prevention	▪ Inspect food boxes before bringing them into a building	All personnel; Self-Help Program Participants; FSP
Eliminate harborage	▪ Seal cracks and crevices with caulk ▪ Remove corrugated cardboard and other materials that can serve as harborage	Self-Help Program Participants; FSP; FMP

Eliminate Standing Water	▪ Fix plumbing leaks, especially around sinks, faucets and dishwashers. ▪ Remove standing water from floors after daily cleaning.	FSP; FMP
Education	▪ Proper storage of food and sanitation to prevent infestations and increase effectiveness of pesticide applications. ▪ Understanding the delayed effect of baits.	In-House PMP; IPMC

Chemical Control

Application Site	Apply pesticides as required based on survey information to areas where cockroaches are known to live or travel.
Site Preparation	Pre-treatment procedures: ▪ Visual inspections (canned air may be used, but no flushing agents) or placement of sticky traps may be accomplished while the space is occupied. ▪ All pesticide applications shall be done only when the space is unoccupied. ▪ Pesticide applicators shall notify building occupants prior to pesticide use. ▪ If insecticidal baits are used, thorough cleaning is required to remove competing food sources. ▪ Remove all food from exposed areas, cover or store processing equipment and utensils, and turn off ventilation system. ▪ Remove and dispose all food debris to increase the effectiveness of bait stations. ▪ Clean grease off surfaces. Oil can interact with some insecticides and reduce their effectiveness. Post-treatment procedures: ▪ Thoroughly clean all food preparation surfaces. ▪ Do not remove bait stations or bait gel placements.
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 stormwater pollution. Applications should be made when storm sewers are dry and rain is not anticipated within a week.
Restrictions	▪ Preventive baseboard spraying in the absence of a pest is prohibited. ▪ Do not apply liquid or dust formulations to occupied spaces or near exposed food. ▪ In food service areas, use only insecticides specifically labeled for those areas.
Prohibited Items	▪ Use of ultrasonic pest repelling devices is prohibited.
Common Active Ingredients	▪ Abamectin ▪ Borate-based products ▪ Fipronil ▪ Hydramethylnon

	▪ Imidacloprid ▪ Indoxacarb ▪ Insect Growth Regulators (IGRs) ▪ Pyrethroids (i.e. bifenthrin, cyfulthrin, cyhalothrin, esfenvalerate, permethrin, tetramethrin)	
Types of Pesticides		**Authorized Applicators**
Baits	▪ Use Cockroach baits (stations containing solid bait or injectable style gel baits) 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.	Self-Help Program Participants; In-House PMP; Contracted PMP
Flushing Agents	▪ Use aerosol contact pesticides directed into potential harborage areas to flush out and kill pests as needed.	In-House PMP; Contracted PMP
Crack and Crevice Residuals	▪ A residual pesticide may be applied (by crack and crevice technique) to all known or suspected harborages, feeding sites, or passageways.	In-House PMP; Contracted PMP
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).	In-House PMP; Contracted PMP
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.	In-House PMP; Contracted PMP
Growth Regulators	▪ Insect growth regulators will always be mixed with "knock-down" pesticides.	In-House PMP; Contracted PMP
Fogging	▪ For rapid knockdown of large infestation; follow up with crack and crevice treatments and/or bait placement if needed.	In-House PMP; Contracted PMP

Contract or Work Considerations

Time Period to Respond	▪ Dependent on impact on mission. ▪ In food service areas, where impact is on health, and office spaces, where impact is on aesthetics and morale, response time should be within 24 hours. ▪ Warehouses and unoccupied or rarely occupied spaces may warrant a longer response time.

Time Period to Obtain Control	▪ Baits are designed to have a delayed toxic effect which allows cockroaches to take the bait to other cockroaches in their harborage. Generally, baits should result in fatalities within 3 days. ▪ Other insecticide treatments should result in immediate kill of the pest. ▪ Many insecticides are ineffective on egg cases (ootheca) and nymphal cockroaches may emerge within days after treatment, causing another infestation.
Level of Control	Post-treatment survey of the target area should result in a pest population lower than the action threshold number.
PMQAE Assessment	▪ Sticky traps are the best way to quantify and compare pre- and post-treatment surveys. ▪ Visual surveys of low to moderate infestations may require visiting the facility at night. ▪ Follow up surveys should be done one week later to see if eggs have hatched and resulted in another infestation.
Reasons for Treatment Failure	▪ Improper application of the insecticide ▪ Harborages not identified and treated ▪ Eggs hatched after treatment ▪ Insecticide resistance ▪ Improper placement of bait stations or gel baits.
Safety Considerations	▪ Do apply liquid and dust Insecticides 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. ▪ 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
Environmental Considerations	▪ Outdoor treatments with pyrethroids are susceptible to runoff and contamination of stormwater. ▪ Disposing of pesticides in a drain or stormdrain is strictly prohibited.
Special Applicator Qualifications	▪ Cockroach control using canned air and approved bait stations may be accomplished by non-certified personnel as part of the Self-Help Program. ▪ All PMP applying pesticides must be DOD or State-certified as pesticide applicators.

Resources

http://www.extension.umn.edu/garden/insects/find/cockroaches/

http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7467.html (helpful for identifying types of cockroaches)

http://pestsense.cahnrs.wsu.edu/Search/MainMenuWithFactSheet.aspx?CategoryId=2&ProblemId=799

IPM Outline 2

Filth Flies

Target Pest or Group	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 Area(s)	▪ Dumpsters ▪ Garbage dumps and recycle centers ▪ Any places where organic debris may accumulate
Impact on Mission	▪ Nuisance that interferes with mission ▪ Mechanical transmission of pathogens leading to illnesses
Scope	Management of biting and non-biting flies associated with organic debris. Excludes flies of public health importance such as mosquitoes, biting gnats, black flies, and bot flies.
Responsibility	• All personnel: Ensure proper sanitation in all living and working spaces. • Self-Help Program Participants: Conduct integrated pest management to control infestations indoors and in outdoor living areas and around the perimeter of buildings using approved non-Chemical control methods. • Food Service personnel (FSP): Ensure compliance with food handling regulations that prevent pest infestations • Pest Management Provider (PMP), In-House or Contract: Conduct integrated pest management to control infestations. • Janitorial Service Provider (JSP): Ensure that refuse containers are frequently emptied and sanitized. • Facilities Maintenance Provider (FMP): Perform facilities repairs and improvements that exclude and minimize pest infestations as requested.
Reporting	Record all pest management operations using the Pesticide Management Treatment Record and report usage to the IPMC every month.

Survey

Survey Method(s)	Visual sighting: ▪ Flies are active during the daytime in warm weather ▪ Flies may be seen flying around and landing on dumpsters and trash cans ▪ Fly larvae (maggots) may be seen at the bottom of trash cans ▪ Flies that enter buildings will congregate around windows ▪ Flies may be seen crawling on or flying around organic debris ▪ Visual surveys of adult flies should also identify where flies are entering a building and where they are breeding. Bites: ▪ Adult stable flies will inflict a painful bite on humans, dogs, and livestock. ▪ Most filth flies do not bite. Trapping: ▪ Light traps: Flies are attracted to ultraviolet light and trapped on a sticky pest strip. These traps can also be used to control adult flies as well as monitor populations. ▪ Sticky traps: Place around areas where filth flies are known to be a problem. Many types contain visual lures. ▪ Pheromone traps: Fly pheromones (such as muscamone) attract flies to a container. Speck counts: ▪ 3X5 index cards may be placed around areas to be monitored. Flies that land on the cards will leave vomit or fecal specks 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 specks. Note: Identification of adult flies is helpful in determining where flies are breeding, in order to target control at the source of the infestation. If the breeding location of the flies cannot be found, collect some flies and identify or send to an
Survey Frequency/ Schedule	▪ Visual observations should be made around likely breeding sites (i.e. 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.
Action Threshold(s)	▪ The presence of biting flies in numbers constituting a nuisance for people or animals indicates a need for control within 24 hours if it is interfering with the mission or activities. ▪ In sensitive areas (i.e. kitchens, medical facilities) the threshold should be low: 2 flies/room. ▪ For counts on sticky traps, 100 flies per week indicates a need for control.

Non-Chemical Control

Type	Method	Responsibility
Sanitation	▪ 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.	All personnel, including: Self-Help Program Participants; JSP
Exclusion	▪ Seal cracks and other openings around doors and windows. ▪ Use tight-fitting screens. ▪ Air-curtains may be installed in commercial facilities.	Self-Help Program Participants; FMP
Trapping	▪ Ultraviolet light traps may be used to reduce adult fly populations in buildings invaded by flies. Light traps shall not be used outdoors. ▪ 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.	All personnel, including: Self-Help Program Participants
Biological	▪ 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.	In-House PMP; Contracted PMP
Education	▪ Educate building occupants on sanitation, excluding flies by closing doors and maintaining screens, and proper food storage	In-House PMP; IPMC

Chemical Control

Application Site	▪ Fly resting areas	
Site Preparation	Do not apply residual insecticides during high temperatures, high winds, or if precipitation is expected.	
Sensitive Areas	▪ Food service 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 these areas. ▪ Ensure that insecticides do not enter drains, streams, lakes and other surface water.	
Restrictions / Regulations / Permits	▪ Do not apply liquid or dust formulations in occupied spaces. ▪ Dichlorvos is a carcinogen and cannot be placed in occupied spaces.	
Common Active Ingredients	▪ Neonicotinoids ▪ Pyrethroids ▪ Methomyl ▪ Cyromazine ▪ Other insecticides	
Methods of Application		**Authorized Applicators**
Non-residual space spray or aerosol	▪ Will temporarily control adult fly populations in buildings and outdoors. ▪ Will not provide long-term control unless breeding sites are eliminated.	In-House PMP; Contracted PMP
Residual insecticides	▪ May be applied to outside areas where adult flies rest. ▪ Will not provide long-term control unless breeding sites are eliminated.	In-House PMP; Contracted PMP
Baits	▪ May be used around refuse containers and other places to which flies are attracted. ▪ Pheromone baits are commonly used so that competing food sources are not a problem. ▪ 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.	In-House PMP; Contracted PMP
Impregnated strips	▪ Plastic strips impregnated with dichlorvos will kill adult flies. ▪ Use only inside trash cans or other unoccupied spaces.	In-House PMP; Contracted PMP
Insect repellents	▪ May be used on humans for temporary prevention of fly bites. ▪ Will not provide long-term control of fly populations, and must be frequently re-applied.	All personnel

Larvicides	▪ Control fly larvae in breeding sites. ▪ Can be used simultaneously with adulticides. ▪ Some larvicides are insect growth regulators with lower toxicity for non-target organisms.	In-House PMP; Contracted PMP

Contract or Work Considerations

Time Period to Respond	Indoor infestations should have shorter response time than outdoor infestations.
Time Period to Obtain Control	Most control methods result in rapid kill and so control should be obtained in a short period of time
Level of Control	100% control indoors. Outdoors the level can be lower depending on the level of tolerance by people around the buildings. If the source of flies is treated then you should expect 100% control in that area.
Safety Considerations	▪ Take precautions when using pesticides around food service areas ▪ Applicator should use personal protective equipment as required by the product label
Environmental Considerations	▪ Avoid contaminating water with pesticides. ▪ Space spraying outdoors can result in drift and impact on non-target organisms.
Special Applicator Qualifications	▪ Fly control using non-chemical/biological methods may be used by non-certified personnel as part of the Self-Help Program. ▪ All PMP or GMP applying pesticides (including herbicides) must be DOD or State-certified as pesticide applicators.

Additional Information

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.

Resources

http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7457.html
http://www.acq.osd.mil/eie/afpmb/docs/techguides/tg30.pdf
http://www.acq.osd.mil/eie/afpmb/docs/techguides/tg29.pdf

IPM Outline 3
Ticks

Target Pest or Group	Ticks
Target Area(s)	Outdoors, especially near or in wooded areas.
npact on Mission	To prevent the spread of tick-borne diseases.
Scope	Near training or encampment areas.
Responsibility	▪ All personnel: Wear proper clothing and use repellents when working or training in areas where there are ticks. ▪ Pest Management Provider (PMP), In-House or Contract: Apply pesticides, as needed. ▪ Grounds Maintenance Provider (GMP): Mowing and removal of vegetation. ▪ IPMC/Environmental Office: Surveillance. Recommendations and approval for land modifications near improved areas to eliminate tick harborage.
Reporting	Record all pest management operations using the Pesticide Management Treatment Record Form and report usage to the IPMC every month

Survey

Survey Method(s)	▪ Personnel complaints. ▪ Cloth drag surveys. ▪ CO_2 ground traps.
Survey Frequency / Schedule	▪ As needed. ▪ Areas identified by personnel complaints, or with a history of infestation.
Action Threshold(s)	▪ 5 or more adult vector species captured in a 5 minute drag near training or encampment areas.

	▪ During declared disease emergencies, one or more adults or nymphs that have been identified as carrying the disease within 5 miles. NOTE: Action thresholds can be changed on advice of an APHC entomologist

Non-Chemical Control

Type	Method	Responsibility
Cultural	▪ Personnel should wear proper clothing such as long pants with the legs tucked into their socks and boots. ▪ Tick infested areas should be avoided for use when an alternative site is feasible.	All personnel
Habitat Modification	▪ Eliminate brush and high grass from training, encampment, improved and high traffic areas. ▪ Mow and otherwise clear overgrown areas next to wood margins with substantial under story. ▪ Rake up leaf litter in smaller, contained areas that receive high human use. ▪ Controlled burning, where environmentally acceptable, has been shown to reduce tick populations for six months to a year.	GMP
Prohibited Items	Use of ultrasonic pest repelling devices is prohibited.	

Chemical Control

Application Site	Apply pesticides as required based on survey information.
Site Preparation	Pre-treatment procedures: ▪ Visual inspections. Post-treatment procedures: ▪ Populations of ticks can be expected to fully recover within 18 months of the last treatment.
Sensitive Areas	▪ Waterways. Avoid stormwater runoff of insecticides and do not apply directly to water. Many insecticides are highly toxic to aquatic organisms. ▪ Areas with high density of pollinators. Many acaricides are highly toxic to bees, butterflies and other beneficial pollinators.
Restrictions	▪ Making large area applications when personnel are present is prohibited

Common Active Ingredients	Repellents for Personal Use: ▪ DEET ▪ Permethrin Residual Pesticides: ▪ Bifenthrin ▪ Cyfluthrin ▪ Cyhalothrin ▪ Cypermethrin ▪ Deltamethrin ▪ Esfenvalerate ▪ Resmethrin ▪ Other synthetic pyrethroids ▪ Pyrethrins or natural Pyrethrum	
Types of Pesticides		**Authorized Applicators**
Repellents	▪ Tick repellent should be applied to exposed skin and around the edge of openings in clothing such as cuffs and waistbands and around boot tops. ▪ Effectiveness of skin-applied repellents decreases over time, especially if the user sweats. They should be periodically re-applied. ▪ Treating clothing with an approved tick repellent pesticide containing DEET or Permethrin to provide additional protection. ▪ Never apply Permethrin directly to the skin.	All personnel
Barrier sprays or granules	▪ Vegetation surrounding training areas and encampments may be treated with a pesticide that leaves a residual barrier to ticks. ▪ Dispersal is done with a back-pack or truck-mounted power sprayer ▪ Reapply if needed in 4 to 6 weeks (or as directed on the pesticide label).	In-House PMP; Contracted PMP

Contract or Work Considerations

Time Period to Respond	Ticks are generally not an emergency and do not require immediate response. If high densities of ticks are found in bivouac areas during training exercises, immediate response may be necessary.
Time Period to Obtain Control	Immediately after treatment.
Level of Control	It is not possible to totally eliminate tick pest populations; control is achieved when the human health concern has been reduced to a nuisance level.
Safety Considerations	▪ Applicators must wear personal protective equipment as required by the product label. ▪ Permethrin repellent should never be applied directly to the skin.
Special Applicator Qualifications	▪ All PMP or applying pesticides (including herbicides) must be DOD or State-certified as pesticide applicators. ▪ Repellents used for personal protection are exempt from applicator certification requirements. However, they must always be applied in accordance with the label directions.

Additional Information

All personnel should check for ticks after working or training in areas where ticks are known to occur.

Removing ticks within 24 hours of their attachment significantly decreases the chances of contracting tick-borne diseases.

Care must be taken when removing an attached tick. Not every tick is infested with a human disease pathogen, but all ticks should be treated as a risk to human health.

Do not apply heat (lighted match) to the tick in hopes it will release. This action may cause the tick to expel its contents (including disease pathogens, if present) into the bite victim.

Do not apply grease or coat the tick in Vaseline. This will kill the tick and likely cause it to expel its contents into the bite victim.

To remove a tick:

- Firmly grasp the head of the tick as close to the skin as possible with tweezers. If you grasp the tick by the abdomen and pinch with the tweezers, you may inject the contents of the tick (including any disease pathogens) into the bite victim. Pinch with only enough pressure to firmly hold onto the tick.
- With gentle but steady pressure, pull on the tick. Usually, the tick will release its hold. Ticks have hooks on their mouthparts and forceful removal may leave the mouthparts imbedded in the skin where they could cause a secondary infection requiring medical attention.

Resources

AFPMB TG 26, Tick-Borne Diseases: Vector Surveillance and control, http://www.acq.osd.mil/eie/afpmb/docs/techguides/tg26.pdf

AFPMB TG 36, Personal Protective Measures Against Insects and Other Arthropods of Military Significance http://www.acq.osd.mil/eie/afpmb/docs/techguides/tg36.pdf

IPM Outline 4
Nuisance Ants

Target Pest or Group	Black ants, Pavement ants, Odorous house ants, Pharaoh ants, Argentine ants, Crazy ants and other nuisance species.
Target Area(s)	Offices, food preparation areas, food storage, patios, barracks, medical treatment facilities.
Impact on Mission	Eat and contaminate food; make spaces uninhabitable or unusable.
Scope	Base-wide, in and around buildings.
Responsibility	▪ All personnel: Ensure proper sanitation in all living and working spaces. ▪ Self-Help Program Participants: Conduct integrated pest management to control infestations indoors and in outdoor living areas and around the perimeter of buildings using approved Self-Help control methods. ▪ Pest Management Provider (PMP), In-House or Contract: Conduct integrated pest management to control infestations indoors and in outdoor living areas and around the perimeter of buildings. ▪ Grounds Maintenance Provider (GMP): Control aphids and similar insects on ornamental plants. Aphids may attract and feed ants. ▪ Facilities Maintenance Provider (FMP): Perform facilities repairs and improvements that exclude and minimize pest infestations as requested.
Reporting	Record all pest management operations using the Pesticide Management Treatment Record Form and report usage to the IPMC every month.

Survey

Survey Method(s)	▪ Visual inspections
	  ▪ Observation of foraging scout ants or ant trails.
	  ▪ Follow ant trails to entryways into building and to food sources.
	  ▪ Follow ant trails to nests.
	▪ Personnel complaints: including information on when pests were observed, where, and how many.
	▪ Conduct pre and post-treatment surveys to determine whether control operations were effective.

Survey Frequency / Schedule	▪ Daily observation by building occupants. ▪ Monthly inspections by PMP, In-House or Contract, outdoors around buildings to identify ant nests.
Action Threshold(s)	▪ Food service areas: 3 per room ▪ Living areas: 5 per room ▪ Medical treatment facilities: 1 per room ▪ Grounds: 2 mounds per yard

Non-Chemical Control

Type	Method	Responsibility
Sanitation	▪ Thorough cleaning of potential food sources in buildings, especially coffee and food preparation areas. ▪ Thoroughly clean food preparation surfaces, countertops, and stoves. ▪ Remove and discard food scraps that may be attractive to ants. ▪ Clean up food and drink spills as soon as possible. ▪ Do not leave dirty dishes on countertops or in sinks	All personnel, including: Self-Help Program Participants
Mechanical Removal	▪ Use a wet sponge or cloth to wipe up ants. ▪ Spray ant trails with household cleaner or soapy water, then wipe up. ▪ This is **not** an effective control method for Pharaoh ants.	All personnel, including: Self-Help Program Participants
Pest-Proofing	▪ Put food in tightly sealed containers. ▪ Seal holes in walls with caulk or temporarily with petroleum jelly.	All personnel, including: Self-Help Program Participants
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 juice-sucking insects. Control aphids and other plant juice-feeding insects on plants	GMP

Education	▪ Proper food storage and sanitation to prevent infestations. ▪ Use of soapy water to control ants indoors.	In-House PMP, IPMC
Prohibited Items	▪ Use of ultrasonic pest repelling devices is prohibited.	

Chemical Control

Application Site	When non-chemical methods do not control pests to an acceptable level, apply pesticides to areas where ants nest or travel as based on surveillance information.	
Site Preparation	Pre-treatment procedures: ▪ Visual inspections. ▪ Pesticide applicator shall contact building occupants prior to pesticide applications. ▪ All food should be removed from exposed areas and processing equipment and utensils covered or stored. Post treatment procedures: ▪ Thoroughly clean all food preparation surfaces. ▪ Do not remove bait stations or other bait placements.	
Sensitive Areas	▪ Exposed food products, food containers, counter tops, or 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. ▪ Waterways. Avoid stormwater runoff of insecticides and do not apply directly to water. Many insecticides are highly toxic to aquatic organisms.	
Restrictions	▪ Use baits and 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.	
Common Active Ingredients	▪ Abamectin ▪ Borate-based products ▪ Fipronil ▪ Hydramethylnon ▪ Indoxacarb ▪ Insect Growth Regulators (IGRs) ▪ Pyrethroids (i.e. bifenthrin, cyfulthrin, cyhalothrin, esfenvalerate, permethrin, tetramethrin) ▪ Sulfluramid	
Types of Pesticides		**Authorized Applicators**
Baits	▪ Bait stations can be used indoors or outdoors. ▪ Granular baits can be applied outdoors near nests. ▪ Baits are specific to the species of ant. ▪ Most effective since it kills the egg-producing queen of the colony. ▪ May require 2 to 7 days for complete control.	Self-Help Program Participants; In-House PMP; Contracted PMP

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. ▪ Application is not allowed in occupied interior spaces.	In-House PMP; Contracted PMP
Dusts	▪ Boric acid dust is an effective low toxicity insecticide that can be applied into wall voids where ants may be nesting. ▪ The treatment area should remain dry after the application to avoid washing the dust away. ▪ Application not allowed in occupied interior spaces.	In-House PMP; Contracted PMP
Granular Insecticides	▪ Acute toxicant in granular form. ▪ Only effective if applied directly to the nest.	In-House PMP; Contracted PMP

Contract or Work Considerations

Time Period to Respond	Ant infestations are generally not an emergency and do not require immediate response. At sensitive sites, such as medical treatment facilities, immediate response may be necessary
Time Period to Obtain Control	For indoor infestations control should be within 2 hours when liquid formulations are used. Baiting indoors or outdoors may take up to a week or more for complete control.
Level of Control	100% control indoors is required.
PMQAE Assessment	Usually customer complaints and follow-up are sufficient to assess efficacy of work.
Safety Considerations	▪ 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.
Environmental Considerations	▪ Pyrethroid insecticides can be highly toxic to aquatic organisms.
Special Applicator Qualifications	▪ Ant control using approved bait stations may be used by non-certified personnel as part of the Self-Help Program. ▪ All PMP or GMP applying pesticides (including herbicides) must be DOD or State-certified as pesticide applicators.

Additional Information

For most people, ants become a problem and require action only when they enter a building. Sometimes ants may nest in walls, especially if there is moisture in those areas. This is a common problem in bathrooms and kitchens. Surveys may be used 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 which gives worker ants enough time to carry small amounts of bait back to the nest. Worker ants will feed the bait to the other ants and eventually kill the entire colony. For this reason, it may take several days to see results from baiting. Different species of ants prefer different forms of bait, and sometimes preferences even vary by season. Ants can be given a "taste test" of several baits to see which ones they prefer and to ensure bait is still effective for that species.

Resources

http://www.ipm.ucdavis.edu/PMG/menu.ants.html

http://www.extension.umn.edu/garden/insects/find/what-to-do-about-household-ants/

http://www.p2pays.org/ref/14/13177.pdf

IPM Outline 5

Mosquito Control

Target Pest or Group	Flying adult mosquito species.
Target Area(s)	All areas, base-wide.
Impact on Mission	▪ Transmission of mosquito-borne diseases to installation personnel ▪ Nuisance biting interfering with occupational and recreational activities
Responsibility	Installation Preventive Medicine Technicians (PMTs): Conduct adult mosquito trapping to identify problem areas and mosquito species. ▪ Map locations of trapping sites. ▪ Conduct disease risk assessments including pathogen testing if that laboratory capability is available. ▪ Provide information to personnel on how to prevent mosquito bites. Pest Management Provider (PMP), In-House or Contract, or Mosquito Control Provider: ▪ Conduct surveys to verify presence of adult mosquitoes at site to be treated. Treat only when and where adult mosquitoes are present. ▪ Use integrated pest management methods to control adult mosquitoes. ▪ Use pesticides in accordance with the label.

Responsibility (continued)	Natural Resources Manager (NRM): ▪ Review and approve mosquito control operations conducted in sensitive areas to ensure minimal impact on the environment. Integrated Pest Management Coordinator (IPMC): ▪ Coordinate with PMTs, control provider, PMPAR, and natural resource manager to identify mosquito-breeding sites that can be permanently eliminated by non-chemical methods. ▪ Maintain mosquito control operation records. Conduct pre- and post-treatment surveys to monitor efficacy of control measures. Facilities Maintenance Provider/Grounds Maintenance Provider (FMP/GMP): ▪ Keep building window and door screens in good repair. ▪ Remove tall and/or overgrown vegetation that provides resting areas for adult mosquitoes. Self-Help Program Participants: ▪ Conduct integrated pest management to control infestations in outdoor areas using approved Self-Help non-chemical control methods. Unit Commanders and Building Supervisors: ▪ Ensure maintenance of window and door screens. ▪ If screens are not available, keep doors and windows closed when mosquitoes are present. ▪ Ensure distribution of mosquito prevention and control information to personnel. All Personnel: ▪ Use personal protective measures to prevent mosquito bites.
Reporting	▪ PMTs report surveillance results to IPMC and Mosquito Control Provider. ▪ Record all pest management operations using the Pesticide Management Treatment Record Form and report usage to the IPMC every month.

Survey

Survey Method(s)	▪ 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 device if available. ▪ Use traps weekly at same locations to reveal seasonal trends in mosquito abundance. Can be used in subsequent years to plan mosquito control program. ▪ Trap mosquitoes for virus testing.

Survey Frequency / Schedule	▪ 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, within 24 hours after application.
Action Threshold	▪ Light traps: 25 biting females or 1 vector species in an un-baited light trap ▪ Landing counts: 4 per 15 minutes ▪ 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 DOD entomologist or State Public Health Department personnel

Non-Chemical Control

Type	Method	Responsibility
Personal Protection	▪ Encourage use of repellents when outdoors in mosquito-infested areas. ▪ Products with the active ingredient diethyl toluamide (DEET) are most effective. ▪ Picaridin (KBR 3023) and IR3535 are also effective. ▪ 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.	FMP; GMP
Exclusion / Pest Proofing	▪ Window and door screens ▪ Remove tall weeds and overgrowth to remove possible resting areas for mosquitoes.	All personnel, including: Self-Help Program Participants; FMP; GMP
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.	All personnel, including: Self-Help Program Participants

Chemical Control

Application Site	When the use of non-chemical methods and larvicide do not control adult mosquitoes to an acceptable level, apply adulticides based on surveillance information and risk of mosquito-borne disease.

Site Preparation	▪ Survey treatment site prior to application to ensure presence of flying mosquitoes. ▪ Ensure building occupants are given warning of spray operations if they will be in the area during treatment. They should be advised to stay indoors and keep doors and windows closed during spraying. ▪ Check for thermal inversion (the ground is cooler than the air) to ensure pesticide stays close to ground. ▪ Check for light wind (3-5 mph) perpendicular to path of vehicle travel to maximize swath width. ▪ Check direction of wind and ensure pesticides do not drift into environmentally-sensitive areas. The pesticide label will indicate what animal species are at risk for pesticide poisoning. ▪ Survey area surrounding treatment area to ensure that bee hives will not be in the path of pesticide drift.	
Sensitive Areas	▪ All ULV and aerial 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.	
Restrictions / Regulations / Permits	▪ Pesticide applications to, over, or near waters of the US may require coverage under a NPDES Aquatic Pesticide Permit depending on size of treatment area.	
Common Active Ingredients	▪ Naled ▪ Malathion ▪ Permethrin ▪ Resmethrin ▪ d-Phenothrin (Sumithrin) ▪ Prallethrin ▪ Etofenprox ▪ Various Herbicides (for habitat reduction)	
Type	**Method**	**Responsibility**
Mosquito Adulticides	▪ Apply with ULV or fog generating ground equipment. ▪ Some chemicals may be corrosive and areas where cars are parked should be avoided or owners notified prior to application.	In-House PMP; Contracted PMP; Mosquito Control Provider
Aerial Application of Adulticides:	▪ Emergency control operations as the result of a disease outbreak may require large area application of an adulticide. ▪ Aerial spraying with an appropriately labeled pesticide and application equipment may be used. ▪ An Aerial Application Statement of Need must be prepared by the IPMC and approved by the ARNG PMC prior to aerial application of pesticides. ▪ Additional NEPA documentation and permitting may be required	Contracted PMP; Mosquito Control Provider

Herbicides	▪ Herbicides may be used to remove vegetation where removal by mechanical means is impractical.	In-House PMP; Contracted PMP
Special Applicator Qualifications	▪ All PMP and Mosquito Control Providers applying pesticides (including herbicides) must be DOD or State-certified as pesticide applicators.	

Additional Information

See AFPMB Technical Guide No. 13 for information on ULV application of pesticides: http://www.acq.osd.mil/eie/afpmb/docs/techguides/tg13.pdf

IPM Outline 6

Stinging Insects

Target Pest or Group	Wasps, hornets yellow-jackets and bees.
Target Area(s)	Outdoors.
Impact on Mission	▪ Stinging insects can cause painful stings, massive envenomization, or serious allergic reactions in personnel. ▪ Hives and nests can cause property damage and attract other unwanted pests.
Scope	▪ Outdoors where stinging insects are a threat to personnel. ▪ In occupied buildings and outbuildings where stinging insects nest.
Responsibility	▪ Self-Help Program Participants: Conduct integrated pest management to control infestations indoors, in outdoor living areas and around the perimeter of buildings using approved Self-Help control methods. ▪ Pest Management Provider (PMP), In-House or Contract: Conduct inspections and integrated pest management to control infestations through killing or removal. Remove wasp/hornet/yellowjacket nests and beehives in buildings. Relocate European honey bee swarms and beehives. ▪ Facilities Maintenance Provider (FMP) and Grounds Maintenance Provider (GMP): Report any stinging insect nest sightings.
Reporting	▪ Record all pest management operations using the Pest Management Treatment Record and report usage to the IPMC every month. ▪ Unusually aggressive bee colonies should be immediately reported to the IPMC.

Non-Chemical Control

Type	Method	Responsibility
Discourage and Eliminate Nests	▪ Nests should be removed or relocated by trained personnel.	In-House PMP; Contracted PMP
Avoidance	▪ Stay away from stinging insects if possible.	All personnel
Eliminate Food Sources	▪ Feed pets indoors. ▪ Cover trash cans.	All personnel
Eliminate Standing Water	▪ Some stinging insects are attracted to water. ▪ Repair leaking outdoor faucets and other mechanical water sources. ▪ Eliminate standing water.	FMP; GMP
Traps (Wasps and Yellowjackets)	<u>Wasps, hornets and yellowjackets:</u> ▪ Trapping should start in the spring and be continued through the summer. Early elimination of the queen will reduce the size of populations later in the year. ▪ Lure traps – baited with a chemical attractant or with meat. ▪ Water traps – Meat hung on a string 1-2 inches over a bucket of soapy water. Cover bucket with mesh to exclude other animals. <u>Bees:</u> ▪ Swarming bees can be lured into a trap that mimics a nesting site. ▪ Trapped bees can be relocated to less populated areas.	In-House PMP; Contracted PMP
Mechanical Removal	▪ Wet/dry vacuums may be used to remove bees, but this should only be done by trained personnel.	In-House PMP; Contracted PMP
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 or fill with expanding spray foam.	FMP; GMP

Chemical Control

Application Site	▪ Apply pesticides, as required based on survey information, to areas where stinging insects are known to harbor or rest.

Site Preparation	Pre-treatment procedures: ▪ Determine the extent of nesting in buildings to determine whether hive removal will be necessary after removing bees. ▪ Ensure the safety of people in the immediate area of the treatment. Do not allow unprotected bystanders to watch control procedures ▪ Pest management personnel should don protective bee suits. Post-treatment procedures: ▪ Remove dead bees and hive material from buildings. The melting of hive materials can cause extensive damage to building structures as well as attract other pests.	
Sensitive Areas	▪ Places where personnel may be harmed by bees or pesticide application. ▪ Buildings that may be damaged by hives.	
Restrictions	▪ Do not apply water-based aerosol pesticides in vicinity of electrical equipment. ▪ Do not apply liquid, aerosol or dust formulations of insecticides in occupied spaces.	
Common Active Ingredients	▪ d-trans Allethrin ▪ Cypermethrin ▪ Deltamethrin ▪ Ethofenprox ▪ Esfenvalerate ▪ lambda-Cyhalothrin ▪ n-Octyl bicycloheptene dicarboximide ▪ Permethrin ▪ d-Phenothrin ▪ Piperonyl butoxide ▪ Prallethrin ▪ Pyrethrins ▪ Prallethrin	
Types of Pesticides		
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.	Self-Help Program Participants, In-House PMP; Contracted PMP
Dusts	▪ Dusts can be applied to nesting areas.	In-House PMP; Contracted PMP
Baits	▪ Baits mixed with a toxicant can be used for wasps, hornets and yellowjackets.	In-House PMP; Contracted PMP

Environmental Considerations	▪ Ensure that insecticides do not enter drains, streams, lakes and other surface water. ▪ Some pollinators (including bees) are protected under the Endangered Species Act. Check with your Environmental Natural Resources office to determine if you have any protected species of bees in your area.
Special Applicator Qualifications	▪ Stinging insect control using approved aerosol insecticides may be used by non-certified personnel as part of the Self-Help Program. ▪ All PMP applying pesticides must be DOD or State-certified as pesticide applicators.

Additional Information

Rusty patched bumble bees are a protected species and should never be harmed. For more information and to learn how to identify these endangered bees from other common bumble bees, go to: https://www.fws.gov/midwest/endangered/insects/rpbb/pdf/RPBBFactSheet10Jan2017.pdf

Resources

http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7450.html

IPM Outline 7
Subterranean Termites

Target Pest or Group	Several species of termites in the family Rhinotermitidae, particularly: ▪ Arid Land Subterranean Termite – *Reticulitermes tibialis* ▪ Dark Southeastern Subterranean Termite – *Reticulitermes virginicus* ▪ Desert Subterranean Termite – *Heterotermes aureus* ▪ Eastern Subterranean Termites – *Reticulitermes flavipes* ▪ Western Subterranean Termite – *Reticulitermes hesperus*
Target Area(s)	Structures containing wood.
Impact on Mission	Damage to wood structures.
Scope	Base-wide, in and around buildings
Responsibility	▪ All personnel: Report termite sightings and damage to the IPMC, FMP or PMP. ▪ Pest Management Provider (PMP), In-House or Contract: Conduct integrated pest management to control infestations. ▪ Grounds Maintenance Provider (GMP): Perform grounds maintenance that minimizes pest infestations, as requested. ▪ Facilities Maintenance Provider (FMP): Perform facilities repairs and improvements that exclude and minimize pest infestations, as requested. ▪ Construction and Facility Management Office (CFMO): Ensure design, construction and pre-treatment techniques that can help prevent subterranean termite infestations are used in all new construction and structure renovations.
Reporting	Record all pest management operations using the Pesticide Management Treatment Record Form and report usage to the IPMC every month.

Survey

Survey Method(s)	Visual Inspections: ▪ 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. ▪ Conduct pre and post-treatment surveys to determine whether control operation was effective.
Survey Frequency / Schedule	▪ Annually in most regions. ▪ Biannually in arid regions. ▪ Ongoing observation by building occupants. ▪ During inspections done by PMP for other wood destroying pests, such as carpenter ants, as they occur.
Action Threshold(s)	▪ Presence of termites infesting wood indicates a need for control.

Non-Chemical Control

Type	Method	Responsibility
Building Design	Several design and construction techniques can help prevent subterranean termite infestations: ▪ Use wood species that are resistant to termite attack. ▪ Keep all wooden components at least 12-inches above the surface of the soil. ▪ Replace soil around the foundation of the building with sand (particle size ranging from 10 to 16 mesh). Before pouring slab, install termite-resistant mesh and eliminate openings around plumbing and other utilities protruding from slab. ▪ Provide adequate ventilation in crawl spaces to keep wood dry.	CFMO, FMP
Cultural	▪ Do not place firewood or other wood against the outside of the building. Doing so can: ▪ Bring wood infested with termites into proximity to the building. ▪ Provide habitat for termites. ▪ Hold moisture next to the building. ▪ Prevent inspection of that section of the building. ▪ Do not allow lawn sprinklers to constantly hit wooden portions of the building or allow water to puddle next to building foundations.	All personnel, FMP, GMP
Physical/ Mechanical	▪ Reduce sources of moisture, such as condensation and leaks.	FMP, GMP

	▪ Trim vegetation against siding and roofs. ▪ Use sealants, such as caulking, to minimize access into buildings. ▪ Clean gutters and ensure they are pitched for proper drainage. ▪ Check to ensure soffits are seated and roofing materials are in good repair. ▪ Replace severely damaged wood. ▪ Remove scrap wood from around structures. ▪ 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.	
Prohibited Items	Use of ultrasonic pest repelling devices is prohibited.	

Chemical Control

Application Sites	▪ Structures containing wood that are infested with termites. ▪ Construction sites determined to be good candidates for pre-treatment.
Site Preparation	Pre-treatment procedures: ▪ Visual inspection of crawl spaces and review of structural plans to determine the best locations for insecticide injections. ▪ Pesticide applicator shall contact building occupants prior to pesticide applications. ▪ All food should be removed from exposed areas and processing equipment and utensils covered or stored. ▪ Cover furnishings and surfaces to protect from dust generated during drilling. Post treatment procedures: ▪ Do not remove bait stations or other bait placements. ▪ Thoroughly clean surfaces and furnishings that may have been covered with dust during drilling ▪ Plug drill holes with cement, caulking, or other appropriate material and repair any other damages associated with drilling and termite survey. ▪ Thoroughly clean all food preparation surfaces in treated buildings.
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.
Common Active Ingredients	▪ Diflubenzuron ▪ Fipronil ▪ Hydramethylnon ▪ Sulfluramid ▪ Plus other termiticides

Types of Pesticides		Authorized Applicators
Chemically Treated Lumber	▪ Use lumber near the soil surface that has been impregnated (pressure treated) with a variety of repellent/fungicidal/insecticidal chemicals prior to construction. ▪ Some of these products are also available for topical application to wood after construction. ▪ These products are not effective for controlling pre-existing termite infestations.	FMP; Construction Contractors; In-House PMP; Contracted PMP
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. ▪ Only non-repellent termiticides should be used.	In-House PMP; Contracted PMP
Baits	▪ Bait stations containing a slow acting insecticide are placed around the building. ▪ Termites feed on the bait, then return to the colony where they share the bait with other members of the colony. ▪ Although some baits are available to the general public, proper and thorough bait placement is critical to the success of the procedure and must be performed by pest management personnel with experience in termite baiting.	In-House PMP; Contracted PMP
Soil Insecticide Injection	▪ 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 need for this work. Applying pesticide to the wrong place can cause contamination in the plumbing or heating ducts.	In-House PMP; Contracted PMP

Contract or Work Considerations

Time Period to Respond	Subterranean termite infestations progress very slowly. Take time to select the proper control measures and find a PMP with termite-control experience.
Time Period to Obtain Control	Termiticides are slow acting. Treatments target not only foragers but the colony and queen as well, and require time before there is a noticeable effect.
Level of Control	Once the colony is destroyed control level should be 100%
PMQAE Assessment	▪ Observe mixing and application during pre-construction treatments to ensure that the PMP uses the proper concentration and amount of termiticide, and that the ground is thoroughly treated to prevent gaps in coverage. ▪ Conduct pre and post-treatment surveys with PMP for post construction treatments to determine efficacy.

Safety Considerations	▪ Applicators must wear personal protective equipment as required by the product label.
Environmental Considerations	▪ Termiticides have a long residual in soil. Care must be taken when applying to prevent contamination of non-target areas.
Special Applicator Qualifications	▪ All PMP must be DOD or State-certified as pesticide applicators. ▪ Subterranean termite control is NOT part of the Self-Help Program.

Resources

http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7415.html
http://www.acq.osd.mil/eie/afpmb/docs/techguides/tg29.pdf

Subterranean termite shelter tubes.

IPM Outline 8
Mice and Rats

Target Pest or Group	Norway rats, roof rats, house mice, and deer mice
Target Area(s)	Buildings, utility vaults, and other structures
Impact on Mission	▪ May transmit disease ▪ Contaminate food ▪ Damage equipment ▪ Nuisance / morale
Scope	Only commensal rodents and those that are frequent pests of structures. Does not include landscape rodents such as gophers and squirrels.
Responsibility	▪ All personnel: Ensure sanitation and other measures to prevent introduction and propagation of pests. ▪ Self-Help Program Participants: Conduct integrated pest management to control infestations indoors and around the perimeter of buildings using non-chemical control methods. ▪ Pest Management Provider (PMP): Conduct integrated pest management to control infestations. ▪ Facilities Maintenance Provider (FMP): Perform facilities repairs and improvements that exclude and minimize pest infestations as requested. ▪ Grounds Maintenance Provider (GMP): Remove potential food sources (i.e. fruit on trees) and create barriers (i.e. by vegetation removal) around buildings to deter rodent invasion. ▪ Natural Resources Manager (NRM): Provide guidance when rodent control operations may impact endangered or threatened species or species of concern.
Reporting	▪ Record all pest management operations using the Pesticide Management Treatment Record Form and report usage to IPMC every month.

Survey

Survey Methods	▪ Visual inspections: observations of rodents or signs of rodents, such as nests, rubmarks, gnawing, earth mounds, burrows, 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 operations were effective ▪ Use of ultraviolet inspection lights (rodent urine and hair will fluoresce under UV light)
Survey Frequency / Schedule	▪ Daily observation by building occupants. ▪ Routine facilities inspections by PMP or pest control service provider.
Action Threshold(s)	Sighting of any rodent or sign of rodent in or immediately surrounding the building.

Non-Chemical Control

Type	Method	Responsibility
Sanitation	▪ Remove or prevent access to all potential food and harborage sources inside and outside of buildings.	All personnel, including: Self-Help Program Participants
Eliminate Standing Water	▪ Fix plumbing leaks around buildings	FMP
Rodent Proofing	▪ Trim ornamental plants and trees to remove harborage. ▪ Seal holes that may serve as entryways through exterior walls. ▪ Trim tree limbs so that they are at least 6 feet from buildings. ▪ Trim vegetation around buildings. ▪ Clean up debris from inside and around buildings. ▪ Request support from facilities maintenance and/or grounds maintenance provider if necessary.	FMP, GMP
Habitat Modification	▪ For field mice: removing vegetation and disking 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. This type of planting allows rodents to move into buildings from unimproved grounds.	GMP

Trapping	▪ Glue boards, snap traps, or other mechanical trapping devices. (see health precautions below)	Self-Help Program Participants, In-House PMP; Contracted PMP
Education	▪ Awareness of the importance of sanitation on preventing rodents ▪ Understanding and preventing diseases associated with rodents.	In-House PMP; IPMC
Prohibited Items	▪ Use of ultrasonic pest repelling devices is prohibited. ▪ 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.	

Chemical Control

Application Site	Apply pesticides as required based on survey information to areas where rodents are known to harbor, feed or travel.
Site Preparation	Pre-treatment procedures: ▪ Pesticide applicators shall contact building occupants prior to pesticide applications. ▪ All bait locations must be mapped. ▪ Bait stations should be secured to prevent removal. ▪ Bait stations must be properly labeled and marked with the date on which they were placed. Post treatment procedures: ▪ Bait stations should be checked to ensure that stations are refilled, intact, and no bait has fallen from them. ▪ Remove bait stations once post treatment surveys indicate that rodents have been eliminated.
Sensitive Areas	▪ Areas where people and non-target animals may come into contact with the rodenticide. ▪ Areas where endangered or threatened rodent species occur and may consume bait. ▪ Areas where rodents may be the primary food source for an endangered or threatened animal. ▪ Habitat destruction to reduce rodent food sources or harborage may also be destructive to critical habitats of endangered or threatened species. ▪ The IPMC must consult the NRM before any pest management operations are conducted outdoors on unimproved grounds or wildlands.

Common Active Ingredients	Second generation anti-coagulants: ▪ Brodifacoum ▪ Bromadiolone ▪ Difenacoum ▪ Difethialone First generation anti-coagulants: ▪ Diphacinone ▪ Chlorophacinone ▪ Warfarin Others: ▪ Zinc phosphide ▪ Cholecalciferol ▪ Bromethalin Fumigants: ▪ Aluminum phosphide	
Types of Pesticides		**Authorized Applicators**
Bait	▪ Anticoagulant bait: Multi or single dose blocks or pellets; toxicant effect is delayed. ▪ Single dose acute toxicant bait: Acute toxicant effect. ▪ Liquid bait: Used in areas where water sources are scarce. ▪ All rodenticide baits must be applied in tamper-proof bait stations. ▪ Baits may also be applied directly into burrows in some circumstances and when explicitly allowed according to the product label.	In-House PMP; Contracted PMP
Fumigants	▪ Used for control of rodents in burrows. ▪ Fumigants are often restricted use pesticides and may require additional record-keeping and certification.	In-House PMP; Contracted PMP

Contract or Work Considerations

Time Period to Respond	▪ Rodents indoors require an immediate response. ▪ High priority areas (i.e. food service establishments) with known rodent problems may require continuous surveillance and subsequent baiting as part of a recurring contract.
Time Period to Obtain Control	▪ Trapping may take several days to complete. ▪ Most rodenticides have a delayed effect and may take 24-48 hours to kill the rodent.
Level of Control	100% indoors.
Safety Considerations	▪ 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

Environmental Considerations	▪ Rodenticides can adversely impact non-target animals through direct poisoning or secondary poisoning. ▪ Traps, such as sticky traps, may catch non-target animals such as reptiles and birds. Sticky traps should only be used indoors.
Special Applicator Qualifications	▪ Rodent control using mechanical methods (traps) may be used by non-certified personnel as part of the Self-Help Program. ▪ All PMP applying pesticides must be DOD or State-certified as pesticide applicators.

Additional Information

Precautions on indoor rodent control:

- 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.
- Rat control indoors using rodenticides should be avoided. The most commonly used rodenticide baits have a delayed toxic effect that does not kill the rodent until hours (or days for multi-dose) 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 caused by the decaying carcass.

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 carcasses are found after rodenticide use. The following precautions should be taken:

- Avoid disturbing feces and other rodent waste when entering enclosed spaces. Use a fitted respirator with high efficiency particulate air (HEPA) filter if necessary.
- Soak rodent waste and dead rodents with a household disinfectant or 10% bleach solution before removing.
- Wear gloves when cleaning or picking up rodent carcasses. Put material in a double plastic bag and dispose of in regular trash.

Resources

House mice: http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7483.html

Rats: http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74106.html

IPM Outline 9
Nuisance Birds



Target Pest or Group	Birds
	▪ Most birds are protected under the Migratory Bird Treaty Act (MBTA).
	▪ Without a permit issued by the U.S. Fish and Wildlife Service (USFWS), no actions that affect birds can be taken.
	▪ Actions that affect birds includes:
	  ▪ Harassment, using non-lethal means
	  ▪ Shooting
	  ▪ Live trapping for relocation
	  ▪ Removal of active nest (or inactive nest of eagles and threatened/endangered species of birds)
	  ▪ Or any action that is considered an impact by the USFWS.
	▪ Bald and Golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) that has greater protections and requirements than the MBTA.
	▪ The following birds are some of the common non-native birds to the United States. These birds are not protected by the MBTA or BGEPA:
	  ▪ European Starlings – *Sturnus vulgaris*
	  ▪ House Sparrows – *Passer domesticus*
	  ▪ Pigeons (or Rock Doves) – *Columba livia domestica*
	  ▪ Mute Swans – *Cygnus olor*

Target Area(s)	Areas near buildings or populated areas.

Impact on Mission	▪ Most birds do not pose any serious medical hazard or create a significant threat to government property or mission accomplishment.
	▪ Birds may carry diseases and parasites that can infect humans.
	  ▪ Bird feces may contain several pathogenic disease-causing organisms such as Histoplasma and Cryptococcus.
	  ▪ Nests may also contain ectoparasites, such as mites or swallow bugs (similar to bed bugs), that may feed on humans if there are no longer birds using the nest. While this is usually a minor medical issue, it can cause significant morale issues.
	▪ Birds that build nests or deposit feces on the exterior of structures can adversely impact the aesthetics of the structure and surrounding area.

Scope	▪ Base-wide (For control of birds at airfields/heliports, please refer to the site-specific Bird/Wildlife Airstrike Hazard (BASH/WASH) Plan or contact the IPMC.)
Responsibility	▪ Pest Management Provider (PMP), In-House or Contract: Conduct integrated pest management of nuisance birds. ▪ Facilities Maintenance Provider (FMP): Perform facilities repairs and improvements that exclude nuisance birds from buildings. ▪ Base Operation Support: Ensure that dumpsters and trashcans are emptied on schedule, and that they are securely covered to prevent entry by nuisance birds. ▪ Natural Resources Manager (NRM): Provides information regarding any regulatory protections of nuisance birds. ▪ All Installation Personnel: Practice good sanitation and do not feed unwanted or nuisance birds to prevent attracting them.
Reporting	▪ Record all pest management operations to the IPMC using the Pest Management Treatment Record and report usage to IPMC every month.

Survey

Survey Method(s)	▪ Visual sighting of birds, nests or bird feces.
Survey Frequency / Schedule	▪ As needed.
Action Threshold	▪ Any verified sighting of a bird where it enters a building or poses a safety or health hazard.

Non-Chemical Control

Type	Method	Responsibility
Exclusion	▪ Primary methods for controlling nuisance birds. ▪ Use screening, hardware cloth and metal flashing to cover holes and cracks to prevent entry of birds into buildings. ▪ Use netting to prevent access to the area under building eaves. ▪ Use lids / covers that can be secured on dumpsters and trashcans.	FMP; PMP
Cultural	▪ Keep loading dock doors and unscreened windows closed when not in use. ▪ Deny access to trash and other sources of food. ▪ Prevent personnel from feeding birds other than at authorized bird feeding locations. ▪ Repair leaking plumbing to remove sources of water. ▪ Raising the mowing height of grass can discourage nuisance birds (especially Canada geese). ▪ Erect nesting platforms for birds such as osprey to offer nesting locations other than power poles.	All personnel

Mechanical/ Physical	▪ Nesting in and roosting on buildings can be reduced by architectural modifications of ridges and openings.
	▪ Silicone-based, anti-graffiti paint can be used to discourage nesting of swallows (the surface of the paint is too slick for the mud nests to stick to it).
	▪ Removal of inactive nests (unless it is an eagle or threatened/endangered species nest).
	▪ Power washing with water can remove inactive nests, but NRM must be consulted prior to any nest removal.
	▪ Shooting may be used to control small populations (i.e., geese, crows) in areas where:
	  ▪ Shooting is legal and completed by a professional.
	  ▪ Shooting can be safely conducted.
	  ▪ Appropriate permits have been obtained.
	▪ Must have NRM coordination and oversight.
		FMP; Qualified PMP; NRM coordination

Trapping	▪ Live cage-type traps may be used for birds, especially if inside buildings. ▪ Lethal trapping may be appropriate in instances when nuisance birds are non-native species. ▪ Extreme care must be taken to prevent killing non-target animals. ▪ All trapping of nuisance birds must be done with coordination and oversight of the NRM.	PMP In-House or Contract; NRM coordination
Harassment	▪ Use of specially-trained dogs can be very effective to discourage non-migratory Canada geese from foraging/roosting on turf in cantonment areas. ▪ Flashing lights and sounds typically have only temporary effects and are not recommended for most circumstances. ▪ All harassment of nuisance birds must be done with coordination and oversight of the NRM.	PMP In-House or Contract; NRM coordination
Prohibited Practices	▪ Use of electronic or ultrasonic pest repelling devices is prohibited. ▪ Predator (owls, coyotes, etc.) statues/decoys are ineffective and prohibited. ▪ Relocation of trapped animals farther than one mile from point of capture is prohibited. ▪ Killing, trapping, relocating or harassing any birds protected under the MTBA, BGEPA and/or Endangered Species Act (ESA) is prohibited, unless the proper permit/authorization is obtained.	
Sensitive Area/ Environmental Concerns	▪ Coordinate with the Cultural Resources Manager (Environmental Office) before undertaking any architectural modifications involving buildings or structures over 50 years old; allow sufficient time for coordination, as consultation outside VAARNG might be required. ▪ Most birds are protected and the identity of nuisance bird species should be certain before any control work takes place.	
Permitting	▪ The appropriate USFWS permit/authorization must be obtained if control actions have any potential to affect MBTA, BGEPA or ESA-protected birds (birds other than European Starlings, Pigeons, House Sparrows, and Mute Swans).	

Special PMP Qualifications	▪ All PMPs performing bird control should hold appropriate licenses and permits to legally capture, transport and release (or euthanize) nuisance birds. ▪ Nuisance birds should never be handled alive or dead with bare hands. PPE should be worn when removing inactive nests and/or bird feces.

Chemical Control

Chemical control (avicides) is rarely used for the control of birds at ARNG sites. Chemical control is only performed in extreme cases, such as when birds are nesting on aircraft or causing danger to human life. In most cases, control is achieved with non-chemical methods since using avicides may kill endangered or threatened birds, and/or non-target species. All chemical control of birds must be pre-approved by the ARNG PMC.

Additional Information

Woodpeckers often "drum" on buildings during the mating season to attract a mate. Drumming typically does not cause any damage to the building. If a woodpecker is causing damage to a building, there is usually an infestation of wood-boring insects. More information on woodpeckers can be found in the link listed in the Resources section below.

Swallows (especially Cliff and Barn Swallows) may carry Swallow Bugs. Swallow Bugs are very similar in appearance to Bed Bugs. If there is a reported outbreak of Bed Bugs in buildings where swallows nest, ensure the infestation is actually Bed Bugs. Swallow bugs are considerably less costly to control than Bed Bugs and require different control techniques.

Some populations of Canada Geese have become non-migratory and may live year-round in cantonment areas, often where there is turf surrounding an ornamental pond. Limiting access to the pond with taller vegetation or a low fence around the entire edge of the pond can help to discourage the geese from using the area since geese prefer to walk into the pond rather than fly up and over a boundary to get to the water.

Resources

Swallow management: http://ipm.ucanr.edu/PMG/PESTNOTES/pn7482.html
Woodpecker management: http://ipm.ucanr.edu/PMG/PESTNOTES/pn74124.html

IPM Outline 9

Vertebrate Wildlife Pests

Target Pest or Group	Vertebrate pests, such as: ▪ Raccoons ▪ Skunks ▪ Squirrels and chipmunks ▪ Voles ▪ Moles and shrews ▪ Groundhogs ▪ Beavers ▪ Opossums ▪ Deer ▪ Coyotes, bobcats and other carnivores ▪ Other nuisance wildlife
Target Area(s)	Areas near buildings or populated areas.
Impact on Mission	▪ Wild and feral animals are dangerous when they are cornered and can become aggressive. ▪ Many wild and feral animals may carry rabies and other diseases and parasites that can infect humans. ▪ Nuisance wildlife can cause severe damage to buildings, other structures and equipment.
Scope	▪ Base-wide

Responsibility	▪ Pest Management Provider (PMP), In-House or Contract: Conduct integrated pest management of vertebrate pests. ▪ Facilities Maintenance Provider (FMP): Perform facilities repairs and improvements that exclude vertebrate pests from buildings. ▪ Base Operation Support: Ensure that dumpsters and trashcans are emptied on schedule and that they are securely covered to prevent entry by vertebrate pests. ▪ Natural Resources Manager (NRM): Provides information regarding any regulatory protections of vertebrate pests. ▪ All Installation Personnel: Practice good sanitation and do not feed wild and feral animals to prevent attracting them.
Reporting	▪ Record all pest management operations using the Pesticide Management Treatment Record Form and report usage to the IPMC every month.

Survey

Survey Method(s)	▪ Visual sighting of vertebrate pests or signs of raccoons. ▪ A number of vertebrate pests are nocturnal, so visual surveys may need to be conducted at night. ▪ Verify personnel reports of vertebrate pest activity.
Survey Frequency / Schedule	▪ As needed.
Action Threshold	▪ Any verified sighting of a vertebrate pest when it enters a building or poses a safety or health hazard.

Non-Chemical Control

Type	Method	Responsibility
Exclusion	▪ Use lids / covers that can be secured on dumpsters and trashcans. ▪ Use hardware cloth and metal flashing to cover holes and cracks to prevent entry of vertebrate pests into buildings. ▪ Repair leaking plumbing to remove source of water for vertebrate pests.	FMP

Trapping	▪ Live cage-type traps may be used for most wildlife and for feral cats and dogs. ▪ Use cat food containing fish or canned tuna as a bait for most vertebrate pests. ▪ Ensure that the target pest cannot reach through the back or side of the trap to steal the bait. ▪ Secure trap to the ground to prevent the animal from tipping it over. ▪ Lethal trapping may be appropriate for instances of nuisance wildlife that is not easily relocated or is a non-native species. ▪ Extreme care must be taken to prevent killing non-target animals. ▪ **All trapping of nuisance wildlife must be done with coordination and oversight of the NRM.**	PMP In-House or Contract; NRM coordination
Food Removal	▪ Deny access to trash and other sources of food. ▪ Prevent personnel from feeding wildlife and feral animals.	All personnel

Shooting	▪ Shooting may be used to control small populations in areas where:
	  ▪ Shooting is legal.
	  ▪ Shooting can be safely conducted.
	  ▪ Appropriate permits have been obtained.
	▪ Qualified marksmen should perform the shooting.
	▪ Not generally practical for large populations
	▪ **All shooting of nuisance wildlife must be done with coordination and oversight of the NRM.**
		Qualified PMP

Prohibited Practices	▪ Use of ultrasonic pest repelling devices is prohibited. ▪ Relocation of trapped animals greater than one mile from point of capture is prohibited. ▪ Killing, trapping, relocating or harassing any wildlife protected under the Endangered Species Act is prohibited.	
Special PMP Qualifications	▪ All PMP performing vertebrate pest control should hold appropriate licenses and permits to legally capture, transport and release (or euthanize) nuisance wildlife and vertebrate pests. ▪ Vertebrate pests should never be handled alive or dead with bare hands. ▪ All PMP performing vertebrate pest control should have pre-exposure immunization against rabies.	

Chemical Control

Chemical control is rarely used for the control of most vertebrate pests.

If sufficient control of vertebrate pests cannot be achieved using the non-chemical controls, contact your IPMC or the ARNG PMC for further guidance. Chemical control of some vertebrate pests may be allowed under certain circumstances. However, all chemical control of

vertebrate pests must be in accordance with a site-specific IPM outline/SOP for chemical control of that pest.

Additional Information

Beaver management: http://agrilifecdn.tamu.edu/txwildlifeservices/files/2016/07/fs_beaver.pdf

Coyote management: http://icwdm.org/handbook/carnivor/coyotes.asp

Deer management: http://ipm.ucanr.edu/PMG/PESTNOTES/pn74117.html

Groundhog management: http://icwdm.org/handbook/rodents/woodchucks.asp

Mole management; http://ipm.ucanr.edu/PMG/PESTNOTES/pn74115.html

Opossum management: http://ipm.ucanr.edu/PMG/PESTNOTES/pn74123.html

Raccoon management: http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74116.html

Skunk management: http://ipm.ucanr.edu/PMG/PESTNOTES/pn74118.html

Squirrel management: http://ipm.ucanr.edu/PMG/PESTNOTES/pn74122.html

IPM Outline 10
Weeds and Unwanted Vegetation

Target Pest or Group	Grasses, broadleaf weeds and woody weeds.
Target Area(s)	Fence lines, road shoulders, parking lots, around fuel storage tanks, utility easements, sidewalks, landscaped areas, lawns and turf, recreational fields and ranges.
Impact on Mission	▪ Fire hazard. ▪ Dense weeds encourage rodent and other pest infestations. ▪ Weeds along roadways hide wildlife increasing the risk for vehicle and animal collisions. ▪ Weeds impair sight-lines along security fences and on training ranges. ▪ Degrades installation appearance.
Scope	Improved and semi-improved grounds, rights-of-way, fence lines, paved areas and ranges.
Responsibility	▪ Self-Help Program Participants: Conduct integrated pest management to control weeds using approved Self-Help control methods. ▪ Pest Management Provider (PMP), In-House or Contract: Conduct integrated pest management to control weeds. ▪ Grounds Maintenance Provider (GMP) and/or Facilities Maintenance Provider (FMP): Mechanical control methods and/or mowing to reduce height of weeds.
Reporting	Record all pest management operations using the Pesticide Management Treatment Record Form and report usage to the IPMC every month.

Survey

Survey Method(s)	▪ Visual observation and identification during routine inspections. ▪ Annual surveys of roadways and fence lines. ▪ Personnel complaints of weeds impeding mission, contributing to pest infestations, fire hazard or degradation of aesthetics. ▪ Conduct pre and post-treatment surveys to determine whether control operations were effective.
Survey Frequency / Schedule	▪ Daily inspection of areas with extreme fire hazard. ▪ Weekly inspection of landscaped areas. Can be done in conjunction with regular landscape maintenance.
Action Threshold(s)	▪ There is a zero tolerance for weeds installation areas where ordinance or other flammable/explosive materials are stored, due to fire hazard. Consequently, visual sighting of any weed warrants control.

Non-Chemical Control

Type	Method	Responsibility
Mechanical Removal	Pulling or hoeing: ▪ Pull weeds either by hand or with tools that work well on large plants, such as a weed. ▪ Pull up as much root as possible since plants can re-sprout new shoots from the root. ▪ 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: ▪ Drag heavy chains across the tops of target weeds, destroying the foliage and reducing weed density. Root plowing: ▪ Plow with horizontal blades beneath the surface of the ground to sever the root system of target weeds.	Self-Help Program Participants, In-House PMP, Contracted PMP, GMP (or FMP)
Steam	▪ Apply steam to foliage to kill plants. ▪ This technique is unlikely to be cost effective for most weed-control situations and is not recommended by the IPMC.	In-House PMP, Contracted PMP, GMP (or FMP)
Plant Competition	▪ Plant areas with desirable low-growing plants, such as native grasses, to shade-out and outcompete weeds.	GMP (or FMP)
Weed Control Mat	▪ Apply weed control matting. ▪ Matting is composed of synthetic polyester fibers spun tightly together to prevent weed growth by blocking sunlight while still allowing water percolation for drainage. ▪ The matting is unrolled to cover weed-infested areas.	GMP (or FMP)

Improve Vigor of Desirable Plants	▪ Healthy landscaping plants are better able to compete with weeds, thereby slowing the rate of weed invasion. ▪ Aerate and remove thatch in lawns. ▪ Maintain proper watering, fertilizing, and pruning schedules for desirable landscape plants. This is particularly important for managing crabgrass in turf.	GMP (or FMP)
Mulch	▪ Apply course-textured mulches up to 4 inches deep. ▪ Apply fine-textured mulches to a depth of about 2 inches. ▪ Organic mulches: wood chips, sawdust, yard waste, and bark chips. ▪ Inorganic mulches: 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.	GMP (or FMP)

Chemical Control

Application Site	When non-chemical methods do not control weeds to an acceptable level, apply herbicides as required based on survey information, to areas where target weeds are problematic.
Site Preparation	<u>Pre-treatment procedures:</u> ▪ Check the local weather forecast. Rain can reduce or negate the effectiveness of an herbicide by washing herbicide off the plant. If precipitation is expected in the next 24-hours, delay application. ▪ Modify irrigation schedule, if necessary. Ensure that sprinklers do not come on immediately following an herbicide application. ▪ Check the local wind conditions. Herbicides can drift and affect non-target plants if applied during windy conditions. ▪ Do not apply herbicides during high temperatures (>95ºF), as this can result in excess vaporization of the herbicide. <u>Post-treatment procedures:</u> ▪ Survey the area to establish the efficacy of control. The length of time between application and survey is dependent upon the species of weed being controlled. ▪ Multiple applications may be necessary, particularly if conditions during the first application were too warm, too dry, or too wet.

Sensitive Areas	▪ Use mechanical controls instead of chemical controls whenever possible around playgrounds and areas frequented by children. ▪ Natural areas containing endangered or threatened plant or animal species are normally off-limits for chemical weed control. Do not apply herbicides or allow herbicide drift onto these areas. ▪ Desirable landscape plants. Prevent herbicide drift onto these plants. ▪ Waterways. Avoid stormwater runoff of herbicides and do not apply directly to water unless allowed by the label. Many herbicides are highly toxic to aquatic organisms.	
Restrictions/ Permitting	▪ 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 US may require coverage under a NPDES Aquatic Pesticide Permit.	
Prohibited Items	▪ Application of salt to control weeds.	
Common Active Ingredients	▪ Glyphosate ▪ Imazapyr ▪ Dichlobenil ▪ Bromacil ▪ Diuron ▪ Pendimethalin ▪ Prometon ▪ Tebuthiuron ▪ Hexazinone ▪ Dicamba ▪ 2,4-D ▪ Diflufenzopyr ▪ Triclopyr ▪ Metsulfuron methyl ▪ Sulfometuron ▪ plus others	
Types of Pesticides		**Authorized Applicators**
Ready-to-Use Glyphosate Herbicides	▪ Spray herbicide directly onto the foliage of the weed. ▪ Apply after the weed emerges, but before seed set. ▪ Foliar application is most effective when weeds are young and the weather is clear. ▪ Spot treat weeds growing in paved areas.	Self-Help Program Participants; In-House PMP; Contracted PMP
Pre-Emergent Herbicides	▪ Apply herbicide to the soil before the first leaves emerge to prevent the weed from developing. ▪ Apply pre-emergent herbicides to the soil just before seed germination. ▪ Selective pre-emergent herbicides must be used so that desirable landscape plants are not harmed.	In-House PMP; Contracted PMP

Foliar-Sprayed Post-Emergent Herbicides	▪ Spray herbicide directly onto the foliage of the weed. ▪ Apply post-emergent herbicides after the weed emerges, but before flowering and seed set. ▪ Foliar application is most effective when weeds are young. ▪ Spot treat weeds growing in paved areas.	In-House PMP; Contracted PMP
Soil-Applied Post-Emergent Herbicides	▪ Apply herbicide to the soil around the weed. ▪ The herbicide is absorbed by the plant through its root system.	In-House PMP; Contracted PMP

Contract or Work Considerations

Time Period to Respond	Dependent on service levels. Can be scheduled annually for pre-emergent applications if there is an established history of weed problems.
Time Period to Obtain Control	Dependent on service levels. May take several days before signs of herbicide effect appear.
Level of Control	Dependent on service levels. Complete removal of weeds from sidewalks and other paved surfaces. For fence lines, weed should be low enough to maintain sight lines. Control weeds around fuel tanks to reduce fire risk.
Safety Considerations	▪ Applicators must wear personal protective equipment as required by the product label. ▪ Restrict entry of personnel into treated areas as directed by the product label.
Environmental Considerations	▪ Prevent herbicide drift to non-target areas and prevent contact with desirable plants. Avoid contaminating water.
Special Applicator Qualifications	▪ Small-scale weed control using approved low-toxicity, ready-to-use herbicides may be performed by non-certified personnel as part of the Self-Help Program. ▪ All PMP or GMP applying pesticides (including herbicides) must be DOD or State-certified as pesticide applicators.

Additional Information

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.

Resources

Weed Management in Landscapes: http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7441.html
Weed Management in Lawns: http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74113.html
Roadside Weed Management: http://edis.ifas.ufl.edu/topic_roadside_weeds
Integrated Roadside Vegetation Management: http://www.tallgrassprairiecenter.org/irvm
DOT Roadside Vegetation Management: https://www.environment.fhwa.dot.gov/ecosystems/vegmgmt.asp

IPM Outline 11
Non-Native, Invasive/Noxious Weeds
In Natural Areas, Ranges and Training Areas

Target Pest or Group	Non-native plants that are widespread and adversely affect the habitats they invade, economically, environmentally or ecologically.
Target Area(s)	Natural areas, ranges, riparian areas, training areas, encroachment buffers.
Impact on Mission	▪ Control required by law ▪ Impacts access to and use of training areas and ranges ▪ Interferes with mission operations ▪ Degrades natural habitats ▪ Impacts endangered and threatened species habitats ▪ May increase wildfire hazard
Scope	Installation unimproved grounds.
Responsibility	▪ Natural Resources Manager (NRM): Oversees weed program coordinating detection and control. ▪ Pest Management Provider (PMP), In-House or Contract: Conducts integrated pest management to control weeds. ▪ IPM Coordinator (IPMC): Ensures environmental compliance of the program.

Control Strategy	▪ Develop a plan to determine what resources need protection against invasive species and which plants pose an actual threat. ▪ Place highest priority on the weeds that have the highest mission impact. ▪ The plan should include solid knowledge of 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. ▪ Use the following resource: http://plants.usda.gov/java/noxiousDriver - Federal and State Noxious Weed Lists to help prioritize. . ▪ 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 weed. Some areas will be dense and completely overrun, while other patches are relatively free of weeds. 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. ▪ 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	▪ Record all pest management operations using the Pesticide Management Treatment Record Form and report usage to the IPMC every month. Report invasive weed control operations to Natural Resources Personnel in cases where weeds are being removed to protect or restore natural habitats. ▪ Reporting of herbicide use and application monitoring to local Water Regulatory Agency is required when the operation is covered under a NPDES Aquatic Pesticide Permit.

Survey

Survey Method(s)	Visual inspection and mapping
Survey Frequency / Schedule	Ongoing inspection, especially in the spring and summer when plants are easy to identify by their blooms.
Action Threshold(s)	▪ Priority of control of weeds is based upon the Federal and State Noxious Weeds list and impact on mission. ▪ Areas of installations where ordinance 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

Type	Method	Responsibility

Prevention	▪ Preventing just one new invasive weed is of greater conservation benefit in the long run and is far less costly than controlling a widespread rampant pest.
	▪ Block the transport of plant materials onto relatively clean sites or sites that are actively being cleaned.
	▪ Common means of spreading plant materials are:
	  ▪ Tire tread from bicycles and vehicles
	  ▪ Vehicle undercarriages
	  ▪ Boot treads
	  ▪ 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
	  ▪ Fill for construction sites such as rock fill and soil
	▪ Check plants that are intentionally brought in to ensure none of them are invasive.
	▪ Keep vehicles, tire treads and boots free of dirt and seeds before entering a sensitive area.
	▪ Import fill dirt and gravel from areas that do not have invasive weeds or purchase from suppliers that are certified weed free.
		NRM oversees prevention program

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 can be used along with pulling to lift the entire plant from the soil.	In-House PMP; Contracted PMP
Cutting	▪ Cutting works well for 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.	In-House PMP; Contracted PMP

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.	In-House PMP; Contracted PMP
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.	In-House PMP; Contracted PMP
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.	NRM Coordinates; In-House PMP; Contracted PMP
Competition and Restoration	▪ Use native plants to out-compete invasive weeds. 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.	NRM coordinates
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 uninfested site since seeds can be spread in the animals' droppings.	NRM coordinates
Biological Control	▪ Beneficial organisms can reduce a few specific 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.	NRM coordinates

Plant Disposal	▪ Avoid leaving plant remains onsite. Many plants can re-root themselves and continue to grow if left in piles. ▪ When invasive plants are removed they should be placed directly into plastic bags which are sealed at the end of the removal process. The sealed bags should be disposed of by being buried in a landfill or burned.	In-House PMP; Contracted PMP
Cleaning of Vehicles and Equipment	▪ In order to prevent the introduction and spread of invasive weeds, 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 being used on a construction site, prior to being used elsewhere on base. ▪ Vehicles/equipment moved from site to site during weed control should also be inspected and cleaned in order to prevent further spread. ▪ Equipment to be cleaned 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.	In-House PMP; Contracted PMP

Chemical Control

Application Site	Apply herbicides as required based on survey information to areas where target weeds are problematic.
Site Preparation	<u>Pre-treatment procedures:</u> ▪ Check the local weather forecast. Rain can reduce or negate the effectiveness of an herbicide by washing the herbicide off the plant. If precipitation is expected in the next 24-hours, delay application. ▪ Check the local wind conditions. Herbicides can drift and affect non- target plants if applied during windy conditions. ▪ Do not apply herbicides during high temperatures (>95□F), as this can result in excess vaporization of the herbicide. <u>Post-treatment procedures:</u> ▪ Survey the area to establish the efficacy of control. The length of time between application and survey is dependent upon the species of weed being controlled. Multiple applications may be necessary, particularly if conditions during the first application were too warm, too dry, or too wet.

Sensitive Areas	Areas frequented by children: ▪ Use mechanical controls instead of chemical controls whenever possible around playgrounds. Sensitive habitat: ▪ 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 other organisms and sensitive sites.	
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 US may require coverage under a NPDES Aquatic Pesticide Permit.	
Common Active Ingredients	▪ Imazapyr ▪ Dichlobenil ▪ Bromacil ▪ Diuron ▪ Pendimethalin ▪ Prometon ▪ Tebuthiuron ▪ Hexazinone ▪ Dicamba ▪ 2,4-D ▪ Diflufenzopyr ▪ Glyphosate ▪ Triclopyr ▪ Metsulfuron methyl ▪ Sulfometuron ▪ plus others	
Methods of Application		**Authorized Applicators**
Selective Broadcast Herbicides	▪ These herbicides selectively kill one class of plants and are safe for 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 helicopters. ▪ Relatively small areas can be treated with a backpack sprayer or hand-compressed sprayer.	In-House PMP; Contracted PMP
Non-selective Spot Treatment Herbicides:	▪ This method directly targets individual plants. ▪ Non-selective herbicides are used and are applied directly to the target plant. ▪ Care must be taken to reduce drift that could harm non-target plants. ▪ Direct application sometimes is used in conjunction with	In-House PMP; Contracted PMP

	non-chemical treatments, especially when removing invasive trees and shrubs which require root kill to prevent re-sprouting. (See "Cutting" in the Mechanical Control section.)	
Foliar Spray	▪ Herbicide is sprayed directly onto the foliage of the weed. ▪ Post-emergent herbicides should be applied after the weed emerges, but before seed set. ▪ Foliar application is most effective when weeds are young.	In-House PMP; Contracted PMP
Cut Stump Treatment	▪ Herbicide is brushed or sprayed on freshly-cut stumps	In-House PMP; Contracted PMP
Aerial Application of Pesticides:	▪ An Aerial Application Statement of Need must be prepared by the IPMC and approved by the ARNG PMC prior to aerial application of pesticides (including herbicides). ▪ Additional NEPA documentation and permitting may be required	Contracted PMP

Contract or Work Considerations

Time Period to Respond	Control is often conducted during surveys. This may involve observing a plant and then hand pulling or applying an herbicide. Responding to a large area of weeds will depend on timing factors.
Time Period to Obtain Control	Most non-chemical methods and many herbicides result in immediate or rapid kill. However, signs of the effectiveness of some herbicides (i.e. browning of leaves) may not be visible for several days.
Level of Control	In high priority areas a high level of control must be maintained.
Safety Considerations	Applicators use personal protective equipment required by the product label.
Environmental Considerations	When operations are conducted in natural areas, care must be taken to prevent adverse impact to the environment by control measures, vehicles, and workers.
Special Applicator Qualifications	▪ All PMP (or GMP/FMP) applying pesticides (including herbicides) must be DOD or State-certified as pesticide applicators. ▪ PMP conducting invasive weed control must be knowledgeable about identifying and controlling the target plants. ▪ PMP conducting invasive weed control must also be knowledgeable about preventing the spread of invasive plants. ▪ PMP conducting invasive weed control should also be able to produce maps (preferably using GPS and GIS) and write detailed reports.

Additional Information

Correct timing of the herbicide application is 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.

References

www.cal-ipc.org/ip/inventory/index.php - California Invasive Plant Council; lists of invasive species and control advice http://courses.washington.edu/ehuf462/462_mats/bradley_method.pdf - The Bradley Method for Control of Invasive Plants

http://www.cal-ipc.org/ip/management/wwh/ - California Invasive Plant Council; a guide to techniques for removing Bay Area invasive plants. Site has a downloadable handbook
http://plants.usda.gov/java/noxiousDriver - Federal and State Noxious Weed Lists

http://www.weedcenter.org/ - Center for Invasive Plant Management;
http://www.weedcenter.org/dodworkshop/2009/index.html - DoD Strategic Management of Invasive Species in the Southwestern U.S.

IPM Outline 12
Bed Bugs

Target Pest or Group	Bed Bugs (Cimex species).
Target Area(s)	Primarily billeting areas, especially transient billeting.
Impact on Mission	Bed bugs bite people, cause allergic reactions, and are generally a nuisance that negatively affect morale and quality of life.
Scope	Base-wide, but most likely in billeting.
Responsibility	▪ Billeting Managers: ▪ Establish rules and regulations to prevent establishment and propagation of pests. ▪ Prevent movement of furniture between rooms when bed bugs are identified. ▪ Contact the IPMC when bed bugs are discovered. ▪ Billeting Residents: ▪ Comply with billeting rules and regulations. ▪ Maintain sanitation and cleanliness of personal items such as bedding. ▪ Immediately report suspected infestations of bed bugs to Billeting Managers. ▪ Pest Management Provider (PMP), In-House or Contract: Conduct surveillance and integrated pest management to control infestations. ▪ Facilities Maintenance Provider (FMP): Perform facilities repairs and improvements that exclude and minimize pest infestations as requested.
Reporting	▪ Report all bed bug infestations to IPMC to assist in identifying and preventing further infestations. ▪ Record all pest management operations to the IPMC using the Pest Management Treatment Record and report usage to IPMC every month.

Survey

Survey Method(s)	▪ Personnel complaints: Complaints are commonly received when personnel go to medical with itching or dermatitis due to bites. ▪ Visual inspections: ▪ Look for pests in mattresses, box springs, bed frames and headboards.

	Less commonly bed bugs are found on baseboards and on walls behind furniture. ▪ Apply a flushing agent to cracks and crevices. ▪ Sticky trap surveys. ▪ Vacuum surveys of harborages. ▪ Dry ice / CO_2 attractant traps. ▪ Conduct pre and post treatment surveys to determine whether control operation was effective
Survey Frequency / Schedule	▪ In billeting, housekeeping should perform inspections during cleaning. ▪ Daily observation by residents in billeting. ▪ Observation during inspections of billeting by unit command leadership personnel. ▪ Monthly observation and/or sticky trap monitoring by PMP of spaces post-treatment
Action Threshold(s)	▪ Detection of 1 bedbug, cast skins, or fecal stains should initiate survey and control as needed.

Non-Chemical Control

Type	Method	Responsibility
Sanitation	▪ Thorough cleaning 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 mattress. ▪ **When removing materials from an infested room, either treat the material or place in bags. Seal bags before taking out of room to prevent spread of the bugs.**	Billeting Residents
Washing/ Cleaning	▪ Before washing, place all clothes and bedding in a dryer and dry on the highest setting for at least 20 minutes to kill bed bugs. ▪ Thoroughly wash bedding in hot water and dry on highest heat setting until dry. ▪ Clean mattresses, box springs, frames, headboards with soap and water.	Billeting Residents; Billeting Manager
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.	Billeting Residents; Billeting Manager
Isolation and Exclusion	▪ Prevent removal of furniture from rooms found to be infested until each item is cleaned. ▪ Remove debris from around outside of buildings. ▪ Repair cracks in walls. ▪ Caulk cracks and crevices in bed frames and furniture. ▪ Specially designed mattress encasements will prevent bed bugs from getting on mattresses and leaving mattresses to infest other areas. They do not have seams that can harbor the bugs.	Billeting Manager; FMP

Heat	▪ Heat infested areas to at least 113º F (45º C) for at least 1 hour. ▪ A pesticide barrier around doorways may be necessary to prevent spread of fleeing bed bugs to adjacent spaces. ▪ Heat may damage sprinkler systems. Implement protective measures before treatment of rooms. ▪ Place all bedding and clothing into a dryer on the highest heat setting for a minimum of 20 minutes then laundered in hot water for at least 10 minutes. Dryer must not be loaded more than 50% capacity. ▪ Due to its prolonged contact with skin, clothing cannot be treated with pesticides. Laundering is crucial to ensure the treatment program does not fail with the re-introduction of bed bugs from infested clothing.	Contract PMP; Billeting Residents
Prohibited Items	Ultrasonic pest repelling devices are useless and prohibited.	

Chemical Control

Application Site	▪ Apply pesticides as required based on survey information to areas where bed bugs are known to harbor. Including: ▪ Bed frames ▪ Mattresses ▪ Baseboards ▪ Furniture ▪ For heavy infestations, barrier treatments may be required, especially around doors, to prevent bed bugs from fleeing to adjacent areas during treatment. ▪ Chemical control using insecticides alone will not control/prevent bed bug infestations.
Site Preparation	▪ <u>Pre-treatment procedures</u>: ▪ No pesticide applications shall be initiated until the space is unoccupied. ▪ Do not remove furniture or beds until PMP has conducted an inspection. ▪ Pesticide applicator shall contact the Billeting Manager prior to pesticide applications. ▪ All bedding and personal items should be removed from exposed areas, placed in bags, and washed or cleaned.
Sensitive Areas	▪ Some people may be sensitive to pesticides. The insecticide on treated mattresses should be allowed to dry and then covered with a mattress cover before being used. ▪ Ensure that insecticides do not enter drains, streams, lakes and other surface water.

Restrictions	▪ Insecticide resistance may cause treatment failure ▪ 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 reoccupy the space. ▪ Foggers are mostly ineffective in controlling bed bugs because bed bugs hide in crevices and voids where aerosols do not penetrate and they are able to avoid contact with the insecticides. Use of foggers is not recommended.	
Common Active Ingredients	▪ Bifenthrin ▪ Cyhalothrin ▪ Deltamethrin ▪ Other Pyrethroids ▪ Pyrethrin For pyrethroid-resistant bed bugs: ▪ Hydroprene (IGR) ▪ Chlorfenapyr (▪ Silica gel ▪ Boric acid	
Types of Pesticides		**Authorized Applicators**
Flushing Agents	▪ Use aerosol contact pesticides directed into potential harborage areas to flush out and kill pests as needed.	In-House PMP; Contracted PMP
Crack and Crevice Residuals	▪ Apply (by crack and crevice technique) a residual pesticide spray to all known or suspected harborages.	In-House PMP; Contracted PMP
Spot Treament Residuals	▪ Apply as a "spot treatment" to indicated areas.	In-House PMP; Contracted PMP
Mattress Treatment	▪ Apply to infested mattresses.	In-House PMP; Contracted PMP
Insect Growth Regulators	▪ IGRs affect the development and reproduction of insects. ▪ When properly applied, IGRs have essentially no effect on vertebrate metabolism because of their mode of action and low application rates, but they can have a significant impact on bed bug molting, fertility and egg hatching success. ▪ Apply according to label directions.	In-House PMP; Contracted PMP

Contract or Work Considerations

Time Period to Respond	Discovery of bed bugs in any area requires a response within 24 hours.
Time Period to Obtain Control	One to two weeks.
Level of Control	100% control
Safety Considerations	▪ Do not treat occupied rooms with liquid or dust formulations.
Special	▪ All PMP or GMP applying pesticides (including herbicides) must be

Applicator Qualifications	DOD or State-certified as pesticide applicators.

Additional Information

Treatment failures are due to incomplete surveys for the pest, improper application, and insecticide resistance. Follow up inspections and control is crucial to eliminating the bugs.

Resources

http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7454.html
http://www.acq.osd.mil/eie/afpmb/docs/techguides/tg44.pdf
http://www.epa.gov/pesticides/bedbugs/

IPM Outline 12

Feral Dogs and Cats

Target Pest or Group	▪ Feral Dogs and Cats. (For control of birds and other vertebrate wildlife pests, please refer to their specific IPM outlines.)
Target Area(s)	Areas near buildings or populated areas.
Impact on Mission	▪ Feral animals may be dangerous when they are cornered and can become aggressive. ▪ Many feral animals may carry rabies and other diseases and parasites that can infect humans.
Scope	▪ Base-wide
Responsibility	▪ Pest Management Provider (PMP), In-House or Contract: Conduct integrated pest management for vertebrate pests. ▪ Facilities Maintenance Provider (FMP): Perform facilities repairs and improvements that exclude vertebrate pests from buildings. ▪ Base Operation Support: Ensure that dumpsters and trashcans are emptied on schedule and that they are securely covered to prevent entry by vertebrate pests. ▪ Natural Resources Manager (NRM): Provides information regarding any regulatory protections of vertebrate pests. ▪ All Installation Personnel: Practice good sanitation and do not feed feral animals to prevent attracting them.
Reporting	▪ Record all pest management operations using the Pesticide Management Treatment Record Form and report usage to the IPMC every month.

Survey

Survey Method(s)	▪ Visual sighting of feral animals or signs of their presence. ▪ Some feral animals may become mainly nocturnal, so visual surveys may need to be conducted at night. ▪ Verify personnel reports of feral dog or cat activity.
Survey Frequency / Schedule	▪ As needed.
Action Threshold	▪ Any verified sighting of a feral dog or cat.

Non-Chemical Control

Type	Method	Responsibility
Exclusion	▪ Use lids / covers that can be secured on dumpsters and trashcans. ▪ Use hardware cloth and metal flashing to cover holes and cracks to prevent entry of feral animals into buildings. ▪ Repair leaking plumbing to remove sources of water for feral animals.	FMP
Food Removal	▪ Deny access to trash and other sources of food. ▪ Prevent personnel from feeding feral animals.	All personnel
Education	▪ Teach site personnel the impact of feral dogs and cats on native wildlife, especially birds, reptiles and small mammals. ▪ Teach site personnel about the threat to human health posed by feral dogs and cats. ▪ Provide resources for pet fostering and adoption organizations.	In-House PMP; IPMC
Trapping	▪ Only live cage-type traps should be used for feral dogs and cats. ▪ Use cat food containing fish or canned tuna for bait. ▪ Ensure that the target pest cannot reach through the back or side of the trap to steal the bait. ▪ Secure trap to the ground to prevent the animal from tipping it over. ▪ Situate and regularly monitor traps to prevent unnecessary stress to trapped animals. ▪ Trap-Neuter-Release (TNR) programs are prohibited.	PMP In-House or Contract; NRM coordination

Shooting	▪ In instances where there is a known threat to human health, shooting may be used to control small populations in areas where: ▪ Shooting is legal. ▪ Shooting can be safely conducted. ▪ Appropriate permits have been obtained. ▪ Qualified marksmen should do the shooting. ▪ Not generally practical for large populations. ▪ Lethal control has considerable risk for generating negative public relations. ▪ Make completely sure that target animals are feral animals and not stray pets.	Qualified PMP
Prohibited Practices	▪ Use of ultrasonic pest repelling devices is ineffective and prohibited. ▪ Relocation of trapped animals is prohibited. ▪ Trap-Neuter-Release (TNR) programs are prohibited. ▪ Killing, trapping, relocating or harassing any wildlife protected under the Endangered Species Act is prohibited.	
Special PMP Qualifications	▪ All PMP performing vertebrate pest control should hold appropriate licenses and permits to legally capture, transport and/or euthanize feral animals. ▪ Feral animals should never be handled, alive or dead, with bare hands. ▪ All PMP performing feral animal control should have pre-exposure immunization against rabies.	

Chemical Control

Chemicals are never used for the control of feral cats and dogs.

Additional Information

Informational brochure about hazards associated with cats:
http://www.denix.osd.mil/nr/otherconservationtopics/invasivespecies/publications/don-t-let-your-cat-go-awol-indoor-cats-are-safe-cats/

Feral cat management:
http://extensionpublications.unl.edu/assets/pdf/ec1781.pdf

Rabies in domestic animals:

https://www.cdc.gov/rabies/exposure/animals/domestic.html

Appendix C – VAARNG State Pesticide Use List (SPUL)

EPA Reg No.	Label Name	ACTIVE Ingredient (Primary)
228-139-71368	2,4-D L.V. 4 (EC) Ester	2,4-dichlorophenoxy-, 2-ethylhexyl ester
62719-556	Accord XRT II (GF-1280/Durango DMA/Duramax)	Glyphosate, dimethylammonium salt
81927-23	Alliagare Imazapyr 2 SL	Imazapyr, isopropylamine salt
83851-3	Amtide MSM 60 DF	Metsulfuron-methyl
228-365	Aquaneat Aquatic Herbicide	Glyphosate-isopropylammonium
241-299	Arsenal AC (Applicators Concentrate) Herbicide	Imazapyr, isopropylamine salt
3862-176-13051	Assualt Wasp and Hornet Killer	Permethrin, mixed cis, trans
706-110-10320	Bed Bug, Lice and Dust Mite Spray	Permethrin, mixed cis, trans
53883-118	Bifen IT (TC) Termaticide/Insecticide	Bifenthrin
34704-955	Bisect L	Bifenthrin
83923-2	Bithor SC	Bifenthrin
67603-11-64695	Blast 'Em Wasp and Hornet Killer	Permethrin, mixed cis, trans
4-392	Bonide Wasp & Hornet Spray	Permethrin, mixed cis, trans
64405-1	Bora-Care	Boron sodium oxide (B8Na2O13), tetrahydrate
73079-4	Boractin Insecticide Powder	Boric Acid
9444-129	Borid	Boric Acid
50534-188-100	Bravo (720) Weather Stik	Chlorothalonil
55467-9	Buccaneer Plus Glyphosate Herbicide	Glyphosate-isopropylammonium
3862-174-11861	Buzz Off Wasp & Hornet Killer	Permethrin, mixed cis, trans
10088-115-68562	Buzz Saw Wasp and Hornet Killer	d-Phenothrin
62719-572	Capstone (Milestone VM Plus)	Aminopyralid, triisopropanolamine salt
432-1332	Centerfire (Premise 75) Insecticide	Imidacloprid
9688-190-8845	Chemisco (Spectricide/Hot Shot) Wasp & Hornet Killer (LE)	lambda-Cyhalothrin
241-430	Chopper Gen2 Herbicide	Imazapyr, isopropylamine salt
73079-12	CimeXa Dust (Silicide)	Silicon dioxide
64240-45	Combat Quick Kill Roach Killing Gel	Fipronil

12455-79	**Contrac All Weather Blox (Rat & Mouse Bait)**	**Bromadiolone**
55809-3	**CRC Wasp & Hornet Killer Plus**	**d-Phenothrin**
62719-260	**Crossbow**	**Butoxyethyl 2,4-dichlorophenoxyacetate**
1021-2776	**Crossfire Insecticide**	**Clothianidin**
8959-10	**Cutrine-Plus Algaecide/Herbicide**	**Copper ethanolamine complex**
499-304	**Cy-Kick CS Contolled Release Cyfluthrin**	**Cyfluthrin**
53883-261	**Cyzmic (Lamba CSI 9.7) CS**	**lambda-Cyhalothrin**
829-287	**Daconil SA-50 Liquid Ornatmental and Vegetable Fungicide**	**Chlorothalonil**
100-1066	**Demand (Patrol) CS Insecticide**	**lambda-Cyhalothrin**
352-853	**DuPont LeadOff Herbicide**	**Thifensulfuron methyl**
432-1549	**Escort XP Herbicide**	**Metsulfuron-methyl**
432-1528	**Esplanade EZ**	**Diquat dibromide**
EX-2	**Essentria (EcoEXEMPT) JET Wasp & Hornet Killer**	**Rosemary Oil**
34704-915	**Evade 4 FL**	**Prodiamine**
12455-97	**Fastrac Place Pacs**	**Bromethalin**
12455-91	**Final Rodenticide Place Pac**	**Brodifacoum**
100-1084	**Fusilade II Turf and Ornamental Herbicide**	**Fluazifop-p-butyl**
62719-37	**Garlon (Element) 3A**	**Triethylamine triclopyr**
62719-40	**Garlon (Element) 4**	**Butoxyethyl triclopyr**
2724-484	**Gentrol (RF 9707) Aerosol**	**(7s)-Hydroprene**
2724-351	**Gentrol IGR (Zoecon RF-259) Emulsifiable Concentrate**	**(7s)-Hydroprene**
42750-61	**Gly Star (Cornerstone/Glyphosate 41) Plus (Pro)**	**Glyphosate-isopropylammonium**
67760-47-9688	**Glyfos Ultra-Kill Ready-To-Use 1.92% Weed & Grass Killer**	**Glyphosate-isopropylammonium**
4787-23	**Glyfos X-tra**	**Glyphosate-isopropylammonium**
72159-14	**Glyphosel Pro Herbicide**	**Glyphosate-isopropylammonium**
241-426	**Habitat Herbicide**	**Imazapyr, isopropylamine salt**
1021-1780-3	**Harris Yellow Jacket Wasp and Hornet Spray**	**d-Phenothrin**
524-445	**Honcho (Plus) (Roundup) (MAX)**	**Glyphosate-isopropylammonium**
524-454	**Honcho (Plus) (Roundup) (Original II)**	**Glyphosate-isopropylammonium**
352-346	**Hyvar X-L Herbicide**	**Bromacil, lithium salt**
73079-6	**InTice Perimeter Bait**	**Boric Acid**
45385-101	**JT EATON Kills Bed Bugs Plus**	**Piperonyl butoxide**

7405-73-10320	**K-2 Spray (DO NOT REORDER)**	**Permethrin, mixed cis, trans**
40208-7	**Kibosh Wasp, Hornet, Bee & Yellow Jacket Killer**	**Piperonyl butoxide**
42750-66-7401	**Kilz all (Gly Star)**	**Glyphosate-isopropylammonium**
10404-43	**Lesco Three-Way Selective Herbicide**	**Dicamba, dimethylamine salt**
12455-61	**Liqua-Tox II**	**Diphacinone, sodium salt**
7173-188	**Maki (Boot Hill) Rat and Mouse Bait Packs (Pellets)**	**Bromadiolone**
11694-107	**Marksman (The End/Tough Guy 720) Wasp & Hornet Killer**	**Permethrin, mixed cis, trans**
432-1264	**Maxforce FC Professional Insect Control Ant Killer Bait Gel**	**Fipronil**
432-1455	**Maxforce Fly Spot Bait**	**cis-9-Tricosene**
6218-73	**Mosquito Bits**	**Bacillus thuringiensis subspecies israelensis Strain**
64405-2	**Niban (Redzone) Granular Bait**	**Boric Acid**
9688-325	**No-Pest Wasp & Hornet Killer5**	**Cypermethrin**
228-570	**Nufarm Polaris AC Complete Herbicide**	**Imazapyr, isopropylamine salt**
228-480	**Nufarm Polaris AC Herbicide**	**Imazapyr, isopropylamine salt**
228-534	**Nufarm Polaris Herbicide**	**Imazapyr, isopropylamine salt**
1021-1603	**Nyguard IGR Concentrate Insecticide (Nylar 10 EC)**	**Pyriproxyfen**
1021-1780-239	**Ortho Hornet & Wasp Killer**	**d-Phenothrin**
432-1557	**Oust Extra Herbicide**	**Metsulfuron-methyl**
241-392	**Phantom (SD) Termiticide-Insecticide**	**Chlorfenapyr**
66222-22	**Pramitol 25E**	**Prometon**
499-550	**PT Waso-Freeze II Wasp & Hornet Insecticide**	**Prallethrin**
66222-192	**Quali-Pro Bifenthrin (Golf & Nursery 7 9F)**	**Bifenthrin**
66222-176	**Quali-Pro Glyphosate (Glyphogan) Plus Herbicide**	**Glyphosate-isopropylammonium**
66222-230	**Quali-Pro Prodiamine 4L Herbicide**	**Prodiamine**
228-366	**Razor Pro Herbicide**	**Glyphosate-isopropylammonium**
305-55	**Repel Mosquito Stop (Permanone)**	**Permethrin, mixed cis, trans**
9688-190-305	**Repel Wasp, Hornet & Yellowjacket Killer**	**lambda-Cyhalothrin**
62719-324	**Rodeo (Glypro/Accord Concentrate) Herbicide**	**Glyphosate-isopropylammonium**

524-549	**Roundup PowerMax Herbicide**	**Glycine, n-(phosphonomethyl)-potassium salt**
524-475	**Roundup Pro (Ultra) Herbicide**	**Glyphosate-isopropylammonium**
524-529	**Roundup Pro Concentrate**	**Glyphosate-isopropylammonium**
524-535	**Roundup Quickpro Herbicide**	**Diquat dibromide**
71995-33	**Roundup Weed & Grass Killer Ready-to-Use Plus**	**Glyphosate-isopropylammonium**
61842-37	**Sevin Brand XLR Plus Carbaryl Insecticide**	**Carbaryl**
9688-141-8845	**Spectracide Pro Wasp & Hornet Killer**	**Permethrin, mixed cis, trans**
2217-833	**Speed Zone Broadleaf Herbicide For Turf**	**2,4-dichlorophenoxy-, 2-ethylhexyl ester**
498-156	**SprayPak Wasp , Bee & Hornet Killer**	**d-Phenothrin**
228-690	**Spyder Extra**	**Metsulfuron-methyl**
352-622-85588	**Sulfomet Extra Herbicide**	**Metsulfuron-methyl**
432-763	**Suspend SC Insecticide (K-Othrine® SC Insecticide)**	**Deltamethrin**
228-520	**Tahoe 3A (Triclopyr 3) Herbicide**	**Triethylamine triclopyr**
279-3206	**Talstar TC Flowable Termaticide/Instecticide**	**Bifenthrin**
432-1483	**Temprid SC Insecticide**	**beta-Cyfluthrin**
7969-329	**Termidor HE Highly Effective Termiticide**	**Fipronil**
7969-210	**Termidor SC Termiticide/Insecticide**	**Fipronil**
149-8	**Terro Ant Killer II**	**Borax (B4Na2O7.10H2O)**
11694-109	**The END Wasp & Hornet Killer**	**Piperonyl butoxide**
9688-190	**Ultra-Kill/Black Flag/Chemisco Wasp and Hornet Killer (LE)**	**Prallethrin**
706-109-9250	**United 173 Wasp Whacker**	**Tetramethrin**
7969-88-829	**Vantage (Poast Plus) Herbicide (DO NOT REORDER)**	**Sethoxydim**
71368-14-55467	**Weedone LV4 Solventless Herbicide**	**2,4-dichlorophenoxy-, 2-ethylhexyl ester**
499-290	**Whitmire PT (Prescription Treatment) 565 Plus XLO**	**n-Octyl bicycloheptene dicarboximide**
11694-111-1270	**Zep Stay Away (DO NOT REORDER)**	**n,n-Diethyl-meta-toluamide and other isomers**
2724-786	**Zoëcon (RF 2050) Wasp-X™ Wasp & Hornet Spray**	**Ethofenprox**

Appendix D – VAARNG Pesticide Management Treatment Record Form

Virginia Army National Guard
PESTICIDE MANAGEMENT TREATMENT RECORD

Instructions:
Submit to the VAARNG Integrated Pest Management Coordinator. Use a separate form for each pesticide when using multiple chemistries on single application.

1. Date	2. Time of Application	
3. Facility/Address/Room Number		
4. Applicator's Name and Certification No.	5. Company Name (If Contractor)	
6. Pesticide Used (Trade Name)	EPA REG No.	
7. Active Ingredient (From Label)	% Active Ingredient	
8. Total Quantity of Pesticide Used Before Mixing (i.e. gallons/fluid ounces or pounds/dry ounces)		
9. Total Quantity Applied After Mixing (i.e. gallons/fluid ounces or No. of bait stations, etc.)		_____ lbs of active ingredient applied
10. Site Description/Size of Treated Area/Wind Speed & Direction/Weather		
11. Purpose of Application (Target Organism and Nature of Problem)		
12. Application Status (Circle One)	Preventive	Recurring Problem One Time Treatment
13. Recommend Alternative Methods to Alleviate the Problem	(i.e. Physical, Mechanical, Cultural, Biological)	

_____	_____	_____	_____
Applicator	**Date**	**Facility Manager**	**Date**

Version 5 OCT 2017

Appendix E – VAARNG Self-Help Program

The VAARNG Self-Help Program allows maintenance workers, facility managers, building occupants and unit personnel to use Integrated Pest Management (IPM) measures for control of minor pests. This program features ready-to-use, low toxicity pesticides pre-approved by the ARNG Pest Management Consultant (ARNG PMC).

VAARNG Self-Help Program participants may only perform pest management actions listed in the Self-Help sections of the IPM Outlines (Appendix B) for the pest(s) being controlled.

Only pesticides that are specifically listed on the VAARNG SPUL for use in the Self-Help Program (Appendix B) may be used and participants must review the educational materials for the pest and the control method prior to their use.

All application, safety, storage, disposal and recording requirements as outlined on the pesticide label, the Self-Help training materials, this IPMP and the Self-Help IPM Outlines are to be followed.

When pest management actions are performed in accordance with the requirements of the VAARNG Self-Help Program, participants are not required to be certified pesticide applicators.

Step 1. Determine if Self-Help is appropriate. Use the Self-Help IPM Outlines (pages E-5-84) to help identify the pest, assess the level of the pest problem and determine what IPM controls can be used to reduce pest presence to acceptable levels.

Step 2. If there is not a Self-Help IPM Outlines (pages E-5-84) for the pest, Self-Help control is NOT appropriate for the pest or, if the level of the pest problem is greater than can be controlled with Self-Help, put in a Work-Order with O&M or DPW.

Step 3. If Self-Help control is appropriate for the pest and the level of the pest problem, use the Self-Help control methods in the order they are given in the Self-Help IPM Outline (pages E-5-84) for the pest. Use all Self-Help cultural, mechanical and physical control methods before using Self-Help chemical control methods. Also, keep in mind that it is rarely possible to completely eradicate a pest and the goal is to control the pest to acceptable levels.

Step 4. If non-chemical Self-Help control methods do not control the pest(s) to acceptable levels, Self-Help-approved pesticides listed in the Self-Help IPM Outlines may be used. These are low-toxicity, ready-to-use pesticides and are the only pesticides allowed for use by Self-Help Program participants.

Pesticides that require dilution are not allowed for use in the Self-Help Program at VAARNG sites.

Step 5. Obtain pesticides/equipment listed on Self-Help SPUL from those distributed by Building 303 (Entomology) or DPW Warehouse 224.

All pesticides used for Self-Help MUST have the exact EPA Registration Number as the pesticide listed on the VAARNG SPUL as approved for Self-Help Use. Pesticide approval is based on the EPA Registration Number of the pesticide and, even if the active ingredient is the same and the pesticide contains the same concentration, a pesticide is not approved for use unless it is listed on the SPUL with that specific EPA Registration Number.

If a Self-Help pesticide for the pest(s) with the listed EPA Registration Number cannot be reasonably procured, contact the IPMC to determine if there is a substitute available. The IPMC can request the addition of pesticides to the Self-Help Program list by submitting the pesticide name, manufacturer, EPA registration number, target pest and target site to the ARNG IPMC for review and approval.

Step 6. Review the Self-Help IPM Outline for the pest (pages E-5-84) and the pesticide label(s) BEFORE applying any Self-Help pesticides.

Those who are applying pesticides on Federal properties (Appendix A) who are not licensed applicators must complete a VAARNG Self-Help Training Acknowledgement before applying the pesticide. After reviewing the training materials and label(s), sign and submit a VAARNG Self-Help Training Acknowledgement of Understanding (in Appendix E, page E-5) to the IPMC (MAJ Webb, brian.j.webb14.mil@mail.mil) and keep a copy locally. The pest/pesticide-specific educational materials must be reviewed at least annually and a VAARNG Self-Help Training Acknowledgement of Understanding is to be resubmitted to the IPMC at that time.

The pesticide label must be reviewed before EVERY application of the pesticide since label requirements can change.

Step 7. Apply the pesticides in accordance with the label and the pest-specific Self-Help IPM Outlines (pages E-5-84). Pesticide labels are legal documents and all directions and restrictions on the label MUST be followed.

Step 8. Report pesticide applications using the VAARNG Pesticide Management Treatment Record (Appendix D). This report is to be completed at time of application and a copy sent to the Facility Manager within one calendar week from application. Facility Managers will send all treatment records to the IPMC on the last business day of each month. Complete all fields in the section marked “Self-Help”.

Step 9. Store and dispose of pesticides as directed by the VAARNG IPMP and in accordance with label directions.

Step 10. If the Self-Help control methods in the Self-Help IPM Outline do not control the pest to acceptable levels, put in a Work Order with O&M or DPW.

Pesticides Approved for use by Self-Help Program Participants:

EPA Reg No.	Label Name	ACTIVE Ingredient (Primary)
3862-176-13051	Assualt Wasp and Hornet Killer	Permethrin, mixed cis, trans
67603-11-64695	Blast 'Em Wasp and Hornet Killer	Permethrin, mixed cis, trans
4-392	Bonide Wasp & Hornet Spray	Permethrin, mixed cis, trans
10088-115-68562	Buzz Saw Wasp and Hornet Killer	d-Phenothrin
9688-190-8845	Chemisco (Spectricide/Hot Shot) Wasp & Hornet Killer (LE)	lambda-Cyhalothrin
64240-45	Combat Quick Kill Roach Killing Gel	Fipronil
55809-3	CRC Wasp & Hornet Killer Plus	d-Phenothrin
EX-2	Essentria (EcoEXEMPT) JET Wasp & Hornet Killer	Rosemary Oil
67760-47-9688	Glyfos Ultra-Kill Ready-To-Use 1.92% Weed & Grass Killer	Glyphosate-isopropylammonium
1021-1780-3	Harris Yellow Jacket Wasp and Hornet Spray	d-Phenothrin
40208-7	Kibosh Wasp, Hornet, Bee & Yellow Jacket Killer	Piperonyl butoxide
42750-66-7401	Kilz all (Gly Star)	Glyphosate-isopropylammonium
432-1264	Maxforce FC Professional Insect Control Ant Killer Bait Gel	Fipronil
9688-325	No-Pest Wasp & Hornet Killer5	Cypermethrin
1021-1780-239	Ortho Hornet & Wasp Killer	d-Phenothrin
499-550	PT Waso-Freeze II Wasp & Hornet Insecticide	Prallethrin
9688-190-305	Repel Wasp, Hornet & Yellowjacket Killer	lambda-Cyhalothrin
71995-33	Roundup Weed & Grass Killer Ready-to-Use Plus	Glyphosate-isopropylammonium
9688-141-8845	Spectracide Pro Wasp & Hornet Killer	Permethrin, mixed cis, trans
498-156	SprayPak Wasp , Bee & Hornet Killer	d-Phenothrin
11694-109	The END Wasp & Hornet Killer	Piperonyl butoxide
9688-190	Ultra-Kill/Black Flag/Chemisco Wasp and Hornet Killer (LE)	Prallethrin
706-109-9250	United 173 Wasp Whacker	Tetramethrin

499-290	Whitmire PT (Prescription Treatment) 565 Plus XLO	n-Octyl bicycloheptene dicarboximide
2724-786	Zoëcon (RF 2050) Wasp-X™ Wasp & Hornet Spray	Ethofenprox

VAARNG SELF-HELP TRAINING
Acknowledgement of Understanding

Type of Pest:

Control Methods:

1. I have read and understand the instructions for performing Self-Help pest control for _____ and have read and understand the pesticide label(s). I will follow the label instructions and all other instructions given to me. If I do not understand the instructions, I will have a qualified person explain them to me before continuing. I understand that any pesticide application not in accordance with the label is a violation of the Federal Insecticide, Fungicide, and Rodenticide Act.

2. I will make sure pets, children, and individuals who may be sensitive or allergic to pesticides will not be present during any application nor will they be allowed back into the treated area(s) before thorough post-treatment ventilation.

3. I will perform the control procedures myself, at my facility area only.

4. Once I have received the Self-Help pest control items, I will not use any of the products in a manner inconsistent with the label. Unused items and empty containers will be disposed of as specified by the Integrated Pest Management Coordinator (IPMC) and the product label.

5. I will record and report Self-Help actions as directed by the IPMC.

Signature:_____ Date:_____

Name:_____ Facility:_____

VAARNG Self-Help IPM Outlines

SELF-HELP IPM Outline 1

Stinging Insects

A. PURPOSE

The Self-Help pest management program authorizes the use of approved Self-Help products (ready-to-use aerosol bee, wasp, and hornet control pesticides) by installation maintenance and VAARNG personnel who encounter stinging insects during the normal course of their assigned duties.

B. RESPONSIBILITIES

- Self-Help Program participants are responsible for proper use, recording, reporting, storage and disposal of Self-Help products.
- **All** label instructions must be read and followed – **The Label is the Law!**
- A Safety Data Sheet (SDS) should accompany the Self-Help product and be readily available to personnel using the product and working in the area where the product is used.
- Only use products that are pre-approved for use in the VAARNG Self-Help Program. Contact the VAARNG IPMC (MAJ Brian Webb) for a current list of approved Self-Help products.
- Self-Help products can be obtained by submitting a Work Order to O&M. Pesticides will be shipped or picked up at the warehouse (Bldg 224) on Fort Pickett.
- Record and report usage of Self-Help products to the VAARNG IPMC at the end of each month using the Pest Management Treatment Record form.

C. ACTIONS

STEP 1. Surveillance.

- Identify the type of stinging insect using the information in this outline.
- Self-Help Program participants **MUST** identify the stinging insect(s) before control is attempted. Controlling some stinging insects and/or the nests may be too dangerous for Self-Help Program participants.
- Many types of stinging insects are "social" and can act together as a single unit. This can increase the risk during control operations since numerous insects can attack simultaneously to defend their nest.
- Additionally, several different species of bees, wasps, and hornets are capable of inflicting severe stings and can sting multiple times.
- Some people are allergic to venomous stings and can have a serious physical reaction if stung. More people die annually from allergic or severe allergic (anaphylactic) reaction caused by insect stings than from snake bites.

STEP 2. Decide if Self-Help is appropriate.

- If it is determined the type of stinging insect is not appropriate for Self-Help Program control, contact the O&M Branch or Entomology to arrange for control by a Pest Management Professional (PMP).
- The decision to use Self-Help for control of stinging insects is often based on personal judgement and common sense. If you have **any** doubts that the stinging insects cannot be controlled with Self-Help actions, do not proceed with Self-Help.
- Approved Self-Help products are tools to assist Self-Help Program participants with the control of small, non-threatening stinging insect nests so that designated tasks can be completed without loss of time waiting for a Pest Management Professional (PMP) to arrive. Trying to control too large a nest could result in multiple stings, loss of work time, and unacceptable risk to VAARNG personnel.

STEP 3. Perform Chemical Control (aerosol spray)

- Self-Help products for stinging insects can be obtained by request from the O&M or Entomology.
- Only use products that are pre-approved for use in the VAARNG Self-Help Program.
- Read the entire product label. **The Label is the Law!**
- Wear appropriate Personal Protective Equipment (PPE) as directed on the label.
- Do **NOT** eat, drink or smoke while using any pesticide.
- Use product as directed on the label for control of the stinging insect and/or nest.
- Always thoroughly wash hands with soap and water after using product and before eating, drinking or smoking.

STEP 4. Storage and Disposal of Self-Help Products.

- Store and/or dispose of any leftover Self-Help products as directed on the label and the VAARNG IPMP.
- If you have any questions on storage or disposal of the Self-Help products, contact the VAARNG IPMC (MAJ Brian Webb).

STEP 5. Recording and Reporting.

- Report Self-Help product use to the VAARNG IPMC (MAJ Brian Webb) using form the Pest Management Treatment Record form.
- The form(s) recording usage should be sent to the VAARNG IPMC at the end of the month.

STEP 6. Follow-up and Assessment.

- If the Self-Help control methods in this outline do not control the pest to acceptable levels, put in a Work Order with the CFMO or contact the Entomologist.

STEP 7. Perform Physical and Cultural Controls.

- Use of chemical controls (pesticides) will only provide temporary control. Habitat modification, building practices (exclusion), or nest removal are more permanent controls.
- Report repeated encounters with stinging insects to the O&M Office or Entomology so that more permanent controls can be implemented.

Honey Bees

- Honey bees are about ½" long, black and yellow, with fuzzy hair on most of their body.
- Honey bees are highly-organized social group insects with a queen, drones, and potentially hundreds to thousands of workers.
- Nests are found in building walls, hollow trees and hollow pillars.
- Honey bees are active during the day and tend to be quiet during the cooler evenings and night, staying close-by or in the nest.
- In most cases, honey bees are fairly docile and will not attack humans unless the nest is disturbed.

Do Not Kill Honey Bees Unless Necessary!

Honey bees are excellent pollinators of plants and are considered beneficial insects.

Honey Bee Nest Control:

- Nest removal by a bee keeper should always be the first control option.
- **Honey bee nest removal is NOT done by Self-Help Program participants!**
- Most honey bee nests will be large. Self-Help Program participants should **NOT** attempt control.
- Contact the VAARNG IPMC (MAJ Webb) for honey bee nest removal.

Mud Daubers

- Mud Daubers are "solitary" wasps (i.e. one adult maintains one nesting site) that build small pipe-shaped mud nests on the underside of roofs, soffits, porches, and other structural members.
- The adults are brown and about ¾" long.
- The mud tube nest is the key to identification of this species.
- Mud daubers can sting repeatedly, but seldom sting unless disturbed.

Mud Dauber Nest Control:

- Mud dauber nests are commonly encountered by maintenance personnel and can generally be controlled by using Self-Help products that have been approved for use on stinging insects.
- Exercise caution when multiple nests are in the same location or if the nests are in a confined location.
- Spray the attending adult with the Self-Help product and quickly move away from the area, then knock off the mud tubes using a screw driver or some other tool.
- It is best to control mud daubers at dawn, dusk, or at night, when the adult is present, and most docile.

Paper Wasps

- Paper wasps are ½" to 1" in length, typically a black, red or brownish color, and may have yellow or orange highlights.
- Many people call this group "umbrella wasps" because of the umbrella-shaped paper comb nest, and identifying the nest is the easiest way to identify this group of wasps.
- The nest is usually a single tier, open paper comb with the cells pointed downwards.
- The nests will be found beneath eaves, soffits, window enclosures, under porches, under wooden shelves, below or in electrical enclosures, in tightly enclosed ornamentals plantings, etc.
- Paper wasp colonies can contain from a few up to a few hundred adults.
- The size of the nest is a direct indicator of the number of adult wasps attending the nest.
- Paper wasps are generally docile and will not attack as a large group like some types of bees. However, paper wasps can sting repeatedly.

Congregations of Paper Wasps:

- Paper wasps over-winter as adults and, in the fall, hundreds to thousands of them may congregate (group together) on the highest structure in an area, such as a church bell tower, an airport control tower, or the peak of an administrative building.
- While this may seem threatening, control is not usually required because the wasps will move on after a while.
- After congregation, these insects will hunt for protected sites to overwinter and will enter buildings around windows, under soffits, past loose flashing, and into any location that may provide shelter.
- On warm winter days, paper wasps can become active and enter the interior of the buildings, causing a nuisance to occupants.

Paper Wasps (continued)

- Generally, these wasps are not aggressive in this situation and a fly swatter or rolled up magazine is the most effective control for small numbers that are found inside of buildings.

Paper Wasp Nest Control:

- Paper wasp colonies are commonly encountered by maintenance personnel and most of them can be controlled using Self-Help products that have been approved for use on stinging insects.
- The nests increase in size as the summer season progresses.
- Exercise common sense if the nest appears large or if there are multiple nests in the area.
- When a nest is sprayed, the adult wasps at the nest will get aggressive, so quickly move away from the area after spraying.
- After the adults die, knock the nest down (if possible).
- It is best to control paper wasps at dawn, dusk, or at night when the adults are at the nest site and the insects are most quiet.

Cicada Killers

- The cicada killer is a very large wasp (1” to 2” long) that is usually seen flying close to the ground.
- The body is shiny black with bright yellow highlights.
- These wasps nest in the ground.
- Because of the large size, many fear this insect.
- Cicada killers are semi-social wasps, but are typically not aggressive.
- There is little chance of being stung unless the insect is handled, agitated, or stepped on with bare feet.
- Control is usually **NOT** required.

Other Solitary Ground-Nesting Wasps & Bees

- Some species of wasps and bees are solitary ground or lawn nesters.
- The nests are typically single round holes in turf or ground with a small untidy mound of excavated soil around the entrance.
- **Control is NOT done by Self-Help Program participants!**
- Control of these ground or lawn-nesting wasp or bee species should **NOT** be performed unless there is a huge number of nests causing turf damage or their presence in a frequently occupied area threatens human health. In such cases, contact O&M or Entomology to arrange for control by a Pest Management Professional.

Yellowjackets

- Yellowjacket wasps are black and yellow insects about ½-inch in length.
- This group of wasps is social and builds large paper comb nests in the ground, in wall voids, or other well protected areas.
- A yellowjacket colony will grow throughout the summer and have thousands of workers by the fall of the year.
- Yellowjackets can sting repeatedly and will attack as a group if the nest is disturbed.
- Yellowjackets are sometimes described as an insect with a bad attitude and many feel that this is the most dangerous of the stinging wasps because of their unpredictable behavior.
- Yellowjacket wasps tend to scavenge at human food sources. Often, they will be found foraging around open trash cans, trash dumpsters, outdoor food serving areas, etc.
- Keeping areas clean, trash cans covered, soda cans properly disposed of etc. will lessen the attractiveness of an area and generally result in adequate control.

Yellowjackets (continued)

Yellowjacket Nest Control:

- **Extreme CAUTION is required.**
- Yellowjackets will fiercely defend their nest. Most incidents of people being repeatedly stung occur when a person unknowingly disturbs an underground nest.
- The nests can be hidden in an ornamental garden, in tall un-mowed grass, under foundations, under large rocks, or in some location that offers concealment for the yellowjacket entrance.
- Self-Help products are inadequate for controlling a nest full of yellowjackets.
- Self-Help Program participants should **NOT** attempt to control yellowjacket nests that are underground or in wall voids unless positive the nest is small.
- To gauge the size of a yellowjacket colony:
  1. Consider the time of year – nests start small in the spring and get larger as the season progresses.
  2 . Watch the entrance. If it is late summer and yellowjackets are observed coming and going every second or two, assume it is a large colony and do **NOT** attempt control.
- When controlling small yellowjacket nests, perform the work at dawn, dusk, or at night when most of the adults are in the nest, and the insects are least active.
- Usually the best choice for yellowjacket nest control is to contact O&M or Entomology to arrange for control by a Pest Management Professional

Hornets (Bald-faced and European)

- Bald-faced and European hornets are wasps that are about 3/4" in length, generally brown and black in color, with vivid yellow or white markings on the face.
- This group of social, stinging insects will build spectacular aerial nests in plain view. The nests are large, grayish-brown, teardrop-shaped, paper carton structures.
- Nests can be found hanging from a tree branch, in a tall ornamental bush, or attached to the eve of a dwelling.
- The nest encloses many tiers and may be tended by thousands of insects by the end of the summer.
- The Bald-faced and European hornets are two common varieties found throughout the United States. They are very aggressive when disturbed, can sting repeatedly, and will attack as a group.
- Generally, hornets should only be controlled by experienced Pest Management Professionals.

Hornets (Bald-faced and European) (continued)

Hornet Nest Control:

- Self-Help Program participants should **NOT** attempt control of aerial hornet nests unless the nest is very small (smaller than a softball).
- If the nests are bigger than a softball, or if there is any doubt about personal safety or risk, do **NOT** attempt Self-Help control and report nest location(s) to the O&M Office or Entomology to arrange for control by a Pest Management Professional (PMP).
- Spraying an aerial nest with an aerosol pesticide will generally split open the nest and agitate the hornets to a stinging frenzy, resulting in their attack of anything nearby. Self-Help products are a very poor defense against frenzied hornets.
- If control is attempted, perform it at dawn, dusk, or after dark when the hornets are in the nest, and most quiet.

Carpenter Bees

- Carpenter bees are semisocial bees that look very much like large bumble bees.
- The size of carpenter bees make them appear intimidating, but they are not aggressive unless handled or agitated.
- Carpenter bees can sting repeatedly.
- Carpenter bees are most likely seen flying close to flowers to collect pollen or hovering near wooden structures where they nest.
- These insects make a ½" to ¾"-round hole in wood such as eves, porch ceilings, window sills, telephone poles, fence posts, etc.
- Unpainted, soft woods are preferred.
- Carpenter bees lay their eggs in the holes.
- Maintenance personnel usually encounter the holes of the carpenter bee rather than the bee itself.
- Do not spray Self-Help products into the hole since it will likely splash back out of the hole.
- Since these holes are often used year after year by succeeding generations or carpenter bees, they should be sealed. Carpenter bee holes can be caulked and the surface repainted to reduce likelihood for reuse.

Approved Self-Help Products for Control of Stinging Insects:

EPA Reg No.	Label Name	ACTIVE Ingredient (Primary
3862-176-13051	Assualt Wasp and Hornet Killer	Permethrin, mixed cis, trans
67603-11-64695	Blast 'Em Wasp and Hornet Killer	Permethrin, mixed cis, trans
4-392	Bonide Wasp & Hornet Spray	Permethrin, mixed cis, trans
10088-115-68562	Buzz Saw Wasp and Hornet Killer	d-Phenothrin
9688-190-8845	Chemisco (Spectricide/Hot Shot) Wasp & Hornet Killer (LE)	lambda-Cyhalothrin
55809-3	CRC Wasp & Hornet Killer Plus	d-Phenothrin
EX-2	Essentria (EcoEXEMPT) JET Wasp & Hornet Killer	Rosemary Oil
1021-1780-3	Harris Yellow Jacket Wasp and Hornet Spray	d-Phenothrin
40208-7	Kibosh Wasp, Hornet, Bee & Yellow Jacket Killer	Piperonyl butoxide
9688-325	No-Pest Wasp & Hornet Killer5	Cypermethrin
1021-1780-239	Ortho Hornet & Wasp Killer	d-Phenothrin
499-550	PT Waso-Freeze II Wasp & Hornet Insecticide	Prallethrin
9688-190-305	Repel Wasp, Hornet & Yellowjacket Killer	lambda-Cyhalothrin
9688-141-8845	Spectracide Pro Wasp & Hornet Killer	Permethrin, mixed cis, trans
498-156	SprayPak Wasp , Bee & Hornet Killer	d-Phenothrin
11694-109	The END Wasp & Hornet Killer	Piperonyl butoxide
9688-190	Ultra-Kill/Black Flag/Chemisco Wasp and Hornet Killer (LE)	Prallethrin
706-109-9250	United 173 Wasp Whacker	Tetramethrin
2724-786	Zoëcon (RF 2050) Wasp-X™ Wasp & Hornet Spray	Ethofenprox

SELF-HELP IPM Outline 2

Cockroaches

A. PURPOSE

The Self-Help pest management program authorizes the use of approved Self-Help products (ready-to-use cockroach baits) by installation maintenance and VAARNG personnel who encounter cockroaches during the normal course of their assigned duties.

B. RESPONSIBILITIES

- Self-Help Program participants are responsible for proper use, recording, reporting, storage and disposal of Self-Help products.
- **All** label instructions must be read and followed – **The Label is the Law!**
- A Safety Data Sheet (SDS) should accompany the Self-Help product and be readily available to personnel using the product and working in the area where the product is used.
- Only use products that are pre-approved for use in the VAARNG Self-Help Program. Contact the VAARNG IPMC (MAJ Brian Webb) for a current list of approved Self-Help products.
- Self-Help products can be obtained by request from the O&M Warehouse or Fort Pickett Entomology (Bldg 303).
- Record and report usage of Self-Help products to the VAARNG IPMC at the end of each month using the Pest Management Application Report form.
- Approved Self-Help products are tools to assist Self-Help Program participants with the control of small-scale cockroach infestations that have yet become extensive enough to warrant Pest Management Professional (PMP) control. Trying to control an excessively large infestation can result in loss of work time and higher costs resulting from cockroach contamination of facilities.
- Cockroach feces and saliva contain proteins and allergens that may trigger asthma attacks in some people. In densely populated areas, scientists have identified a correlation between roach presence and the incidence of asthma.
- Cockroaches can also spread various pathogens, including bacteria, viruses and parasitic worms.

C. ACTIONS

STEP 1. Surveillance.

- Identify the type of cockroach, the extent of the infestation and possible entry points into the building, food sources and water sources.
- It is important to identify the type of cockroach so the most effective baits are used. The size and type of bait depends on the type of the cockroach. Use the fact sheets attached to this outline to identify the type of cockroach.
- Determine the extent of the cockroach infestation to help decide if the control needed

is beyond that available to Self-Help Program participants.

- Locating where cockroaches are entering the building(s) and their sources of food and water is vital to long-term control of cockroaches. There is an endless source of cockroaches in the world and control will be a never-ending battle if cockroaches can easily get into the building and/or there is readily-available food and water.

STEP 2. Decide if Self-Help is appropriate.

- If it is determined the extent of the cockroach infestation is not appropriate for Self-Help Program control, contact the O&M Office or Fort Pickett Entomology to arrange for control by a Pest Management Professional (PMP).
- The decision to use Self-Help for control of cockroaches is often based on personal judgement and common sense. If you have **any** doubts that the cockroach infestation can be controlled with Self-Help actions, do not use Self-Help.

STEP 3. Perform Physical and Cultural Controls.

- Using cockroach baits as the only control method will rarely provide sufficient control of cockroach infestations.
- Habitat modification (cleaning up food sources and nesting locations) and building maintenance practices (repairing holes, cracks and other paths that cockroaches use to enter buildings) are vital in controlling cockroach infestations.
- If all the actions in STEP 3 and 4 have been done and there are still on-going or repeated cockroach infestations at the same facility, contact the VAARNG IPMC (MAJ Brian Webb). More extensive control methods may need to be done by contract or the Fort Pickett Entomologist.

STEP 4. Perform Chemical Control (baiting).

- Self-Help products for cockroaches can be obtained by submitting a Work Order request to O&M. Only use products that are pre-approved for use in the VAARNG Self-Help Program.
- Read the entire product label. **The Label is the Law!**
- Wear appropriate Personal Protective Equipment (PPE) as directed on the label.
- Do **NOT** eat, drink or smoke while using any pesticide.
- Use product as directed on the label for control of cockroaches.
- See Section 3 Control, Chemical below for further guidance on using cockroach baits.
- Always thoroughly wash hands with soap and water after using product and before eating, drinking or smoking.
- Bait will not kill all the cockroaches immediately – the pesticide has a delayed effect so the cockroaches that have eaten the bait can expose other cockroaches. They do this by spreading small amounts of the bait around on their body/feet, when other cockroaches eat their pesticide-containing feces, or when other cockroaches eat the bodies of pesticide-killed cockroaches.
- Use of chemical controls (pesticides) only will rarely provide sufficient control of cockroaches. Habitat modification through cleaning and sanitation, and building

practices (exclusion) are more permanent controls.

STEP 5. Storage and Disposal of Self-Help Products.

- Store and/or dispose of any leftover Self-Help products as directed on the label and the VAARNG IPMP.
- If you have any questions on storage or disposal of the Self-Help products, contact the VAARNG IPMC (MAJ Brian Webb).

STEP 6. Recording and Reporting.

- Report Self-Help product use to the VAARNG IPMC using the Pest Management Treatment Record form.
- The form recording usage should be sent to the VAARNG IPMC at the end of the month with any other IPM reports.

STEP 7. Follow-up and Assessment.

- If the Self-Help control methods in this outline do not control the cockroaches to acceptable levels with 30 days, put in a Work Order with the O&M Office.

COCKROACH CONTROL

WHY IS CONTROL NEEDED?

Cockroaches are often the most abundant and troublesome pests in offices, dining halls and other buildings.

The cockroach's appearance, odor and habits make them objectionable to many people. A few cockroaches can become a large infestation very quickly because of their extraordinary ability to reproduce and how well they are able to co-exist with people.

Cockroaches' feces and saliva contain proteins and allergens that may trigger asthma attacks in some people. In densely populated areas, scientists have identified a correlation between roach presence and the incidence of asthma.

Cockroaches can also spread various pathogens, including bacteria, viruses and parasitic worms.

1. GENERAL BIOLOGY

There are several thousand species of cockroaches throughout the world. Four species are of primary economic importance: German, Brown-Banded, Oriental and American. However, seven species/groups are commonly found in buildings (depending on geographic area). The Asian cockroach (a recently introduced species) is being seen with increasing frequency.

See information sheets below for more information on each of the common cockroach species.

2. INSPECTION AND SURVEY

Cockroaches are seldom seen during daylight hours and, in colder climates, they will live year round in structures. In warmer climates, once cockroaches gain entry into buildings, they seek out safe areas (harborages) and make the regular trips, usually during dark periods, to food sources from their harborages. Inspection for cockroach infestations normally involves flushing of pests from harborages (using canned air), sticky traps and/or inspection for droppings.

Visual Sighting: A good flashlight is an essential tool for cockroach inspections. Cracks and crevices should be examined with specific attention near sources of food and water, or in damp areas. Canned air can be sprayed into cracks as a flushing agent to force the cockroaches out where they can be seen and identified.

An indicator of a heavy cockroach infestation is fecal spots near likely harborages (places where they hide).

Cockroach fecal droppings are sometimes confused with rodent droppings. The feces of small cockroaches are black and resemble ground coffee or black pepper. Larger cockroaches leave black or brown droppings which are cylindrical in shape and have ridges down the side.

Rodent fecal droppings are usually dark, moist, soft and shiny, if recent, or dry and hard, if a few days old. When examined under a magnifier or microscope, hairs can usually be seen in rodent droppings. Mouse droppings have pointed ends.

Trapping:
Sticky traps (aka glue boards or glue traps) are excellent tools for cockroach surveys. They are inexpensive, non-toxic and easy to use. Placement of sticky traps near suspected cockroach harborages (places where they hide) for 24 hours will provide quantitative results of current infestations. However, catching no roaches does not necessarily mean there are no roaches. Sticky trap catches are proportionate to roach population size and activity in the area where the trap is placed.

Sticky traps should never be placed outdoors or in areas where non-target wildlife (such as birds, bats or snakes) may be accidentally trapped. If non-target wildlife is found alive on a sticky trap, talcum powder, cornstarch or vegetable oil can be applied to the exposed glue around the trapped wildlife and the animal can then usually free itself. For birds and bats, it is best to immediately take the trap, without attempting to remove the animal, to a licensed wildlife rehabilitator for assistance.

3. CONTROL METHODS

Cultural:

Sanitation: Most cockroach infestations can usually be traced to poor sanitary conditions that provide a source of food for the cockroaches. A control program should include removal of the food supply by improving food and refuse storage and removal.

- Keep kitchen scraps in sealed containers.
- Clean up food and beverage spills immediately.
- Do not leave food out overnight.
- Vacuum or sweep frequently.
- Fix leaking faucets and plumbing.

Because of cockroach habits, good sanitation is important to achieving and maintaining successful control of cockroaches. In the absence of good sanitation, chemical control measures cannot be expected to be fully effective.

Physical:

Exclusion: Cockroaches can get inside of buildings by hiding themselves or their egg cases in packages (such as cartons of supplies, cases of soda, boxes of vending machine

foods, etc.) that are brought into the building. It is impossible to inspect all incoming boxes, but efforts should be made to inspect as much as possible.

Movement of cockroaches between buildings may be along steam and water lines, or in sanitary and storm drain sewers. In warmer climates where they can live outdoors most of the year, cockroaches may simply walk into a building looking for food or water. The use of exclusion practices such as caulking and sealing cracks and other possible entrances is very helpful in preventing and controlling cockroach infestations.

Since cockroaches often enter through small openings, seal the following areas:

- Cracks and crevices where cockroaches can hide, such as crevices where countertops and kickboards meet the walls.
- Holes in the walls that lead into the wall void, such as around pipes.
- Around doors and windows.
- Cracks, crevices and holes in walls and foundation; this will reduce entry of the larger cockroaches (such as American cockroaches) from the outdoors.
- Seal exterior cracks and crevices with silicone caulk, making sure all windows have tight fitting screens in good repair.
- Use door sweeps and screen doors.

Mechanical:

Sticky Traps: Sticky traps (aka glue traps or glue boards) alone will not control most cockroach infestations. Although sticky traps are simple to use and may be effective in stopping an infestation from occurring, chemical control is usually necessary once an infestation is established.

Ultrasonic and/or Electromagnetic Repellent Devices: These devices have been proven to be ineffective and may **NOT** be used.

Chemical:

As a general rule, 4-6 bait stations are needed for every 100 square feet (10' x 10' room) of infested area.

Use a higher number of bait stations where the infestations are heaviest.

Placement should be concentrated where there is a food source, in areas that have not been treated with other pesticides, or where there are access routes from untreated adjoining areas.

Do not spray insecticides in areas where bait stations are placed. Insecticide sprays kill cockroaches on contact and then they are not able to expose other cockroaches to the bait.

The bait must be placed where cockroaches live or travel so the insects have maximum access to it. Bait stations should usually be placed next to walls and/or in dark, enclosed areas.

For active infestations, the bait stations should be replaced every 90 days.

<u>German or Brown Banded Cockroaches (smaller infestations – less than 10 cockroaches found in one room only):</u>

- Use 6 small bait stations and 3 sticky traps.
- Place the sticky traps along baseboards, usually behind appliances and other objects that are not moved on a daily basis.
- Read the entire bait station label. **The Label is the Law!**
- Wear appropriate Personal Protective Equipment (PPE) as directed on the label.
- Do NOT eat, drink or smoke while using any pesticide.
- Place the bait stations along floor/wall junctions in protected places, especially in those areas where cockroaches have been seen.
- Bait stations can also be placed under appliances, preferably next to the sides of the devices.

Always follow the label directions for the use, placement and disposal of bait stations.

<u>German or Brown Banded Cockroaches (for larger infestations – cockroaches found in more than one room):</u>

- Get 6-12 small bait stations and 6-8 sticky traps.
- Read the entire bait station label. **The Label is the Law!**
- Wear appropriate Personal Protective Equipment (PPE) as directed on the label.
- Do NOT eat, drink or smoke while using any pesticide.
- Place the bait stations along floor/wall junctions in protected places, especially in those areas where cockroaches have been seen.
- Bait stations can also be placed under appliances, preferably next to the sides of the devices.

Always follow the label directions for the use, placement and disposal of bait stations.

<u>American, Smokybrown, Oriental or Australian Cockroaches:</u>

- Use 3-5 large bait stations and 3 sticky traps per each room where cockroaches are found (i.e., bathrooms, kitchens and utility rooms).
- Read the entire bait station label. **The Label is the Law!**

- Wear appropriate Personal Protective Equipment (PPE) as directed on the label.
- Do NOT eat, drink or smoke while using any pesticide.
- Place the sticky traps along baseboards, usually behind appliances and other objects that are usually not moved on a daily basis.
- Place the bait stations along floor/wall junctions in protected places, especially in those areas where cockroaches have been seen.
- Bait stations can also be placed under appliances, preferably next to the sides of the devices.
- Adult American, Smokybrown and Oriental cockroaches are too large to enter the small bait stations.

Always follow the label directions for the use, placement and disposal of bait stations.

Asian Cockroaches:

- Control with cultural and physical controls:
  - Change white light bulbs to yellow bulbs around entrance doors.

  - Seal exterior cracks and crevices with silicone caulk, making sure all windows have tight fitting screens in good repair.
  - Use door sweeps and screen doors.
  - If cultural and physical controls are not enough, put in a Work Order with O&M for PMP control of outdoor populations.

Wood Cockroaches:

- Bait stations are not effective for wood cockroaches.
- Vacuum or sweep up individual wood roaches and dispose of them outside.

Wear appropriate Personal Protective Equipment (PPE) as directed on the label whenever handling cockroach bait stations.

Bait will not kill all the cockroaches immediately – the pesticide has a delayed effect so the cockroaches that have eaten the bait can expose other cockroaches to the bait. They do this by spreading small amounts of the bait around on their body/feet, when other cockroaches eat their pesticide-containing feces, or when other cockroaches eat the bodies of pesticide-killed cockroaches.

Dispose of used bait stations as directed on the label. If the label is missing, dispose of by wrapping the bait station and placing in a garbage can.

4. AFTER TREATMENT SURVEILLANCE

Clean up or remove egg cases, cast skins and droppings/stains in order to tell if there is new cockroach activity.

Continue to use sticky traps and check them regularly, noting what is captured. Look for cockroaches at night just after the lights in a room are switched on. Look for egg cases, cast skins, fecal droppings or staining.

If there is a reduction in the number of cockroaches, then Self-Help control efforts are working. Remove sticky traps after 30 days if additional roaches are not caught.

If sticky traps are full of cockroaches and/or there are still egg cases, cast skins and droppings/stains being seen after cleaning up those from the initial infestation, put in a Work Order with O&M for PMP control.

German Cockroach

- The German cockroach is the most common pest in homes, barracks, dining facilities, and warehouses.
- It is a small brownish insect about 5/8-inches long and easily identified by two longitudinal black bars on the pronotum (the disc-like plate behind head).
- German cockroaches live in warm, dark places and are most commonly found in places close to food and water such as dining facilities, bathrooms and pantries. They live in walls, cabinets and other hiding places in these rooms.
- They will also live anywhere that has adequate food, water and shelter present. They may be found near plants, pet food, in clutter such as clothing on the floor, books, magazines, newspapers, boxes and paper bags.
- They secrete a fluid that leaves a characteristic odor. This odor may even linger after the cockroaches are gone if there was a large infestation.
- German cockroaches can be found in almost all geographical areas of the United States.
- In addition to common human foods, German cockroaches will feed on almost anything with nutritional value such as saps, glue and toothpaste.
- German cockroaches breed year-round.
- The females produce from 4-5 egg capsules during their life span. Each egg capsule (called an "ootheca") produces about 30 nymphs.
- The adult female carries her egg case until 1-2 days before hatching. The egg case is then deposited in a sheltered place.
- Nymphs hatch from the egg case and are somewhat similar in appearance to adults except that they lack wings.
- Development from egg to adult ranges from about 50 to 200 days depending on temperature and relative humidity.

Asian Cockroach

- Asian cockroaches were introduced to Florida in 1980's and have quickly become established in the southeastern United States. Their range is expanding and Asian cockroaches have been found as far north as Michigan.
- Asian cockroaches are almost identical in appearance to the more common German cockroach. Adults of both species are approximately 5/8-inches long and 3/16-inches wide. Both are similar in color, with prominent dark stripes just behind the head. However, their behavioral patterns are quite different.
- Unlike German cockroaches that are repulsed by light and the presence of people, Asian cockroaches live outdoors in warm climates, are attracted to light and take little notice of human presence.
- Asian cockroaches usually live outside buildings in moist shady leaf litter and grassy areas and are generally not active during the day. If the leaf litter is disturbed, adult Asian cockroaches will fly to escape.
- If the temperature is 70 degrees F. or higher at dusk, Asian cockroaches fly towards any light source. They are very strong flyers and can fly as far as 120 feet. They are attracted to light and usually invade buildings by entering around doors and windows. Once inside, they fly to sources of light.
- Asian cockroaches are omnivorous and will eat pet food, seeds, flowers, and even pet feces.
- In the winter, Asian cockroaches survive by burrowing into leaf litter and soil. In the spring, they begin to emerge, and their numbers grow into large populations that can reach 30,000 to 240,000 cockroaches per acre.
- Asian cockroaches are often mistaken for German cockroaches, and control measures are applied the interiors of buildings but not outside where Asian cockroaches live.
- Because Asian cockroaches live outdoors, management practices need to target leaf litter and mulch. It is imperative that cockroaches be identified correctly so that control and management practices can be applied in the correct locations.

Female Asian and German cockroaches.
Asian cockroach on the left and German cockroach on the right.

- Asian and German cockroaches are best told apart by looking to see if the wings of the female cover the egg case (ootheca) when it is being carried. Males can only be told apart using magnification.
- In contrast, German cockroaches live strictly inside homes, flee from sources of light, and, although adult German cockroaches have fully developed wings, German cockroaches do not fly.
- Asian cockroaches are easily controlled with most pesticides; in contrast, German cockroaches often have resistance to many classes of insecticides.

Oriental Cockroach

- Oriental cockroaches are medium sized, black cockroaches that are often called "waterbugs".
- They are shiny, blackish-brown and are approximately ¾ to 1-inches long.
- The wings of adult male Oriental cockroaches cover two-thirds of the abdomen. Adult

female specimens are wingless, and their small wing pads extend only to the middle of the abdomen.

- Oriental cockroaches do not fly and prefer warm, damp places such as cellars and sewers.
- Oriental cockroaches are primarily an outdoor species. Most outdoor populations live beneath mulch in landscape beds, in leaf litter, beneath stones or debris outside.
- They frequently get into buildings beneath doors, through open doors or gaps beneath siding. If access is available, Oriental cockroaches can thrive in the voids or openings beneath porches, in wall voids and crawlspaces.
- In urban areas, Oriental cockroaches can be found in large numbers living in storm drains and sewers.
- Oriental cockroaches are known for their preference for feeding on garbage, filth or material that has begun to decay.
- Oriental cockroaches are very dependent on water. Studies have shown they can survive up to a month without food, but they cannot survive for more than two weeks without water.
- Although their natural habitat is outdoors, Oriental cockroaches may infest homes in summer. Inside, they tend to remain on lower floors.
- Oriental cockroaches tend to gather in large numbers near water sources.
- In areas where large populations of Oriental cockroaches are present, a musty odor can often be detected
- On average, an adult male oriental cockroach will live 110 to 160 days and the adult female can live anywhere from 35 to 180 days.
- A single female oriental roach can produce approximately eight egg cases with approximately 16 eggs per case.
- Approximately 30 hours after a female Oriental cockroach has produced an egg case, she will drop it in a protected area where it will stay until the young hatch.
- In the warmer months, the time it takes for an egg to develop into an adult may be as few as 200 days. However, when the weather becomes colder, or during the late fall and winter months, it can take as many as 800 days for Oriental cockroaches to go from egg to adult.
- Oriental cockroaches are found worldwide, although they are more common in the northern states than in the southern United States.

American Cockroach

- American cockroaches are one of the largest commonly-found roaches in the United States.
- They are about 1¼ to 1½-inches long and dark brown to mahogany color with somewhat obscure yellow margins on the pronotum (the disc-like plate behind the head). The adults have fully developed wings that completely cover the back end of their body.
- In northern states, American cockroaches almost always live indoors and are found in warm, damp places such as sewers, steam tunnels, around floor drains, near sump pumps, crawl spaces and damp basements. In basements, they may be found in corners areas high on the walls or in floor drains. They more commonly congregate in open spaces instead of small cracks and crevices.
- In southern states, American cockroaches live and reproduce outdoors and are capable of flight. They can be found in moist, shady areas like yards, hollow trees, woodpiles and mulch. At times they can be found under roof shingles or attics. Usually, they will live outside but will wander inside in search of food and water or during extremes in weather conditions.
- American cockroaches enter buildings to find water or food. They forage under appliances, in drains, in food storage cabinets and on the floor for crumbs, and scraps of food. They will also eat any food that is left out overnight and will even chew through thin plastic food packaging.
- Adult American cockroaches live from 200 to 400 days.
- The American cockroach will reproduce indoors (and outdoors in warmer climates).
- The female can produce as many as 90 egg capsules in its life time. Each egg capsule has approximately 15 eggs.
- The young or nymphs (1/4-inch long) emerge from the eggs in about 60 days. It takes about 30 days for the young to mature to adulthood, but this is temperature dependent and means the nymphs will mature faster in warmer temperatures and slower in colder temperatures.
- American cockroaches are the most common cockroach found in the sewers of the United States. Because of their longevity and reproductive capacity, American cockroaches can produce very large populations. As many as 5,000 American cockroaches have been collected from a single sewer manhole.

Smokeybrown Cockroach

- Smokybrown cockroaches are approximately 1¼-inches long. They are typically brownish black but their color can vary from dark mahogany to black, they.do not have markings and are shiny, Both sexes have wings that extend beyond their abdomen.
- They live primarily outdoors and are good fliers. Smokybrown cockroaches are attracted to lights and may enter buildings because they are drawn to interior lighting.
- Smokybrown cockroaches enter buildings through openings or gaps beneath siding, through attic or soffit vents, openings around utility and plumbing penetrations, and through open windows or doors.
- Smokybrown cockroaches are found outside in areas that are warm, very moist and protected from the elements. They can easily become dehydrated, so the availability of a moist environment is critical for survival. Around buildings and structures, smokybrown cockroaches can be found in tree holes and cavities, beneath mulch beds and ground cover, and around soffits and eaves, or areas where moisture problems may exist.
- Smokybrown cockroaches primarily feed during the late dusk or early dawn hours when they leave their hiding places in search of food. They will feed on any food that may be available, including human food scraps, dead insects, fecal matter and even plant materials. They may also be seen drinking available water.
- Female smokybrown cockroaches deposit their egg cases approximately one day after it is formed and firmly glue it to an object. Females produce from 4-32 egg cases in a lifetime with each case containing from 4-29 eggs.
- The time spent from egg to adult is about 400 days depending on humidity and temperature.
- An adult female smokybrown cockroach can live about 250 days.
- Smokybrown cockroaches are common pests of the southeastern United States. Although they are mainly found from central Texas eastward, and as far north as North Carolina, smokybrown cockroaches have also been found as far north as Indiana and Illinois.

Australian Cockroach

- The Australian cockroach is slightly smaller in size (about 1-inch long) and similar in appearance to the American roach.
- It can be recognized by the vivid pale area surrounding the edge of the pronotum (the disc-like plate behind head).
- Australian cockroaches can be found in wall voids, tree holes, leaf piles, mulch, wood piles, tree bark, in and around shrubs and greenhouses. Inside they are found in attics, kitchens, garbage cans and garages.
- Australian cockroaches feed on plant material and decaying material. They will also eat starchy materials like book bindings and glue in boxes.
- Australian cockroaches are good fliers and they will enter buildings where enough food, moisture, and heat are available.
- Females drop egg cases in hidden areas and cracks and crevices. Each case has about 24 eggs with a smaller percentage that hatch. The nymphs are marked with yellow patches and take about a year to develop.
- They are mostly found in the south and tropical areas like Hawaii. They have been found in houses in the northern states due to transportation and shipping. They can populate well when temperatures stay above 80 degrees.
- Australian cockroaches are more common in Florida and California than in more northern, colder states.

Brown Banded Cockroach

- Adult brown banded cockroaches are 1/2 to 5/8-inches long and are reddish brown to dark brown in color. They have two cross bands of lighter color, one is at the base of the wings and the other is about 1/3 of the way down the back. The female is broader than the male; her wings do not extend to the tip of her abdomen like the male's wings.
- Brown banded cockroaches are not as common as German cockroaches, but they are found nationwide.
- Brown-banded cockroaches like warm temperatures and are found in places where cockroaches are usually not expected, such as on closet shelves and inside/under large and small electrical appliances (electric clocks, computers, radios and television sets). They tend to hide in places up off the floor, including behind pictures and wall hangings.
- Brown-banded cockroaches are not normally as troublesome as German cockroaches, but they can reach large numbers if food and water are abundant.
- They produce an unpleasant odor and will feed on food product, glues and fabrics.
- The female produces about 13 egg capsules in her lifetime. Each egg capsule contains 10 to 18 eggs.
- Female brown banded cockroaches frequently glue their egg capsules beneath furniture and behind pictures.
- Adult brown-banded cockroaches live about 6 months. The developmental time from egg to adult is over 200 days.

Wood Cockroaches

- Wood cockroaches are light to dark brown, about ¾ to 1-inch long, and the sides of the thorax and front half of the wings have a yellow border. The females are wingless and are rarely seen.
- Wood cockroaches are found mostly in the eastern United States.
- Wood cockroaches live outside, but will occasionally enter homes by coming in with firewood or other items stored outside. They are often confused with German, American or Smoky Brown cockroaches.
- Behavior is the best way to tell the difference between wood cockroaches and other cockroaches. Wood cockroaches can be seen day or night, they aren't skittish and are less likely to scurry away when approached, and they wander around when inside a building without gathering in any particular area.
- Wood cockroaches normally live outdoors in moist woodland areas, including woodpiles, mulch, under the loose bark of trees, branches or decaying logs. Wood cockroaches eat decaying organic matter such as rotting trees and leaf litter.
- They are generally considered a minor pest since they prefer to be outside, need an environment that is consistently moist, and do not survive long nor breed indoors
- Wood cockroaches don't breed inside and pesticides that control other roaches are not as effective against them, so it is best to simply pick them up with a vacuum cleaner or broom and dustpan and discard them outside.

Approved Self-Help Products for Control of Cockroaches:

Combat Quick Kill Roach Killing Gel EPA Registration Number 64240-45

SELF-HELP IPM Outline 3

Nuisance Ants

A. PURPOSE

The Self-Help pest management program authorizes the use of approved Self-Help products (ready-to-use ant baits) by installation maintenance and VAARNG personnel who encounter ants during the normal course of their assigned duties.

B. RESPONSIBILITIES

- Self-Help Program participants are responsible for proper use, recording, reporting, storage and disposal of Self-Help products.
- **All** label instructions must be read and followed – **The Label is the Law!**
- A Safety Data Sheet (SDS) should accompany the Self-Help product and be readily available to personnel using the product and working in the area where the product is used.
- Only use products that are pre-approved for use in the VAARNG Self-Help Program. Contact the VAARNG IPMC (MAJ Brian Webb) for a current list of approved Self-Help products.
- Record and report usage of Self-Help products to the VAARNG IPMC at the end of each month using the Pest Management Treatment Record form.
- Approved Self-Help products are tools to assist Self-Help Program participants with the control of small-scale ant infestations that have not become extensive enough to warrant Pest Management Professional (PMP) control. Trying to control an excessively large infestation can result in loss of work time, higher costs and unnecessary exposure of personnel to pesticides.

C. ACTIONS

STEP 1. Surveillance.

- Identify the type of ant, the extent of the infestation and possible entry points into the building, food sources and water sources.
- It is important to identify the type of ant so the most effective baits are used. The type of bait and methods used depend on the type of the ant. Use the fact sheets attached to this outline to help identify the type of ant or contact the VAARNG IPMC for assistance.
- Determine the extent of the ant infestation to decide if the control needed is beyond that available to Self-Help Program participants.
- Locating where ants are entering the building(s) and their sources of food and water is vital to long-term control. There is an endless source of ants outdoors, and ant control will be a never-ending battle if ants can easily get into the building and/or there is readily-available food and water.

STEP 2. Decide if Self-Help is appropriate.

- After identifying the type of ant using the information in this outline and determining the type of ant is **NOT** appropriate for Self-Help Program control, do not attempt Self-Help.
- Approved Self-Help products are tools to assist Self-Help Program participants with the control of small-scale ant infestations that have not yet become wide-spread enough to warrant Pest Management Professional (PMP) control. Trying to control an excessively large infestation will result in loss of work time, higher costs and unnecessary exposure of VAARNG personnel to pesticides.

STEP 3. Perform Physical and Cultural Controls.

- Using ant baits as the only control method will rarely provide sufficient control of nuisance ant infestations.
- Habitat modification (cleaning up food sources) and building maintenance practices (repairing holes, cracks and other paths that ants use to enter buildings) are vital in controlling nuisance ant infestations.
- If all the actions in STEP 3 and 4 have been done and there are still on-going or repeated ant problems at the same facility, contact the VAARNG IPMC. More extensive control methods may need to be done by contract or the O&M Office or Fort Pickett Entomology.

STEP 4. Perform Chemical Control (baiting).

- Self-Help products for ants can be obtained by submitting a Work Order request to O&M.
- Only use products that are pre-approved for use in the VAARNG Self-Help Program.
- Read the entire product label. **The Label is the Law!**
- Wear appropriate Personal Protective Equipment (PPE) as directed on the label.
- Do **NOT** eat, drink or smoke while using any pesticide.
- Use product as directed on the label for control of ants.
- See section 3 Control, Chemical, below for further guidance in effectively using ant baits.
- Always thoroughly wash hands with soap and water after using product and before eating, drinking or smoking.
- Baits will not kill all the ants immediately – the pesticide has a delayed effect so ants that have eaten the bait can carry it back to the nest to feed to other ants.
- Use of chemical controls (pesticides) will only rarely provide sufficient control of ants. Habitat modification through cleaning and sanitation, and building practices (exclusion) are more permanent controls.

STEP 5. Storage and Disposal of Self-Help Products.

- Store and/or dispose of any leftover Self-Help products as directed on the label and the VAARNG IPMP.
- If you have any questions on storage or disposal of the Self-Help products, contact the VAARNG IPMC.

STEP 6. Recording and Reporting.

- Report Self-Help product use to the VAARNG IPMC using the Pest Management Treatment Record form.
- The form recording usage should be sent to the VAARNG IPMC at the end of each month that the treatment is conducted.

STEP 7. Follow-up and Assessment.

- If the Self-Help control methods in this outline do not control the ants to acceptable levels with 30 days, put in a Work Order with O&M.

ANT CONTROL

1. WHY IS CONTROL NEEDED?

Ants are common pests across the United States.

With the exception of carpenter ants, most ant species do not cause damage to structures.

However, ants enter buildings in search of food/water and their presence is disruptive to most people. Also, some ants may bite or sting.

2. GENERAL BIOLOGY

Ants are small, usually wingless insects. However, winged ants may be seen swarming at certain times during the year.
Ants are 1/8 to 1/2-inch in length and may be yellow, red, brown, or black.

Ants (above left) should not be confused with termites (above right). Both ants and termites swarm at various times of the year. Ants have a thin waist (pedicel), elbowed antennae, and the forewings are distinctly larger than the hind set of wings. Termites have a fat waist (actually, no waist), the antennae are straight, and all four wings are of equal size.

Where ant nests occur may change with the seasons or where in the United States they occur. Ant species found nesting in structures in the north may be found nesting both in and out of structures in the south.

Ants enter structures through cracks and crevices as they search for food, water and shelter.

Ants generally live outdoors, but a few species may build nests inside buildings.

Ant nests are usually found behind loose baseboards, behind hollow walls, or in other protected voids.

Adult ants are the only life stage normally seen inside facilities.

A colony of ants consists of one or more queens, workers and males. As many as 500,000 ants may live in one colony.

Males and queens emerge in the late spring or early summer when it is time for mating. Mating usually occurs in flight and the queen loses her wings afterwards, then starts a new colony or joins an existing colony.

The queen is the only ant that lays eggs. Depending on the type of ant, she lays as few as 15-20 eggs per year or as many as 5-20 eggs per day.

See attached information sheets for each of the common ant species.

2. INSPECTION AND SURVEY

It is very important to determine which species (one or more may be involved) of ants are present and, if possible, the nest locations.

Visual Sighting: Follow ant trails to find the nests. Ants lay down a chemical pheromone trail along their established routes to and from a food source so other ants can easily find the food.

Inside a building, inspect along the carpet edges, doors, windows, and especially areas where food is stored or eaten. The easiest way to find a trail to the nest is to watch where ants go after reaching a food source.

Outside of a structure, inspect around foundation walls, areas of vegetation, and mulch. Any vegetation found near patios and walls may hide ant nests or their trails. Check under any item that is on the ground. Some ant nests are well hidden.

Use of non-toxic baits is also a very effective surveillance tool. Survey bait items may include, but are not limited to, peanut butter, jelly, hamburger, bacon grease, french fries, or honey. The combination of a sweet and a meat/grease is a very enticing combination. Map the premises and note the locations of the baits and where ants are seen each day.

3. CONTROL METHODS

Carpenter Ant control is NOT done by Self-Help Program participants.

Cultural:

Sanitation: Most ant infestations can usually be traced to a source of food for the ants. A control program should include removal of the food supply by improving food and refuse storage and removal.

- Keep food in sealed containers.
- Clean up food and beverage spills immediately.
- Vacuum or sweep regularly to remove spilled food particles.
- Do not leave food out overnight.

- Fix leaking faucets and plumbing.
- Store garbage cans in dry places, keep them clean and empty often.

Good sanitation is important to achieving and maintaining successful control of ants. In the absence of good sanitation, chemical control measures are not fully effective.

Physical:

Exclusion: The use of exclusion practices such as caulking and sealing cracks and other possible entrances can be very helpful in preventing and controlling ant infestations.

Since ants often enter through small openings, seal the following areas with caulking:
- Cracks, crevices or holes that provide entry into the facility, especially in the walls and foundation.
- Holes in the walls that lead into the wall void, such as around pipes.
- Around doors and windows, making sure all windows have tight fitting screens in good repair.

Ants may also be carried into buildings in or on objects. Inspect plants and other items before bringing them indoors.

Move firewood, dead trees and limbs away from facilities. Keep vegetation trimmed so it does not touch buildings.

Mechanical:

Sticky Traps: Sticky traps are not effective in controlling ants and are generally not used.

Ultrasonic and/or Electromagnetic Repellent Devices: These devices have been proven to be ineffective and may NOT be used.

Chemical:

While sanitation will help a great deal in controlling ants, it will not always completely solve the problem if large numbers of ants are entering or nesting in the structure.

Toxic Ant Baits: Toxic ant baits are an effective control for most species of ants, and an appropriate control method for Self-Help program participants.

Ants take the toxic bait back to the nest and feed it to the other ants in the colony. After a number of days (or weeks in some cases), all of the ants in the colony have eaten, or been fed, the bait and die.
Using a toxic bait that is attractive to the species of ant is important. The lure part of the bait may be solid or liquid and based on sugar, fat or protein. With some species of ants, different baits may be preferred at different seasons. If ants are not showing any interest in a bait, try another formulation that has a different type of lure.

Bait should be replaced regularly and an ample amount should be used.

As a general rule, one bait station is adequate for every 100 square feet (10' x 10' room) of infested area.

Toxic ant bait is best placed along an active trail. Otherwise, place it in areas where there is a food source, that have not been treated with other chemicals and/or where there are access routes from untreated adjoining areas.

Do not spray insecticides in areas where bait has been placed. Insecticide sprays kill ants on contact and they are not able take the bait back to other ants in the colony.

Do not clean up ant trails that lead between the bait and the ant nest. The ants must be able to access the bait **and** return to the nest with it.

Practice good sanitation in the areas where the bait is located so the bait is not competing with other sources of food.

For active infestations, the bait should be replaced every 30 days or when the ants have eaten it all.

Wear appropriate Personal Protective Equipment (PPE) as directed on the label whenever handling toxic ant bait.

Bait will not kill all the ants immediately – the pesticide has a delayed effect so ants can carry the bait back to the nest to feed to other ants.

Dispose of used bait stations as directed on the label. If the label is missing, dispose of by wrapping the bait station and placing in a garbage can.

Be sure to continue to do the cultural and mechanical controls (sanitation and exclusion). As long as the ants can enter the building and food/water are available, they may continue to be a problem even though bait stations are in place.

<u>Ants that are Nesting Inside Buildings:</u>

- Use approximately one bait station/100 square feet.
- Always wear appropriate Personal Protective Equipment (PPE) as directed on the label whenever handling ant bait.
- Place bait stations next to ant trails and/or where ants have been seen.
- Replace bait stations that are empty and relocate stations that have little or no ant activity.
- Bait stations should be used until ants disappear.

Always follow the label directions for the use, placement and disposal of bait stations.

Pharaoh Ants:
Pharaoh ants are a special problem because their colonies "bud" when stressed or threatened and create multiple new colonies. When dealing with pharaoh ants, use ant baits that have Hydramethylnon as an active ingredient. They have been the most effective to date against the pharaoh ant. Other type of insecticidal baits (such as those containing the active ingredient methoprene) have a delayed action and are generally not successful with pharaoh ants.

- Baits are usually the only effective method of control.
- Use approximately one bait station/100 square feet.
- Always wear appropriate Personal Protective Equipment (PPE) as directed on the label whenever handling ant bait.
- Place a bait station as close as possible to a line of foraging ants without disturbing them.
- Do not disturb the colonies or spray them with insecticides since it can cause them to "bud" and form new colonies in the building.

Always follow the label directions for the use, placement and disposal of bait stations.

Ants that are Nesting Outside and Foraging Inside (other than Fire Ants or Carpenter Ants):
Perform the Cultural and Physical controls listed in the previous sections, especially sealing the routes ants are using to get into the building.

If ants are **NOT** entering structures and are **NOT** Fire Ants, Carpenter Ants or a species of ant that poses a risk to the environment, human health or property, there is usually not a need to control them.

If Cultural and Physical controls have been performed to the greatest extent possible and ants continue to enter a building:

- Toxic ant baits are usually the secondary method of control.
- Get approximately one bait station/100 square feet.
- Always wear appropriate Personal Protective Equipment (PPE) as directed on the label whenever handling ant bait.
- Place a bait station as close as possible to a line of foraging ants without disturbing them.
- Replace bait stations that are empty and relocate stations that have little or no ant activity.
- Bait stations should be used until ants disappear.

Always follow the label directions for the use, placement and disposal of bait stations.

Put in a Work Order with the O&M Office or contact the Fort Pickett Entomologist to arrange for control of Carpenter ants by a Pest Management Professional (PMP).

4. AFTER TREATMENT SURVEILLANCE

The number of ants should diminish within days (or weeks in some cases) after using toxic ant baits.

Remove toxic bait after 30 days if ants are no longer being seen.

If ants are still being seen after 30 days, even after trying different formulations of bait, put in a Wok Order with the O&M Office or contact the Entomology Office for PMP control.

INTERIOR-NESTING ANTS

- Most ants that nest in buildings and structures range from 1/15 to1/4-inches long and range in color from a light yellow to a reddish yellow and jet black.
- These ants will nest in walls, woodwork, behind cabinets and beneath masonry.
- Indoor colonization by ants occurs year-round, especially in warmer climates.
- They will feed on all types of food material, such as sweets, fruits or nuts, and fatty, greasy, or oily materials.
- Once ants find a food source, they will leave a pheromone trail for other ants to follow.
- The thief ant and the odorous house ant (pictured above) are two of the more common species nest indoors.
- Other ants that may nest indoors are Argentine Ants, Crazy Ants, Fire Ants, Ghost Ants, Leafcutter Ants, Pavement Ants and Pharaoh Ants.

OUTDOOR-NESTING ANTS
(other than Fire Ants or Carpenter Ants)

- Many species of ants that nest outdoors and will forage indoors for food.
- Pavement ants prefer to nest under rocks, next to buildings and under cracks in pavement. Harvester ants (pictured above) are often confused with fire ants, but harvester ants are much larger than fire ants and make large bare areas around their nests with a single entrance hole to the colony.
- Leafcutter ants are also much larger than fire ants and have a distinctive built-up dense cluster of mounds at the colony's center called a "town", and have many entrance holes over a very large area.
- The large yellow ant (citronella ant) nests near structures and their winged reproductives are often confused with termites.
- Field ants occasionally invade structures. They nest in open areas in small mounds.
- If ants are **NOT** entering structures and are **NOT** Fire Ants, Carpenter Ants or a species of ant that poses a risk to the environment, human health or property, there is usually not a need to control them.

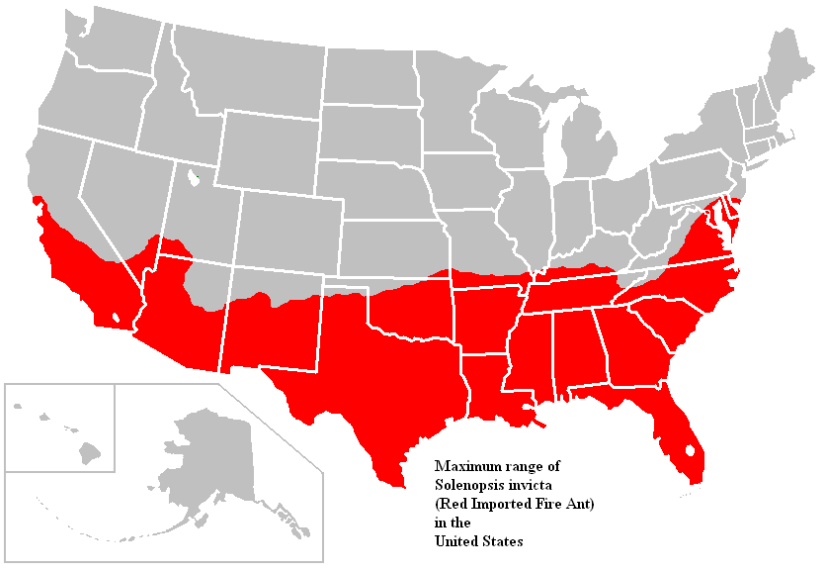
PHARAOH ANTS

- Workers are approximately 1/5 to 1/2-inches long. The body is often pale yellow or red with a darker abdomen.
- Pharaoh ants may bite.
- They will feed on all types of food material.
- Pharaoh ant workers search actively for food and often use pipes, electrical and telephone wires to enter buildings. They also get inside through poorly caulked windows or under flashing.
- Once pharaoh ants invade a building, they will infest other rooms and are usually found year-round.
- Pharaoh ants tend to nest in inaccessible areas such as behind baseboards, in wall voids, wall sockets, in furniture and appliances, in ceilings and under floors.
- Pharaoh ants can also nest outside, but cannot survive outdoors during winter in northern areas of the United States.
- Pharaoh ants are a special problem because their colonies "bud" when stressed or threatened and create multiple new colonies.
- Pharaoh ant queens can produce 400 eggs in a lifetime. New nests can be formed by the migration of as few as 10 immatures, 5 workers, and one queen. This process is called “budding”.
- Colonies consist of queens, males, workers and brood (eggs, larvae, and pupae). Flights of swarmers seldom ever take place even through winged reproductive ants are produced.
- Development time from egg to adult for workers averages 38 days at 80F.
- A queen can live from 4-14 months, a worker lives for about 10 weeks, and males live 3-5 weeks.
- Pharaoh ants have many queens. More than one nest may occur inside a home and individual ants from one nest do not fight with their counterparts from any other nests.
- Baits are usually the only effective method of control. Place bait station as close as possible to line of foraging ants without disturbing them. Do not disturb the colonies or

spray them with insecticides as this can cause them to "bud" and form new colonies in the building.

- When controlling pharaoh ants, use ant baits that have Hydramethylnon as an active ingredient. Other type of toxic ant baits (such as those containing the active ingredient methoprene) have a delayed action and are generally not successful with pharaoh ants.
- Never attempt control of pharaoh ants using a contact insecticide since it will only cause the colony to "bud" and spread to other areas.

FIRE ANTS



- Fire ants are medium-sized red and black colored ants that build mounds of soft soil.
- Worker fire ants vary in size from small (1/16-inch long) to large (almost 1/4-inch long). Many other ant species have worker ants that are uniform in size and may be a similar color.

- Other small to medium-sized ants that build small nests in soil often have central nest openings through which the ants enter and leave. Fire ant mounds have no central openings.
- Harvester ants are much larger than fire ants and make large bare areas with a single entrance hole to the colony.
- Leafcutter ants are also much larger than fire ants and have a distinctive built-up dense cluster of mounds at the colony's center called a "town", and have many entrance holes over a very large area.

- Red and black imported fire ants (Solenopsis invicta, and Solenopsis richteri) are native to South America. They were accidentally introduced into the United States around the 1930's through the port of Mobile, Alabama; probably in soil used for ship ballast, and have spread through the southern United States.
- There are several other species of fire ants that are native to the United States.
- Mounds are rarely larger than 18″ in diameter. In cold, dry areas, mounds are usually much smaller and harder to detect.
- When disturbed, fire ants emerge aggressively, crawling up vertical surfaces, biting and stinging. Their sting usually leaves a white pustule on the skin.
- Fire ants are sensitive to vibration or movement and tend to sting when the object they are on moves. Usually, whatever causes one ant to bite and stings triggers the other ants to sting as well.
- A very small portion of the human population (approximately 1%) are hypersensitive to ant venom and can experience potentially lethal allergic reactions. However, even healthy individuals may experience severe reactions such as anaphylactic shock if they suffer from a multiple stinging incident.

CARPENTER ANTS

- Carpenter ants are large, black or red, and 3/8 to 1/2-inch long.
- Carpenter ants live in damp wood where they excavate the softer wood to make a nest.
- The presence of carpenter ants usually indicates excess dampness or leaking water.
- Carpenter ants most often forage at night.
- **Carpenter Ant control is NOT done by Self-Help Program participants.**
- Put in a Work Order with the O&M Office or contact the Fort Pickett Entomology Office to arrange for control of Carpenter ants by a Pest Management Professional (PMP).

Approved Self-Help Products for Control of Ants:

Maxforce FC Professional Insect Control Ant Killer Bait Gel, EPA Registration Number 432-1264

SELF-HELP IPM Outline 4

Rodents (Mice & Rats)

A. PURPOSE

The Self-Help pest management program authorizes the use of approved Self-Help products (mechanical and physical controls only) by installation maintenance and VAARNG personnel who encounter rodents (mice and rats) during the normal course of their assigned duties.

B. RESPONSIBILITIES

- Self-Help Program participants are responsible for proper use, recording, reporting, storage and disposal of Self-Help products.
- Only use products that are pre-approved for use in the VAARNG Self-Help Program. Contact the VAARNG IPMC (MAJ Brian Webb) for a current list of approved Self-Help products.
- **NO chemical control products (rodent baits and/or poisons) are allowed for Self-Help use at VAARNG sites.**
- Self-Help products can be obtained by submitting a Work Order to O&M.
- 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 dust from these waste materials is inhaled. Precautions should also be taken when handling dead rodents in traps.

C. ACTIONS

STEP 1. Surveillance

- Identify the type of rodent, the extent of the infestation and possible entry points into the building, food sources and water sources.
- It is important to identify the type of rodent so the most effective physical and mechanical controls are used. The size of any traps used depends on the size of the rodent. Use the fact sheets attached to this outline to identify the type of rodent.
- As much as possible, determine the extent of the rodent infestation as much as possible to decide if the control needed is beyond that available to Self-Help Program participants.
- Locating where rodents are entering the building(s) and their sources of food and water is vital to long-term control of rodents. There is an end-less source of rodents outdoors. Rodent control will be a never-ending battle if rodents can easily get into the building, especially if there is readily-available food and water.

STEP 2. Decide if Self-Help is appropriate.

- The decision to use Self-Help for control of rodents is often based on personal judgement and common sense. If you have **any** doubts that the rodents can be controlled with Self-Help actions, contact the O&M Office or Fort Pickett Entomology for help with assessing the situation and/or to arrange for control by a Pest Management Professional (PMP).

STEP 3. Perform Physical and Cultural Controls.

- Seal all cracks and crevices, especially those over 1/4-inch wide where the rodents may be entering the building. Screening 1/8-inch square or smaller, steel wool and/or metal flashing can be used. Rodents will often chew through calking, although some elastomeric sealants can be used successfully to exclude mice.
- Do not leave unscreened doors and windows open.
- Regularly check objects that are brought into the building, such as boxes, furniture and equipment, to make sure they do not contain rodents.
- Seal food items in metal or rodent-proof containers.
- Store food items in the refrigerator.
- Regularly empty interior garbage cans and place garbage in secure, rodent-proof containers outside until it is removed from the site.

STEP 4. Perform Mechanical Control (trapping).

- Self-Help products for control of rodents can be obtained by submitting a Work Order request to O&M.
- Only use products that are pre-approved for use in the VAARNG Self-Help Program.

NO chemical control products (rodent baits and poisons) are approved or allowed for Self-Help use at VAARNG sites.

- Wear gloves when performing rodent control actions such as setting traps and handling rodents.
- Wear additional Personal Protective Equipment (PPE) (such as eye and/or respiratory protection) if directed on the label or in areas where Hantavirus is known to occur.
- Do **NOT** eat, drink or smoke while performing rodent control actions.
- Read all instructions for the trap. If no instructions are provided, refer to the fact sheets attached to this outline for guidance on placing and using traps for the target pest.
- Always thoroughly wash hands with soap and water after setting or handling traps/dead rodents, and before eating, drinking or smoking.

STEP 5. Storage and Disposal of Self-Help Products.

- Store and/or dispose of any leftover Self-Help products as directed on the label and the VAARNG IPMP.
- If you have any questions on storage or disposal of the Self-Help products or disposal of dead rodents, contact the VAARNG IPMC (MAJ Webb).

STEP 6. Recording and Reporting.

- Report Self-Help product use to the VAARNG IPMC using the Pest Management Treatment Record form.
- The form recording usage should be sent to the VAARNG IPMC at the end of each month.

STEP 7. Follow-up and Assessment.

- Using trapping as the sole control method will only provide temporary control.
- Habitat modification (cleaning up food sources, removing nesting locations) and building practices (repairing holes, cracks and other paths that rodents use to enter buildings) are more permanent controls.
- If all the actions in STEP 4 have been done and there are still on-going or repeated rodent infestations at the same facility, contact the VAARNG IPMC. More extensive permanent controls may need to be done by contract.

S

RODENT CONTROL

WHY IS CONTROL NEEDED? Rodents like to live the same places and eat the same food as people do. They will contaminate food, destroy fabrics and furniture in search of nesting material and gnaw woodwork, cabinets, furniture and other materials and objects in order to gain access into buildings. They are capable of transmitting diseases to humans such as Rocky Mountain spotted fever, Hantavirus, and Bubonic plague (via the fleas they carry).

1. GENERAL BIOLOGY

See attached information sheets for each of the common rodent pests.

2. INSPECTION AND SURVEY

The normal harborages (places where they rest and nest) indoors are in spaces between walls, attics, eaves, in cabinets and other furniture, and in stored food products. Outdoors, rodents will nest in weeds, rubbish, dense vegetation or in grasslands.

Rodents are usually nocturnal and secretive. They are rarely seen during the day except when infestations are very heavy. Therefore, it is necessary to interpret signs indicating the presence of rodents. Inspection techniques will involve searching for "signs" in the areas of suspected harborage. Signs are found along walls, under piles of rubbish, behind or under storage areas, and in thick vegetation. The following signs are indicative of a rodent infestation.

Fecal droppings: Fecal droppings are usually dark, moist, soft and shiny. In a few days the droppings become dry and hard. When examined under a magnifier or microscope, hairs are usually evident in rodent droppings.

- House mouse: Droppings are typically ¼-inch or less long and are pointed at the ends.
- Norway rat: Droppings are typically ¾-inch long and have blunt ends.
- Roof rat: Droppings are typically ½-inch long and are curved with pointed ends.

Runways: Rodents are creatures of habit and will utilize the same runways between their food source, and nesting areas. Because of their well-developed sense of touch, they prefer body contact with a vertical surface such as a wall or fence and will develop a pathway that can be recognized both outdoors and indoors.

Rub Marks: Mice do not leave obvious rub marks like rats unless there is an extremely heavy infestation. The rub marks of mice will be very low to the floor, and appear more as worn paint or paper rather than oily paint or paper. If rub marks are grossly evident, then the infestation of rodents is probably rats.

Tracks: Wherever there is dust, or when powder or flour is placed out in suspected runways, the tracks left by the animals' feet can give a clue as to the direction of their nests.

3. CONTROL METHODS

Cultural:

Sanitation: Most rodent infestations can usually be traced to poor sanitary conditions that provide a source of food for rodents. A good control program should include removal of the food supply by improving refuse storage and removal.

Elimination of Shelter: Trash and waste materials should be removed to prevent their use as shelters and nesting areas. Lumber and all other materials that can be used as shelters should be stacked on platforms, at least 18 inches above the ground, and at least 18 inches away from walls. Vegetation near buildings should be removed or kept trimmed.

Physical:

Rodent Proofing: House mice can enter through openings as small as 1/4 inch. If a pencil can fit through a crack, so can a house mouse. Structural openings around pipes and electrical conduits should be sealed with metal mesh, metal flashing or steel wool. Most rodents can chew through caulking, however elastomeric sealant may be effective against mice. All openings less than 4 feet above ground should be sealed with metal plates or concrete. Doors should be self-closing and tight fitting at the bottom. Spaces at the door bottoms may be sealed by attaching metal strips.

Mechanical:

Trapping: Trapping is recommended for rodent control when physical and cultural control methods are not enough to control the population.

However, trapping alone is rarely effective. There is an unlimited supply of rodents outdoors and they will continue to enter facilities unless food sources are removed, shelter/nesting areas are eliminated and the means of accessing the facility are sealed.

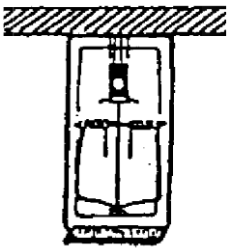
Using cultural methods (sanitation, elimination of shelter), physical methods (rodent proofing) along with mechanical methods (trapping) can control most rodent infestations.

"Old-fashioned" snap traps are highly effective and inexpensive to purchase.

A large number of snap traps should be set in the areas of rodent activity. Placing 12 traps in a room is not too many.

Where the snap traps are placed is very important. Snap traps should be placed in runways along walls, and not in the open. The traps should be placed against the wall, back-to-back with the triggers facing out and/or perpendicular to the wall, with the trigger portion near the wall.

TWO SNAP TRAPS WITH TRIGGERS FACING OUT



SNAP TRAP WITH TRIGGER NEAR WALL

Another effective method of setting snap traps is to place a board so it leans against the wall to make a shadowy "tunnel" and place the traps under the board with the trigger against the wall. Several traps can be set in a row with a ½-inch space between each trap to capture rodents that attempt to jump over the traps.

Peanut butter is a popular and easy to use bait for snap traps. Bacon, chocolate and nuts are also good baits (tie solid baits to the trap trigger with dental floss).

Commercial rodent trap lure baits (that do not contain a pesticide) are available in convenient syringes or squeeze bottles, but are not necessarily better than the above food baits. However, they do not contain any peanut products, which protects individuals with peanut allergies in the vicinity of the baited traps.

Rodents (especially rats) may be scared of new objects in their environment and may not go near the trap at first. To help overcome this, traps can be pre-baited (bait the trap, but do not set the trigger) for a couple of days to get rodents accustomed to the trap. Then rebait and set the trigger.

Rodents can become trap shy if the trap is triggered but they are not caught. Changing the bait often helps. For example, changing to bait from peanut butter to bacon (tied to the trap trigger

with dental floss) can be effective for trap-shy rodents. Changing the location of the traps may also help.

Traps should be inspected daily. Remove and dispose of dead rodents. Always wear proper PPE when handling rodents.

In addition to snap traps, several other rodent traps can be used successfully. Other traps are usually metal boxes with one or more openings, with trade names like "Ketch-all" or "Tin Cat". These traps rely on rodent curiosity and the rodents enter the trap to explore what is inside. Some of these traps have snap devices to kill and collect the rodents as they enter, and others are constructed so that rodents cannot escape once they are inside the trap. The traps must be inspected frequently to dispose of dead or trapped rodents.

Sticky Traps: Sticky traps (aka glue traps or glue boards) are not as effective as mechanical traps for rodents. Although sticky traps are simple to use, mice often can free themselves, and this type of trap is ineffective with adult rats.

Sticky traps are not recommended for trapping rodents in most instances.

Sticky traps should **never** be placed outdoors or in areas where non-target wildlife (such as birds, bats or snakes) may be accidentally trapped. If non-target wildlife is found alive on a sticky trap, talcum powder, cornstarch or vegetable oil can be applied to the exposed glue around the trapped wildlife and the animal can then usually free itself. For birds and bats, it is best to immediately take the trap, without attempting to remove the animal, to a licensed wildlife rehabilitator for assistance.

Ultrasonic and/or Electromagnetic Rodent Repellent Devices: These devices have been proven to be ineffective and may NOT be used.

Chemical:

Rodent Baits: Rodent baits are **NOT** allowed as part of the Self-Help Program. In nearly all instances, trapping of rodents is the preferred control over using toxic baits. Rodents do not immediately die from ingesting bait, and often die in walls and other enclosed spaces where the carcasses cannot easily be removed. The resulting unpleasant odors may persist for three or more months. Also, many baits are still active in the bodies of rodents even after they have died. Any other animal that scavenges and eats the rodent can also be killed by the toxic ingredient in the bait.

HOUSE MICE

- House mice are about 6 inches long, including the tail. The length of the head and body together is about 3 inches. The tail is almost naked and about as long as the head and body combined. The color of mice ranges from dark gray to light brown and most are dusky gray with lighter bellies. A mouse's head and feet are proportional to its body size. A young rat will have a head and feet that look way too big for its body.
- In areas where facilities are next to open fields or wooded areas, deer mice may enter buildings. Deer mice are slightly larger than house mice, have big ears and eyes, and are usually reddish brown in color. Because of the association of deer mice with Hantavirus (which can be easily spread to humans and causes death), immediately call the Environmental Office for assistance in identification and take appropriate steps to protect human health if you think you have this species present.
- Adult mice usually live 1/2 to 3 years. Mice become sexually mature at about 35 days. The average female has about 8 litters in her lifetime and litter average about 6 young.
- The house mouse is found throughout the world and is the most domesticated of all rodents. They prefer to live in association with humans and man-made structures, but the house mouse can live outside as a field rodent.
- Mice are nibblers compared to the voracious appetite of rats.
- The house mouse can survive in dry habitats and metabolize water from its food source. They do not always need a source of water.
- Mice can enter a structure through holes in walls, floors and the foundation. They can also enter through cracks and crevices around doors and windows. All it takes for a mouse to enter a structure is a 1/4 inch square hole.
- House mice eat and contaminate human food. They urinate and defecate continually. They gnaw and destroy furniture, woodwork, books, paper products, clothing and fabrics. Their urine and feces stain these objects. House mice are also capable of transmitting *Salmonella*, other bacterial diseases, roundworms, and tapeworms.

NORWAY RATS

- Norway rats (*Rattus norvegicus*) are stocky burrowing rodents, about 16 inches long, including the tail. They were unintentionally introduced to North America around 1775 and have spread throughout the contiguous 48 states. Also called the brown rat, house rat, barn rat, sewer rat, gray rat, or wharf rat, it is a slightly larger animal than the roof rat.
- The nose of a Norway rat is blunt, the ears are small, close set and do not reach the eyes when pulled down. The tail is scaly, semi-naked and shorter than the head and body combined.
- Adult Norway rats weigh about one pound, with coarse fur that is usually is brownish or reddish-gray above, and whitish-gray on the belly. Blackish individuals occur in some locations.
- Norway rats live in close association with people. They burrow to make nests under buildings and other structures, beneath concrete slabs, along stream banks, around ponds, in garbage dumps, and at other locations where suitable food, water and shelter are present. In urban areas they live in and around residences, in basements, warehouses, docks, and in sewers. Although they can climb, Norway rats tend to inhabit the lower floors of multi-story buildings.
- Norway rats will eat nearly any type of food. When given a choice, they select a varied diet and choose fresh foods over stale or contaminated foods. They prefer cereal grains, meats and fish, nuts, and some types of fruit.
- Rats require 1/2 to 1 ounce of water daily when feeding on dry foods but need less when moist foods are available. Food items in household garbage offer a fairly balanced diet and also satisfy their moisture needs.
- Norway rats are primarily nocturnal and usually become active around dusk. Some individuals may be active during daylight hours when the rat population is high, when disturbed (weather change, construction, etc.) or when their food source is threatened.
- Norway rat territories are usually 50-150 feet surrounding nests. In populations where there is plenty of food and shelter, the territories are smaller. However, rats will travel 300 feet or more to obtain their food and water if necessary. In urban areas most rats

remain around the buildings and areas that provide their necessities, and do not move great distances unless disturbed.

- Rats have poor eyesight beyond 3-4 feet, relying more on their hearing and excellent senses of smell, taste and touch. Norway rats are very sensitive to motion up to 30-50 feet away, but are considered colorblind.
- Rats use their keen sense of smell to locate food items and to recognize other rats. Norway rats also have an excellent sense of touch due to very sensitive body hairs and whiskers they use to explore their environment. Much of a rodent's movement in a familiar area relies heavily on the senses of touch and smell to direct it around its home range.
- Rodents prefer a stationary object on at least one side of them as they travel, so they commonly move along walls. This is helpful in deciding where to place traps.
- Rats' sense of taste is excellent, and they can detect some contaminants in their food at levels as low as 0.5 parts per million. This highly developed taste sensitivity can lead to bait rejection if the rodent baits are contaminated with insecticide odors or other chemicals.
- Norway rats typically construct nests in below-ground burrows or at ground level that may be lined with shredded paper, cloth, or other fibrous material.
- Litters of 6 to 12 young are born 21 to 23 days after conception. Newborn rats are naked and their eyes are closed, but they grow rapidly and start eating solid food at 2½ to 3 weeks. They become completely independent at about 3 to 4 weeks and reach reproductive maturity at 3 months of age, sometimes as early as 8 weeks.
- Female Norway rats may come into heat every 4 or 5 days, and they may mate within a day after a litter is born. The average female rat has 4 to 6 litters per year and may successfully wean 20 or more offspring annually.

ROOF RATS

- The roof rat (*Rattus rattus*) is distinguished between Norway rats and roof rats by pulling the tail back over the body. The tail of a roof rat will reach the nose. The tail of the Norway rat will not reach beyond the ears.

- Roof rats range along the lower half of the East Coast and throughout the Gulf States and upward into Arkansas. They also exist along the Pacific Coast and are found on the Hawaiian Islands. Occasionally isolated populations are reported from areas not within their normal distribution range, but these instances are rare.
- Roof rats prefer higher areas than Norway rats and often will live in trees or on vine covered fences. Landscaped areas and vegetation along waterways provide good habitat. Being agile climbers, roof rats frequently enter buildings from the roof or openings near utility lines that they use to travel from area to area. They have been found in sewer systems, but this is not very common.
- The food habits of roof rats resemble those of tree squirrels. They mainly eat fruit and nuts, but also feed on a variety of ornamental and native plant materials. Like the Norway rat, they are omnivorous and will feed on most anything if hungry. Roof rats usually require water daily, though their local diet may provide an adequate amount if high in water content.
- Litters containing 5-8 young are born about 21 to 23 days after conception. The young rats are naked and their eyes are closed when born, but develop rapidly, growing hair within a week. When they are 9 to 14 days old, their eyes open and they begin to explore for food and move about near their nest. In the third week they begin to take solid food.
- The young may continue to nurse until 4 or 5 weeks old. Young rats generally cannot be trapped until about 1 month old. At about 3 months of age, they are completely independent of the mother and are reproductively mature.
- In tropical or semitropical regions, the breeding season may be nearly year-round. Usually the peaks in breeding occur in the spring and fall.

- Roof rats usually begin searching for food shortly after sunset. If the food is in an exposed area and too large to be eaten quickly, they often carry it to a safe hiding place before eating it. Many rats will hoard considerable amounts of solid food, which they may or may not eat later.
- When necessary, roof rats will travel considerable distances for food. They can often be seen at night running along overhead utility lines. They may live in trees or attics and climb down to a food source.
- All rats see poorly, relying more on smell, taste, touch and hearing. They are considered to be colorblind, responding only to the degree of lightness and darkness of colors. Roof rats also have an excellent sense of balance. They use their tails for balance while traveling along overhead utility lines and are very agile climbers.
- From the standpoint of pest control, traditional trapping on the ground or floor will not catch many roof rats. Traps are best set along roof rafters and beams that show signs (rub marks) of frequent roof rat travel.
- Roof rats have a strong tendency to avoid new objects in their environment and this can influence control efforts. These rats may take several days before they will approach a trap.
- Roof rats can be very difficult to trap and their control may often be beyond the scope of the Self-Help program.

Approved Self-Help Products for Control of Mice:

Snap Traps

SELF-HELP IPM Outline 5

Weeds

A. PURPOSE

The Self-Help pest management program authorizes the use of approved Self-Help products (low-toxicity, ready-to-use herbicides) by installation maintenance and VAARNG personnel who control weeds during the normal course of their assigned duties.

B. RESPONSIBILITIES

- Self-Help Program participants are responsible for proper use, recording, reporting, storage and disposal of Self-Help products.
- **All** label instructions must be read and followed – **The Label is the Law!**
- A Safety Data Sheet (SDS) should accompany the Self-Help product and be readily available to personnel using the product and working in the area where the product is used.
- Only use products that are pre-approved for use in the VAARNG Self-Help Program. Contact the VAARNG IPMC (MAJ Brian Webb) for a current list of approved Self-Help products.

C. ACTIONS

STEP 1. Estimate the area of the weeds to be treated.

If the area to be treated is more than 500 square feet or 200 linear feet of fenceline/roadside/building foundation, a Pest Management Professional (PMP) may be needed to control the weeds. The number of weeds in the area should also be considered.

STEP 2. Self-Help products for weeds can be obtained by submitting a Work Order request to O&M. Only use products that are low-toxicity, ready-to-use (do not require dilution or mixing) and pre-approved for use in the VAARNG Self-Help Program.

STEP 3. Receive training on the proper use of the pesticide upon pick-up from the O&M Warehouse. Sign a Self-Help training Acknowledgement of Understanding (Page E-5) and return the form to the IPMC before applying any pesticides.

STEP 4. Read the entire product label. **The Label is the Law!**

- Wear appropriate Personal Protective Equipment (PPE) as directed on the label.
- Do **NOT** eat, drink or smoke while using any pesticide.
- Use product as directed on the label for control of the weed.
- Always thoroughly wash hands with soap and water after using product and before eating, drinking or smoking.

STEP 5. Store and/or dispose of any leftover Self-Help products as directed on the label and the VAARNG IPMP. If you have any questions on storage or disposal of the Self-Help products, contact the VAARNG IPMC (MAJ Webb).

STEP 6. Report Self-Help product use to the VAARNG IPMC using the Pest Management Treatment Record form. The form(s) recording usage should be sent to the VAARNG IPMC at the end of the month.

STEP 7. If the Self-Help control methods in this outline do not control the weeds to acceptable levels, put in a Work Order with the O&M Office or contact the Fort Pickett Entomologist.

Approved Self-Help Products for Control of Weeds:

EPA Reg No.	Label Name	Active Ingredient
42750-66-7401	Kilz all (Gly Star)	Glyphosate-isopropylammonium
67760-47-9688	(Glyfos) Ultra-Kill Ready-To-Use 1.92% Weed & Grass Killer	Glyphosate-isopropylammonium
71995-33	Roundup Weed & Grass Killer Ready-to-Use Plus	Glyphosate-isopropylammonium

SELF-HELP IPM Outline 6

Flies

A. PURPOSE

The Self-Help pest management program authorizes the use of approved Self-Help products (including traps and baits) by installation maintenance and VAARNG personnel who encounter flies during the normal course of their assigned duties.

B. RESPONSIBILITIES

- Self-Help Program participants are responsible for proper use, recording, reporting, storage and disposal of Self-Help products.
- **All** label instructions must be read and followed – **The Label is the Law!**
- A Safety Data Sheet (SDS) should accompany the Self-Help product and be readily available to personnel using the product and working in the area where the product is used.
- Only use products that are pre-approved for use in the VAARNG Self-Help Program. Contact the VAARNG IPMC (MAJ Brian Webb) for a current list of approved Self-Help products.
- Approved Self-Help products are tools to assist Self-Help Program participants with the control of flies in their work and billeting areas. These Self-Help control efforts supplement fly control done at the site by Pest Management Professionals (PMPs).
- Flies can carry and transmit several diseases and parasites that can cause sickness in humans. All flies, including non-biting flies, can transmit disease organisms by tracking them from their source onto food or people.

C. ACTIONS

STEP 1. Surveillance.

- Identify the type of flies and, if possible, where they are breeding.
- It is important to identify the type of flies so the most effective controls are used. Sanitation is the best control method for some types of flies, and others are more effectively controlled by traps and habitat modification.
- Use the fact sheets attached to this outline to identify the type(s) of flies.

STEP 2. Decide if Self-Help is appropriate.

- After identifying the flies using the information in this outline and it is determined control of that type of fly is **NOT** appropriate for Self-Help Program, or additional control measures are needed, contact the O&M Office or Fort Pickett Entomology to arrange for control by a Pest Management Professional (PMP).
- Approved Self-Help products are tools to assist Self-Help Program participants with the control of flies in their work and billeting areas. These Self-Help control efforts

supplement fly control done at the site by Pest Management Professionals (PMPs). Attempting to control flies with methods that are not effective for the type of fly will result in loss of work time, higher costs and unnecessary exposure of VAARNG personnel to pesticides.

STEP 3. Perform Physical and Cultural Controls.

- Using pesticides as the only control method will rarely provide effective control of fly infestations.
- Habitat modification (removing sources of food and fly breeding locations) is vital in controlling flies.
- If all the actions in STEP 3 and 4 have been done and there are still on-going significant fly infestations at the same facility, contact the VAARNG IPMC (MAJ Webb). Further assessment and more extensive control methods may need to be implemented by contract or the CFMO.

STEP 4. Perform Chemical Control (trapping with chemical baits).

- Self-Help products for flies can be obtained by submitting a Work Order request to O&M. Only use products that are pre-approved for use in the VAARNG Self-Help Program.
- Read the entire product label. **The Label is the Law!**
- Wear appropriate Personal Protective Equipment (PPE) as directed on the label.
- Do **NOT** eat, drink or smoke while using any pesticide.
- Use product as directed on the label for baiting of flies.
- See Chemical Control options below for further guidance on using fly baits and traps.
- Always thoroughly wash hands with soap and water after using product and before eating, drinking or smoking.
- Use of chemical controls will rarely provide sufficient control of flies. Habitat modification by removing food sources and fly breeding areas provides additional control.

STEP 5. Storage and Disposal of Self-Help Products.

- Store and/or dispose of any leftover Self-Help products as directed on the label and the VAARNG IPMP.
- If you have any questions on storage or disposal of the Self-Help products, contact the VAARNG IPMC.

STEP 6. Recording and Reporting.

- Report Self-Help product use to the VAARNG IPMC using the Pest Management Treatment Record form.
- The form recording usage should be sent to the VAARNG IPMC at the end of the calendar month.

STEP 7. Follow-up and Assessment.

- If the Self-Help control methods in this outline do not control the flies to acceptable levels within 30 days, put in a Work Order with the O&M Office or contact the Fort Pickett Entomologist.

FLY CONTROL

WHY IS CONTROL NEEDED?

Flies can carry and transmit several diseases and parasites that can cause sickness in humans. All flies, including non-biting flies, can transmit disease organisms by tracking them from their source onto food or people.

Some flies, such as drain flies, can be a human health hazard due to respiratory problems associated with inhalation of fly hairs and body parts.

Other flies, such as deer flies, horse flies and stable flies, can inflict painful bites.

Besides their ability to transmit numerous diseases, the presence of flies can also be very annoying and distracting to personnel.

1. GENERAL BIOLOGY

Domestic flies are those that are commonly found in close association with people and the animals associated with humans.

House flies and other domestic flies may fly into buildings through open doors and windows. In some cases, they may also crawl in through holes, cracks, and crevices.

Flies can reproduce very quickly and in large numbers. For example, house flies will lay about 500 eggs in their lifetime. If all the offspring of a single female house fly survived and reproduced, in five months there would be approximately 191,010,000,000,000,000,000 flies.

Flies will not usually breed in structures unless garbage is present for longer than one week, or there is a dead animal in an attic, crawl space, or other interior area.

Flies generally reproduce outdoors, but they will enter homes or buildings in search of food, moisture and shelter. If there is suitable decaying organic material available, they will reproduce indoors.

The life cycle of most flies is completed in 1-4 weeks, but it depends on the type of fly and weather conditions. The females generally lay around 150 eggs at a time. The legless white larvae (maggots) hatch, feed on the decaying animal or plant material and develop into pupae in about 7-14 days. The adult emerges from the pupae in three or more days.

See the attached information sheets for more information on types of flies that can be commonly found in work areas.

2. INSPECTION AND SURVEY

Identify the type of flies using the fact sheets attached to this outline. It is important to identify the type of flies so the most effective controls are used.

Sanitation is the best control method for some types of flies and others are more effectively controlled by traps and habitat modification.

Visual Sighting:

- Observation of adult flies hovering around trash containers and resting on walls and cabinets near trash containers.
- Observation of fly larvae (maggots) in trash or trash containers.
- Adult drain flies often congregate on walls and windows of rooms containing drains where drain flies are breeding
- Locate the drain(s) from which drain flies are emerging in order to target their breeding sites.
- Adult fruit flies are usually seen near fruit or other rotting foods.

Trapping:

- Sticky (adhesive) fly strips (that do not contain a pesticide) can be used for fly surveillance.
- For drain flies, seal suspected drain openings with a glue board, masking tape, or inverted plastic cup overnight to trap adult drain flies if they are present.

3. CONTROL METHODS

House Flies

An occasional fly in a building is not out of the ordinary, but continual fly problems are not normal. Sanitation and exclusion are the best methods for controlling house flies.

Cultural:

Sanitation: Removing feeding and breeding sites is critical for effective house fly control.

- House flies often breed in dirty trash containers.
- Cover outdoor trash containers with tight-fitting lids.
- Empty trash containers frequently.
- Clean and sanitize trash containers that have accumulated organic material.
- Clean dumpsters regularly.

Physical:

Exclusion:

- Seal cracks and other openings around doors and windows.
- Use tight-fitting screens on windows and doors.
- Do not leave unscreened doors and windows open.

Mechanical:

Trapping:

- Ultraviolet light traps may be used to reduce adult fly populations inside buildings. Light traps may not be used outdoors.
- Do not place light traps so they are visible from outside the structure since it can attract flies into the building.
- Light traps by themselves are unlikely to control heavy fly infestations.
- Do not use electric bug zappers that electrocute flies inside food-preparation areas or eating facilities. At these sites, only use light traps that collect flies on sticky traps.

Fly Swatters: Fly swatters are an effective control method for small numbers of flies that are inside buildings.

Sticky Fly Strips:

- Sticky fly strips that **do not** contain pesticides can also be used to help control flies inside buildings.
- Use one or two strips per room.
- Do not place strips in the kitchen or food preparation areas.
- **NEVER** use fly strips that contain pesticides in occupied areas.
- Ultrasonic and/or Electromagnetic Repellent Devices: These devices have been proven to be ineffective and may NOT be used.

Chemical:

Trapping: Traps containing chemical bait (lures) may be used outside of buildings to reduce fly populations. However, there is a never-ending source of flies outside and sanitation/exclusion are more effective methods of house fly control in most circumstances.

Self-Help Chemical Control of House Flies using Chemical-Baited Traps:

- Jar traps, such as the Farnam Terminator or Captivator, with Starbar Fly Trap Attractant, are an effective system for trapping house flies in most instances.
- Read the entire product label. **The Label is the Law!**
- Wear appropriate Personal Protective Equipment (PPE) as directed on the label.

- Do NOT eat, drink or smoke while using any pesticide product.
- Use correct number, spacing and placement of fly traps as directed on the label.
- Use correct number of baits (lures) per trap as directed on the label.
- Place traps around refuse containers and other places that attract flies.
- Do not use traps/baits indoors or use in outdoor areas where flies are not already present because the bait may attract flies to an otherwise fly-free area.
- The bait (lure) usually has a strong, unpleasant odor and traps are best placed away from windows that are regularly kept open and areas where personnel congregate.
- Empty trap(s) regularly and add additional bait (lure), as directed on the label, throughout the fly breeding season.
- Always thoroughly wash hands with soap and water after using Self-Help products and before eating, drinking or smoking.

Always follow the label directions for the use, placement and disposal of pesticide-containing products.

Fruit Flies

An occasional fruit fly in a building is not out of the ordinary, but continual fly problems are not normal. Sanitation and eliminating food sources are the best methods for controlling fruit flies.

Cultural:

Sanitation: Eliminating feeding and breeding sites is critical for effective house fly control.

- Empty trash containers daily to prevent the buildup of decaying foods that can attract fruit flies.
- Fruit flies are attracted to moist fermenting foods. They require only a moist film of decaying organic matter to breed.
- Keep garbage disposals, empty bottles and cans, trash containers, mops and cleaning rags clean to prevent fruit flies from using them as breeding sites.
- The bottom and sides of trash containers, especially large dumpsters, should be periodically steam-cleaned or washed to remove accumulation of organic matter.

Eliminate Food Sources:

- Fruit flies are attracted to gases produced by ripening fruit.
- Store fruit in the refrigerator in order to avoid attracting fruit flies and other pests.
- Cover outdoor trash containers with tight-fitting lids.
- Empty trash containers frequently.
- Clean and sanitize trash containers that have accumulated organic material.

Physical:

Exclusion:

- Seal cracks and other openings around doors and windows.
- Use tight-fitting screens on windows and doors.
- Do not leave unscreened doors and windows open.

Mechanical:

Fly Swatters: Fly swatters are an effective control method for small numbers of flies inside buildings.

Sticky Fly Strips:

- Sticky fly strips that **do not** contain pesticides can also be used to help control flies inside buildings.
- Use one or two strips per room.
- Do not place strips in the kitchen or food preparation areas.
- **NEVER** use fly strips that contain pesticides in occupied areas.

Ultrasonic and/or Electromagnetic Repellent Devices: These devices have been proven to be ineffective and may **NOT** be used.

Chemical:

- If the cultural, physical and mechanical methods do not control fruit flies to acceptable levels, contact the O&M Office to arrange for control by a Pest Management Professional (PMP).

Drain Flies

Sanitation and eliminating breeding sites are the best methods for controlling drain flies.

Cultural:

Sanitation: Eliminating breeding sites is critical for effective drain fly control.

- Drain flies breed in accumulated organic matter that accumulates inside interior drain pipes.
- Remove this material with over-the-counter drain cleaners.
- Scrubbing drains with a stiff brush may be necessary to remove heavy buildup.

Physical:

Exclusion:

- Seal cracks and other openings around doors and windows.
- Use tight-fitting screens on windows and doors.
- Do not leave unscreened doors and windows open.

Mechanical:

Fly Swatters: Fly swatters are an effective control method for small numbers of flies inside buildings.

Sticky Fly Strips:

- Sticky fly strips that **do not** contain pesticides can also be used to help control flies inside buildings.
- Use one or two strips per room.
- Do not place strips in the kitchen or food preparation areas.
- **NEVER** use fly strips that contain pesticides in occupied areas.

Ultrasonic and/or Electromagnetic Repellent Devices: These devices have been proven to be ineffective and may **NOT** be used.

Chemical:

- If the cultural, physical and mechanical methods do not control fruit flies to acceptable levels, contact the O&M Office to arrange for control by a Pest Management Professional (PMP).

Fungus Gnats

An occasional gnat in a building is not out of the ordinary, but continual fly problems are not normal. Eliminating breeding habitat in indoor potted plants is the best method for controlling fungus gnats.

Cultural:

Eliminate Breeding Sites: Eliminating feeding and breeding sites is critical for effective fungus gnat control.

- Avoid overwatering potted plants. Allow the surface of the soil to dry between waterings.
- Dump excess water out the saucer/tray under plants after watering indoor plants.

- Use only sterilized potting soil in indoor plants. Unless potting soil is pasteurized first, it is often infested with fungus gnats.
- Do not move potted plants that are infested with fungus gnats to new areas where flies can infest other pots.
- In some cases, the best control is to dispose of severely infested plants.

Physical:

Exclusion:

- Seal cracks and other openings around doors and windows.
- Use tight-fitting screens on windows and doors.
- Do not leave unscreened doors and windows open.

Mechanical:

Sticky Fly Strips or Sticky (Glue) Traps:

- Sticky fly strips that **do not** contain pesticide or glue traps can also be used to help control adult fungus gnats after their removing breeding sites.
- Attach strips or sticky (glue) traps (they can be cut into smaller pieces) to wooden skewers or sticks and place in potted plants that are infested with fungus gnats.
- Do not place sticky traps in the kitchen or food preparation areas.
- **NEVER** use fly strips that contain pesticides in occupied areas.
- Sticky (glue) traps should never be placed outdoors or in areas where non-target wildlife (such as birds, bats or snakes) may be accidentally trapped. If non-target wildlife is found alive on a sticky trap, talcum powder, cornstarch or vegetable oil can be applied to the exposed glue around the trapped wildlife and the animal can then usually free itself. For birds and bats, it is best to immediately take the trap, without attempting to remove the animal, to a licensed wildlife rehabilitator for assistance.

Ultrasonic and/or Electromagnetic Repellent Devices: These devices have been proven to be ineffective and may **NOT** be used.

Chemical:

- If the cultural, physical and mechanical methods do not control fungus gnats to acceptable levels, contact the O&M Office to arrange for control by a Pest Management Professional (PMP).

Biting Flies

Biting flies are most commonly encountered outdoors and are difficult to control since they breed outside where there is a nearly unlimited source of flies and breeding sites. Trapping and use of repellents are also not as effective with these flies as with other flies and insects.

Cultural:

Eliminate Breeding Sites: The most effective and economical method for reducing stable fly numbers is to eliminate their breeding sites.

- Remove or compost grass clippings.
- Properly maintain compost piles, by periodically turning the pile, to prevent them from becoming breeding areas for flies.

Physical:

Exclusion:

- Use tight-fitting screens on windows and doors.
- Do not leave unscreened doors and windows open.

Mechanical:

Fly Swatters: Fly swatters are an effective control method for small numbers of flies inside buildings.
Ultrasonic and/or Electromagnetic Repellent Devices: These devices have been proven to be ineffective and may **NOT** be used.

Chemical: Chemical control methods that can be used for Self-Help are not effective for biting flies.

Trapping: Using traps for biting flies is not an effective control method since, unlike house flies, they are not attracted to traps using odor-based lures. Light traps may not be used outdoors.
Insect Repellents: Insect repellents are not typically effective for biting flies. Covering exposed areas of the body is preferred.

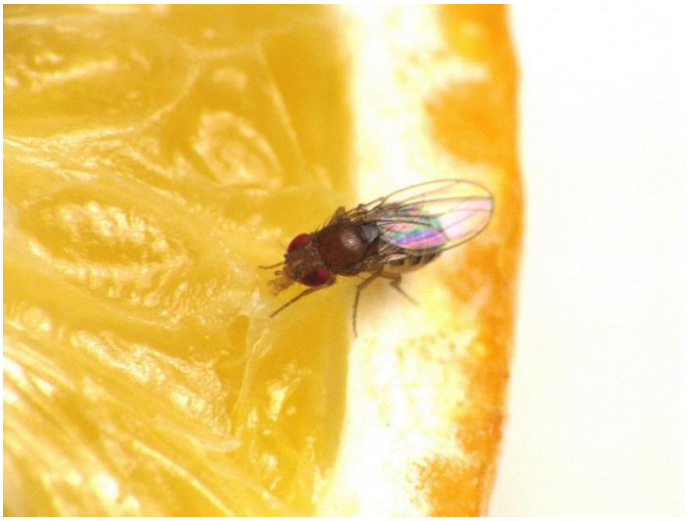
4. AFTER TREATMENT SURVEILLANCE

Fly strips that **do not** contain pesticide and sticky (glue) traps can be used to determine the effectiveness of fly control.
If there is a reduction in the number of flies, Self-Help control efforts are working. If using traps, continue to empty and bait traps until the end of the fly breeding season.
If there is not a reduction in the number of flies after 14 days of starting control efforts, put in a Work Order with the O&M Office or contact the Fort Pickett Entomologist for Pest Management Professional (PMP) assessment and possible additional control measures.

House Flies

- House flies (*Musca domestica*) are 3/16 to 1/2-inches long and have two wings. They have large compound eyes and their bodies are usually striped. Their color varies from light gray to metallic shades of green, blue, and blue-green.
- House flies have sponging mouthparts and eat solid food by first liquefying it with their saliva. House flies can also regurgitate onto a solid food to assist with the liquefying process.
- Like all flies, house flies have a four-stage life cycle: egg, larva, pupa, and adults.
- Female flies deposit eggs in animal feces, carrion or moist organic material where the larvae (maggots) complete their development.
- The rate of house fly development is dependent upon temperature; and under summertime conditions, flies may develop from egg to adult in as little as 7 days. Once the female fly has mated, she can lay several batches of eggs, typically containing over 100 eggs each.
- House flies cannot bite because they have sponging mouthparts.
- House flies can carry a number of disease organisms that they pick up while feeding on animal feces, animal body secretions, or kitchen waste and they can then deposit onto human foods during feeding.
- House flies leave dark fecal and regurgitation spots on wall surfaces where they rest.

Fruit Flies



- Fruit fly adults are small (about 1/8-inch long), yellow or brownish flies that usually have red eyes.
- Fruit flies are attracted to ripened fruits and vegetables. They can also breed in drains, garbage disposals, empty bottles and cans, trash containers, mops and cleaning rags.
- Fruit flies lay large numbers of eggs on fruit and the larvae feed on the fruit.
- Fruit flies are active during periods of warm weather, and a single generation may develop in less than a week when temperatures are between 80° and 89°F.
- Temperatures above 105°F kill adult fruit flies in a few minutes.
- Infestations can originate from over-ripened fruits or vegetables that were previously infested and brought inside.
- The adults can also fly in from outside through inadequately screened windows and doors.
- Fruit flies are primarily nuisance pests. However, they also have the potential to contaminate food with bacteria and other disease-producing organisms.

Drain Flies

- Drain flies, also called moth flies, are about 1/8-inch in length and often dark-colored. Their wings are covered with fine hairs that gives them a moth-like appearance.
- Drain flies rest on surfaces with their wings held over their back in a roof-like manner
- They are not good flyers, and usually fly with short hopping flights.
- Female drain flies lay eggs in wet organic matter, usually in sink or shower drains.
- Drain flies may also be found developing in wet animal manure, sewage or compost.
- Very large numbers of these flies in one area probably indicates a breeding site bigger than a few indoor drains.
- The life cycle of drain flies can be as short as 8 days, but can take as long as 24 days, depending on the temperature.
- Drain flies do not bite people or animals, and they cause no damage to structures or plants.
- However, because drain flies develop in decaying organic matter, they can carry disease organisms from their development sites to areas where sterility is important, such as health care facilities and food preparation areas.
- Drain flies may also affect human health when present in high numbers, because the bodies of dead flies may disintegrate to form potential allergens.

Fungus Gnats

- Fungus gnats (Orfelia and Bradysia species) are very small (1/8 to 1/16-inch long), dark flies that are similar in appearance to tiny mosquitoes. Adult fungus gnats have slender legs with segmented antennae that are longer than their head.
- Fungus gnats live in dirt, potting mix, and other sources of organic-rich soil.
- The source of fungus gnat infestations are usually potted plants.
- Fungus gnat larvae primarily feed on fungi and organic matter in soil, but can also chew on plant roots.
- Adult fungus gnats may emerge from indoor houseplants and become a nuisance.
- Adult fungus gnats are attracted to light and they are often seen flying near windows. They may also remain near potted plants and can be seen resting or moving on the soil or plant leaves.
- Females lay tiny eggs in moist organic debris or potting soil. The larvae have a shiny black head and an elongated, whitish-to-clear, legless body. If conditions are especially moist, the larvae may leave slime trails on the surface of soil that look like trails from small snails or slugs.
- Adult fungus gnats don't usually damage plants or bite people. Their presence is primarily considered a nuisance.
- Adult fungus gnats are short-lived and a generation of fungus gnats (from female to female) can be produced in about 17 days depending upon temperature.

Biting Flies

- There are numerous flies that bite people and animals, including deer flies (pictured above), horse flies and stable flies.
- Deer flies range in size from about 1/4 to 1/3-inches long. Their wings are clear with dark bands or patches, and their bodies are gray or light brown and some species have yellow and black striping. They have large, often brightly colored, eyes and their antennae are usually longer than their head.
- Horse flies range in size from 3/4 to 1-1/4-inches long and usually have clear or solidly-colored wings and brightly colored eyes.
- Like mosquitoes, it is the female deer fly and horse fly that bites. Females require a meal of blood in order to produce eggs.
- The female deer fly bites with two pairs of mouthpart "blades" that cut the skin. Once the skin is cut, the female fly then laps up the blood from the wound.
- Deer flies feed on a variety of mammals, including humans, pets, livestock and deer. They usually bite moving targets and attack the top half of the body, such as the head or neck.
- Horse flies feed the same way as deer flies, but prefer biting lower half of the body, such as the legs, and tend to attack stationary targets.
- Deer fly females will continue to return and bite repeatedly if their feeding behavior is interrupted.
- Male deer flies and horse flies are mainly pollen and nectar feeders.
- Deer and horse flies are most likely encountered in hot summer and early fall weather, and are active during daylight hours.

Approved Self-Help Products for Control of Flies:

(Whitmire) PT (Prescription Treatment) 565 Plus XLO (Formula 2) (WB), EPA Registration Number 499-290.

Appendix F – IPM Points of Contact

VAARNG

MAJ Brian Webb Integrated Pest Management Coordinator	Phone 804-436-3784 Email brian.j.webb14.mil@mail.mil
Donald "Donnie" McDaniel VAARNG Entomologist	Phone 434-480-2120 Email donald.w.mcdaniel9.nfg@mail.mil
Brandon Martin Natural Resources Manager	Phone 434-292-2292 Email brandon.t.martin26.nfg@mail.mil
Susan Smead Cultural Resources Manager	Phone 434-298-6411 Email susan.e.smead.nfg@mail.mil
Ken Oristaglio Conservation Manager	Phone 434-298-6416 Email kenneth.l.oristaglio.nfg@mail.mil
Matt Thompson Environmental Compliance Manager	Phone 434-298-6402 Email matthew.thompson50.nfg@mail.mil
Pam Coleman Environmental Program Manager	Phone 434-298-6445 Email pamela.w.coleman.nfg@mail.mil
COL Charlton Dunn CFMO	Phone 434-298-6423 Email charlton.t.dunn.mil@mail.mil
Dave Short O&M Chief	Phone 434-292-2612 Email david.k.short.nfg@mail.mil
Derrick Hall Architecture and Engineering Manager	Phone 434-298-6232 Email derrick.hall11.nfg@mail.mil
Rebecca Moses Safety/Occupational Health Manager	Phone 434-298-5927 Email rebecca.m.moses5.nfg@mail.mil
Fort Pickett Fire and Rescue	Phone 434-292-2217

Other Resources

DOD Pesticide Hotline 410-436-3773 / DSN 312-584-3773
usarmy.apg.medcom-phc.mbx.pesticide-hotline@mail.mil

CHEMTREC

Emergency Number 1-800-424-9300
(For assistance in a chemical emergency involving a spill, leak, or exposure.)

Non-emergencies 1-800-262-8200

National Pesticide Telecommunications Network

Provides up-to-date technical reference material on toxicity, human and environmental effects, disposal, and proper use of pesticides.

http://npic.orst.edu/ 1-800-858-7378

Mobile Access to Pesticides and Labels (MAPL)

US EPA-sponsored pesticide and label finding tool for mobile devices.

http://pi.ace.orst.edu/mapl/