FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

for the

IMPLEMENATION OF US ARMY

INTEGRATED PEST MANAGEMENT PROGRAM

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FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR THE IMPLEMENTATION OF THE U.S. ARMY INTEGRATED PEST MANAGEMENT PROGRAM

EXECUTIVE SUMMARY

Background

The Army Pest Management Program implements Department of Defense (DoD) policies to protect health, property, and natural resources from damage by insects, weeds, and other species in ways that promote training and readiness with minimum risks to the environment. Key to the Program's implementation is: (1) to fully institutionalize sustainable Integrated Pest Management (IPM) strategies and techniques in all aspects of Army pest management planning, training, and operations, and (2) to reduce pesticide risk and prevent pollution while preventing and controlling installation pests and disease vectors that could adversely impact readiness or the welfare of troops and their dependents.

Army Pest Management Program policies implement Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requirements per DoD Instruction, *DoD Pest Management Program* (DoDI 4150.07) and other DoD policies, and are currently described in Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*, as part of the Army Environmental Program. The DoD Pest Management Program provides specific guidance on pest management plans; training, certification and accreditations of pest management personnel; pest management contracts; pesticide procurement, handling and application procedures, storage and mixing facilities, self-help, disposal, and record keeping; safety and occupational health considerations; and special requirements such as aerial application of pesticides, quarantine, and animal damage pest management procedures.

The Army has developed a pest management program that is based on IPM guidelines. The Army pest management program objective is to use an IPM approach for the judicious use of non-chemical and chemical control techniques to achieve effective pest control with minimal environmental impacts. IPM, as implemented by Army, is a decision-making process designed to: identify the conditions causing a particular pest problem, devise ways to change those conditions and to discourage recurrence of the problem, and select the least-toxic/low risk combination of strategies to directly suppress pest populations.

The Army advocates adoption of IPM strategies in developing installation Integrated Pest Management Plans (IPMPs) as an approach to reducing reliance on pesticides while achieving effective pest control. The IPMPs outline the resources necessary for surveillance and control; describe the administrative, safety, and environmental requirements of the program; pesticide applicators training and certification requirements; and pesticide use recordkeeping requirements. The goal is that Army installations be able to perform their mission through an effective IPM program that

promotes health, safety, and the welfare of personnel; enhances the quality of training lands and facilities; and minimizes impacts on the natural and human environment. At the installation level, all aspects of an IPMP will go through a full process of coordination with environmental staff, medical and other installation stakeholders responsible for natural and cultural resources.

Army agencies are encouraged to analyze actions at a programmatic level for those programs that are similar in nature or broad in scope [32 CFR 651– 651.14(c) (1) and (2) and 651.27]. This level of analysis will eliminate repetitive discussions of the same issues and focus on the key issues at each appropriate level of project review. As outlined in the DoD Instruction 4150.07, the DoD has adopted implementation of IPM on DoD property/land as an official policy. This Programmatic Environmental Assessment (PEA) has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, its implementing regulations, and the Army's 32 Code of Federal Regulations (CFR) Part 651 (32 CFR 651 supersedes AR 200-2) to assess the potential environmental effects of the proposed action. It documents the potential impacts of each alternative and category of pest control (for example, physical & mechanical, cultural, biological, and chemical) activities on the Army installation.

The affected environment includes facilities and training lands administered by the active Army components. Resource areas and issues analyzed include land use, air quality, noise, geology and soils, biological and cultural resources, socioeconomics, environmental justice, infrastructure, hazardous materials, and cumulative impacts. Measures known as "significance criteria" were used to measure potential impacts to each resource area.

Proposed Action and Alternatives

The proposed action is to ensure full implementation of IPM to meet Federal law and DoD and Army policies and continued improvement of installation IPM programs. The Army has a strong record of performance in pest management including a highly trained cadre or pesticide applicators, comprehensive integrated pest management plans, and continuance reduction in use of pounds of active pesticide ingredients in the past several years. However, there are areas where improvement in the Army installation pest management program is possible to fully implement IPM at all Army installations. One area where improvement is needed is review of all technical portions of installation pest management contracts by a Command Pest Management Consultant (PMC) to ensure IPM methodology is stipulated in the Performance Work Statement (PWS) under consideration. Continued improvement of Army installation integrated pest management programs is achievable through adoption of new pest management technologies, equipment, and best management practices.

The four alternatives considered are: (A) non-chemical pest control techniques (physical & mechanical, cultural, and biological); (B) non-chemical pest control techniques and limited chemical use (pesticides) – the preferred alternative; (C) chemical pest control

techniques (pesticides); and (D) no action. All alternatives would be implemented in full compliance with applicable State and Federal laws and regulations and DoD policy.

Alternative A: This alternative focuses on an ecosystem management approach using all available techniques, exclusive of pesticide use to control pests. The physical & mechanical, cultural, and biological control techniques would incorporate exclusion, sanitation, habitat modification, prescribed burns, traps and commercial lures, and biological control (use of predators, parasites or disease organisms) to control pest populations. Currently, no Army installations utilize an ecosystem management approach that incorporates only physical & mechanical, cultural, and biological control techniques, exclusive of pesticide use to control pests.

Alternative B: Non-chemical pest control techniques and limited chemical use (pesticides) – preferred alternative. This alternative is a combination of the controls used in Alternatives A and C with an emphasis on physical & mechanical, cultural, and biological controls prior to using pesticides. A combination of the following techniques would be employed: exclusion, sanitation, habitat modification, prescribed burns, traps and commercial lures, biological control and limited pesticide use. IPMPs would include special procedures for implementing pest control in sensitive ecological areas, such as wetlands, or in areas where threatened or endangered species are found.

Alternative C: Chemical pest control techniques (pesticides). This alternative emphasizes the use of pesticides to control pests (complying fully with all applicable State and Federal regulations and laws) with no emphasis on other techniques mentioned in Alternatives A and B. Currently, no Army installations utilize an emphasis upon the use of pesticides to control pests with no emphasis on other non-chemical techniques.

Alternative D: The no action alternative is to continue current pest management practices at each installation. This alternative must be considered in accordance with the regulations promulgated by the Council on Environmental Quality (CEQ) (40 CFR § 1502.14(d)). In the no action alternative, each individual installation would continue to manage pests in a manner consistent with past practices, complying fully with all applicable State and Federal laws and regulations, without adopting new best management practices and procedures to improve efficiencies and to further reduce risk from pesticide use.

Pest Management Procedures

Army has an established process in pest management that validates environmental, health and safety aspects of the program throughout Army installations. These procedures are addressed in full in Appendix A. In summary:

- **IPMPs and Annual Review Process** - All Army installations under this PEA will have an approved IPMP as required by DoD Instruction 4150.07 and AR 200-1.

The plans are reviewed annually by designated Pest Management Consultants (PMCs).

- **Pesticide Use Proposal Review** - All pesticides used on Army installations are approved prior to use. Pesticides are approved on a case-by-case basis based upon the site of application, intended pests and local conditions and laws. In all cases, pesticides are only approved provided they are registered by the US Environmental Protection Agency (EPA) and the state in which the installation is located.

- **Training and Certification Validation** - All in-house personnel and contractors who apply pesticides on Army installations receive training and certification according to EPA-approved plans from DoD or the state where the installation is located.

- **Pest Management Contract Review** – Army installations are required to submit the technical portion of all pest control PWSs to designated PMCs for technical review before the contracts are let. This also includes the review of Pest Management services acquired using Government Purchase Cards.

- **Pest Management Records and Reports** – Army installations maintain complete daily records of all pesticide applications and non-chemical pest management operations.

- **DoD Pest Management Measures of Merit** (MoM) - To measure and evaluate the effectiveness of the DoD and Army pest management program, DoD instituted DoD target metrics for IPMPs, pesticide use reduction, and pesticide applicators' certification. .

- **Management Oversight** - The following reviews are used for oversight of Army pest management programs at installations: On-site Program Reviews, Internal Reviews, External Reviews, Environmental Performance Assessment System (EPAS) Reviews, and On-site Pest Management Program Assistance Visits (PMPAVs).

Conclusions

Based on the analysis performed in this PEA, implementation of the proposed action with selection of Alternative B would have no significant direct, indirect, or cumulative effects on the quality of the natural or human environment. Preparation of an Environmental Impact Statement (EIS) is not required. A Finding of No Significant Impact (FNSI) would be appropriate and would be provided for a 30-day public comment period.

Alternative A (sole use of physical & mechanical, cultural, and biological pest control techniques) would control some pests, but because these control techniques are not fully effective in all situations, many infestations would continue to spread. This would

be caused by either the size of the infestation or because of the adaptability of the pest species. These methods, used individually or in combination, are not sufficiently practical or effective to meet mission requirements. Examples of these methods include:

- Physical & mechanical control can involve using barriers such screens, temperature manipulation such as cold storage to control stored product pests, light traps to attract insects to a killing device such as an electric grid or a sticky paper, or use of sounds to avert certain pests such as birds. For weed control, examples include mowing, use of black plastic sheets, and use of the thermal steam machines or flame machines.

- Cultural controls include practices such as good sanitation, habitat modification, removal or destruction of breeding, harborage, and overwintering habitats of pests.

- Biological control includes methods such as introduction of natural parasites and predators (i.e., lady beetles and lacewings), introduction of a species-specific pathogen delivered either by application or by a vector, use of insect growth regulators to control the growth of larval insects, and use of pheromone traps as a surveillance and control tool for stored product pests and agricultural pests.

Alternative B – Preferred Alternative (non-chemical pest control techniques addressed in Alternative A combined with limited pesticide use) would be most effective and the preferred approach to pest control. This approach would effectively control most pest populations by reducing the size and spread of pest infestations. This fully integrated approach most closely matches the goals and intent of Army Pest Management Program and would provide the greatest long-term potential for an effective pest control operation. Impacts on air resources, noise levels, soils, water resources, biological resources, cultural resources, socioeconomics, environmental justice, infrastructure, and hazardous and toxic materials and waste would be minor and/or temporary.

Alternative C (chemical pest control techniques - pesticides) would likely create negative impacts on Army personnel and the environment. Pest resistance has made some pesticides ineffective and release of pesticides into the environment has become less acceptable to the public because of concerns about human health and environmental risks associated with extensive use of pesticides. This alternative does not meet the spirit or intent of the DoD mandates to reduce the amount of pesticides applied to neither military lands nor the federal requirement to utilize IPM.

Alternative D (the no action alternative) would be a continuation of current pest management practices at each installation with no adoption of new pest management technologies, equipment, and best management practices. Although IPM is currently in practice at all Army installations, IPM is not fully implemented at each installation. One area where improvement is needed is review by a Command Pest Management Consultant (PMC) of all technical portions of installation pest management contracts

and pest management services acquired using Government Purchase Cards to ensure IPM methodology is stipulated. In addition, the threats to Army personnel and dependents from disease vectors and pests, to Army training lands from unwanted vegetation and invasive species, and to the infrastructure of each installation are constantly changing over time and with changes in weather. These threats require adjustments to installation IPM programs and an adaptive strategy to properly respond to and control these changing populations of disease vectors and pests. This no action alternative would maintain the status quo at each installation without adopting new best management practices and procedures to improve efficiencies and further reduce risk from pesticide use while preventing and controlling these new pest management threats and changing conditions. This no action alternative over time would degrade readiness, national security and economical and ecological impacts on Army land, property and personnel.

Possible mitigations for all alternatives are identified. They include carefully considering sensitive areas such as wetlands, threatened and endangered species habitat before applying pesticides, and taking precautions when applying pesticides in and near dining facilities, child development centers, schools, medical treatment facilities, playgrounds, barracks, residential areas and office work spaces. Resource specific precautions include establishing protective buffers, coordination with installation natural resources staff, reseeding with native plant seed stock and periodically evaluating ongoing pest management programs. Without a comprehensive treatment and monitoring plan based on adaptive IPM pest management strategies, there is a high probability that any given treatment would not be successful.

Site-specific activities outside the scope of this analysis would be considered as separate actions requiring site-specific NEPA documentation. Examples of specific activities that do not fall under this PEA include aerial application of pesticides, pesticide use in areas that contain threatened or endangered species or habitat, pesticide use in wetlands except for aquatic pests, and the introduction of exotic species for pest control. These activities would require site-specific documentation to evaluate potential impacts or mitigation to reduce the impact to non-significant levels.

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LEAD AGENCY: U.S. Army Installation Management Command

COOPERATING AGENCIES: None

TITILE OF PROPOSED ACTION: Programmatic Environmental Assessment for the US Army Integrated Pest Management Program

AFFECTED JURISDICTIONS: Various (Army installations throughout US)

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DOCUMENT DESIGNATION: Programmatic Environmental Assessment

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ACRONYMS

AFPMB	Armed Forces Pest Management Board
AICUZ	Air Installation Compatible Use Zone
AIRFA	American Indian Religious Freedom Act
AR	Army Regulation
ARPA	Archeological and Historic Resources Preservation Act
ASSON	Aerial Spray Statement of Need
AQCR	Air Quality Control Region
BASH	Bird Aircraft Strike Hazard
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CDC	Child Development Center
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DOD	Department of Defense
DODI	DoD Instruction
DPW	Directorate of Public Works
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
EPAS	Environmental Performance Assessment System
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FNSI	Finding of No Significant Impact
FQPA	Food Quality Protection Act
FFCA	Federal Facility Compliance Act
IMCOM	Installation Management Command
IPM	Integrated Pest Management
IPMC	Integrated Pest Management Coordinator
IPMP	Integrated Pest Management Plan
HMTA	Hazardous Material Transportation Act
MoM	Measures of Merit
MWR	Morale, Welfare and Recreation
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Grave Protection and Repatriation Act
NEPA	National Environmental Policy Act

NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OCPUR	Out of Cycle Pesticide Use Request
OSHA	Occupational Safety and Health Act
PEA	Programmatic Environmental Assessment
PMC	Pest Management Consultant
PMPAV	Pest Management Program Assistance Visit
PMQAE	Pest Management Quality Assurance Evaluator
PUF	Plan Update Form
PUP	Pesticide Use Proposal
PWS	Performance Work Statement
RCI	Residential Community Initiative
RCRA	Resource Conservation and Recovery Act
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
TSCA	Toxic Substances Control Act
USAEC	US Army Environmental Command
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

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1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

This Programmatic Environmental Assessment (PEA) evaluates the pest management program for all active Army installations under Installation Management Command (IMCOM) Regions, IMCOM Pacific (Army installations in Hawaii and Alaska), and Army Medical Command Installations.

The Army mission is to provide installations that enable soldier and family readiness, and provide a quality of life that matches the quality of service they provide the nation.

1.2 Integrated Pest Management

The Department of Defense (DoD) is mandated to use integrated pest management (IPM) techniques in carrying out pest management activities and shall promote IPM through procurement and regulatory policies and other activities (Pub. L. 104-170, title III, Sec. 303, Aug. 3, 1996, 110 Sat.1512.).

IPM differs from traditional pest control in at least the following ways:

- *Proactive vs. Reactive*. Traditional pest control tends to ignore the reasons why a pest problem exists, but instead reacts to an infestation by temporarily treating the pest with chemicals. IPM may also include an immediate corrective response which includes the use of pesticide (s), however, IPM is mainly a preventive maintenance process that attempts to control pests by reducing their food, water, harborage (hiding places), and entry points.

- *Management Process vs. Pest Management*. Traditional pest control relies on the "exterminator" to solve pest problems. IPM recognizes that the exterminator often cannot do this, and that lasting solutions usually depend on coordinated management initiatives to upgrade sanitation, housekeeping, repair and good occupant operating practices.

- *Pesticides Only when Necessary vs. Scheduled Treatment*. Traditional pest control consists of routine pesticide application whether pests are present or not. These chemicals are mistakenly thought of as protective disinfectants that can "keep the bugs away." IPM consists of routine inspection and monitoring, but in most cases relies on pesticides only when evidence indicates that pests are actually present, and when non-chemical approaches have been unsuccessful.

- *Least Toxic Treatment vs. Surface Spraying or Fogging*. Traditional pest control tends to apply pesticide to exposed areas far from where it's needed and use far more of it than necessary. In fact, the "baseboard spraying" and room fogging that is still widely practiced by much of the pest control industry is not very effective at killing cockroaches and other pests living deep within furniture, equipment, or structural elements. IPM applies pesticides with precision and restraint. It emphasizes that only the safest compounds, formulations and methods of application are appropriate. Insecticide bait is usually preferable to spray. When sprays are necessary, they are limited strictly to "crack and crevice" applications. Space sprays or "fogging" are reserved for extraordinary situations where no other solution is practical. In summary, non-chemical control alternatives are always considered before pesticide use. As part of developing IPM Programs for installations, Army promotes the use of pesticides that are:

    - least hazardous to human health;
    - least disruptive to natural ecosystems;
    - least toxic to non-target organisms;
    - most likely to produce long-term reduction of the targeted pest; and
    - easiest to apply and as cost-effective as possible while still supporting the Army mission.

- *Expertise vs. Minimal Training*. Traditional pest control technicians are often required to do very little except operate a compressed air sprayer. IPM requires a much higher standard of expertise. For an IPM program to be successful, it is essential that management has informed technical guidance on all aspects of the pest control effort.

The four basic principles listed below are the basis of IPM and describe the approaches that would be used to manage pests on Army managed facilities and training lands (examples of acceptable integrated pest management procedures can be found in Appendix D). While any one of these methods may solve a pest problem, often several methods are used concurrently, particularly if long term control is needed. Although chemical control is an integral part of IPM, non-chemical control is emphasized because it is generally less harmful to the environment. Pesticide use is generally a temporary measure that, in the long run, is more expensive than using non-chemical control methods designed to prevent infestations. Non-chemical control, that initially may be more expensive, is usually cost-effective in the long run. Non-chemical controls have the advantage of being nontoxic, thereby reducing the potential risk to human health and the environment. IPM uses the following steps, listed below, in order of priority, to reduce pest problems:

Physical & Mechanical Control – This type of control either alters the

environment in which a pest lives such as by the use of energy (heat, cold, light, sound), or by direct removal of pest by use of mechanical devices and traps, and pest exclusion. Examples of this type of control include: harborage elimination through caulking or filling voids, screening windows and doors, mechanical traps or glue boards, barriers to prevent entry of any pests into buildings, and air curtains at food facilities for fly exclusion. Physical control can involve temperature manipulation such as cold storage to control stored product pests, light traps to attract insects to a killing device such as an electric grid or a sticky paper, or use of sounds to avert certain pests such as birds. For weed control, mowing, use of black plastic sheets, and use of the thermal steam machines or flame machines are available technologies that can be implemented on Army installations.

Cultural Control – Strategies in this method involve manipulating environmental conditions to suppress or eliminate pests. This type of control includes: sanitation, habitat modification, and eradication. Cultural control also includes the removal or destruction of breeding, harborage, and overwintering habitats of pests. The removal of the food source and a thorough cleaning of the area will often eliminate the pest without the need for chemical control measures.

Biological Control – In this control strategy, predators, parasites or disease organisms are used to control pest populations. Biological control usually does not eradicate pest populations. However, biological control often provides long-term environmental suppression of the populations to acceptable levels. Examples of biological control: introduction of natural parasites and predators, introduction of a species-specific pathogen delivered either by application or by a vector, use of insect growth regulators to control the growth of larval insects, thereby limiting the number that each maturation and reproduction, and use of pheromone traps as a surveillance and control tool for stored product pests, and agricultural and quarantineable pests.

Chemical Control – Chemical control is the reduction of pest populations or prevention of pest injury by using chemicals to poison, repel, or attract them to other devices. In addition to typical pesticides, pheromones, growth regulators, and repellents are major components of chemical control. Use of new commercially available technologies such as Weedseeker® which spray only weeds, not the bare ground is an example of state-of-the-art pesticide delivery system that are used on several DoD installations.

Pest management requirements for Army installations vary considerably. The following is a generalized list of major pest categories. Priorities would vary according to specific sites. Appendix A includes examples of surveillance and control methods for each pest category including:

- Public health-related pests such as mosquitoes, ticks, fleas, wasps & hornets, spiders, fire ants, filth flies and rodents;

- Pests found in and around buildings/homes such as cockroaches, ants, crickets, earwigs, stored products pests;
- Structural pest such as subterranean termites and drywood termites;
- Quarantine and regulated pests such as gypsy moth larvae;
- Undesirable vegetation such as broadleaf weeds, invasive and noxious weeds; and
- Vertebrate pests such as birds, bats, and snakes.

1.3 Purpose and Need for the Action

The purpose of the Army Pest Management Program is to protect health, property and natural resources from damage by insects, weeds, and other pests in ways that promote training and readiness with minimum risks to the environment.

Currently, the Department of Defense and US Army pest management programs use a multifaceted approach to reduce the health and environmental risks from pesticides based on the concept of IPM and several key Pest Management MoMs. This approach is supported by and described in DoD and policy in DoD Instruction 4150.07, "*DoD Pest Management Program*", dated May 29, 2008 and Army policy in AR 200-1, "*Environmental Protection and Enhancement*", dated Dec 13, 2007.

In DoD Instruction 4150.07, DoD policy clearly states the principle that the military departments (1) will use IPM techniques in their operations and on their installations in carrying out pest management activities and (2) will promote IPM through procurement and regulatory policies, and other activities. IPM is defined in DoD Instruction 4150.07, as a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks. The primary objective of an IPM program is to use non-chemical and chemical control techniques to achieve effective control of the target pest. Pests are defined as unwanted plants, animals, or microorganisms. Common pests include insects, birds, rodents, weeds, fungi, and vertebrate pests.

To institute IPM at the installation level, DoD and Army pest management policy require all installations to have an installation IPMP. An IPMP is a long-range, well-defined planning and operational document that describes the IPM program. Written pest management plans are required as a means of establishing and implementing IPM. IPMP include IPM outlines for control of applicable pests on a given installation using biological, cultural, physical & mechanical, and pesticides. Installation IPM Coordinators (IPMCs) who are assigned at each installation by the garrison commander are responsible to ensuring that the IPMP fully and accurately describes the

installation's IPMP. When planning, writing and coordinating all pest management operations on the installation, pest management personnel incorporate IPM techniques and technologies to reduce total reliance on pesticides support of installation's IPM operations and activities. The IPMPs are reviewed and technically validated annually by PMCs by the senior Army Pest Management Consultant and approved by the Armed Forces Pest Management Board (AFPMB).

DoD policy also requires that all pesticide applications on DoD and Army installations be made only by personnel trained and certified as DoD pesticide applicators by State-certified applicators with equivalent DoD categories for work being performed. This requirement ensures that pesticide applicators can only be made by individuals who have training in the proper and safe use of pesticides according to EPA registered pesticide labels.

To measure and evaluate the effectiveness of the DoD and Army pest management program, in 1994, DoD instituted the below MoMs for pest management. Data for these measures are reported annually to the Assistant Deputy Under Secretary of Defense (Environment, Safety and Occupational Health) (ADUSD(ESOH)). The target metrics for the current DoD pest management MoMs are:

1) MoM #1: IPM Planning: Through the end of Fiscal Year (FY) 2010, 100 percent of DoD installations will maintain IPMPs that are reviewed and approved by a DoD-certified pest management consultant and annually updated by the installation pest management coordinator.

2) MoM #2: Pesticide Use Reduction: Through the end of FY 2010, the Department of Defense will maintain the reduction goal in annual pesticide use by both government and contractor pesticide applicators on DoD installations. This reduction goal is set at an average of the FY 2002 and 2003 usage, which is 389,000 pounds of active ingredient (45 percent of the original 1993 baseline – a 55 percent reduction).

3) MoM #3: Pesticide Applicator Certification: Through the end of FY 2010, 100 percent of DoD pesticide applicators will be certified. Direct hire employees, certified in accordance with the DoD plan for the certification of pesticide applicators, have a maximum of 2 years to become certified after initial employment. Contracted employees shall have appropriate State or host-nation certification in the appropriate categories at the time the contract is let.

The Army's commitments in achieving MoMs goals are well reflected in the Army's FY 2009 Environmental Quality Data: 1) The percentage of IMCOM-managed Army installations with reviewed and validated IPMPs in FY 2009 was 99 percent. 2) The Army achieved its pesticide use reduction below the Army's baseline average (389,000 pounds for FY 2002 and FY 2003) with a total of: 222,932 total pounds of active ingredient. 3) The Army sustained its excellent record for certification of pesticide applicators with an overall Army-wide rate of 100 percent.

Army manages installations and facilities in a manner to promote mission readiness and execution, ensure the well being of soldiers, civilians and family members, improve infrastructure, and preserve the environment. Within the parameters of achieving its mission, Army acknowledges its role as steward of the land.

Procedures established by Army for pest management operations at Army installations are addressed in Appendix A.

1.4 Scope of the Document

This document analyzes the Army pest management program and provides policy guidance for routine pest management activities on improved and semi-improved lands conducted under applicable Federal, DoD and Army laws and regulations. It is not a site-specific analysis for any specific installation or pest treatment. This document does not attempt to provide a quantitative analysis of the site-specific impacts associated with specialized pest management projects that may be implemented at individual installations. The analysis in this document assumes that all pesticides would be used, handled, transported, and disposed of in accordance with the EPA approved directions and the label guidance provided by the manufacture and DoD Instruction 4150.07. Additionally, pesticides would only be applied by trained and certified applicators. An IPMP is developed in consultation and coordination with the installation stakeholders including Operations Officer (G-3); Range Control; Directorate of Plans, Training, Mobilization, and Security; Directorate of Public Work (DPW); Facilities Engineering; Preventive Medicine; Natural Resources; Safety; Environment and golf course Morale, Welfare and Recreation (MWR) personnel. As a result, the content of an IPMP is consistent with the Integrated Natural Resources Management Plan, Integrated Cultural Resources Management Plan, Master Plan, Range Development Plan, and bird-aircraft strike hazard (BASH) plan.

This PEA evaluates the pest management program for all active Army components. This document does not apply to Army Reserve sites or National Guard Bureau (NGB) installations, the NGB installations are covered under a separate PEA document.

Site-specific activities outside the scope of this analysis would be considered as separate actions requiring site-specific NEPA documentation. Examples of specific activities that do not fall under this PEA include aerial spray of pesticides, pesticide use in areas that contain threatened or endangered species or habitat, pesticide use in wetlands except for aquatic pests, and the introduction of exotic species for pest control. These activities would require site-specific documentation to evaluate potential impacts or mitigation to reduce the impact to non-significant levels. Army installations may conduct aerial application of chemicals to manage impact and control noxious weeds on training areas, and mosquito control. Aerial spraying is generally required to prevent overgrowth in ranges, where unexploded ordnances prevent normal IPM practices. AR 200-1 requires that an Aerial Spray Statement of Need (ASSON) be enclosed with an installation's IPMP. Elements of an ASSON will include an introduction and main body. Key elements of the main body should include: rationale; description of the target area;

pesticide information; application information; alternative methods; sensitive areas; Federal, State, and County coordination; and environmental documentation.

2.0 PROPOSED ACTIONS AND ALTERNATIVES

The Army proposes full implementation of IPM to meet Federal law, DoD and Army policies and to continue to improve installation IPM programs. The goal is to use an integrated approach to pest management that emphasizes reducing the use of chemical controls to achieve effective pest control with minimal risk to environmental quality. The reduction of chemical control techniques would, in some cases, accompany an increase in the use of cultural, physical & mechanical and biological approaches. This approach enhances Army's emphasis on an overall ecosystem approach to land and facilities management. The Army proposes to prepare, review, and implement and annually validate IPMPs at each of its installations. Adhering to these IPMPs would ensure effective, economical, and environmentally acceptable pest control while maintaining compliance with pertinent laws and regulations. The goals of the IPMPs are to promote health, safety, and welfare of military and their dependents, civilians and contractors through an effective pest management program and to maintain a professionally trained pest management force that can support the Army mission. Trained and certified personnel would perform all pesticide applications and all pesticides would be applied in strict compliance with EPA requirements and label instructions and DoD and Army pest management policy.

2.1 ALTERNATIVES CONSIDERED

2.1.1 Alternative A: Non-chemical Pest Control Techniques

This alternative focuses on the ecosystem management approach and provides for use of all available techniques, exclusive of chemicals to control pests. The non-chemical alternative would incorporate habitat modification, increased competition from desirable species, physical & mechanical control, mulching, plant rotation, biological control, and prescribed burns to manage pests. This alternative would also require that the policies and procedures for the certification of pesticide applicators be documented. Review and modification of each individual IPMP will be conducted on an annual basis as needed, based on changing conditions.

The IPM Outlines in Appendix B identify over 24 examples of physical & mechanical, cultural, and biological pest control methods. These include exclusion techniques, good housekeeping practices, elimination of water sources, live traps, and the use of fish, insects and bacteria. Specific pest management activities for pest situation at Army installations will be determined based on a combination of variables including pest location, climate, pest populations, time of year, and cost of treatment and will be based on options outlined in each installation IPMP.

Currently, no Army installations utilize an ecosystem management approach that incorporates only physical & mechanical, cultural, and biological control techniques,

exclusive of pesticide use to control pests. Inclusion of this alternative represents one side of the spectrum of pest management, namely an exclusively "non-chemical" approach.

2.1.2 Alternative B: Non-chemical Pest Control Techniques and Limited Pesticide Use (Preferred Alternative)

This is the preferred alternative and would incorporate all of the non-chemical control techniques listed in Alternative A with limited use of pesticides. IPMPs would include special procedures for implementing pest control in sensitive ecological areas, such as wetlands, or in endangered species habitat. Additional NEPA documentation would be required for specialized pest management operations (e.g., aerial spray and non-routine pesticide applications to 640 or more acres). All control techniques would be performed in full compliance with applicable State and Federal laws and regulations and installations would be in compliance with the Federal requirement that all federal agencies implement IPM. Per Title 7 – Agriculture, Chapter 6 – Insecticides and Environmental Pesticide Control, Subchapter II – Environmental Pesticide Control, Sec. 136r-1 (Integrated Pest Management), federal agencies shall use Integrated Pest Management techniques in carrying out pest management activities and shall promote Integrated Pest Management through procurement and regulatory policies, and other activities. Under this preferred alternative, the individual installation IPMP would document the policies and procedures for the certification of pesticide applicators. Review and modification of each individual IPMP will be conducted on an annual basis as needed, based on changing conditions.

2.1.3 Alternative C: Chemical Pest Control Techniques – Primarily Pesticides

Although this alternative does not support DoD policy, to limit pesticides, or the Federal requirement that all Federal agencies use Integrated Pest Management [Title 7 – Agriculture, Chapter 6 – Insecticides and Environmental Pesticide Control, Subchapter II – Environmental Pesticide Control, Sec. 136r-1 (Integrated Pest Management)], it is included in the analysis. This alternative includes the use of pesticides to control pests with little or no emphasis on the techniques discussed in Alternative A. The application of pesticides would fully comply with applicable State and Federal laws and regulations. Alternative C would also document the policies and procedures for the certification of pesticide applicators as well as allow for the annual review and modification of the IPMP.

Currently, no Army installations utilize an emphasis upon the use of pesticides to control pests with no emphasis on other non-chemical techniques. As with Alternative A, above, this alternative represents the other end of the pest management spectrum, namely the "chemical-focused" approach.

2.1.4 Alternative D: No Action (Required by CEQ)

In the no action alternative, each individual installation would continue to manage pests in a manner consistent with past and current practices with no adoption of new pest management technologies, equipment, and best management practices. Although IPM is currently in practice at all Army installations, IPM is not fully implemented at each installation. One area where improvement is needed is review of all technical portions of installation pest management contracts PWSs and pest management services by a designated PMC to ensure IPM methodologies are stipulated in the contract. In addition, the threats to Army personnel and dependents from disease vectors and pests, to Army training lands from unwanted vegetation and invasive species, and to the infrastructure of each installation are constantly changing over time and with changes in weather. These threats require adjustments to installation IPM programs and an adaptive strategy to properly respond to and control these changing populations of disease vectors and pests. This no action alternative would maintain the status quo at each installation without adopting new best management practices and procedures to improve efficiencies and further reduce risk from pesticide use while preventing and controlling these new pest management threats and changing conditions. This no action alternative over time would degrade readiness, national security and economical and ecological impacts on Army land, property and personnel.

2.2 ALTERNATIVE DEVELOPMENT

The Army has developed the above alternatives to meet its needs for pest management. The Federal government and the Army are working under increasingly tighter budgetary limitations. IPMPs must be economically feasible to be implemented. Installations have a limited number of personnel dedicated to pest management efforts. Therefore, only alternatives that can be performed by existing staffing levels are evaluated in this PEA. IPMPs must also meet all applicable laws and regulations, as well as the directives promulgated in DoD Instruction 4150.07 and Army Regulation 200-1.

3.0 AFFECTED ENVIRONMENT

3.1 General

The affected environment includes facilities and training lands supported by the Army. The following is a general description of the physical and biological environment of the United States and Federal laws regulating impacts to the environment.

Guidance from CEQ dated July 1, 1997, states that agencies "must include analysis of reasonably foreseeable transboundary effects of proposed actions in their analysis of proposed actions in the United States." Should any potential impacts be identified, agencies with relevant expertise in the affected country would be contacted. Actions that impact migratory species, wide-ranging species, air quality, watersheds, and other components of natural ecosystems are types of actions that may have impacts across borders.

This PEA addresses broad issues relevant to the entire program as opposed to site-specific issues. Most of the potential types of impacts depend on site-specific characteristics of the proposed action and on site-specific resources. Characteristics and resources vary from site to site (for example, water resources, threatened and endangered species, historical resources); therefore, specific physical, biological, and socioeconomic resources would be addressed in more detail in the appropriate site-specific environmental documentation and IPMP. With the exception of pesticide requirements, this document is limited to a listing of the relevant laws, regulations and plans that apply to this PEA.

3.2 Land Use

General

The United States contains a wide variety of ecosystems that are dynamic and natural complexes of living organisms interacting with each other and with their associated non-living environment. The DoD has adopted the policy that land use practices and decisions be based on scientifically sound conservation procedures and techniques that follow ecosystem management principles.

Natural land uses and land uses that reflect human-caused modifications are considered in this section. Natural land use classifications include wildlife areas, forests, and other open or undeveloped areas. Human land uses include residential, commercial, industrial, utilities, agricultural, recreational and other developed uses.

Master planning of Army Installations is guided by AR 210-20. There are 12 general land use classification used by Army planners and they include: airfields, maintenance, industrial, supply/storage, administration, training/ranges, unaccompanied personnel housing, family housing, community facilities, medical, outdoor recreation, and open space. Management plans, policies, ordinances, and regulations determine the types of

uses that are allowable, or protect specially designated or environmentally sensitive uses.

Army serves as a steward to millions of acres of land. A typical Army installation consists of training lands which often includes bombing and gunnery ranges, and a cantonment area made up of administrative buildings, housing, maintenance facilities, and other infrastructure typical of developed areas.

Just over 60 percent of the land in the United States is privately owned. The federal government owns 28.8 percent, the State and local governments possess 8.6 percent, and 2.3 percent is Native American owned. www.**ers**.usda.gov/Publications/EIB14

3.3 Air Quality

Air quality in a given location is described by the concentrations of various pollutants present in the atmosphere. National Ambient Air Quality Standards (NAAQS) have been established by the U.S. Environmental Protection Agency (EPA) for six criteria air pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), ozone (O_3), and lead (Pb). NAAQS represent the maximum levels of criteria pollutants that are considered acceptable, providing an adequate margin of safety to protect public health and welfare. Short-term standards (1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health effects, while long-term standards (annual averages) have been established for pollutants contributing to chronic health effects. Lead has a unique quarterly averaging period. Secondary standards are also established for non-health impacts, such as plant damage.

The Clean Air Act (CAA) places the responsibility on individual states to achieve and maintain the NAAQS. The primary mechanism for states to achieve and maintain the NAAQS is the EPA-required State Implementation Plan (SIP). The SIP identifies goals, strategies, schedules, and enforcement actions that will lead each state into compliance with NAAQS. Each state has the authority to adopt standards stricter than those established under the federal program. The federal NAAQS are depicted in Table 3-1.

The EPA designates all areas of the U.S. as having air quality better than (attainment) or worse than (non-attainment) the NAAQS. When there is insufficient ambient air quality data for the EPA to form a basis for attainment status, the area is designated “unclassified”. The criteria for non-attainment designation varies by pollutant: 1) an area is in non-attainment for O_3 if NAAQS have been exceeded more than three discontinuous times in 3 years, and 2) an area is in non-attainment for any other pollutant if NAAQS have been exceeded more than once per year. Areas that were once in nonattainment and now meet NAAQS are designated “maintenance areas” and carry many of the same requirements as when they were nonattainment.

Typical Army installation activities governed by the CAA include: use, maintenance and inspection of vehicles; operation of boilers; some training activities; air emissions

monitoring; fuel storage and distribution; surface coating and use of ozone depleting chemicals; and prescribed burns.

Table 3-1. National and State Ambient Air Quality Standards

Air Pollutant	*Averaging*	*Primary[1]*	*Secondary[2]*
CO	1-hour 8-hour	35 ppm 9 ppm	35 ppm 9 ppm
NO_2	Annual	0.053 ppm	0.053 ppm
SO_2	3-hour 24-hour Annual	- 0.14 ppm 0.03 ppm	0.50 ppm - -
$PM_{2.5}$[3]	24-hour Annual	35 µg/m^3 15 µg/m^3	Same as primary.
PM_{10}	24-hour Annual	150 µg/m^3 50 µg/m^3	150 µg/m^3 50 µg/m^3
O_3	1-hour[4] 8-hour	0.12 ppm 0.08 ppm	0.12 ppm 0.08 ppm
Pb	Quarterly average	1.5 µg/m^3	1.5 µg/m^3

Notes: [1] Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly.

[2] Secondary standards set limits to protect public welfare, including protection against Decreased visibility and damage to animals, crops, vegetation, and buildings.

[3] $PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter. New standards for $PM_{2.5}$ and 8- hour ozone standards were established in 1997; guidelines are being drafted.

[4] The ozone 1-hour standard applies only to designated nonattainment areas.

Ppm = parts per million

µg/m^3 = micrograms per cubic meter.

Sources: EPA 1999

Relevant Laws, Regulations, and Plans

- The Clean Air Act (CAA) of 1970, as amended
- The primary mechanisms regulating air pollutant emissions are the State's SIP or air quality control region regulations. These regulations normally follow the Federal guidelines for State programs and have many similar features.

3.4 Noise

Noise is considered unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive. It may involve a broad range of sound sources and frequencies or it can have a specific, readily identifiable source. There is a wide diversity among human responses to noise that vary not only according to the type and characteristics of the noise source, but also to the sensitivity and expectations, the time of day, and the distance between the noise source (for example aircraft or equipment) and the receptor (for example a person or animal).

Typical sources of noise on Army installations and training lands include: small arms firing, mortar and artillery practice, demolition training, and Army aircraft operations. Traffic can be a major source of noise, especially in urban areas or near busy expressways. Construction equipment and heavy machinery can also be a major contributor to noise levels.

Relevant Laws, Regulations, and Plans

- The Noise Control Act of 1972 (40 CFR 202-205)
- DoD Directive 4165.57, Air Installation Compatible Use Zone
- Chapter 14 of AR 200-1 establishes the Installation Compatible Use Zone
- State, regional, and local governmental agencies may develop zoning and planning ordinances that have the potential to affect Army facilities and training lands and their operations.

3.5 Geology and Soils

Geology

The surface geology of the United States is diverse and reflects the erosion and deposition processes that have predominated North America. The effects of pest management may vary throughout the United States depending on the geological composition of soils and topographic features in a particular area.

Soils

Each Army installation within the United States has its own combination of soil types and different soil characteristics such as fertility and permeability. Soil is the medium in which plants are anchored and from which they draw water and mineral nutrients. Soil is derived from complex interactions of geologic, biotic, and climatic factors acting over time.

Relevant Laws, Regulations, and Plans

- The Soil Conservation and Domestic Allotment Act of 1935, as amended
- The Soil and Water Resources Conservation Act of 1977, as amended

3.6 Water Resources

Surface Water

Surface water includes wetlands, reservoirs, ponds, lakes, streams, rivers, bays, and oceans. Runoff from rain, snowmelt, irrigation, precipitation and human activities flows into surface waters, which usually flow into larger water bodies and eventually into the ocean. The National Pollutant Discharge Elimination System (NPDES) permit program, managed by the EPA in coordination with the States, regulated community, and public, regulates industrial wastewater. A watershed includes the whole region contributing to the supply water which includes all the land that drains into a stream, river or lake. North America has several major watersheds. Over 2,000 watersheds exist in the United States.

Relevant Laws, Regulations, and Plans

- The Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1972 (CWA), as amended through the enactment of the Great Lakes Legacy Act of 2002 (Public Law 107-303, November 27, 2002)
- Section 10 of the Rivers and Harbors Act of 1938
- The Wild and Scenic Rivers Act of 1968, as amended (16 U.S.C. 1271-1287)
- The Fish and Wildlife Coordination Act of 1934, as amended (16 U.S.C. 661-667 et seq.)
- States have individual regulations and best management practices to protect surface waters and prevent non-point source pollution.

Groundwater/Hydrology

Groundwater is the supply of water found beneath the Earth's surface, usually in aquifers, which is often used to supply wells and springs. Groundwater is the major source of drinking water in some parts of the United States. Depth to groundwater, rate of groundwater movement, permeability of overlying soils, and uses of groundwater are all site-specific factors that are used to asses local groundwater vulnerability and susceptibility to contamination. In some regions, the quantity, in addition to the quality, of groundwater available is an issue for consideration.

Relevant Laws, Regulations, and Plans

- The Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1972 (CWA), as amended through the enactment of the Great Lakes Legacy Act of 2002 (Public Law 107-303, November 27, 2002)

- The Safe Drinking Water Act of 1974, as amended

- State and local authorities have regulations to protect groundwater from contamination and regulate discharges to groundwater.

Floodplains

A floodplain is the lowland adjacent to a river, lake, or ocean. Floodplains are designated by the rarity of a flood that is large enough to inundate them. For example, the 100-year floodplain would represent the area of inundation for a 100-year period flood (a flood with a statistical frequency interval of once every 100 years). Most of the known floodplains in the United States have been mapped by the Federal Emergency Management Agency (FEMA).

Relevant Laws, Regulations, and Plans

- Section 404 of the CWA, 33 U.S.C. 1344

- EO 11988, Floodplain Management

- The Watershed Protection and Flood Control Act of 1954, as amended (16 U.S.C. 1001 et seq.)

- Food, Conservation and Energy Act of 2008.

3.7 Biological Resources

The flora and fauna within these ecosystem types are highly varied. North America, north of Mexico, has indigenous representatives of 211 flowering plant families (Thorne 1993) and approximately 20,000 plant species of which 4,189 are endemic to the region (http://www.plant-talk.org/facts.htm). The interaction of climate, landform, and soil largely determines the vegetation of an area. Vegetation at individual Army installation varies based on amount of native vegetation and degree of vegetation management. The vegetation of an area largely determines the type, distribution, and abundance of wildlife and also determines types of pests that may be present.

Ecoregions

The biological resources of the United States consist of all plants and animals and the

habitats in which they occur including both terrestrial and aquatic ecosystems. The biological resources of the United States may be divided into the following seven major terrestrial biomes (large climatic regions): tundra, taiga, temperate deciduous forest, grassland, desert, scrub forest, and tropical forest. These biomes are characterized by

Different types of plants and animals and are a result of complex interactions of temperature, wind, humidity, latitude, altitude, and topography.

Tundra

The northern and western portions of Alaska (approximately sixty percent) are considered tundra. Soils in this area are commonly permanently frozen (permafrost), although the top soil layer thaws in the summer and refreezes in the winter. The land has the appearance of a gently rolling plain, with many lakes, ponds, and bogs in the depressions. There are a few small, widely scattered trees, such as Sitka alder (*Alnus sinuata*), on the tundra. Much of the ground is covered by mosses, lichens, and grasses. There are numerous small perennial herbs, which are able to withstand frequent freezing and grow rapidly during the brief cool summers, covering the tundra with brightly colored flowers.

Caribou (*Rangifer tarandus*), arctic fox (*Alopex lagopus*), arctic hare (*Lepus arcticus*), and lemming (*Lemmus trimucronatus*) are among the principal mammals; polar bear *(Thalarctos maritimus*) are common near the coast. Vast numbers of birds, particularly shorebirds such as sandpipers (*Calidris sp*.), plovers (*Pluvialis sp*.), etc.) and waterfowl (ducks, geese, etc.), nest on the tundra in summer. Tundra in northern and coastal Alaska provides summer breeding habitat for tundra swans (*Cygnus columbianus*). However, most birds migrate south for the winter. The willow ptarmigan (*Lagopus*) is a permanent avian resident of the tundra. Insects, mainly flies and mosquitoes, are abundant. Though the number of individual organisms on the tundra is often very high, the number of species is limited.

Taiga

The taiga, south of the tundra, predominates in eastern Alaska; on the upper slopes of the Coast Ranges in Washington, Oregon, and northern and eastern California; on the upper slopes of the Rocky Mountains in Idaho, western Montana, Wyoming, Colorado, and small portions of the southwest; the northern portions of states bordering Canada, including a significant portion of Maine; and a relatively small area along the upper slopes of the Appalachian Mountains. Taiga, also called boreal forest, is dominated by coniferous trees and is dotted with lakes, ponds, and bogs and experiences very cold winters. Taiga summers are longer and somewhat warmer than tundra summers. As a result, taiga subsoil thaws and vegetation grows abundantly in summer. In Alaska, the northern reaches of the taiga may contain areas of discontinuous permafrost.

The number of species living in the taiga is higher than on the tundra, but is much less than in biomes farther south. Conifers including spruce (*Picea sp*.), fir (*Abies sp*.), and

tamarack (*Larix laricina*)) are the most characteristic larger plants in the taiga. Deciduous trees, such as paper birch (*Betula pendula*), are also common. Moose (*Alces alces*), black bear (*Ursus americanus*), grey wolf (*Canis sp*.), lynx (*Lynx lynx*), wolverine (*Gulo luscus*), marten (*Martes americana*), porcupine (*Erethizon dorsatum*) and many smaller rodents are present in the taiga. Waterfowl, such as common loons (*Gavia immer*), grebes (*Podiceps sp*.), and scoters (*Melanitta sp*.) are abundant in summer. Permanent avian residents include spruce grouse (*Canachites canadensis*), boreal owls (*Aegolius funereus*), and three-toed woodpeckers (*Picoides tridactylus* and *Picoides arcticus*). The taiga of eastern Alaska provides summer breeding habitat for trumpeter swans (*Cygnus buccinator*).

Temperate Deciduous Forest

Most of the states east of the Mississippi are located in the temperate deciduous forest biome. Rainfall is abundant in these areas and the summers are relatively long and warm. Vegetative communities are dominated by broad-leaved deciduous trees such as oaks (*Quercus sp*.), maples (*Acer sp*.), and poplars (*Populus sp*.). Some common mammals found in the temperate deciduous forest are ground squirrels (*Citellus sp*.), deer (*Odocoileus sp*.), foxes (*Vulpes sp*.), and bears (*Ursus sp*.). Deciduous forest provides habitat for many birds such as wild turkeys (*Meleagris gallopavo*), cooper's hawks (*Accipiter cooperii*), and cardinals (*Cardinalis cardinalis*), whip-poor-wills (*Caprimulgus vociferous)* and warblers (*Parulidae*).

Grassland

The central portion of the United States, approximately from the Rocky Mountains to the Mississippi River consists of grasslands. These are areas are characterized by annual warm-cold cycles and either relatively low total annual rainfall (10-12 inches) or uneven seasonal occurrence of rainfall conditions suitable for grasses and other herbaceous plants. Common grasses include bluestem (*Andropogon sp*.), quack grass (*Agropyrom repens*), and panic grass (*Panicum sp*.). As rainfall decreases from east to west, the stature of the vegetation decreases successively through tall, mixed and short grass prairies. Shrubs or trees, such as willows (*Salix sp*.) and bur oak (*Quercus macrocarpa*), are scattered throughout portions of the grasslands and often associated with riparian areas.

Grasslands contain vast numbers of large and conspicuous herbivores, such as bison *(Bison bison*) and pronghorn antelope (*Antilocapra americana*). Burrowing rodents or rodent-like animals, such as prairie dogs (*Cynomys ludovicianus*) and badgers (*Taxidea taxus*), are common. Grassland marshes, particularly the prairie potholes of the northern great plains, are extremely productive waterfowl habitats. Grasslands also provide valuable grazing land for livestock.

Desert

Most of the southwestern United States is part of the desert biome. Since rainfall is

often less than 10 inches per year, not even grasses can survive as the dominant vegetation. These arid regions are subject to the most extreme temperature fluctuations of any biome. During the day they are exposed to intense sunlight, and the temperature of both air and soil may rise very high (130ºF or higher for air temperature and 185ºF or higher for surface temperature). In the absence of the moderating influence of abundant vegetation and water vapor in the air, heat is rapidly lost at night.

Deserts in the United States contain areas of bare soil and scattered drought-resistant shrubs or small trees such as Joshua tree (*Yucca brevifolia*), creosote bush (*Larrea tridentata*), and mesquite (*Prosopis glandulosa*), and succulent plants such as saguaro cactus (Carnegiea gigantea) that can store much water in their tissues. In addition, there are often many small rapid-growing annual herbs with seeds that will germinate only after a rain. Once they germinate, these young plants shoot up, flower, set seed, and die, all within a few days.

Most desert animals are active primarily at night or during the brief periods in early morning and late afternoon when the heat is not so intense. During the day they remain in cool underground burrows or in cavities in plants or, in the case of some spiders and insects, in the shade of the plants. Desert animals include rodents, such as kangaroo rats (*Dipodomys sp*.), snakes such as western diamondback rattlesnakes (*Crotalus atrox*), lizards such as gila monsters (*Heloderma suspectum*), arachnids and insects. A few birds, such as the gilded flicker (*Colaptes chrysoides*) and Gambel's quail (*Lophortyx gambelii*), also live in the desert. Most desert animals possess numerous physiological and behavioral adaptations for life in their hostile environment.

Aquatic and moist habitats are important to wildlife in desert regions. Desert springs and streams contain a large number of endemic (geographically restricted in distribution) fish species, many of which are protected under federal or state regulations. The springs, playas, and marshes of western Nevada and eastern California harbor a high concentration of federally listed threatened, endangered, and candidate plant and animal species.

Scrub Forest

The major scrub forests of the United States are the chaparral and coastal sage scrub communities of western California. The plant communities of scrub ecosystems are dominated by shrubs and/or multi-stemmed trees that are typically less than 16 feet in height. Riparian or wetland scrub associations are widespread, but scrub is more characteristic of regions of moderate aridity (i.e. 10 to 30 inches of rainfall per year) and seasonal drought, often on slopes and rock or other poor soils. Examples of scrub vegetation include coyote brush (*Baccharis pilularis*) and sage (*Salvia clevelandii*).

Coastal sage scrub is somewhat more open and generally occurs below chaparral, although the two often intermingle. Both types of communities are subject to periodic fires, with ensuing succession. Chaparral provides habitat for mammals such as mule deer (*Odocoileus hemionus*), and Sonoma chipmunks (*Eutamias sonomae*), snakes

such as striped racers (*Masticophis lateralis*), and birds such as scrub jays (*Aphelocoma coerulescens*).

Tropical Forest

Hawaii, Guam, and Puerto Rico contain tropical forests. Warm temperatures combined with abundant and fairly uniform rainfall create dense forests that contain vertically stratified communities. Different levels beneath the high tree canopy contain plant species adapted to ever diminishing amounts of sun. On the forest floor, few plants are effective at photosynthesis, although any break in the canopy encourages exuberant growth of tree saplings and other plants. Competition for light is intense but the abundant rains make adaptations that are never seen under drier conditions, possible. Many types of vines grow upwards toward the sunlight. Mosses, orchids, lichens, and bromeliads grow on tree branches and obtain minerals from falling leaves, debris, and the wastes of animals living in the canopy. Many insects, spiders, amphibians, birds, and mammals, such as spider monkeys spend most of their lives at a single level in the canopy. The number and types of organisms living in or on a single tree in a tropical forest often exceed the number and types of organisms living in an entire temperate forest. In addition, due to the geographic isolation of islands, Hawaii, Guam and Puerto Rico contain significant numbers of species that are found nowhere else.

Aquatic Ecosystems

Many of the nation's biological resources are found in aquatic environments. Like terrestrial ecosystems, aquatic ecosystems also vary in type with varying physical conditions. Thus the plants and animals in lakes differ from those in the flowing waters of rivers and streams, and even those in a single stream differ from one another, depending on whether they are in rapids or in water flowing slowly and calmly over a smooth bottom.

The system adopted by the US Fish and Wildlife Service (Tiner, 1984) provides a basis for defining and classifying aquatic ecosystems. Deepwater habitats are defined as permanently flooded, and include inland lakes and streams and sub-tidal marine habitats. Wetlands include marshes, swamps, bogs, playas, and periodically flooded areas. In general, wetlands are transitional ecosystems between terrestrial and deepwater habitats. Riparian ecosystems, broadly defined, encompass all terrestrial areas of relatively high soil moisture that occur adjacent to rivers and streams.

Wetlands of the United States may be divided into two broad categories: estuarine/coastal wetlands that are subject to tidal influxes of seawater and palustrine wetlands, which are interior freshwater wetlands. Functions provided by wetlands include improving water quality, reducing flood and storm damages, providing fish and wildlife habitat, and providing opportunities for recreation and aesthetic appreciation. Wetlands are one of the most productive ecosystems in the world. Most fish feed on wetland-produced food and use wetlands as nursery grounds. In addition, wetlands are of prime importance to waterfowl, which feed, nest, and raise young in diverse wetland

habitats.

Riparian areas also provide habitat for a wide variety of species. In arid to semi-arid regions, riparian zones often support the only significant woodland or forest habitats and harbor a large number of wildlife species in comparison to the surrounding uplands. Riparian corridors permit the extension of species into drier regions than they would otherwise occupy. Finally, riparian vegetation regulates many of the physical and chemical characteristics of small streams, along with supplying much of their primary nutrients in the form of leaf litter. Riparian vegetation stabilizes stream and riverbank habitats, and in small streams, reduces solar radiation and water temperature in the streambed. The biological resources of riparian areas and wetlands are extremely sensitive to changes in water level, neighboring vegetation, and sedimentation.

Relevant Laws, Regulations, and Plans

- The Migratory Bird Treaty Act of 1918, 16 U.S.C. 703-711
- The Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. 668-668c)
- The Lacey Act of 1900, as amended (18 U.S.C. 42; 16 U.S.C. 3371-3378)
- EO 11987, Exotic Organisms
- The Federal Noxious Weed Act of 1975, as amended, Public Law 93-629 (7 U.S.C. 2801 et seq., 88 Stat. 2148)
- Military Reservations and Facilities: Hunting, Fishing, and Trapping (Public Law 86-337, 10 U.S.C. 2671)
- The Airborne Hunting Act, Public Law 92-159, approved November 18, 1971 (85 Stat. 480), and subsequently amended by Public Law 92-502, approved October 28, 1972 (86 Stat. 905)
- The Waterfowl Depredations Prevention Act of 1956, as amended (7 U.S.C. 442-445; Chapter 512; July 3, 1956; 70 Stat. 492)
- The Anadromous Fish Conservation Act of 1965 (16 U.S.C. 757a et seq.)
- The Wild, Free-Roaming Horses and Burros Act of 1971, as amended (16 U.S.C. 133d-1340)

Endangered and Threatened Species

There are many animal and plant species located on Army installations that are listed as either threatened, endangered, species of concern, species at risk, candidate species,

etc. Each year the US Army Environmental Command (USAEC) completes an Army-wide survey of threatened and endangered species. The most current survey from 2007 can be found at:

http://aec.army.mil/usaec/endangered/index.html
Critical habitat, as defined by the Endangered Species Act (ESA) of 1973, are areas with physical or biological features essential to the preservation of a species that may require special management or protection. Federal agencies are required to take precautions to not destroy or harm areas designated as critical habitat. The following considerations are made when determining critical habitat for a species: space for individual and population growth and for normal behavior, shelter, nutritional or physiological requirements, areas for breeding and rearing offspring, and habitats that are protected from disturbances or are representative of the historic geographical and ecological distributions.

Relevant Laws, Regulations, and Plans

- The ESA of 1973, as amended, 16 U.S.C. 1531-1547, et seq.

- States also have individual regulations protecting State species of concern and State threatened or endangered species in addition to species on the Federal listing.

Wetlands

The Army Corp of Engineers and Environmental Protection Agency defines wetlands as the following: "Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." The three parameters used to determine whether an area is a wetland or not are vegetation, soil, and hydrology.

The National Wetlands Inventory of the U.S. Fish and Wildlife Service has mapped most of the wetlands, greater than 10 acres in size, found in the United States, including those located on military installations. Wetland delineations are the best source of detailed wetland information for a particular site.

The Army policy for wetlands calls for the avoidance of negative impacts to aquatic resources caused by filling, flooding, draining, sedimentation, water quality degradation, increased noise, or human activity, and to mitigate any unavoidable adverse impacts. Army strives to avoid a net loss of values and functions of existing wetlands and prevent an overall net loss of wetlands on Army land.

Relevant Laws, Regulations, and Plans

- Section 404 of the CWA, 33 U.S.C. 1344

- EO 11990, Protection of Wetlands

- More than half of the States have enacted laws protecting wetlands, and, in some areas, municipalities also have wetlands laws.

- States develop regulations and management practices to protect surface waters, coastal zones, and wetlands and to prevent non-point source pollution.

3.8 Cultural Resources

Cultural resources that may be found at Army facilities and training lands are archaeological, architectural, or traditional resources. Archaeological resources include the locations of prehistoric or historic activities that have left a significant impact on the earth or where artifacts have been found. Buildings, districts, bridges, dams, or other infrastructure of historic or aesthetic importance are included under architectural resources. Traditional cultural resources are related to both historic and contemporary sacred and ceremonial areas, locations of historic events, and other resources that Native Americans, Native Alaskans, or other groups consider necessary for the perseverance of their traditional culture.

The United States has many sites of historic and archeological significance. The National Register of Historic Places (NRHP), maintained by the National Park Service, is the nation's official list of districts, buildings, sites, structures, and objects significant in American history, architecture, archeology, engineering, and culture. The Army has more than 65,000 buildings subject to the National Historic Preservation Act, of which 10,000 have been designated eligible for or listed on the NRHP. Many more properties are potentially eligible for the National Register.

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources can be divided into two major categories: Prehistoric and Historic resources, and Native American resources. Prehistoric and Historic resources include archaeological resources (prehistoric and historic) and architectural resources. Native American resources are also known as properties of traditional religious and cultural importance. Archaeological resources include any material remains of past human life or activities that are 100 years old or more and capable of providing scientific or humanistic understandings of past human behavior and cultural adaptation through the application of scientific or scholarly techniques (Archaeological Resources Protection Act of 1979, Section 3(I) 16 U.S.C. 470bb). For example, *archaeological resources* consist of sites, arrowheads, stone flakes, or bottles. *Architectural resources* include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. *Properties of traditional religious and cultural importance* can include

archaeological resources, buildings, neighborhoods, prominent topographic features, habitats, plants, animals, or traditional hunting and gathering areas that American Indians or others consider essential for the continuance of traditional cultures.

Under the National Historic Preservation Act (NHPA) of 1966, as amended, only cultural resources included in or eligible for inclusion on the NRHP, defined as 'historic properties', warrant consideration with regard to adverse impacts from a proposed action. Historic properties generally must be more than 50 years old to be considered for protection under the NHPA. However, under the NHPA, more recent structures, such as Cold War era military buildings, may warrant protection if they are "exceptionally significant." To be considered eligible for the NRHP, cultural resources must meet one or more criteria as defined in 36 CFR 60.4 for inclusion on the NRHP. These criteria include association with an important event, association with a famous person, embodiment of the characteristics of an important period in history, or the ability to contribute to scientific research. Resources must also possess integrity (i.e., its important historic features must be present and recognizable). Historic properties may be buildings, structures, historic districts, or objects.

Several other Federal laws and regulations have been established to manage cultural resources, including the Archaeological and Historic Resources Preservation Act of 1974, the ARPA of 1979, and the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990. In addition, coordination and consultation with Tribes must occur in accordance with the above laws and implementing regulations as well as the American Indian Religious Freedom Act (1978); EO 13007, *Sacred Sites*; EO 13175, *Consultation and Coordination with Indian Tribal Governments*; and the DoD requirements relating to the *Annotated American Indian and Alaska Native Policy* (1999), which emphasizes the importance of respecting and consulting with Tribal governments on a government-to-government basis. This policy requires an assessment through consultation of the effect of proposed DoD actions that could significantly affect Tribal resources, Tribal rights, and Indian lands before decisions are made by the respective services.

Relevant Laws, Regulations, and Plans

- At the State level, the State Historic Preservation Officer provides assistance in determining cultural significance and eligibility for the National Register, and may also nominate properties, irrespective of ownership.

- EO 11593, Protection and Enhancement of the Cultural Environment

- The Public Buildings Cooperative Use Act of 1976

- DoD Directive 4710.1, Archaeological and Historic Management

- The Native American Graves Protection and Repatriation Act of 1990

- The American Indian Religious Freedom Act of 1978, Public Law 95-341 (42 U.S.C. 1996)

- Archeological Resources Protection Act of 1979 (16 USC 470aa-470mm)
- American Indian Religious Freedom Act of 1978, as amended (42 USC 1996-1996a)
- Archeological and Historic Preservation Act of 1974 (16 USC 469-469c)
- National Historic Preservation Act of 1966, as amended (16 USC 470-470w)
- Historic Sites, Buildings and Antiquities Act of 1935 (16 USC 461-467)
- Antiquities Act of 1906 (16 USC 431-433; 34 Stat 225)
- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001-3013)

DoD and Army Regulations and Policy

- http://www.defense.gov/releases/release.aspx?releaseid=1876

- Department of Defense: American Indian and Alaska Native Policy Memo

Federal Regulations and Guidelines

- Advisory Council on Historic Preservation: Protection of Historic Properties (36 CFR 800)
- Protection of Archeological Resources (32 CFR 229)
- Department of the Interior: Native American Graves Protection and Repatriation Act Regulations (43 CFR 10)
- Department of the Interior: Curation of Federally-owned and Administered Archeological Collections (36 CFR 79)
- Department of the Interior: Determinations of Eligibility for Inclusion in the National Register of Historic Places (36 CFR 63)
- Department of the Interior: National Historic Landmarks Program (36 CFR 65)
- Department of the Interior: National Register of Historic Places (36 CFR 60)
- Department of the Interior: Preservation of American Antiquities (43 CFR 3)
- Department of the Interior: Protection of Archeological Resources (43 CFR 7)
- Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act
- Secretary of the Interior's Professional Qualification Standards (48 FR 44716, 1983)
- Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation
- Secretary of the Interior's Standards for Architectural and Engineering Documentation: HABS/HAER Standards
- Secretary of the Interior's Standards for Rehabilitation

- Secretary of the Interior's Illustrated Guidelines for Rehabilitating Historic Buildings
- Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68)

Executive Orders

- EO 13327 Federal Real Property Asset Management
- EO 11593 Protection and Enhancement of the Cultural Environment
- EO 13006 Locating Federal Facilities in Historic Properties in our Nation's Central Cities
- EO 13007 Indian Sacred Sites
- EO 13175 Consultation and Coordination with Indian Tribal Governments
- EO 13287 Preserve America

3.9 Socioeconomics

The social and economic structure of a region is composed of a number of interrelated resources. The resources are defined by an area's population, household characteristics, employment, and personal income. Other contributors to the socioeconomic composition of an area include the availability and cost of housing, the quality of community services, and the types of industries that comprise the economic base. Active Army installations are located in 53 different communities in 28 states and cover a broad range of socioeconomic conditions.

3.10 Environmental Justice

On 11 February 1994, President Clinton issued EO 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. The purpose of the order is to avoid disproportionate adverse environmental, economic, social, or health impacts from Federal actions and policies on minority and low-income populations. As defined by the CEQ's guidance for addressing environmental justice, a minority is a person who identifies him or herself as black, Asian or Pacific Islander, Native American or Alaskan Native, or Hispanic. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than the general population of the larger surrounding area.

Low-income populations are identified using the Census Bureau's statistical poverty threshold that is based on income and family size. The Census Bureau defines a poverty area as a census tract where 2 percent or more of the residents have incomes below the poverty threshold and an extreme poverty area as a census tract with 40 percent or more of the residents below the poverty level.

Relevant Laws, Regulations, and Plans

- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks

- The Americans with Disabilities Act of 1990

Protection of Children

Executive Order 13045 seeks to protect children from disproportionately incurring environmental health or safety risks that might arise as a result of Army policies, programs, activities and standards. Army recognizes that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. Army family housing, guest houses, Child Development Centers (CDCs), pre-schools, schools, and other sites where children may present on an installation will be examined under each alternative.

On Army installations where CDCs, pre-schools, Head Start, or other similar programs occur, guidelines which fall under AR 200-1 and AR 608-10 will be adhered to. Guidelines are as follows: all pest management activities at the installation CDCs, pre-schools, and Head Start must be inspected by a health consultant (Preventive Medicine staff or school nurse) or safety officer monthly; annual review of all aspects of the pest management operation must be in accordance with the installation IPMP; herbicides are not to be used in children's outdoor play areas; IPM should be implemented to the extent possible and pests should be controlled with non-chemical measures; as the last option, if pesticide application is needed, treatment shall take place with least toxic pesticides while children are not in the facility.

3.11 Infrastructure

Infrastructure includes the utilities, roadways, railroads, air operation facilities, and buildings of an area. For purposes of this PEA, infrastructure would include all the Army installation real estate assets that support its facilities, including utilities such as, gas, electric, storage areas, storm water, sewer, solid waste disposal areas, and water systems.

3.12 Hazardous and Toxic Materials and Wastes

Hazardous substances are generally materials that pose a threat to human health or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. Regulations dealing with hazardous materials have specific regulatory definitions for hazardous materials, hazardous chemicals, hazardous substances, and so forth. Hazardous materials regulations require proper storage and handling of chemicals and require that spill contingency and response requirements related to hazardous materials be met. A typical Army installation has varying quantities

of hazardous materials associated with various operations. Materials might include ordnance, antifreeze, degreasing solvents, cleaners, fertilizer, and pesticides. Some pesticides are hazardous materials that require special management practices.

Relevant Laws, Regulations, and Plans

- The Occupational Safety and Health Act of 1970 (OSHA), 29 U.S.C. 651-678
- The Toxic Substances Control Act of 1967, 15 U.S.C. 2601-2629
- The Hazardous Materials Transportation Act of 1975, 49 U.S.C. 1801-1819, et seq.
- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. 9601-11050, 10 U.S.C. 2701-2810 et seq.
- The Emergency Planning and Community Right-to-Know Act of 1986
- EO 12843, Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances
- The National Fire Code, Flammable and Combustible Liquids Code of 2000
- Hazardous materials may be regulated on the State level, as well as by local agencies (county/city fire departments) that require flammable/combustible materials to meet certain storage requirements. Local ordinances follow the National Fire Protection Association's, Fire Protection Guide on Hazardous Materials (Pamphlets 325A, 325M, 49, 49 IF, and 704M).

Pesticides and Residues

Pesticides are substances or mixtures of substances, including biological control agents, that may prevent, destroy, repel, or mitigate pests and are specifically labeled for use by the U.S. Environmental Protection Agency. Also, any substance or mixture of substances used as a plant regulator, defoliant, desiccant disinfectant, or biocide. All pesticides will be applied in strict accordance with the pesticide label. Pesticides and pesticide spills occurring at Army installations and training lands would be handled in accordance with procedures outlined in the Armed Forces Pest Management Board Technical Guide No. 15, Pesticide Spill Prevention and Management.

Residues from pesticides applied to crops may persist in the environment. If these crops are then consumed, people or other animals could be negatively affected. Pesticide labels contain application instructions and warnings about residues. Pesticides at Army installations and training lands would be applied in accordance with

specified procedures. Pesticide residues may be a health hazard when pesticides are applied near food storage or preparation areas.

Many pesticides persist in the environment long after they have been applied. Residual pesticides can adhere to indoor surfaces, affecting air quality. Repeated outdoor applications of a pesticide can cause residues to build up leading to potential soil, surface water, groundwater contamination, and bioaccumulation.

The U.S. Geological Survey (USGS) has studied pesticides in surface and ground water. In the first cycle (1992-1996) of the USGS's National Water Quality Assessment Program, more than 50 percent of all stream samples contained 5 or more pesticides and about 25 percent of ground water samples had 2 or more pesticides http://water.usgs.gov/nawqa/pnsp/

Relevant Laws, Regulations, and Plans

The Federal Insecticide, Fungicide, and Rodenticide Act of 1976 (FIFRA) as amended, title 7 U.S.C. 136-136y, addresses the sale, distribution, transportation, storage, and use of pesticides.

The Federal Environmental Pesticide Control Act of 1972, enacted as Public Law 92-516, amended the 1947 FIFRA (Public Law 80-102, June 25, 1947, 61 Stat.163).

The 1972 amendments established a program for controlling the sale, distribution, and application of pesticides through an administrative registration process under the Administrator of the EPA. The amendments provided for classifying pesticides for "general" or "restricted" use. Restricted-use means that the EPA has determined that the pesticide may cause adverse effects on the environment, even when it is applied exactly according to label instructions. This damage may include injury to the pesticide applicators or other people unless additional precautions are taken. FIFRA states that Restricted-use pesticides may only be applied by or under the direct supervision of a certified applicator. But on Army installations, General-use and Restricted pesticides may only be applied by a certified applicator. Contractors used by the Army for pest management must have current certification for the types of applications to be performed. The law further stipulated that application of pesticides must not jeopardize the existence of threatened or endangered species (40 CFR 171.9 and 50 CFR 402).

Additionally, facilities are required to dispose of any pesticide, pesticide container, or pesticide residue in a manner consistent with labeling, not including open dumping or burning (40 CFR 165.7). The 1972 amendments authorized States to regulate the sale or use of any pesticide within a State, provided that such regulation does not permit any sale or use prohibited by the Act. State pesticide regulatory programs are to be at least as stringent as FIFRA. State and local programs typically contain regulations that are tailored to an industry or activity that is prevalent or particularly sensitive in a State. Although DoD and Army regulations are generally more stringent, there may be cases where State and local pesticide regulations provide more stringent standards or

specifically identify a requirement that may be qualitatively regulated under the Federal program. State and local pesticide programs generally include regulations that address the following topics: restrictions or requirements for the sale, distribution, or use of selected pesticides; disposal requirements for excess pesticides and pesticide wastes, such as pesticide containers; restrictions on the control of specific animal or insect species; specifications for bulk pesticide storage tank or storage facilities; operational requirements for selected application methods; and record keeping and applicator certification requirements. Other regulations include:

- The Food Quality Protection Act of 1996, Public Law 104-170

- The Food, Drug, and Cosmetics Act of 1938, as amended (21 U.S.C. Section 346a, et seq.) sets the tolerances for pesticide residues in food.

- The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 U.S.C. 4701) established a broad, new Federal program to prevent the introduction and control the spread of introduced aquatic nuisance species and the brown tree snake.

- The National Invasive Species Act of 1996

- EO 11987, Exotic Organisms, requires that executive agencies, to the extent permitted by law, restrict the introduction of exotic species into the natural ecosystems on lands and waters that they own, lease, or hold for purposes of administration; and encourage the States, local governments, and private citizens to prevent the introduction of exotic species into natural ecosystems of the United States.

- EO 13112, Invasive Species, requires that Federal agencies who actions may affect the status of invasive species identify those actions. Federal agencies must monitor invasive species populations, prevent their introduction and provide for restoration of native species. Additionally, Federal agencies must not authorize or carry out actions that cause or promote the introduction or spread of invasive species in the United States or elsewhere.

- The Federal Noxious Weed Act of 1974 (7 U.S.C. 2801 et seq.) provides for the control of noxious plants on land under the control or jurisdiction of the Federal government.

- DoD Manual 4150.07, Volume 1, Plan for the Certification of Pesticide Applicators, establishes training goals and provides a uniform training process, training standards, and procedures to prepare DoD pest management personnel to meet DoD pest management policy objectives.

- DoD Instruction 4150.7-P DoD Plan for the Certification of Pesticide Applicators. This document outlines the procedures to train and certify DoD pesticide applicators and is approved by the U.S. Environmental Protection Agency.

- DoD Instruction 4150.7-M DoD Pest Management Training and Certification Manual. This document outlines the DoD pest management training program.

- AR 200-1 Pest Management, implements the Army's pest management program to meet legal compliance requirements, comply with DoD and national policies, and support the military mission.

Solid Waste

Solid waste is considered to be non-hazardous trash, garbage, bulky wastes, liquids, or sludge generated by an installation's operations and activities. The typical Army installation contracts with a waste disposal company to remove garbage and trash generated on site. The majority of waste generated at a typical installation consists of garbage, paper waste, and cans and bottles. Recycling and resource recovery activities are also considered to be a form of solid waste management. Army installations use recycling management procedures and plans to reduce pollution and minimize waste.

Relevant Laws, Regulations, and Plans

- The Resource Conservation and Recovery Act of 1976 (RCRA), as amended

- The Federal government sets minimum national standards for municipal solid waste disposal in 40 CFR 258, State and local governments are responsible for implementing and enforcing waste programs.

- DOD Directive 4165.60, Solid Waste Management – Collection, Disposal, Resource Recovery and Recycling Program

Hazardous Waste

Hazardous waste can pose a potential or substantial hazard to human health or the environment when improperly managed. Regulations define hazardous waste as possessing at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appearing on specific EPA lists. EPA's regulations also exclude certain wastes, such as household waste, from being considered hazardous waste. Typical types of hazardous waste that might be generated at an installation include opened paints and solvents with expired shelf times and batteries. A typical installation that does generate hazardous waste is likely to qualify as a conditionally exempt small quantity generator (that is, generates less than 100 kilograms (kg) per month). Most pesticide residuals are considered to be hazardous waste and some may be considered acutely hazardous. Additionally, pesticide containers, wastes from pesticide mixing,

and any material that comes in contact with the pesticides may be considered hazardous waste if it meets the EPA criteria. Any hazardous waste generated as a result of pest management activities, to include troop issued personal repellents requires shelf-life management to ensure use before expiration and disposal in accordance with label directions.

Relevant Laws, Regulations, and Plans

- RCRA, Subtitle C, Public Law 98616 (42 U.S.C. 6921-6939b)
- RCRA encourages States to develop their own hazardous waste statutes and to operate regulatory programs.
- The Federal Facility Compliance Act of 1992
- DoD 4140.27-M Shelf-Life Management Manual

Pollution Prevention

Pollution prevention includes, but is not limited to, reducing or eliminating hazardous or other polluting inputs that can contribute to both point and non-point source pollution; modifying manufacture, maintenance, or other industrial practices to reduce pollution; modifying product designs; recycling (especially in-process, closed-loop recycling); preventing the disposal and transfer of pollution from one media to another; and increasing energy efficiency and conservation. Any reasonable mechanism that successfully avoids, prevents, or reduces pollutant discharges or emissions other than by the traditional method of treating pollution at the discharge end of a pipe or a stack would be considered pollution prevention. The 1993 CEQ guidance memorandum titled "Pollution Prevention and the National Environmental Policy Act" encourages Federal agencies to incorporate pollution prevention principles, techniques, and mechanisms into their planning and decision making processes and to evaluate and document these efforts in NEPA documents.

Relevant Laws, Regulations, and Plans

- EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management, January 24, 2007
  - Amends: EO 13327, February 4, 2004
  - Revokes: EO 13101, September 14, 1998; EO 13123, June 3, 1999; EO 13134, August 12, 1999; EO 13148, April 21, 2000; EO 13149, April 21, 2000

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 General

This section presents in a programmatic manner the environmental impacts associated with the proposed action and alternatives and the relationship between short-term uses of the environment, the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitment of resources (should the proposed action be implemented). Direct, indirect, and cumulative effects, to include significance and means to mitigate adverse impacts are discussed for each resource area. This programmatic analysis is intended for the direction of the program, not for site-specific actions.

As is common practice in NEPA documents, the word “would” is used in this PEA when discussing impacts. It is used in conjunction with identified impacts regardless of the probability of impact occurrence. There is never complete certainty that an expected impact would occur. In certain cases, a number of factors would have to be present for an impact to result.

Due to the breadth of the PEA, the environmental consequences for the resource areas are general in nature. Impact thresholds for each resource area were also developed to ensure a consistent and defensible evaluation of effects in the document. In order to render consistent impact analyses for the range of geographic regions where IMCOM installations are located, efforts were made to standardize impact analysis methodology and significance criteria to the extent possible. References to available data are included within the individual resource sections. The information is qualitative and, where possible, quantitative.

In order to determine whether there is the potential for impacts, especially significant impacts, criteria are presented for each of the analyzed resource area. The criteria are based on relevant and applicable Federal, State, and local statutes and regulations. In addition, relevant best management practices (BMPs) and appropriate Army guidance and directives are used to determine criteria to measure the potential degree of environmental impact.

To determine whether an impact is significant, there needs to be consideration of context and intensity of potential impacts. Context normally refers to the setting, whether local or regional, and intensity refers to the severity of the impact. Both short- and long-term effects are relevant. Factors considered for determining significance of impacts are presented for each resource area.

Significance criteria were used to evaluate the levels of potential impacts to each resource area. Any aspect of the proposed action that would exceed these criteria would be considered to be a potentially significant impact, and would require further evaluation or mitigation to reduce the impacts to an insignificant level. This includes any

aspect of the proposed action that would threaten to violate a Federal, State, or local law or requirements imposed for the protection of the environment.

The impacts categories and keys are listed below. Unless otherwise noted in the resource sections to follow, the impact categories “no effect,” “negligible minor effect,” “moderate effect,” and “beneficial” are considered insignificant impacts. The impact category “increased risk, potential significant effect” is considered significant.

Key: ◯ No effect anticipated
⊙ Negligible minor effect anticipated
⊘ Moderate effect anticipated
⊗ Increased risk, potential significant effect anticipated
+ Beneficial impact

Each resource area may have proposed mitigations and best management practices (BMPs). Mitigation is the reduction or elimination of an adverse impact through avoidance, minimization, rectification, and compensation. BMPs are proactive standard methods and standard course of business to effectively and practically address environmental impacts, to include compliance with existing environmental laws, regulations, policies, management plans and programs; good housekeeping; and preventive maintenance. The measures need to be technically feasible and meet the Purpose of and Need for the Proposed Action.

A summary table follows the section discussing impacts for each resource area. The table presents the impacts by resource area and by alternative. The comparison of impacts under each alternative is measured against the baseline described in the Affected Environmental section. In general, the no-action alternative may have no or negligible impacts. There may be both adverse and beneficial impacts within a single resource category. This is discussed in the text and reflected in the table.

4.2 Land Use

Significance Criteria

- Any aspect of the action that would cause conflicts with development, land plans, and policies;
- Substantially conflict with proposed and existing adjacent uses;
- Cause the conversion of a substantial amount of productive agricultural land;
- Interfere with emergency response plans or emergency evaluation plans; and/or
- Substantially impact soil types designated as prime or unique farmland.

Alternative A – Non-chemical Pest Control Techniques

Non-chemical pest management techniques would have temporary, minor impacts on general land use. There would be no change in existing land use or land use plans and policies. No interference to emergency response or evaluation plans would occur. There would be no conversion of productive agricultural land or impacts to soil types designated as prime or unique.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest management techniques and limited pesticide use would have temporary, minor impacts on general land use. There would be no change in existing land uses or land use plans and policies. No interference to emergency response or evaluation plans would occur. There would be no conversion of productive agricultural land or impacts to soil types designated as prime or unique.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Chemical pest control techniques would have temporary, minor impacts on general land use. There would be no change in existing land use or land use plans and policies. No interference to emergency response or evaluation plans would occur. There would be no conversion of productive agricultural land or impacts to soil types designated as prime or unique.

Alternative D – No Action

This alternative, no action, would not change the current level of impacts on general land use.

4.3 Air Quality

Significance Criteria

- Any impacts to air quality in attainment areas would be considered significant if pollutant emissions associated with the proposed action caused or contributed to a violation of any national, State, or local ambient air quality standard, exposed sensitive receptors to substantially increased pollutant concentrations, represented an increase of ten percent or more in affected Air Quality Control Region's (AQCR) emissions inventory, or exceeded any significance criteria established by the Session Initial Protocol.

- Impacts to air quality in non-attainment areas would be considered significant if the net change in proposed pollutant emissions caused or contributed to a violation of any national, State, or local ambient air quality standard; increased the frequency or severity of a violation of any ambient air quality standard; or delayed the attainment of any standard or other milestone contained in the SIP.

- With respect to the General Conformity Rule of the CAA, impacts to air quality would be considered significant if emissions increased a non-attainment or maintenance area's emissions inventory by ten percent or more for individual non-attainment pollutants; or exceeded de minimize threshold levels established in 40 CFR 93.153(b) for individual non-attainment pollutants or pollutants for which an area has been re-designated as a maintenance area.

Alternative A – Non-chemical Pest Control Techniques

Non-chemical pest control techniques would have a minor impact on air quality. Most non-chemical techniques produce little or no air pollution. There could be minor, temporary local air quality impacts such as dust or exhaust from motorized equipment (for example, from weed eaters and lawnmowers). The use of prescribed burns for pest management, as called for at specific sites, may cause localized, temporary increases in air pollution and would be coordinated with the appropriate State agency to ensure compliance with the SIP under the CAA. Prescribed burns may impact air quality for a significantly larger area and longer time period than pesticide application. The emphasis on non-chemical techniques would reduce the amount of chemicals currently released into the air.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Limited, site-specific impacts could occur caused by non-chemical management techniques such as mechanical removal or control burns. Burns would be coordinated with the appropriate State agency to ensure compliance with the SIP under the CAA. Chemical application would result in a limited amount of pesticide released into the air. All hand spraying would be performed in accordance with the manufacturer's label and EPA approved guidance to reduce the airborne drift. Pesticides would not be sprayed when wind speeds exceed the ideal speed per product label. The appropriate SIP would be consulted to ensure that there are no potential conflicts with Federal, State, and local regulations or policies.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Minor impacts to air quality could occur from the increased use of pesticides. Site-specific outdoor and indoor air quality impacts may occur during or shortly after the application of pesticides. The potential for dispersal of pesticides into the air under adverse weather conditions would exist. However, pesticides would not generally be sprayed when wind speeds exceed the limit stated on the product label. All hand spraying would be performed in accordance with the manufacturer's label and EPA approved guidance. The appropriate SIP would be consulted to ensure that there are no potential conflicts with Federal, State, local regulations or policies.

Alternative D – No Action

Continuing current pest management techniques would not change the existing level of impacts to air quality.

4.4 Noise

Significance Criteria

- Any aspect of the proposed action that would generate noise that would conflict with Federal, State, or local noise standards;
- Substantially increase ambient noise levels for adjoining noise-sensitive areas;
- Expose people to noise levels exceeding OSHA standards for permissible noise exposure;
- Create noise levels incompatible with an existing or proposed land use; and/or
- Generate noise levels greater than 75 decibels (dBA) measured using A-weighting (dBA) at the location of any sensitive receptor (AR 200-1).

Alternative A – Non-chemical Pest Control Techniques

Non-chemical pest control may cause minor, site-specific increases in noise levels when using powered equipment or bird control noise devises during outside management activities. Non-chemical pest control activities are not likely to generate noise that would conflict with Federal, State, or local noise standards or create noise levels incompatible with existing or proposed land use.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest control and limited pesticide use may cause minor, site-specific increases in noise levels when using powered equipment or bird control noise devices during outside management activities. Non-chemical pest control techniques and limited pesticide use are not likely to generate noise that would conflict with Federal, State, or local noise standards or create noise levels incompatible with existing or proposed land use.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Pesticide use would have a negligible effect on noise levels. Chemical pest control activities would not generate noise that would conflict with Federal, State, or local noise standards or create noise levels incompatible with adjoining noise sensitive areas or existing or proposed land use.

Alternative D – No Action

Continuing the current pest management practices would not change the noise levels at individual installations.

4.5 Geology and Soils

Significance Criteria

- Any aspect of the proposed action that would substantially degrade a unique soil type or geologic feature;
- Cause a decrease in soil permeability or substantially increase surface water runoff or wind- or water-induced soil erosion above historic levels;
- Degrade a soil type that is a component of a sensitive natural habitat;
- Cause an increase in landscape instability or landslides through topographical or slope alterations;
- Increase public exposure to danger from seismic activity; and/or
- Result in the irrevocable loss of established or potential mineral-bearing resources of economic value.

Geology

Alternative A – Non-chemical Pest Control Techniques

Non-chemical pest management techniques would have a negligible impact on geology. Existing geologic features or potential mineral-nearing resources in the area would not be affected. There would be no increase of landscape instability or exposure to danger from seismic activity.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest management techniques and limited pesticide use would have a negligible impact on geology. Existing geologic features or potential mineral-nearing resources in the area would not be affected. There would be no increase of landscape instability or exposure to danger from seismic activity.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Chemical pest control techniques would have a negligible impact on geology. Existing geologic features or potential mineral-bearing resources in the area would not be affected. There would be no increase of landscape instability or exposure to danger from seismic activity.

Alternative D – No Action

Continuing current pest management practices would not change the current level of impact on geology.

Soils

Alternative A – Non-chemical Pest Control Techniques

Non-chemical pest management techniques may have site-specific, positive impacts by reducing the amount of chemical pesticide applied. Localized, minor increases in soil erosion could occur from mechanical vegetation removal. However, erosion controls would be implemented in all circumstances that involve potential soil disturbance. Soils that are subjected to substantially increased surface water runoff, or wind or water-induced soil erosion because of weed removal would be reseeded with native seed stocks.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

At the site-specific level, minor increases in soil erosion may occur from mechanical vegetation removal. However, using appropriate pest management practices would minimize impacts. Soils that are subjected to substantially increased surface water runoff, or wind or water-induced soil erosion because of weed removal would be reseeded with native seed stocks. Pesticide use could potentially contaminate local soils. These risks would be lowered by using and applying the pesticide as specified by the manufacturer, properly disposing of it, and making an appropriate choice of pesticides with short residual times.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Site-specific increases in pesticide use would increase the risk of contaminating local soils. These risks would be lowered by applying pesticides as specified by the manufacturer, properly disposing of them, and choosing pesticides with short residual times.

Alternative D – No Action

Continuing current pest management techniques would not change the existing level of soil erosion from mechanical techniques and contamination of local soils from pesticides.

4.6 Water Resources

Significance Criteria

- Any aspect of the proposed action that would degrade surface water or groundwater quality below State or Federal criteria;

- cause erosion and siltation by disturbing existing channel banks, channel beds, or levees;

- interfere, beyond historic level, with groundwater recharge or potentially deplete groundwater resources used for other beneficial purposes; and/or

- substantially increase the risk of flooding to sensitive lands.

- create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide additional sources of polluted runoff

Surface Waters

Alternative A - Non-chemical Pest Control Techniques

Minor, site-specific impacts such as increased sediment runoff may occur if pest management techniques are not properly implemented.

Alternative B - Non-chemical Pest Control Techniques and Limited Pesticide Use

Minor, site-specific impacts such as increased sediment runoff may occur if non-chemical pest management techniques are not properly implemented. The limited use of pesticides would create a risk for contaminating local surface waters. Using and applying pesticides as specified by the manufacturer's label's and choosing pesticides with short residual effects would reduce these risks. A buffer zone (no spray buffer strip) would be established around water areas to protect surface waters for pesticides without an aquatic label and comply with applicable state regulations. Techniques, such as spot application, using short residual pesticides, and avoiding sensitive areas would be employed to reduce pesticide runoff and leachate. Pesticides would be applied only under optimal weather conditions and not just before or after heavy rainfall. Pesticide mixing upstream of water bodies (including drains leading to surface water bodies and groundwater aquifers) would be avoided and facilities would have pesticide spill prevention and control plans, if appropriate. Additionally, equipment will not be washed near wellheads, ditches, streams, or other water sources.

Alternative C - Chemical Pest Control Techniques - Primarily Pesticides

Pesticide use would increase the possibility of contaminating local surface waters. A buffer zone would be established around water areas to protect surface waters. Pesticide application would not occur in these areas unless in accordance with manufacturer's labels and EPA guidance and approved by the agencies with legal jurisdiction. Techniques, such as spot application, using low residual pesticides, and avoiding sensitive areas would be employed to reduce pesticide runoff and leachate. Pesticides would be applied only under optimal weather conditions and not just before

or after heavy rainfall. Pesticide mixing upstream of water bodies (including drains leading to surface water bodies and groundwater aquifers) would be avoided and facilities would have pesticide spill prevention and control plans, if appropriate.

Alternative D – No Action

Continuing current pest management techniques would not change the existing level of risk of contamination to local surface waters.

Groundwater/Hydrology

Alternative A - Non-chemical Pest Control Techniques

Impacts to groundwater resources from the use of non-chemical pest control techniques would be negligible. Groundwater resources would not be degraded or depleted.

Alternative B - Non-chemical Pest Control Techniques and Limited Pesticide Use

When using pesticides, there would be a potential for contamination of local groundwater, degrading it below State or Federal criteria. This would result in a slight increase in overall risk to the environment and ecological diversity as well as having a potential for imposed fines. These risks would be mitigated by appropriate use and application of pesticides as specified by the manufacturer, proper disposal, and appropriate choice of pesticides with short residual times.

Alternative C - Chemical Pest Control Techniques - Primarily Pesticides

Use of pesticides increases the risk of contamination of local groundwater, degrading it below State or Federal criteria. This would result in an overall risk to the environment and ecological diversity as well as having a potential for imposed fines. These risks would be lowered by appropriate use and application as specified by the manufacturer, proper disposal, and appropriate choice of pesticides with short residual times.

Alternative D – No Action

Maintaining current pest management techniques would not change the current level of risk that pesticides may contaminate local groundwater.

Floodplains

Alternative A - Non-chemical Pest Control Techniques

Minor impacts to floodplains, such as increased erosion, could occur when applying non-chemical pest control techniques. Buffer zones around floodplains would be implemented and no activities, such as the mechanical removal of pests, would occur in floodplains unless specifically approved by the agency with legal jurisdiction.

Alternative B - Non-chemical Pest Control Techniques and Limited Pesticide Use

Minor impacts to floodplains, such as erosion and soil and water contamination, could occur when improperly applying chemical and non-chemical pest control techniques. To minimize potential impacts, buffer zones around floodplains would be implemented and no activities, such as the mechanical removal of pests or the application of aquatic herbicides, would occur in floodplains unless specifically approved by the agency with legal jurisdiction. No pesticides would be applied in floodplain areas except when in accordance with manufacturer's label and EPA guidance.

Alternative C - Chemical Pest Control Techniques - Primarily Pesticides

Pesticide use could increase the potential for contaminating floodplains, if they are improperly applied. To reduce this potential, buffer zones would be established around floodplains, and no operations would occur in floodplains unless specifically approved by the agency with legal jurisdiction.

Alternative D – No Action

Continuing current pest management techniques would not change the existing level of impacts on floodplains.

4.7 Biological Resources

Significance Criteria

- Any aspect of the proposed action that would substantially conflict with special natural communities by reducing a wildlife population below self-sustaining levels;
- Cause direct or indirect impacts on individuals or populations of plant/wildlife species listed or proposed for listing as threatened or endangered under Federal or State endangered species legislation;
- Conflict with special-status species;
- Cause a reduction in the biodiversity of an area and/or;
- Result in the introduction of noxious invasive weeds or exotic species to the area.

Alternative A – Non-chemical Pest Control Techniques

There may be minor, site-specific impacts to the existing flora and fauna associated with non-chemical pest control. Buffer zones established around sensitive areas, including

sensitive species habitat, pristine habitat, rivers and streams, and wetlands, would provide adequate protection. There could be minor, site-specific impacts to non-target species by certain methods; however, non-chemical controls would not be expected to reduce wildlife populations, other than target species, below self-sustaining levels.

The introduction of exotic species for pest control purposes is a non-chemical means of pest control that could have an impact on local flora and fauna. To minimize potential impacts, such actions would be coordinated with the U.S. Department of Agriculture and USFWS. Protected migratory birds would not be controlled without coordinating with USFWS to include obtaining any required permits.

Additionally, non-chemical control methods would not introduce noxious invasive weeds to an area. Only native seed mixes would be used to limit the introduction of noxious invasive weeds or exotic species.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical management techniques and limited pesticide use may allow for target species to develop a resistance to specific pesticides. Site-specific impacts would vary based on, among other things, the specificity of the pesticide and its persistence in the environment. Buffer zones established around sensitive areas, including sensitive species habitat, pristine habitat, rivers and streams, and wetlands, would adequately protect these areas.

Non-chemical controls and limited pesticide use would not be expected to reduce wildlife populations other than the target species below self-sustaining levels. The introduction of exotic species for pest control purposes is a non-chemical means of pest control that could potentially have a local impact on flora and fauna. To minimize potential impacts, such actions would be coordinated with the U.S. Department of Agriculture and USFWS. Only biological materials approved by the U.S. Department of Agriculture or appropriate regulatory agency would be used. Except for EPA approved biological pesticides such as *Bacillus thuringiensis* (Bt), use of any other biological control agents (such as predators and parasites) by Army facilities would be coordinated with the appropriate Federal and State officials. Protected migratory birds would not be controlled without coordinating with the appropriate Federal and State officials.

Additionally, these methods would not result in the introduction of noxious weeds to an area. Only native seed mixes would be used to limit the introduction of noxious weeds or exotic species.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Pesticide use may lead to the target species developing resistance to the specific pesticides used. Additionally, there may be site-specific impacts to non-target species caused by the pesticide applied. These non-target species may include predators that

normally help keep target pest populations under control. Predators may accumulate pesticides in their systems and pass them on to other predators higher up the food chain, resulting in bioaccumulation. The site-specific impacts would vary based on, among other things, the specificity of the pesticide and its persistence in the environment. Populations of non-target species may be reduced to below self-sustaining levels. Buffer zones would be established around sensitive areas, including sensitive species habitat, rivers and streams, and wetlands. Protected migratory birds would not be controlled without consultation with the appropriate Federal or State agency and obtaining a permit if necessary. Pest control methods using pesticides would not introduce noxious weeds or exotic species.

Alternative D – No Action

Continuing current unplanned pest management techniques would result in no change to the existing level of risk to biological resources.

Endangered and Threatened Species

Alternative A – Non-chemical Pest Control Techniques

Minor, direct and/or indirect impacts to threatened and endangered species could occur from the use of primarily non-chemical pest management techniques. At the site-specific level, care must be taken to avoid harming protected species, as required by the ESA. No pest management operations would be conducted that have the potential to negatively impact endangered or protected species or their habitats without prior coordination with the USFWS. Additionally, site-specific impacts would not conflict with special status species. Non-chemical control methods would not be expected to reduce population viability or lead to Federal listing of sensitive species.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Minor, direct and/or indirect impacts to threatened or endangered individuals could occur at the site-specific level. To reduce this potential, no pest management operations would be conducted that have the potential to negatively impact endangered or protected species or their habitats without prior coordination with the USFWS. No pesticides would be applied within 100 feet of known threatened or endangered species unless use in such a site is specifically approved by specific language on an EPA approved pesticide label. Additionally, site-specific impacts would not conflict with special status species. Non-chemical control methods would not be expected to reduce population viability or lead to Federal listing of sensitive species.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Pesticide use could cause direct and indirect impacts to threatened or endangered individuals. Historically, pesticide use has been attributed to a population decrease in a number of species of birds, including the bald eagle. Careful choice and application of

pesticides with short residual times and that do not bioaccumulate would reduce the overall risk to any particular species. No pest management operations would be conducted that are likely to have a negative impact on endangered or protected species or their habitats without prior coordination with the USFWS. No pesticides would be applied within 100 feet of known threatened or endangered species unless use in such a site is specifically approved by specific language on an EPA approved pesticide label.

Alternative D – No Action

Continuing current pest management techniques would not change the existing level of risk that threatened or endangered species may become harmed, either directly or indirectly, through the use of pesticides.

Wetlands

Alternative A – Non-chemical Pest Control Techniques

Non-chemical pest management techniques could have minor, site-specific impacts on wetlands, such as compacting wetland soils or altering wetland hydrology. To minimize these impacts buffer zones around wetlands would be implemented and no activities would occur in wetlands unless specifically approved by the agency with legal jurisdiction. The non-use of pesticides would eliminate the possibility of impacts to wetlands from improper pesticide application. The control of invasive wetland plant species would allow native vegetation to reclaim former habitat and therefore result in an increase in use of the wetlands by animals as the diverse and complex habitats are restored. Water quality should remain good or improve in the long-term with the restoration of native vegetation and protection of soils. Without the limited use of synthetic herbicides, infestations of some exotic plants would increase in wetlands, and riparian communities, negatively impacting these sensitive resources.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest management techniques and limited use of pesticides could have minor, site-specific impacts on wetlands. Buffer zones around wetlands would be implemented and no activities would occur in wetlands or unless specifically approved by the agency with legal jurisdiction. No pesticides would be applied in wetland areas except when in accordance with manufacturer's label and EPA guidance. The control of invasive wetland plant species would allow native vegetation to reclaim former habitat and therefore result in an increase in use of the wetlands by animals as the diverse and complex habitats are restored. Water quality should remain good or improve in the long-term with the restoration of native vegetation and protection of soils. The use of non-chemical pest control techniques combined with limited pesticide use would likely decrease the use of chemicals in the long term.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Pesticide use would increase the likelihood of contaminating wetlands if they are improperly applied within or in close proximity to wetlands. To reduce this potential, buffer zones would be established around wetlands and no operations would occur in wetlands unless specifically approved by the agency with legal jurisdiction. The control of invasive wetland plant species would allow native vegetation to reclaim former habitat and therefore, result in an increase in use of the wetlands by animals as the diverse and complex habitats are restored. The flora could suffer non-target organism casualties should any of the herbicide come in contact with them. Contact application would minimize this damage, but could take more time of the staff or contractor.

Alternative D – No Action

Continuing the current level of pest management techniques would not change the existing level of impacts on wetlands.

4.8 Cultural Resources

Significance Criteria

For cultural resources, the threshold for significant impacts includes any disturbance that cannot be mitigated and affects the integrity of a historic property (an eligible cultural resource). The threshold also applies to any cultural resource that has not yet been evaluated for its eligibility to the NRHP or disturbs a resource that has importance to a traditional group under American Indian Religious Freedom Act (AIRFA), EO 13007, and NAGPRA.

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may be the result of physically altering, damaging, or destroying all or part of a resource, altering characteristics of the surrounding environment by introducing visual or audible elements that are out of character for the period the resource represents, or neglecting the resource to the extent that it deteriorates or is destroyed. Indirect impacts are those that may occur as a result of the completed project, such as increased vehicular or pedestrian traffic in the vicinity of the resource. Specific significant criteria include:

- Any aspect of the proposed action that would result in a loss of Federal protection for, or adversely affect, properties that are considered to be eligible for or are listed in the NHRP. This includes neglecting the resource to the extent that it deteriorates or is destroyed;

- Introduce visual, audible, or atmospheric elements that are out of character with a protected property or alters its setting;

- Reduce the vividness, intactness, or unity of high-quality or distinctive views; and/or

- Reduce the quality of scenic corridors or views from important roadways for tourist and recreational travel as defined in the Bureau of Land Management visual resources guidance.

- Reduce access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and/or

- Adversely affect the physical integrity of sacred sites.

Alternative A – Non-chemical Pest Control Techniques

Non-chemical pest management techniques could leave historic properties or sacred sites structures vulnerable to structure damaging pests such as rats, burrowing animals, termites, carpenter ants, and carpenter bees. Some techniques to modify a structure, such as placing material designed to discourage nesting (for example spike strips and netting), may adversely impact historic structures and would need to be coordinated with the appropriate cultural resource officers. Allowing invasive species to overtake an area could adversely affect native species or the physical integrity of areas used by Native American religious practitioners.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest management techniques with limited use of pesticides would have a negligible impact to historic/cultural resources. This alternative would not cause damage, or losses in federal protection to properties listed in the NHRP; introduce visual, audible, or atmospheric element out of place with a protected property; reduce the vividness, intactness, or unity of high-quality or distinctive views; or reduce the quality of scenic corridors or views; reduce access to and ceremonial use of Native American sacred sites; or adversely affect the physical integrity of sacred sites.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Pesticide use could impact historical structures if intrusive treatment of wall spaces is not properly coordinated with the appropriate cultural resources officers. Overuse of pesticides could adversely affect native species or the physical integrity of areas used by Native American religious practitioners.

Alternative D

Continuing current pest management techniques would not change the existing level of impact on historic/cultural resources.

4.9 Socioeconomics

Significance Criteria

- Any aspect of the proposed action that would induce substantial growth or concentration of historic baseline populations by 10 percent or more, causing changes in population, employment, income, housing, or tax base;

- Create a need for major expansion or substantial alteration of the existing school systems; and/or

- Create a need for substantial additions to law enforcement, fire protection, and medical emergency services, staff, or equipment to maintain acceptable service rates.

Alternative A – Non-chemical Pest Control Techniques

Pest management is a continuing expense for installations. Relying solely on non-chemical pest management techniques would eliminate the expenditure of funds for pesticides. However, non-chemical control techniques require time, labor, and equipment to implement. Depending on the site-specific techniques chosen, the total cost of the pest management program may increase or decrease based on the additional labor, time, and equipment required for pest management. A change in pest management techniques would not have a substantial (more than +/- 10 percent) effect on population, employment, income, housing, or tax base in the surrounding area. It would not change the local levels of demand for schools, law enforcement, fire protection, or medical services.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest management techniques and limited pesticide use would likely be more cost effective than Alternative D and Alternative A. A change in pest management techniques would have a negligible effect on population, employment, income, housing, or tax base in the surrounding area. It would not change the local levels of demand for schools, law enforcement, fire protection, or medical services.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

An increased reliance on pesticides would increase the amount of funds the Army spends on pesticides and pesticide application contracts. Depending on the site-specific techniques chosen, the total cost of the pest management program may be increased or decreased based on changes in the amount of chemicals, labor, time, and equipment required for pest management. The exclusive use of pesticides has generally been show to be less cost-effective than the more integrated approach outlined in Alternative B. In addition, total reliance on pesticides may have a long-term negative impact on immediate vicinity of an installation grounds due to possible pesticide run-off and contamination. A change in pest management techniques would have a negligible effect on population, employment, income, housing, or tax base in the surrounding area. Demand for schools, law enforcement, fire protection, or medical services, would not change.

Alternative D – No Action

Continuing current pest management practices would not change the amount of money spent on pest management or how that money is allocated.

4.10 Environmental Justice

Significance Criteria.

- This includes any aspect of the proposed action that would cause a disproportionate and adverse impact on minority or low-income populations or children.

Alternative A – Non-chemical Pest Control Techniques

Non-chemical pest management techniques would have a negligible impact on environmental justice issues and would not cause a disproportionate and adverse impact on minority or low-income populations or children.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest management techniques and limited pesticide use would have a negligible impact on environmental justice issues and would not cause a disproportionate and adverse impact on minority or low-income populations or children.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

A total reliance on pesticides could potentially pose an increased health risk for children and the elderly. Pesticides would be applied judiciously and all appropriate control methods and safeguards would be implemented.

Alternative D – No Action

Continuing current pest management techniques would not change the existing level of impact on environmental justice issues.

4.11 Infrastructure

Significance Criteria:

- Any aspect of the proposed action that would cause a demand for housing that cannot be accommodated by historic activities;

- Require additional capacity or resources to provide services or utilities for current users and/or the proposed project;

- Reduce utility resources or capacity, of current users, to less than the accepted standard;

- Generate a substantial amount of new traffic that would require expansion of existing roadways or construction of facilities;

- Result in an intersection or highway segment currently operating at an acceptable level to deteriorate to unacceptable levels; and/or

- Cause a substantial increase in traffic at an intersection or highway segment that is already over capacity.

Alternative A – Non-chemical Pest Control Techniques

Non-chemical pest management techniques would have a negligible impact on infrastructure issues. Increases in traffic and/or demand for housing and utilities would not occur.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest management techniques and limited pesticide use would have a negligible impact on infrastructure issues. Increases in traffic and/or demand for housing and utilities would not occur.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Pesticide use would have a negligible impact on infrastructure issues. Increases in traffic and/or demand for housing and utilities would not occur.

Alternative D – No Action

Continuing current pest management techniques not maintain the existing level of impact on infrastructure issues.

4.12 Hazardous and Toxic Materials and Wastes

Significance Criteria

- Any aspect of the proposed action that would create a potential public health hazard;

- Increase the use of hazardous materials above historic levels;

- Involve the use, production, or disposal of materials or contaminated soils that pose a hazard to people or animal or plant populations in the area affected;

- Increase, above historic levels, the generation of hazardous substances that require disposal at local or regional facilities;

- Not evaluate and incorporate potential pollution prevention practices to the maximum extent practical;

- Not use the various pesticides in accordance with the approved label instructions; and/or

- Not handle and dispose of residues in accordance with all RCRA regulations and guidelines.

Alternative A – Non-chemical Pest Management Techniques

Non-chemical pest management techniques would have a minor positive impact by reducing the amount of hazardous materials purchased, stored, and used at installations.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest management techniques and limited pesticide usage would have site-specific impacts. The amount of hazardous materials purchased, stored, and used at installations may increase or decrease depending on the pest population and the site-specific pest control techniques chosen.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Pesticide use would have a negative impact on the amount of hazardous materials purchased, stored, and used at installations. Pesticide use would not create a potential public health hazard, provided that they are used in accordance with their label directions and best management practices are implemented.

Alternative D – No Action

Maintaining the same level of reliance on pesticides would not change the amount of hazardous materials purchased, stored, and used at installations.

Pesticides and Residues

Alternative A: Non-chemical Pest Management Techniques

Non-chemical pest management techniques would create a positive impact by eliminating pesticides used and stored at installations and the probability of pesticide residue accumulating in the environment.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Site-specific impacts could occur. The amount of pesticides purchased, stored, and used may increase or decrease depending on the site-specific pest control techniques chosen. Appendix A provides examples of specific integrated pest management techniques. Where pesticide use is justified, Army installations will apply the least toxic and least persistent pesticides in controlling pests. Techniques to minimize the amount of pesticides applied would be used whenever possible. Precautions would be taken to purchase only as much pesticide as would be needed for a season and minimize the amount of pesticide mixed and applied. This alternative also would support the DoD Pest Management MoM #2.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Reliance on pesticides would have a negative impact by increasing the overall amount of pesticides used at installations by increasing the potential for spills and contamination to natural resources. Best management practices for all pesticides would help limit this potential negative impact. Where pesticide use is justified, Army installations will apply the least toxic and least persistent pesticides in controlling pests. Techniques to minimize the amount of pesticides applied would be practiced whenever possible. Precautions would be taken to purchase only as much pesticide as needed for a season and minimize the amount of pesticide mixed and applied. This alternative would negatively impact in achieving DoD pesticide reduction goal (MoM #2).

Alternative D – No Action

Continuing the current pest management practices would not change overall pesticide usage at installations and would not increase the current level of probability that pesticide residue would accumulate in the environment.

Solid Waste

Alternative A – Non-chemical Pest Management Techniques

Non-chemical pest management techniques would have a negligible impact on the generation of non-hazardous, solid waste. Minor increases in pest-related wastes may occur at specific sites.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest management techniques with limited use of pesticides would have a negligible impact on the generation of non-hazardous solid waste.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Relying on pesticides would have a negligible impact on the generation of non-hazardous solid waste. Minor increases or decreases in waste may occur at specific sites.

Alternative D – No Action

Continuing current pest management practices would not change the amount of non-hazardous solid waste generated at installations.

Hazardous Waste

Alternative A – Non-chemical Pest Management Techniques

Non-chemical pest management techniques would have minor, positive impacts by decreasing the generation of hazardous waste such as excess pesticides and empty containers.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

The use of non-chemical pest management techniques would have site-specific impacts by decreasing the generation of hazardous waste such as excess pesticides and empty containers. Limiting the amount of pesticide purchased and mixed for a specific application would reduce the amount of residual waste generated. Residuals, such as wastewater and empty pesticide containers, would be properly managed to ensure that the environment is not affected. Pesticide containers would be triple-rinsed in accordance with Federal regulations and properly disposed of in a sanitary landfill or returned to the supplier for reuse. Pesticide rinse waters would be properly managed and would be used, when possible, in future pesticide mixing applications or applied to a registered site as an alternative to disposal.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Relying exclusively on pesticides may have a negative impact by increasing the generation of hazardous waste, such as excess pesticides and empty containers at installations. Limiting the amount of pesticide purchased and mixed for a specific application would reduce the amount of residual waste generated. Residuals, such as wastewater and empty pesticide containers, would be properly managed to ensure that the environment is not affected. Pesticide containers would be triple-rinsed in accordance with Federal regulations and properly disposed of in a sanitary landfill or returned to the supplier for reuse. Pesticide rinse waters would be properly managed and would be used, when possible, in future pesticide mixing applications or applied to a registered site as an alternative to disposal.

Alternative D – No Action

Continuing current pest management techniques would not change the amount of hazardous waste generated at individual installations.

Pollution Prevention

Alternative A – Non-chemical Pest Management Techniques

Non-chemical pest management techniques would have a positive impact on the Army's pollution prevention initiatives by eliminating the use of pesticides and waste generated during application. In addition, this alternative would help the Army meet MoM #2, allowing a reduction in the amount of pesticides used.

Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use

Non-chemical pest management with a limited use of pesticides follows pollution prevention principles and would have a positive impact on the Army's pollution prevention initiatives. In addition, this alternative would help the Army meet MoM #2.

Alternative C – Chemical Pest Control Techniques – Primarily Pesticides

Relying only on pesticides would not support the DoD policy for pollution prevention or the Army pollution prevention initiatives. This alternative would encourage the use of pesticides and does not decrease the amount of waste produced, contrary to pollution prevention principles.

Alternative D – No Action

Continuing current pest management techniques would not assist the Army pollution prevention initiatives. This alternative does not evaluate the prevention or incorporate pollution prevention principles to the maximum extent possible. There would be no reduction in the amount of pesticides used and no reduction in the amount of hazardous waste generated.

4.13 Cumulative Impacts

Cumulative impacts, as defined by CEQ in 40 CFR 1508.7 are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Cumulatively past, present and future pest management activities may impact the environment in one way or another. Long-term and cumulative impacts are more difficult to comprehend and quantify than short-term impacts. For example, pesticides

used in agriculture, in landscaping operations , on golf courses, and in residential areas can reach other destinations than intended target sites. Depending on the specific site, some Army installations are located adjacent to areas that may impacted from cumulative impacts of pesticide run off, drift, leaching and sediments from adjacent activities into installations boundaries. But these impacts are viewed to be remote and would be identified in the review of the IPMP. Other sources of cumulative impacts, such as aerial application of herbicide for mosquito abatement and invasive weed control are conducted in such a way that it avoids negative impacts and, therefore, does not contribute to cumulative effects. Also, all aerial application of insecticides and herbicides are subject to strict control and regulatory oversight and is only conducted after all relevant authorizations and approvals are granted. Before each aerial application may be initiated, specific climatic conditions must prevail (for example, wind speed, wind direction, temperature). Furthermore, the regular update, review and approval of the installation IPMP makes the likelihood of significant cumulative impacts from all sources remote because actions that have the potential for resulting in impacts would be identified and either avoided or mitigated. The key objective of selecting Alternative B is to encourage the full implementation of IPM practices and reduce reliance on chemical pesticides. In the long-term, cumulative impacts of Alternative B are less disruptive on ecosystem and beneficial organism than the other alternatives

Alternative A- Non-chemical Pest Management Techniques

Based on the analyses presented in this chapter there would be no significant cumulative effects as defined by CEQ on air resources, water resources, physical resources, human health, or socioeconomics from an emphasis on non-chemical pest management techniques. For example, while non-chemical pest management techniques may have temporary local impacts on air quality, these minor impacts would be naturally absorbed, and there would be no cumulative impacts regionally or nationwide on air quality. Ground disturbance, burning, introduction of biological materials, and pest control near sensitive areas and species would incorporate the use of buffers and be coordinated with the appropriate Federal, State, and local agencies to avoid significant impacts. However, manual or cultural controls may not always be effective, and biological controls are not available for many pest species. Relying on non-chemical methods of pest control may allow pest species, especially exotic plants and animals, to potentially dominate an ecosystem and expand to nearby suitable habitats, thus adversely affecting the biodiversity of the environment. Failing to control pests on Army properties would potentially violate noxious weed laws and would not follow DoD and Army policy. This may result in an overall cumulative negative impact on ecosystems. In addition, there are no practical and viable non-chemical methods to deal with many nuisance pests and medically significance pests.

Alternative B - Non-chemical Pest Control Techniques with Limited Pesticide Use

Based on the analyses presented in this chapter there would be no significant cumulative effects on air resources, water resources, physical resources, human health,

or socioeconomics from an emphasis on non-chemical pest management techniques with limited pesticide use. The discussion of the non-chemical approach applies equally to as stated in Alternative A. The combination of non-chemical and limited pesticide use would, however, provide a much more effective pest control approach. The limited, careful application of least toxic pesticides would not likely leave significant residues or bioaccumulate, and therefore would have a negligible cumulative effect on past, present, and future pesticide application on air or water quality, soils, or sensitive species other than the target pest.

Alternative C - Chemical Pest Control Techniques - Primarily Pesticides

An emphasis on pesticide use would have the potential for creating a negative cumulative impact on future pest management, sensitive species, water quality, soils, and human health. The continued use of pesticides for pest control may cause certain pest species to become resistant to the control treatments. Also, predators of target species may ingest the pesticides, which may accumulate in the living tissue of the predator and become further concentrated in animals that prey upon them. This concentration of chemicals in living tissues can impact the population of non-target predator species, for instance, by reducing reproductive success. Additionally, the concentration of pesticides in non-target species consumed by humans, especially fish and shellfish, may raise human health concerns. Implementing a pest management program based solely on pesticide use would have the highest potential to cumulatively impact biological resources. The probability of soil and water contamination also increases. The potential cumulative impacts of a program that relies heavily on pesticides would vary with the properties of the individual pesticides used.

Alternative D - No Action

The continuation of the current unplanned pest management techniques would be less likely than Alternative C's emphasis on chemical pest management techniques to have cumulative impacts on future pest management, sensitive species, water quality, soils, and human health. However, the current unplanned approach taken by the Army is not an integrated method and would be anticipated to use more pesticides than Alternatives A and B.

4.14 Mitigation Measures

The following mitigation measures and procedures are primarily of a preventive or avoidance nature for all four alternatives considered:

- No practices or procedures that threaten to violate a Federal, State, or local law or requirements imposed for the protection of the environment would be performed.

- Sensitive areas as defined by the Army or as listed on pesticide labels would be considered before pest control operations are conducted. No pesticides would

be applied directly to wetlands, water areas (for example, lakes or rivers), or within 100 feet of known threatened or endangered species unless use in such sites is specifically approved by the agency with jurisdiction by law or by specific language on an EPA approved pesticide label. Special precautions would also be taken if pesticides were applied in dining facilities, buildings used for childcare centers, pre-schools or medical treatment facilities.

- Generally, buffer zones would be established around sensitive areas to include sensitive species, rivers and streams, and wetlands. Buffer zones would ensure that native wildlife populations are not directly or indirectly impacted. Only native seed mixes would be used to limit the introduction of noxious weeds or exotic species to an area.

- Prescribed burns would be coordinated with the appropriate State agency to ensure compliance with SIPs under the CAA.

- All hand spraying would be performed in accordance with the manufacture's label and EPA approved guidance. The various SIPs would be consulted to ensure that there are no potential conflicts with Federal, State, and local regulations or policies. An ASSON is required by AR 200-1 before any application of aerial chemicals to Army installations can be conducted.

- Soils that are subjected to substantially increased surface water runoff or wind- or water-induced soil erosion because of weed removal would be reseeded with native seed stocks.

- Buffer zones of 100 feet, or more when warranted, would be used around pristine habitat and other sensitive areas. No pest management operations would be conducted that are likely to have a negative impact on endangered or protected species or their habitats without prior consultation/coordination with the USFWS. Protected migratory birds, which may pose a threat or nuisance concern periodically to installations, would not be controlled without prior appropriate consultation/coordination/permitting.

- The Army would periodically evaluate ongoing pest control operations and evaluate all new pest control operations to ensure effectiveness and compliance with applicable laws. Army pest control strategies are addressed in Appendix A – IPM Outlines.

Note there may be other consultation and coordination requirements, such as cultural resources consultations with the SHPO/ACHP, Native American Government-to-Government, coastal zone consistency determination, US EPA, etc.

CEQ recommends (40 CFR 1508.20) this type of mitigation over restoration or replacement mitigation. In certain situations, it may not be possible to implement the recommended mitigation. In these cases, this determination would be made only after a

thorough, site-specific analysis and determined that the proposed treatment or land management practice would not have a significant impact on any resource.

5.0 COMPARISON OF ALTERNATIVES AND CONCLUSIONS

5.1 Comparisons of Alternatives

Four pest management alternatives were examined as part of this analysis including programs with the following emphases: non-chemical pest management techniques; non-chemical pest control techniques with limited pesticide use; chemical pest control techniques, primarily pesticide use; and “No Action”, as required by CEQ. It was determined that the more integrated approach of emphasizing non-chemical techniques with limited pesticide use was the preferred alternative.

Alternative A, using only non-chemical pest management control techniques would be in compliance with all applicable laws and regulations. However, it would not be as effective at controlling and reducing target species populations to acceptable levels as Alternative B, the application of non-chemical pest management control techniques with limited pesticide use. Alternative C (the alternative of emphasizing pesticide use for control of pests) is a less desirable alternative because induced resistance has rendered many pesticides ineffective and the release of pesticides into the environment is becoming less acceptable because of concerns for human health and environmental risks. Alternative C is the least desirable alternative of the three alternatives (A, B, C). While compliant with all applicable laws and regulations, the No Action alternative does not meet current DoD policy guidance and does not represent a cost-effective, systematic approach to pest management.

The preferred alternative with an emphasis on non-chemical techniques along with limited pesticide use has all of the advantages of the non-chemical techniques alternative with the added benefit of the practical, effective, and safe use of least toxic pesticides. Certain pests have not historically been controlled without the use of pesticides. It is, however, reasonable to expect that, with the limitations described in this alternative this IPM approach can be performed in an ecologically sound manner with very minimal negative impacts to both human health and the environment. The direct and indirect impacts to threatened endangered, and sensitive plant and animal species from this approach can be mitigated through the appropriate use of buffer zones and the proper timing of applications. Pest management activities having a potential to impact special interest species would only be done with the full approval and coordination of the USFWS and various responsible State agencies and may require additional NEPA documentation.

The following is a brief table summarizing the potential environmental impacts of the Proposed Action and Alternatives, based on the analysis presented in Chapter 5.0.

Table 5-1. Potential Environmental Impacts of the Proposed Action and Alternatives				
Resource/ Topic Area	**Alternative A** **Non-chemical Pest Control Techniques**	**Alternative B** **Non-chemical Pest Control Techniques and Limited Pesticide Use**	**Alternative C** **Chemical Pest Control Techniques - Primarily Pesticides**	**Alternative D** **No Action**
Land Use	Impacts would be negligible.	Impacts would be negligible.	Impacts would be negligible.	Current level of impacts would not change.
Air Quality	Minor, short-term impacts from dust, exhaust, and/or smoke caused by power equipment and prescribed burning.	Minor, site-specific impacts caused by power equipment, prescribed burning, and pesticide applications. Limited amount of pesticide would be released into the air.	Minor impacts caused by pesticide spray applications. Potential for dispersal of pesticides under adverse weather conditions.	Current level of impacts would not change.
Noise	Minor, local increases in noise levels during outside weed management activities. Minor disturbance to wildlife.	Minor, local increases in noise levels during outside weed management activities. Minor disturbance to wildlife.	An increased reliance on chemical pest control should have no overall effects on noise levels.	Current level of impacts would not change.
Geology and Soils	Amount of pesticide applied to soils would be eliminated. Minor, site-specific increases in soil erosion caused by mechanical weed removal may occur.	Minor, site-specific increases in soil erosion caused by mechanical weed removal may occur. Possible risk of soil contamination from pesticide applications.	Increased risk of soil contamination from pesticide applications.	Current level of impacts would not change.

Table 5-1. Potential Environmental Impacts of the Proposed Action and Alternatives				
Resource/ Topic Area	**Alternative A** **Non-chemical Pest Control Techniques**	**Alternative B** **Non-chemical Pest Control Techniques and Limited Pesticide Use**	**Alternative C** **Chemical Pest Control Techniques - Primarily Pesticides**	**Alternative D** **No Action**
Water Resources	Surface water and floodplains may be exposed to minor, site-specific impacts such as increased sedimentation.	Surface water and floodplains may be exposed to minor, site-specific impacts such as increased sedimentation. Risk of contamination to surface water, groundwater, and floodplains from pesticide applications.	Increased risk of contamination to surface water and groundwater, and floodplains.	Current level of impacts would not change.
Biological Resources	Minor impacts to non-target species, endangered and threatened species, and wetlands could occur at the site-specific level. Invasive species populations may increase.	Non-target species, endangered and threatened species, and wetlands could occur at the site-specific level. Target species may develop resistance to pesticide.	Target species may develop resistance to pesticide. At the site-specific level, non-target species, endangered and threatened species, and wetlands may be negatively affected.	Current level of impacts would not change.
Cultural Resources	Increased risk of structural damage from pests, such as termites. Possible site-specific impacts resulting from the need to modify a structure.	Impacts would be negligible. Possible site-specific impacts resulting from the need to modify a structure.	Possible impacts to structures if intrusive treatment of wall spaces is not properly coordinated with the appropriate cultural resources.	Current level of impacts would not change.

Table 5-1. Potential Environmental Impacts of the Proposed Action and Alternatives				
Resource/ Topic Area	**Alternative A** **Non-chemical Pest Control Techniques**	**Alternative B** **Non-chemical Pest Control Techniques and Limited Pesticide Use**	**Alternative C** **Chemical Pest Control Techniques - Primarily Pesticides**	**Alternative D** **No Action**
Socio-economic	Pest management control costs may increase or decrease, depending on time, labor, and equipment needed.	Pest management control costs may increase or decrease, depending on time, labor, and equipment needed. Overall, more cost-effective than Alternatives A and C.	Pest management control costs may increase or decrease, depending on time, labor, and equipment needed.	Current level of impacts would not change.
Environ-mental Justice and Protection of Children	Impacts would be negligible.	Impacts would be negligible. Limited use of least toxic products would have a negligible impact.	Significant potential adverse impact on infants and young children.	Current level of impacts would not change.
Infra-structure	Impacts to structures, due to wood destroying organisms, could be significant. Impacts to golf courses and other recreational areas could be significant as many non-chemical control methods do not adequately control turf pests.	Impacts would be negligible.	Impacts would be negligible.	Current level of impacts would not change.

Table 5-1. Potential Environmental Impacts of the Proposed Action and Alternatives				
Resource/ Topic Area	**Alternative A** **Non-chemical Pest Control Techniques**	**Alternative B** **Non-chemical Pest Control Techniques and Limited Pesticide Use**	**Alternative C** **Chemical Pest Control Techniques - Primarily Pesticides**	**Alternative D** **No Action**
Hazardous and Toxic Materials and Waste	Minor positive impacts resulting from the reduction of hazardous materials and pesticides purchased, stored, generated and used. Minor increases in pest-related wastes may occur at the site-specific level. Positive impact on pollution prevention initiatives.	Hazardous materials and pesticides purchased, stored, generated, and used could increase or decrease depending on site-specific pest control techniques chosen. Positive impact on pollution prevention initiatives.	Negative Impacts from the amount of hazardous material purchased and pesticides stored, generated, and used. Increase in potential for spills and contamination to natural resources. This alternative would not support the DoD policy for pollution prevention.	Current level of impacts would not change.

Table 5-1. Potential Environmental Impacts of the Proposed Action and Alternatives				
Resource/ Topic Area	**Alternative A** **Non-chemical Pest Control Techniques**	**Alternative B** **Non-chemical Pest Control Techniques and Limited Pesticide Use**	**Alternative C** **Chemical Pest Control Techniques - Primarily Pesticides**	**Alternative D** **No Action**
Cumulative Impacts	May allow pest species, especially exotic plants and animals, to dominate an ecosystem. Failing to control pests on Army properties would potentially violate noxious weed laws and would not follow Army policy. This may result in an overall cumulative negative impact on ecosystems. There would be a cumulative effect from the interaction of other pest management programs in the area. Potential increase in cost to maintain buildings due to damage from wood-destroying organisms. Potential increase in cost to maintain golf courses and other recreational areas.	The limited, careful application of least toxic pesticides would not likely leave significant residues, and therefore, would have a negligible cumulative effect on, past, present, and future pesticide application or on air or water quality, soils, or sensitive species other than the target pest. It is possible that pest(s) may develop a resistance to pesticides.	Possible negative cumulative impact on future pest management, sensitive species, biological resources, water quality, soils, and human health. It is possible that pest(s) may develop a resistance to pesticides. Cumulative impacts would vary with the properties of the individual pesticides used.	Less likely than Alternative C to have cumulative impacts on future pest management, sensitive species, water quality, soils, and human health. However, it is not an integrated method and would be anticipated to use more pesticides than Alternatives A and B.

5.2 Conclusions

Based on the analysis performed in this PEA, implementation of the proposed action would have no significant direct, indirect, or cumulative effects on the quality of the natural or human environment. Preparation of an EIS is not required. A FNSI would be appropriate and would be provided for a 30-day public comment period.

Table 5.2 provides a matrix showing potential environmental impacts under the four alternative courses of action.

Table 5.2 Matrix of Potential Environmental Effects of Using Four Alternative Pest Management Practices

	Land Use	Air Quality	Noise	Geology and Soil	Water Resources	Biological Resources	Cultural Resources	Socio-economic	Environmental Justice & Protection of Children	Infrastructure	Hazardous & Toxic Materials & Waste
1. Alternative A – Non-chemical Pest Control Techniques	⊙	⊘	⊙	⊙	⊙	⊙	⊗	○	○	⊗	+
2. Alternative B – Non-chemical Pest Control Techniques and Limited Pesticide Use	⊙	⊘	⊙	⊙	⊘	⊙	⊙	○	⊙	+	⊙
3. Alternative C – Chemical Pest Control Techniques Primarily Pesticides	⊙	⊘	○	⊗	⊗	⊗	⊗	○	⊗	+	⊗
4. Alternative D - No Action Alternative	○	○	○	○	○	○	○	○	○	○	○

Key:
- ○ No effect anticipated
- ⊙ Negligible minor effect anticipated
- ⊘ Moderate effect anticipated
- ⊗ Increased risk, potential significant effect anticipated
- \+ Beneficial impact

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APPENDIX A

Army Pest Management Procedures

Integrated Pest Management Plans and Annual Review Process: Army has an established process in pest management that validates environmental, health and safety aspects of the program throughout Army installations. All Army installations under this PEA will have an approved IPMP as required by DoD Instruction 4150.07 and AR 200-1. In addition to installations receiving annual technical validation of IPMPs by the USAEC Pest Management Consultant, Army installations use of pesticides and training and qualifications of the pesticide applicators get a thorough review from USAEC by the following established procedures:

Pesticide Use Proposal Review Process: Designated Army Pest Management Consultants approve the procurement and use of all pest management materiel on Army installations. This is done during the annual review of the installation's intended pest management plan. The USAEC approves pesticide use for active IMCOM and Pacific Army installations. USAEC uses a Pesticide Use Proposal (PUP) form for the annual approval of pesticides projected by installations to be used in the upcoming year. USAEC uses an Out-of-Cycle Pesticide Use Request (OCPUR) to approve pesticide use requests at other times. Pesticides procured by Army installations should be registered for intended uses by the state where the installation is located.

Training and Certification Validation: The Department of Defense (DoD) follows an EPA-approved plan (DoDM 4150.7, Volume 1), 'the DoD Plan', when training and certifying DoD personnel as pesticide applicators. This plan contains training standards based upon requirements in the Code of Federal Regulations (see:40 CFR 171). The DoD Pest Management Training Program and training standards for DoD personnel who are involved with pest management but who are not pesticide applicators are described in DoD 4150.7-M. Contractor personnel who apply pesticides on DoD installations receive training and certification according to EPA-approved plans from the state where the installation is located.

Pest Management Contracts Review Procedures: Commercial pest control contracts are used to supplement the in-house resources or installed in place of existing services on many Army installations. USAEC Pest Management Consultant reviews and approves technical aspects of all pest control contract services before the contractors are let. Such contracts include pest management at installations food serving facilities; commissaries; Army, Air Force Exchange Service facilities; housing (other than Residential Community Initiative (RCI)); landscaping; weed control; and termite control during construction projects. The Consultant review is focused on IPM components of the contract PWS, qualification and certification of contractor applicators, and review of pesticides proposed to be used under the PWS.

Pest Management Records and Reports: Army installations maintain complete daily records of all pesticide applications and non-chemical pest management operations

using DD Form 1532-1 (Pest Management Maintenance Record) or a computer-generated equivalent, database or spreadsheet. Installation records will include all pest management operations, to include those performed by installation pest management shops, contract, RCI privatized housing, tenant and supported activities, self-help, forestry operations, golf course, non-appropriated fund activities, lessees per formal agreements; government purchase card procured pesticide applications, and those installations and facilities in the Base Realignment and Closure (BRAC) cleanup program. Pest management activities by residents at their private quarters on Army installations are exempt from the scope of this requirement, except as regulated by individual installation policies and procedures. These records of pest management operations should be retained indefinitely. Pesticide use records must be readily accessible for review during environmental audits.

Pest Management Concept of Operations: The Army pest management program concept of operations is based on:

Local planning: Installation and other locally administered programs are based on planning documents that identify responsible personnel, pest related threats, program shortcomings, and strategies to resolve them.

Command responsibility: Army commanders at all levels of command are responsible for the effectiveness and regulatory compliance of pest management operations under their control. Commanders may delegate their authority, but not their responsibility, to meet program requirements and objectives.

Pest Management Consultant: The Army Pest Management Consultant is responsible to review, interpret and establish program standards for the installation, and provides technical guidance to support these programs.

Installation Integrated Pest Management Coordinators: Individuals designated as IPMCs are responsible to their commanders to meet planning, record keeping, and reporting requirements of the Army Pest Management Program.

Pest Management Quality Assurance Evaluators: A DoD employee trained in pest management at DoD sponsored courses, which protect the Government's interest through on-site performance evaluation of commercial pest management contracts or other contracts that involve the use of pesticides.

High training standards: Only individuals who meet DoD and Army Pest Management Program standards of training may act as Pest Management Consultants, pesticide applicators, IPMCs, or Pest Management Quality Assurance Evaluators (PMQAEs) for pest management service contracts. These high training requirements are necessary to ensure that Army Pest Management Program standards and objectives will be met.

Integrated Pest Management Program Management Oversight: Management oversight of Army pest program is conducted using the following methods:

Pest Management Measures of Merit: DoD Measures of Merit (MoM) for pest management were established in 1995 and was updated in 2004. MoMs were developed to define environmental security goals, measure how well those goals are being achieved, and assess program effectiveness. DoD Instruction 4150.07 requires that installations must implement the DoD Pest Management MoMs listed below and answer data calls for the measures of merit from the DUSD(I&E) http://www.afpmb.org/pubs/dir_inst/dir_inst.htm

- MoM #1 Goal: Through the end of FY 2010, 100% of DoD installations will have pest management plans prepared, reviewed, and updated annually by pest management professionals.

- MoM #2 Goal: Through the end of FY 2010, DoD will maintain the achieved reduction in annual pesticide use on DoD installations. This reduction goal is set at an average of the FY 2002 and 2003 usage, which is 389,000 pounds of active ingredient (45% of the original 1993 baseline- a 55% reduction). Pesticide applications by contractors shall be included.

- MoM #3 Goal: Through the end of FY 2010, 100% of DoD's installation pesticide applicators will be properly certified (either by DoD or the appropriate state). Direct hire employees have a maximum of 2 years to become certified after initial employment. Contract employees shall have the appropriate state certification when the contract is let.

Pest Management Oversight: The following reviews are used for oversight of Army pest management programs at installations:

On-site Program Reviews: Pest management programs require periodic oversight and review by qualified personnel so that commanders and program managers at all levels of command receive timely and accurate information for proper management decisions (DoD Instruction 4150.07 and AR 200-1).

Internal Reviews: Commanders will implement guidance and procedures for program reviews by installation staffs that promote regulatory compliance and cost-effective IPM practices at installations and activities under their control.

External Reviews: DoD Instruction 4150.07 requires on-site pest management program reviews of installations at least every 36 months. This requirement may be met by: command sponsored compliance based program reviews; command sponsored PMPAVs to promote “best pest management practices” compliance or other Army program needs; or program reviews by non-DoD Government agencies.

Environmental Performance Assessment System (EPAS) Reviews: Compliance status of Army installations pest management in respect to environmental laws and regulations are assessed during EPAS visits. The program and its database serve as the Army's environmental compliance insurance policy. It provides real solutions to installations and helps the Army obtain a program-wide view of its compliance efforts.

On-site Pest Management Program Assistance Visits: The purpose of PMPAV is to provide on-site IPM assistance to MACOM installations to sustain and improve installation infrastructure and ranges. These visits by USAEC provide “hands on” technical assistance and assistance with IPM technology applications to installations for field problems associated with pest management programs on Department of the Army lands. These visits are not inspections; they help installations solve local problems, use new IPM methods, or put in place new pest management guidance. Assistance provided during these visits includes, but is not limited to the following areas: integrated pest management plans; pest management contracting; pesticide safety and security; new IPM methods; IPM management of invasive species; technical guidance on pest management Environmental Program Requirements; technical pest management assistance prior to Environmental Performance Assessment System (EPAS) reviews; and coordination with the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) on control of pests of public health importance.

Integrated Pest Management Technical Information:

Armed Forces Pest Management Board (AFPMB) Website: The AFPMB website at http://www.afpmb.org provides DoD policy, IPM technical guides, literature retrieval, and other sources of technical information.

USAEC Consultations: USAEC Pest Management Consultants provides telephone and email consultations for Army installations on the entire scope of Army installation pest management issues.

USAEC Pest Management Website: The USAEC Website is a highly useful one-stop source in support of Army integrated pest management program. The link for the pest management portion of the site is: http://aec.army.mil/usaec/pest/index.html

APPENDIX B

EXAMPLES OF INTEGRATED PEST MANAGEMENT OUTLINES

INTEGRATED PEST MANAGEMENT OUTLINE NO. 1

PEST: Mosquitoes

SITE: Cantonment Area and Training Areas

1. Purpose: To control biting mosquitoes in order to reduce human annoyance and the risk of disease.

2. Surveillance

a. Conducted by: Preventive Medicine and pest management technicians.

b. Methods: Personnel complaints and visual observations of mosquito populations. Pest management technicians monitor potential breeding sources, particularly during the outdoor seasons. Upon request, Preventive Medicine staff will conduct larval and adult mosquito surveillance using dippers and traps. Chemical control will be used only to supplement non-chemical control methods as needed.

c. Frequency: Varies based on location/weather.

3. Pest Management Techniques

a. Non-chemical

(1) Type: Physical and Mechanical

(a) Method and Location: Screens should be placed in windows on buildings occupied at night to exclude adult mosquitoes. Temporary standing water sites (e.g., tire ruts) should be graded or filled to eliminate mosquito breeding. Precautions must be taken not to damage wetlands. Eliminate artificial container (e.g., tires, wrinkled tarps, refuse, neglected equipment, toys) breeding sites.

(b) Conducted by: Facility maintenance or grounds keeping personnel.

(2) Type: Biological. Mosquito fish (*Gambusia affinis*) or *Bacillus thuringiensis israeliensis* (Bti).

(a) Method and location: Applied to mosquito larvae found in standing water that cannot be eliminated by normal sanitary practices.

(b) Conducted By: Pest Management Technicians

(3) Type: Cultural.

(a) Method and Location: Remove and discard any refuse or materials capable of holding water such as tires and broken equipment. Potential for breeding exists particularly at vehicle storage yards where waste tires may accumulate.

(b) Conducted by: All personnel and facility maintenance staff In-house.

b. Repellent

(1) Basis for Treatment: Use of the DoD military repellent system (permethrin on uniform, DEET on exposed skin), especially Soldiers on field exercises during peak mosquito activity.

(2) Method and Location: Repellent applied to the skin.

(3) Conducted by: Installation personnel.

(4) Product Name: DoD Repellent System

(5) Control Standard: Mosquitoes do not attach to skin for feeding**.**

c. Insecticide.

(1) Basis for Treatment: Confirmed mosquito-borne disease, as determined by the Preventive Medicine Environmental Health office and local health department officials. Treatment of breeding sites that cannot be addressed in a non-chemical manner. Selective targeted adulticide fog in areas with proven adult mosquitoes (as determined by light trapping) and when there is a threat of disease (e.g., West Nile Virus, Eastern Equine Encephalitis).Mosquitoes expected in the area.

(2) Method and Location: Ultra low volume treatment of areas where people are being bitten.

(3) Conducted by: In-house pest management technicians and contractor certified pesticide applicators or state/county mosquito control personnel.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Fewer complaints, and trap counts of man-biting species less than threshold level.

d. Insecticide..

(1) Basis for Treatment: When there is a threat of disease (e.g., West Nile Virus, Eastern Equine Encephalitis). Mosquito trap counts exceed 25 females/trap/24 hour period.

(2) Method and Location: Larval control using a residual application in standing water, flood land, tire piles, and other breeding areas.

(3) Conducted by: In-house pest management technicians and contractor certified pesticide applicators or state/county mosquito control personnel.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Trap counts of less than 25 female mosquitoes/trap/24 hour period. If effective, no live mosquito larvae should be present 5 days after treatment.

4. Precautions for Sensitive Areas: Do not treat when wind speeds exceed five

miles per hour. See label for other precautions.

5. Prohibited Practices: Do not apply ULV insecticides near honeybee colonies.

6. Environmental Concerns: Take extra precautions when treating near the habitat of an endangered or threatened species.

7. Remarks: Mosquito control requires coordination with State and local mosquito control resources. Source elimination and larval control are the best strategies to reduce the threat of mosquitoes.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 2

PEST: Ticks

SITE: Woody Areas, Shrub Margins Overgrown Areas and Other Outdoor areas.

1. Purpose: To prevent ticks from biting people.

2. Surveillance.

a. Conducted by: IPMC, Preventive Medicine and pest management technicians.

b. Methods: Tick drags as required for all areas on installation. Visual specimen confirmation during and after potential exposure. Reports of ticks or tick-borne diseases from medical or veterinary clinics.

c. Frequency: As needed during tick activity season

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Proper wearing of clothing outdoors can prevent ticks from attaching to skin. Long pants should be worn and tucked into boots or socks. Mow and otherwise keep 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.

(b) Conducted by: Site users, particularly soldiers in training areas.

(2) Type: Biological. None

(3) Type: Cultural.

(a) Method and Location: Posting and avoidance of identified tick habitat. Site avoidance. If areas are known to have large tick populations, alternative areas should be selected.

(b) Conducted by: Site users, leaders and planners.

b. Repellent.

(1) Basis for Treatment: Ticks expected in the area.

(2) Method and Location: Repellent applied to the skin.

(3) Conducted by: Site users.

(4) Product Name: DoD Repellent System.

(5) Control Standard: Ticks do not attach to skin for feeding.

c. Repellent.

(1) Basis for Treatment: Ticks expected in the area.

(2) Method and Location: Repellent applied to clothing.

(3) Conducted by: Site users.

(4) Product Name: DoD Repellent System.

(5) Control Standard: Ticks do not attach to skin for feeding.

d. Insecticide.

(1) Basis for Treatment: Ticks frequently found in the area.

(2) Method and Location: Barrier treatment around bivouac area.

(3) Conducted by: In-house pest management technicians and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Ticks not on personnel during or after potential exposure at the treated area.

4. Precautions for Sensitive Areas: See label for precautions.

5. Prohibited Practices: See label.

6. Environmental Concerns: See label. Do not treat uniforms where excess permethin residue or spray–over would contaminate the environment. Do not indiscriminately destroy potential tick habitat that may also have environmental significance.

7. Remarks: Ticks would most likely be encountered during training, recreation, and grounds maintenance.

INTEGRATED PEST MANAGEMENT OUTLINE NO 3

PEST: Fleas

SITE: Occupied Buildings

1. Purpose: To control fleas in buildings to reduce the pain, discomfort, and potential health difficulties to occupants and pets.

2. Surveillance.

a. Conducted by: Building occupants, IPMC, Preventive Medicine and pest management technicians.

b. Method: Visual observation.

c. Frequency: As required.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Vacuuming carpets and upholstered furniture will help control fleas – be sure to empty cleaner bag immediately after vacuuming since fleas are not necessarily killed. Pet bedding can also be vacuumed and washed in hot water and detergent.

(b) Conducted by: Building occupants.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Dogs and cats should be treated with an approved insecticide by the Veterinary Clinic.

(b) Conducted by: Pet owner.

b. Insecticide.

(1) Basis for Treatment: Fleas are present in large numbers and causing a nuisance.

(2) Method and Location: Using a 2-gallon sprayer, treat interior of buildings IAW label directions. Aerosols spray spot treatments.

(3) Conducted by: Pest management technicians.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Fleas no longer exist. For IGR (Insect Growth Regulator), no live fleas 90 days following treatment. This product will prevent flea larvae from developing into pupae, but will not kill pupal or adult fleas at time of application. For adulticides, no live fleas 5 days following treatment.

4. Precautions for Sensitive Areas: Release of fogger requires careful preparation of rooms to be treated. Preparations include: removing pets and covering food/food serving items, wood/waxed floors, stereo covers; and turning off aquarium pumps, air handling, and sources of ignition (flammable).

5. Prohibited Practices: Follow the label.

6. Environmental Concerns: None.

7. Remarks: Fleas may become a problem if quarters with pets are vacated for extended periods (e.g., vacation, between occupancy). During this time flea larvae develop into pupae and wait for hosts to trigger pupation. When this happens, newly emerged fleas seeking a blood meal appear. Fleas may also be a problem in buildings which have feral cats or other animals living under them. Adult fleas may enter the first floors of the buildings through small cracks or other openings and subsequently bite people working inside. To remedy this problem, capture and remove the feral animal (see outline 26).Good sanitation is a fundamental to cockroach elimination.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 4

PEST: Filth Flies.

SITE: Food service facilities.

1. Purpose: To control filth flies in facilities where food is prepared or served.

2. Surveillance.

a. Conducted by: Food service personnel, IPMC, Preventive Medicine and pest management technicians.

b. Methods: Visual observation.

c. Frequency: Daily by food service personnel.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Sticky fly traps may be used in areas which are not directly over prepared food or food preparation surfaces. Sticky fly strips may be used in areas that are not directly over prepared food or food preparation surfaces. This method may be effective when only a few flies are found indoors. These glue strips may be a source of contamination and annoyance if they are neglected or bumped into. Ultraviolet electric fly devices (stuns and captures flies on glue surface, not zapper types) may be used in kitchen and eating areas, but again not directly over food preparation surfaces. These have been proven effective under certain circumstances.

(b) Conducted by: Food service personnel and pest management personnel.

(2) Type: Mechanical and Physical.

(a) Method and Location: Screens should be used to preclude fly entry when doors and windows are to be left open. Automatic self-closing devices should be placed on outer doors to reduce the time open doors permit fly entry. Air curtains may also be used at entry points, but must be installed and maintained correctly to blow flies away from the entrance and not into the entrance and should cover the entire door width.

(b) Conducted by: Building maintenance personnel. However, keeping doors closed when not in use is the responsibility of food service personnel.

(3) Type: Biological. None.

(4) Type: Cultural.

(a) Method and Location: Use good sanitation to reduce food and water which attract flies. Clean up spilled food from work surfaces, walls and floors. Wash dirty dishes and cooking containers following use - do not leave exposed food in the facility overnight. Place garbage in sealable bags. Place the bags in containers with tight fitting lids and keep containers closed when not in use. Do not place dumpsters within 50 feet of the facility and empty dumpsters at least once a week.

(b) Conducted by: Food service personnel.

b. Insecticide.

(1) Basis for Treatment: Presence of flies within the facility.

(2) Method and Location: Contact treatment with an aerosol insecticide.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Absence of flies in the facility.

4. Precautions for Sensitive Areas: See pesticide label for precautions.

5. Prohibited Practices: Do not apply pesticides on food items, utensils, or on food preparation surfaces.

6. Environmental Concerns: None.

7. Remarks: Good sanitation should virtually eliminate fly problems at food service facilities. The pesticide listed above should be the only chemical control used. If flies are coming into the facility from a nearby source such as farm, dump, etc., then Public Works personnel should be notified to look into the problem. Refuse containers need to be cleaned weekly in the summer months to preclude fly breeding.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 5

PEST: Mice/Rats.

SITE: Food Storage Facilities, Commissary, Food Service Facilities, Barracks, Administrative Facilities, Ranges and Airfields

1. Purpose: To control mice/rats in food service and preparation areas, warehouses, offices, and other administrative buildings.

2. Surveillance.

a. Conducted by: Occupants, IPMC, Preventive Medicine and pesticide applicators.

b. Methods: Visual observation for damage, droppings, or rub marks.

c. Frequency: Daily by building occupants. As required by pest controllers and facility managers.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Eliminate openings to the buildings which are greater than 1/4-inch (1/2 inch for rats). Particular attention should be given to doors that do not close tightly and areas on the outside of the buildings where pipes and other utilities enter the building. Snap traps and sticky glue boards may be used to capture mice and rats when an infestation is found.

(b) Conducted by: In-house and contractor certified pesticide applicators.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Enforce high sanitary standards thereby reducing food and water essential for rodent survival. Clean up spilled food products immediately or daily at the latest. Remove bags, boxes, broken or unused equipment, and other potential harborage from food storage areas. Remove broken and unnecessary equipment in storage rooms, work areas, and in the outdoor areas of the facility. Keep salvage and break areas clean at all times. Keep food in closed containers. Store pallets of food at least 24 inches from walls to permit routine cleaning, inspection, and control. Maintain proper waste disposal and regular emptying of dumpsters; more frequently if necessary.

(b) Conducted by: All facility personnel.

b. Rodenticide.

(1) Basis for Treatment: Rodents or evidence of rodents found during

surveillance. Non-chemical measures have been, or are concurrently being employed and have failed to work.

(2) Method and Location: Bait stations located in and around buildings with rodent infestations. Tamper-proof bait stations shall be used to reduce the risk to non-target animals. Read label directions. Place Bait Stations in safe locations and document the location of each station.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: No product or building damage from mice/rats. Significant reduction in the number of mouse/rat droppings should be seen around bait stations within 30 days following bait placement.

4. Precautions for Sensitive Areas: See pesticide label for precautions. Due to recent concerns regarding the risk of rodent-borne hantavirus which can cause serious human illness, proper personal protective equipment (including respirators outfitted with HEPA filters) must be worn if work is done in confined rodent infested spaces. Additional precautions including providing sunlight, ventilation, and disinfecting the rodent contaminated areas with a 10% bleach solution is also advised. Traps containing rodents should only be handled with disposable gloves and the trap and rodent should be disinfected and disposed of in a doubled plastic bag. Further instructions are available from the installation Preventive Medicine staff. Only non-chemical measures will be used at Child Development Centers.

5. Prohibited Practices: Keep out of reach of children, pets, and other non-target animals. Place baits in tamper proof bait stations.

6. Environmental Concerns: None.

7. Remarks: Rodenticides should be considered the last option in controlling mice/rats. As long as entry points into buildings exist, then trapping or baiting may be the only alternative for control. The presence of spilled food products and/or poor housekeeping (e.g., pallets against the wall, old boxes and equipment in store rooms, etc.) will adversely impact any baiting or trapping program. Roof rats have the ability to climb great heights in buildings. Therefore, buildings should be surveyed for rat entry points not only at ground level, but along walls and roofs as well.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 6

PEST: Ants.

SITE: Offices, Food Service Facilities, Barracks and Housing

1. Purpose: To eliminate nuisance ant populations.

2. Surveillance.

a. Conducted by: Facilities occupants, IPMC and pest management technicians.

b. Methods: Visual observations and sticky traps.

c. Frequency: Ongoing as required.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Caulk cracks, crevices, holes in walls and floors, and other points of entry through which ants can gain access to the building. Doors and windows should seal tightly. Trees and shrubs should be trimmed back away from the structure.

(b) Conducted by: Maintenance personnel are usually responsible for structural modifications such as weather stripping, door repairs, etc. Building occupants also can perform some of routine minor maintenance.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Sanitation. Clean up spilled food and place stored food items in closed containers. Keep break areas clean and clean up spilled food immediately. Rinse out food containers (e.g., soda cans, coffee cups, etc.) to reduce food which attracts ants. Be sure not to overlook items such as recycle materials, pet food, etc.

(b) Conducted by: Building occupants and/or the facility manager.

b. Insecticide.

(1) Basis for Treatment: Presence of ants in unwanted areas.

(2) Method and Location: Bait stations or gel baits placed in infested areas where ants are seen foraging.

(3) Conducted by: Pest management technicians or building occupant using Self-help materials

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Elimination of ants.

c. Insecticide.

(1) Basis for Treatment: Presence of nuisance ant populations in buildings.

(2) Method and Location: Bait stations placed along ant runways and in entry points.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Elimination of ants.

4. Precautions for Sensitive Areas: See pesticide label for precautions.

5. Prohibited Practices: Do not apply pesticides on food items or packages/outer wrapping of food.

6. Environmental Concerns: None.

7. Remarks: Ants are a minor problem. Placement of an insecticide barrier around external building openings appears to control ants before they can enter. Ant problems occasionally occur in other buildings than those in this outline. However, the same information contained in this outline applies. Proper ant identification is essential to effective control ant infestations. Ants should be given a taste test of several baits to see which ones they prefer and to insure bait is still good. Ants are rarely of medical concern.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 8

PEST: Fire ants

SITE: Lawns, parade fields, other maintained grassy areas.

1. Purpose: To minimize exposure to these pests that sting and may cause allergic reactions.

2. Surveillance.

a. Conducted by: IPMC, Preventive Medicine and pesticide applicators.

b. Methods: Visual observations for ants or mounds.

c. Frequency: Visual observations are conducted by building area occupants during work operations. Pest management technicians perform surveys when services are requested following Self-help failure.

3. Pest Management Techniques.

a. Non-chemical. NOTE: Non-chemical controls are highly encouraged whenever possible but pesticides are the primary method to control fire ants that may infest structures, cause damage to man-made resources such as electrical boxes and transformers, prey upon threatened or endangered species, or interfere with training.

(1) Type: Mechanical and Physical.

(a) Method and Location: Exclusion is the primary method of control for building sites.

(b) Conducted by: Maintenance personnel.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Restoration of native tall grasses and reforestation may reduce some fire ant populations.

(b) Conducted by: Natural resources personnel.

b. Insecticide.

(1) Basis for Treatment: Fire ants present in turf area which is used for training, parades, or recreation. Colonies located close to buildings, electrical boxes, telephone boxes, etc. also require treatment.

(2) Method and Location: In small turf areas broadcast application of bait by hand using a small hand-held spreader or by sprinkling the material directly out of the original container. Large turf areas will be treated by broadcasting the bait using a calibrated mechanical or electric spreader. Individual mound treatment may be treated by broadcasting with calibrated spreaders.

(3) Conducted by: In-house or contract certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Worker ants actively seen carrying the bait (foraging) back to the colony indicates the bait quality is good and there is sufficient fire ant activity to provide control. Initial fire ant population reductions will typically begin within 24 hours. Within 6 weeks after the initial application fire ant activity in colonies shall discontinue for an additional 12 weeks.

4. Precautions for Sensitive Areas: Do not contaminate food or feed by storage, use, or disposal.

5. Prohibited Practices: None.

6. Environmental Concerns: Do not apply baits when wind speed exceeds 15 mph. Fire ant baits are not known to adversely affect reptiles or ground foraging birds.

7. Remarks: Apply baits when fire ants are actively foraging. This is usually when the soil temperature is above 60°F and the ambient air temperature is 70-90°F. Do not apply baits if the grass is wet or if rainfall is expected within 3 hours. Do not irrigate baited areas for at least 3 hours.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 9

PEST: Wasps and Hornets

SITE: In and around buildings and recreational areas.

1. Purpose: To control stinging insects in and around occupied buildings and recreational areas.

2. Surveillance.

a. Conducted by: Building occupants, facility manager(s), and in-house and contractor certified pesticide applicators.

b. Methods: Visual observation for nests or hives.

c. Frequency: Daily by building occupants. As required by pest controllers and facility managers.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Screening windows and doors; removal of wasp nests in their early stages; and removal of honeybee swarms by a beekeeper. Also, spraying bees with ¼ cup of dishwashing liquid in a gallon of water in a mist spray pattern will knock wasps or hornets down by covering them to prevent breathing. Mud dauber nests can be knocked down by using a broom.

(b) Conducted by: Facility personnel/building occupants with the exception of the honeybee swarm removal.

(2) Type: Biological. None

(3) Type: Cultural.

(a) Method and Location: Empty organic and drink container refuse regularly from outdoor refuse containers near areas of human activities and buildings. Make sure material is bagged and sealed, and keep all refuse containers doors and lids tightly closed. Rinse and put away recyclable beverage cans.

(b) Conducted by: Building occupants, refuse collectors

b. Insecticide.

(1) Basis for Treatment: Wasps and hornets found in and around buildings and recreational areas.

(2) Method and Location: Hand-held aerosol applied directly to insects and nests.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: No wasp/hornet activity in or around buildings and recreational areas.

c. Insecticide.

(1) Basis for Treatment: Carpenter Bee galleries detected in wooden structures.

(2) Method and Location: Dust placed in and around entrance holes. Holes filled with caulk or steel wool after dusting.

(3) Conducted by: Pest management technicians.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standards: No further carpenter bee activity noted.

4. Precautions for Sensitive Areas: See pesticide label for precautions. Areas where bees are beneficial to man (e.g., bee hives, flower beds, etc.) should be avoided. Protective clothing including thick gloves, thick coveralls, and a veil covering the head should be used if bee or wasp nests or hives are being controlled. Workers sensitive/allergic to bee venom should not attempt control efforts. These individuals should also consult medical authorities to see if it would be appropriate to carry an epi-pen while doing routine pest management operations where venomous insects may be encountered.

5. Prohibited Practices: None.

6. Environmental Concerns: None.

7. Remarks: Because honeybees are beneficial, attempts are made to contact beekeepers to remove swarms. Chemicals are used only as a last resort for control. Beekeepers should be called to remove swarms.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 10

PEST: Spiders.

SITE: Buildings and other structures.

1. Purpose: To control spiders thus minimizing the risk of bites from poisonous spiders and other spiders from buildings or other workplaces.

2. Surveillance.

a. Conducted by: Building occupants, pest management technicians.

b. Methods: Visual observations - spiders are frequently found in dry, dark, usually undisturbed places inside buildings; in carports, utility sheds and other outdoor storage areas; and under buildings.

c. Frequency: As required.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Spiders and their webs can be eliminated by using a broom or vacuum cleaner in most cases. Maintenance of screens and weather stripping around doors and windows will keep out small insects which the spiders use for food. Sticky traps can also be placed next to door jambs to intercept incoming spiders (if it is suspected they are coming into the building from outside) - the traps can also be used to determine if further control efforts are needed, depending on the number and species of spiders caught. Install yellow or sodium vapor light bulbs at outside entrances. These lights are less attractive than incandescent bulbs to night-flying insects, which, in turn, attract spiders. Outdoor lighting should be turned away from windows and doorways.

(b) Conducted by: Building occupants, pest management technicians

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Spiders can be discouraged through good housekeeping, both inside and outside. Keep boxes, old equipment, and other items neatly stored on shelves; clean up and dispose of trash, debris, old equipment, etc. Wear shoes at all times and use gloves when moving rocks, wood or other debris. Do not leave clothes, shoes, sleeping bags, or other items on the floor and shake out all items prior to use. Ensure adequate lighting when working in crawl spaces or other infrequently used areas.

(b) Conducted by: Building occupants.

b. Insecticide. Chemical control of spiders inside buildings is not recommended and should be considered only as a last resort. Residual sprays are not recommended for use in buildings that are occupied or will be occupied in the near future. Insecticides will not provide long-term control and should not be used against spiders outdoors. Typically, pesticide control of spiders is difficult unless the pesticide is sprayed directly on the spider.

(1) Basis for Treatment: If residual materials are used in unoccupied buildings or in areas where other methods fail, applications are recommended only along baseboards, door casements, and corners, and only where spiders are present.

(2) Method and Location:

(3) Conducted by: Pest management technicians

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Application of pesticide by the Pest Management technicians should not be done unless the occupants have first tried Self-help and their efforts have failed to control the spiders. No complaints or call backs should be received within 30 days after treatment.

4. Precautions for Sensitive Areas: Spiders are beneficial to humans because they control a wide variety of insect pests such as mites, flies, and mole crickets. Spiders should be left alone in gardens, shrubbery, and other vegetated areas.

5. Prohibited Practices: None.

6. Environmental Concerns: None.

7. Remarks: Spiders need to eat insects and other arthropods to maintain an infestation. When spiders are simply seeking shelter from the outside, they will die if a food source is not readily available. For this reason, good housekeeping is essential in preventing or suppressing spider infestations. Black widows generally live in dark damp cavities and have loose webs so be cautious when opening access panels and culvert lids.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 11

PEST: Scorpions.

SITE: Trailers, camp sites, warehouses and other buildings

1. Purpose: To control scorpions in and around trailers, camp sites, warehouses and other buildings.

2. Surveillance.

a. Conducted by: Building occupants, pest management technicians.

b. Methods: Visual observations.

c. Frequency: As required, based on complaints.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Scorpions rest during the day under leaf litter and other available litter. Reduction of leaf litter adjacent to the house will reduce numbers. Shrubs should be trimmed so that an air flow can go under them and dry the habitat.

(b) Conducted by: Building occupants

(2) Type: Biological. None.

(3) Type: Cultural. Do not leave clothes, shoes, sleeping bags, or other items on the floor and shake out all items prior to use.

b. Insecticides.

(1) Basis for Treatment: Scorpions observed in or around the building.

(2) Method and Location: Pressurized sprayer - insecticide applied to areas where scorpions are observed. Apply around and under the base of the trailers (outside) and other buildings.

(3) Conducted by: Pest management technicians.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: No call backs to treated buildings within 30 days following treatment.

4. Precautions for Sensitive Areas: None.

5. Prohibited Practices: None.

6. Environmental Concerns: None.

7. Remarks: Scorpions are a minor nuisance around trailers, camp sites and sheds. These arthropods seek shelter from the heat around and under the structures and occasionally get inside. They do not constitute a serious human health hazard unless an individual is hypersensitive to the venom. Stings feel similar to that of a wasp.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 12

PEST: Birds – Unprotected (Pigeons, Starling, House Sparrows)

SITE: Offices buildings, warehouses, loading docks, barracks and other administrative buildings.

1. Purpose: To control birds that nest, roost, or loaf in or on buildings or other areas where they will damage or contaminate equipment or other material or create a health hazard for employees.

2. Surveillance.

a. Conducted by: Building occupants and the facility manager(s).

b. Methods: Visual observation of birds and/or droppings.

c. Frequency: Ongoing

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: The preferred method of bird control is exclusion. Openings to the outside of buildings and should be screened or closed to prevent bird entry. Minor repairs can be done by occupants major repairs may require work by Facilities Division Preventive Maintenance. Baited live traps can be used to capture and relocate birds from inside buildings and from roosting areas on or near buildings. Architectural modifications of ridges and openings used for nesting and roosting on can be done on buildings where this is a problem. In some cases, material designed to discourage nesting (e.g., spike strips or netting) can be used. Also where legal, safe, and environmentally friendly, shooting birds can be an option. This is only used when there are only a few isolated birds since it is labor intensive and hazardous.

(b) Conducted by: Building occupants, preventive maintenance, pest management technicians (trapping)

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Keep loading doors and unscreened windows closed when not in use. Discourage personnel from feeding birds, especially pigeons.

(b) Conducted by: Building occupants.

b. Repellant.

(1) Basis for Treatment: Presence of birds after non-chemical methods have been tried and failed to control the infestation.

(2) Method and Location: Application of treated bait to areas where unwanted birds feed.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Birds do not return for 7 days following treatment.

4. Precautions for Sensitive Areas: Take precautions if any architectural modifications are attempted that may involve buildings or structures that are historically significant. If in doubt, check with the Chief, Environmental Office.

5. Prohibited Practices: Electronic and ultrasonic bird repelling devices and scare devices such as owl decoys have proven ineffective and their use is prohibited by DOD Instruction 4150.07.

6. Environmental Concerns: The species listed above are non-native and are not protected under the Migratory Bird Treaty Act or other Federal or state laws or regulations. They, therefore, can be controlled or managed without special permits. Most other wild species are protected by law. The identity of any pest species should be certain before any manipulations take place.

7. Remarks: Personal protective measures, including respiratory protection using HEPA filters, should be used if significant deposits of droppings are encountered during cleanup or structural modifications. Consultation with the Safety Officer is advised. If safety, health, or aesthetic impacts become significant, coordination will take place with Federal and State Wildlife Officials.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 13

PEST: Bats.

SITE: Offices buildings, warehouses, barracks and other buildings.

1. Purpose: To control bat infestations in buildings.

2. Surveillance.

a. Conducted by: IPMC, pesticide applicators, natural resources personnel and building occupants.

b. Methods: Visual observation of bats and/or droppings.

c. Frequency: Ongoing

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Close up openings in roofs thus eliminating attics as a harborage choice for bats. This should be done in late fall or early spring before bats are present to avoid trapping bats within the structure.

(b) Conducted by: Maintenance personnel and pest management technicians.

(2) Type: Biological. None.

(3) Type: Cultural. None

b. Repellant.

(1) Basis for Treatment: Failure to exclude bats from buildings.

(2) Method and Location: Apply appropriated labeled product in roosting areas.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Absence of bats in former roosting sites.

4. Precautions for Sensitive Areas: Bats that have come in contact with humans or pets will be tested for rabies. Pest Management Technicians can safely catch and release individual bats that stray into buildings. If the bat exhibits abnormal behavior, the veterinary clinic will be notified for further instructions. If the building is identified as a maternity roost (many bats and young present), no action will be taken and the Fish & Wildlife Management Program will be notified.

5. Prohibited Practices: (1) Check State and local regulations prior to implementing potentially lethal control measures. There are laws protecting bats, so the use of pesticides and injuring or killing bats could result in fines. (2) With any bat, special caution must be taken and PPE used since bats can carry diseases like Rabies.

6. Environmental Concerns: None.

7. Remarks: Contact the Command Pest Management Consultant for advice on bat management.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 14

PEST: Snakes.

SITE: Offices buildings, warehouses, barracks and miscellaneous administrative buildings, and ranges.

1. Purpose: To discourage or remove snakes, especially poisonous species, from buildings and other areas where human activity is likely.

2. Surveillance.

a. Conducted by: All personnel.

b. Methods: Visual observation of snakes, as they are noticed. If many snakes are observed or repeat work orders occur in a building, inspection for rodents should be conducted.

c. Frequency: As necessary when snakes are encountered in an area where they are not wanted.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Capture with snake loop and remove or contact the natural resources office.

(b) Conducted by: Pest management technicians, natural resources personnel or Military Police.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Avoidance. If at all possible, bypass snakes. Snakes generally prefer to avoid people. Most encounters with snakes can be avoided by simply allowing the snake to leave the area. The biggest risk of snake bites comes from people going out of their way to handle or otherwise provoke snakes into a defensive attitude. If snakes cannot be avoided, pest controllers or Military Police should be called. **Do not harm or kill snakes!**

(b) Conducted by: Personnel encountering snakes.

b. Chemical. None.

4. Precautions for Sensitive Areas:

5. Prohibited Practices: Do not kill snakes.

6. Environmental Concerns: None.

7. Remarks: Snakes, both poisonous and nonpoisonous, will be captured alive and removed to a location where they will not cause harm or disrupt activities. If snakes are repeatedly found in an area or building, modify the environment so that it does not provide food, shelter (cover) or water. The snakes are there for a reason, eliminate the reason they are there.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 15

PEST: American Cockroaches.

SITE: Sewers, Steam Tunnels, Basements and Crawl Spaces.

1. Purpose: To control American Cockroaches in above sites thereby reducing nuisance and contamination to personnel and equipment.

2. Surveillance.

a. Conducted by: IPMC, Preventive Medicine and pest management technicians..

b. Methods: Visual observation (preferably at night) in manholes, crawl spaces, steam tunnels, etc. Sticky traps and flushing agent can be used as supplementary surveillance measure.

c. Frequency: Complaints and as needed.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Eliminate moisture in basements and other below-ground areas in buildings that could support cockroach populations. Ventilate wet or damp areas under buildings. In buildings which experience frequent invasion of American cockroaches, drains, particularly those in the basements or on ground level, should have grates or screens over the openings with a mesh size less than 1/8-inch. Utility doors should fit tightly, and pipe chases and other entry points should be sealed.

(b) Conducted by: Facility maintenance personnel as directed by the Pest Management Coordinator or facility manager.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Use good sanitation to reduce food and water for cockroaches. Standing water should be eliminated and leaking pipes should be fixed. Remove debris, clutter, and unnecessary objects. Store essential items on elevated shelves to keep floors free of harborage and allow inspection

(b) Conducted by: Building occupants, facility maintenance personnel.

b. Insecticide.

(1) Basis for Treatment: Presence of cockroaches, cockroach droppings, egg cases.

(2) Method and Location: Use Self-help items where cockroaches have been seen. Apply bait stations in locations where cockroaches have been seen. Place the

bait stations along the junction between walls and floors for maximum effectiveness. Put the application date on the of bait station.

(3) Conducted by: Building occupants using Self-help, in-house pest management technicians and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Continue bait station use for 30-60 days. If cockroaches are still found, then call the pest controller for assistance. Bait stations should be removed when empty or after 30-60 days, whichever is shorter, to prevent the empty containers from providing cockroach harborage.

c. Insecticide.

(1) Basis for Treatment: Large populations of cockroaches still present after Self-help measures have been used and failed to control the infestation-an average of more than one roach per trap per night. **Important:** Treatment will not be conducted without conducting surveillance using sticky traps.

(2) Method and Location: Crack and crevice residual application.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: No live cockroaches found 30 days following treatment. When sanitation and harborage present problems in a facility, a reduction in the number of cockroaches in sticky traps may indicate the effectiveness or limitation of chemical control efforts.

4. Precautions for Sensitive Areas: Take precautions when treating break areas or areas in which food is stored.

5. Prohibited Practices: Do not apply pesticides on food items, utensils, or food preparation surfaces. Do not allow unauthorized personnel in the facility during treatment.

6. Environmental Concerns: None.

7. Remarks: Good sanitation is a fundamental to cockroach elimination. Residual insecticides should be considered the last option in controlling cockroaches. As long as poor sanitation or harborages exist, the effectiveness of controls may be limited. American cockroaches are not a problem as long as they stay in the sewer system. However, at times they invade buildings. Treatment should proceed from the place where cockroaches cause problems in buildings back to their harborage sites in the sewers or other underground places. If this is not done, then treatment in underground cockroach harborage sites may drive additional insects into buildings not previously experiencing problems.

INTEGRATED PEST MANAGEMENT OUTLINE NO 16

PEST: German Cockroaches

SITES: Food Service Facilities Offices, Housing, Barracks, CDCs, Hospitals & Clinics, Warehouses, Barracks and other Administrative Buildings

1. Purpose: To control cockroaches in dining facilities and other buildings thereby reducing contamination of food and distress to personnel and preserving morale and a wholesome atmosphere.

2. Surveillance.

a. Conducted by: IPMC, Preventive Medicine staff, food service staff and pesticide applicators.

b. Methods: Visual observation and sticky traps.

c. Frequency: As necessary when a minor infestation of cockroaches occurs.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Physical and Mechanical

(a) Method and Location: Use sticky traps in kitchens, bathrooms, break areas, or other areas where food and water are available. Eliminate interior cracks, voids, gaps, and other openings in buildings where cockroaches harbor. Particular attention should be given to where pipes and utility lies pass through walls, especially in food service, break rooms, and restroom areas. Use caulk and other fillers to fill harborage sites. Remove debris, clutter, and unnecessary objects. Store essential items on elevated shelves to keep floors free of harborage and allow inspection.

(b) Conducted by: Building occupants, Maintenance personnel, and Pest Management Technicians

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Clean up spilled food and place stored food items in closed containers. Keep break areas clean and clean up spilled food immediately. Rinse out food containers (e.g., soda cans, coffee cups, etc.) to reduce cockroach food. Keep papers, bags, boxes and other items off the floors in the kitchen and bathroom to eliminate harborage areas for the cockroaches. Be sure not to overlook items such as recycle materials, pet food, etc.

(b) Conducted by: : Building occupants, Food service employees .

b. Insecticide.

(1) Basis for Treatment: Cockroaches present based upon trap surveillance and inspection.

(2) Method and Location: Use of bait stations and bait placements in infested areas, typically along baseboards. Stations are to be dated, monitored, placed in sufficient numbers, and removed when bait is exhausted and/or no longer effective, as per label instructions. Use contact spray if quick knock-down is required, sanitation and harborage issues have been addressed, and unusually large population is detected.

(3) Conducted by: Pest management technicians or building occupants using Self-help materials

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Continue bait station use for 30-60 days. If cockroaches are still found, then call the contracted pest controller for assistance. Bait stations should be removed when empty or after 30 to 60 days, whichever is shorter, to prevent the empty containers from providing cockroach harborage.

c. Insecticide.

(1) Basis for Treatment: Cockroaches present after non-chemical measures and baiting were attempted and/or cockroaches are detected in large numbers. **Important:** Treatment will not be conducted without conducting surveillance using sticky traps.

(2) Method and Location: Apply residual insecticides to harborage areas in crack and crevices where cockroaches have been detected

(3) Conducted by: Pest management technicians

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: No live cockroaches found 30 days following treatment. When sanitation and harborage present problems in a facility, a reduction in the number of cockroaches in sticky traps may indicate the effectiveness or limitation of chemical control efforts.

4. Precautions for Sensitive Areas: Prior coordination with management should result in no food items out and all food preparation surfaces covered, prior to application of sprayed pesticides. Only non-chemical measures will be used in the Child Development Centers.

5. Prohibited Practices: Do not apply insecticides on food items, utensils, or food preparation surfaces. .

6. Environmental Concerns: None.

7. Remarks: Good sanitation is a fundamental to cockroach elimination. Pesticides

should be considered as the last option in controlling cockroaches. As long as poor sanitation or harborages exist, the effectiveness of control measures may be limited.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 17

PEST: Stored Product Pests.

SITE: Food Storage Warehouses and Food Handling Facilities

1. Purpose: To control insects that damage food and fiber products.

2. Surveillance.

a. Conducted by: Facility personnel, Veterinary Food Inspectors, Preventive Medicine Specialists, and/or in-house and contractor certified pesticide applicators..

b. Methods: Visual observations for insects and/or conditions that could favor insect infestations in stored food products. Particular attention should be given to rodent bait stations when they are in use since most baits are subject to insect infestation. Augment visual observations with pheromone and sticky traps.

c. Frequency: Monthly in food service facilities - Food service personnel and/or Preventive Medicine; daily in the Commissary and its warehouses; weekly - Veterinary Inspectors.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Clean up spilled food materials which may attract and provide a food source for insects at least daily. Vacuuming works better than sweeping in particle-filled cracks and crevices. Eliminate harborage by caulking (or filling with other material) minor cracks, crevices, holes in walls or floors. Fix leaks, improve drainage, and install screened vents to increase airflow in high moisture areas.

(b) Conducted by: Facility personnel.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Damaged goods should be kept in tight-fitting containers. Infested products are removed and disposed immediately upon discovery.

(b) Conducted by: Facility personnel.

b. Insecticide.

(1) Basis for Treatment: Presence of insects in products or in the food storage area.

(2) Method and Location: Treatment around pallets, crack and crevice, floor/wall interfaces, and other areas where insects are present.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: No evidence of insects for 30 days following treatment.

4. Precautions for Sensitive Areas: See pesticide label for precautions.

5. Prohibited Practices: Do not apply pesticides on food items or packages/outer wrapping of food.

6. Environmental Concerns: None.

7. Remarks: Most infestations of stored products pests can be eliminated by disposing of the infested product and treating the storage area with an effective aerosol insecticide. Rotation of infestible stock also can be very effective in preventing infestations.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 18

PEST: Subterranean Termites.

SITE: Buildings and other structures.

1. Purpose: To prevent subterranean termites from damaging wooden structures especially those of historic importance.

2. Surveillance.

a. Conducted by: Facility manager and in-house and contractor certified pesticide applicators.

b. Methods: Visual observation for termites and/or conditions that could favor termite infestations. Ideally all buildings should be examined annually. Guidance from the Armed Forces Pest Management Board is provided in Technical Guide No. 29, Integrated Pest Management (IPM) In And Around Buildings. The AFPMB recommends that, at a minimum, all buildings should be surveyed at least once every two years.

c. Frequency: At least once every two years. May be done in conjunction with service orders for other pest control when convenient.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Ventilate wet or damp areas under buildings. Use a vapor barrier in crawl space to reduce moisture. Repair and replace infested wood and structural material. Monitor new construction to ensure wooden construction waste is not used as fill for concrete foundations and steps. Tree and large shrub stumps located near buildings are removed so as not to attract termites. Soil at grade level is removed when found within 4 inches of wooden structural elements to eliminate earth to wood contact. Expansion joints in concrete floors and around plumbing that penetrates slabs are sealed with an elastomeric sealant.

(b) Conducted by: Maintenance personnel, pest management personnel

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Area sanitation including removal of old wood, stumps, and water sources which could support termite colonies.

(b) Conducted by: Maintenance personnel and pest management personnel

b. Insecticide.

(1) Basis for Treatment: New construction and when active termite colonies are found.

(2) Method and Location: Power soil injection around building foundation

(3) Conducted by: Pest management technicians

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: No subsequent termite infestation or damage of treated structures for five years after application.

4. Precautions for Sensitive Areas: See pesticide label for precautions. Avoid getting pesticide in areas where water can become contaminated, and in air ducts of buildings. Do not apply when people are in the building.

5. Prohibited Practices: Buildings with sub or intra-slab duct work must not be treated. Ducts can become contaminated and the insecticide vapor spread throughout the building.

6. Environmental Concerns: None.

7. Remarks: Termite control is a complex operation. The Command Pest Management Consultant should be contacted prior to contracting for this work.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 19

PEST: Drywood Termites.

SITE: Buildings and other structures

1. Purpose: To prevent termites from damaging wooden structures, lumber and other wooden structures of historical importance.

2. Surveillance.

a. Conducted by: In-house and contractor certified pesticide applicators.

b. Methods: Visual observation for termites, termite frass and/or conditions that could favor termite infestations. Ideally all buildings should be examined annually. Guidance from the Armed Forces Pest Management Board is provided in Technical Guide No. 29, Integrated Pest Management (IPM) In And Around Buildings. The AFPMB recommends that, at a minimum, all buildings should be surveyed at least once every two years.

c. Frequency: At least once every two years may be done in conjunction with service orders for other pests whenever practical.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Expansion joints in concrete floors and around plumbing that penetrates slabs are sealed with an elastomeric sealant. Replace damaged wood with treated lumber or other termite resistant material wherever possible. Pre-treated lumber can be used to replace existing lumber to prevent re-infestation in areas of potential termite activity. Remove all wood debris and stumps within 10 feet of foundations. Provide termite foundation-flashing on all new construction. Use vinyl, aluminum concrete or other materials in place of wood in areas prone to termite infestations. Structures and localized areas can be heat-treated, subjected to microwaves, liquid nitrogen, or electricity to eliminate termite infestations. These eradication methods must be conducted by experienced personnel.

(b) Conducted by: In-house and contractor certified pesticide applicators.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Repair and replace infested wood and structural material with pressure treated wood. Infested wood should be burned if possible, otherwise have it buried in a sanitary landfill.

(b) Conducted by: Maintenance personnel.

b. Fumigants. Note: Contractors have the option of selecting pesticides but must obtain approval for use by contracting officer or the contracting officer representative and the Command Pest Management Consultant.

(1) Basis for Treatment: Active infestation in structural members of buildings or other large wooden structure.

(2) Method and Location: Structural fumigation under tarps.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: No subsequent termite infestations or damage from treated structures for one year after treatment.

c. Insecticide.

(1) Basis for Treatment: Smaller infested piece of wood or non- pressure treated wood to be protected from infestation.

(2) Method and Location: Residual pesticide application to infested areas.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: No subsequent termite infestations or damage from treated structures for five years after application.

4. Precautions for Sensitive Areas: None.

5. Prohibited Practices: None.

6. Environmental Concerns: None.

7. Remarks: None.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 20

PEST: Minor Nuisance Crawling Pests (crickets, earwigs, millipedes, centipedes, silverfish).

SITE: In all buildings.

1. Purpose: To control insects and arthropods that occasionally invades buildings.

2. Surveillance.

a. Conducted by: IPMC, Preventive Medicine, pesticide applicators and building occupants.

b. Methods: Individual complaints and observations.

c. Frequency: On-going.

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Maintain screens and weather stripping around doors and windows to exclude nuisance pests. Place sticky traps along baseboards in areas where crickets, spiders, earwigs and other nuisance arthropods are seen. Use a vacuum cleaner to remove pests and food sources.

(b) Conducted by: Building occupants.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Good housekeeping. Nuisance arthropods will hide in areas which are cluttered with trash, old boxes, etc. Clean up these areas to minimize infestations. Use yellow light bulbs outside of entrance door to attract fewer insects to the structure

(b) Conducted by: Building occupants.

b. Insecticide.

(1) Basis for Treatment: Infestations remain after all non-chemical control methods have been implemented.

(2) Method and Location: Hand-held aerosol applied directly to insects.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Nuisance pest infestations are controlled to a tolerable

level.

c. Insecticide.

(1) Basis for Treatment: Infestations remain after commercially available aerosol spray is used.

(2) Method and Location: Spot and/or crack and crevice treatment in areas where pests are seen. 2-gallon sprayer; foundations outside buildings and door thresholds; baseboards and voids inside buildings where pests may hide. Verify label for allowable target pests.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Infestation is controlled to a tolerable level.

4. Precautions for Sensitive Areas: See label for precautions.

5. Prohibited Practices: None.

6. Environmental Concerns: None.

7. Remarks: Most nuisance arthropods are minor pests and are easily controlled through non-chemical methods and the light use of insecticides.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 21

PEST: Gypsy moth larvae.

SITE: Shade and Ornamental Tees.

1. Purpose: To control gypsy moths that can defoliate, weaken, and kill trees.

2. Surveillance.

a. Conducted by: Pest Management Technicians, USDA and State Forest Service Personnel.

b. Methods: Visual observation for egg masses and/or larvae. Pheromone traps can be used to survey for adult males. Daily, through the spring months look for caterpillars. In the early summer months, install pheromone traps to capture and quantify adult male moths that can help to determine the population level and anticipated degree of infestation in the following year. As time allows in the fall, look for egg masses on tree trunks and nearby structures. Consult with the US Forest Service to participate in cooperative survey agreements that determine treatment thresholds and may result in participation in Federally-funded suppression programs.

c. Frequency: As required (April - September).

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Apply barrier sticky tape around trunks to capture migrating larvae. Wrap burlap or fabric around trunk and remove larvae that harbor beneath it during the daylight hours. Caterpillars can be killed by placing in a jar with soapy water solution, and discarding.

(b) Conducted by: Pest Management Technicians and Grounds Maintenance Personnel and the Forestry Office.

(2) Type: Biological.

(a) Method and Location: Apply *Bacillus thuringiensis* (Bt), a bacteria specific to caterpillars of this type. Apply approved virus or fungal products labeled specifically for gypsy moth, as they become available.

(b) Conducted by: State Forest Service or U.S. Dept. of Agriculture, Forest Service and facility personnel.

(3) Type: Cultural. None

b. Insecticide.

(1) Basis for Treatment: Number of egg masses per acre exceeds the local maximum established by the State Forest Service or the U.S. Dept. of Agriculture,

Forest Service.

(2) Method and Location: Varies.

(3) Conducted by: Contracted pest controllers, pilots, and State Forest Service or U.S. Dept. of Agriculture, Forest Service personnel.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: No larvae observed for 30 days after treatment.

4. Precautions for Sensitive Areas: See pesticide label for precautions. Do not apply over exposed personnel.

5. Prohibited Practices: None.

6. Environmental Concerns: None.

7. Remarks: Bt should be applied to all leaf surfaces of the trees. Heavy rains following treatment may necessitate re-treatment.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 22

PEST: Incidental Vertebrate Pests (Stray Dogs and Cats, Skunks, Raccoons)

SITE: In and around buildings.

1. Purpose: To remove unwelcome wild, feral, stray vertebrates from areas and structures where human activities occur and where these activities as well as human health may be affected by the animal's presence. To prevent or control a flea infestation traced to feral cats. o control vertebrate pests in and around buildings.

2. Surveillance.

a. Conducted by: Building occupants, pest management technicians

b. Methods: Visual observation.

c. Frequency: Ongoing

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Live trapping (if applicable) with wire or solid cage traps. Release wild animals in remote areas if allowed by local laws and regulations.

(b) Conducted by: In-house and contractor certified pesticide applicators or Military Police.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Good sanitation. Animals are attracted to uncovered trash and debris. Place all trash in covered dumpsters or closed trash cans. Screen or repair entry points through which animals can gain access to crawl spaces, attics, etc.

(b) Conducted by: Building occupants and the facility manager.

b. Pesticide: None

4. Precautions for Sensitive Areas: No animal will be handled inhumanely or treated in such a way to violate any state or federal laws governing wildlife.

5. Prohibited Practices: Any inhumane treatment of animals

6. Environmental Concerns: None.

7. **Remarks:** (1) When dogs and cats are captured, they should be taken to the nearest animal shelter for adoption or disposal as they deem appropriate. Wild animals should be humanely destroyed if they can't be released in remote areas. A local veterinarian should be consulted when dealing with stray animals. (2) Pest Management Technicians should be vaccinated against rabies (with booster every two years) if handling vertebrates (e.g., stray/feral cats and dogs) and must wear strong protective (leather) gloves when transporting traps or otherwise handling animals.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 23

PEST: Vegetation Control.

SITE: Utility poles, sidewalks, around buildings foundations, parking lots, fence lines, etc.

1. Purpose: To control undesirable vegetation in order to minimize damage to property, and to limit risk of fire or security breaches.

2. Surveillance.

a. Conducted by: Ground maintenance and pest management technicians

b. Methods: Visual observation.

c. Frequency: Ongoing though the growing season (March through September).

3. Pest Management Techniques.

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Weed eaters may be used but are labor-intensive. Once vegetation is cut, new growth occurs rapidly; frequent cutting is necessary. Hot water treatment is labor intensive; however, plant part remnants inhibit re-infestation. Perennial weeds may need subsequent treatment to provide complete control. Also barriers, such as mulch, can be used around building perimeters, along sidewalks and under fences to suppress weeds where it is feasible.

(b) Conducted by: Ground maintenance and pest management personnel

(2) Type: Biological. None.

(3) Type: Cultural. None.

b. Herbicide.

(1) Basis for Treatment: Vegetation present around buildings, along fence lines, etc.

(2) Method and Location: Hand or power sprayer. Herbicide is applied to unwanted vegetation in accordance with label directions.

(3) Conducted by: Pest management technicians.

(4) Product Name. Consult individual installation IPMP.

(5) Control Standard: Vegetation is killed within two weeks following treatment.

4. Precautions for Sensitive Areas: Avoid contact with foliage, green stems or fruit of desirable plants and trees. Avoid direct application to any body of water. Avoid drift which could damage desirable plants; do not spray if wind speed is in excess of five miles per hour.

5. Prohibited Practices: Application of herbicides by un-certified personnel.

6. Environmental Concerns: None.

7. Remarks: None.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 24

PEST: Broadleaf Weed Control

SITE: Grounds Throughout Installation (primarily Turf) parade fields, lawns, and other common grassy areas.

1. Purpose: To control broadleaf weeds in lawns and grassy areas.

2. Surveillance.

a. Conducted by: Ground maintenance personnel, pest management technicians.

b. Methods: Visual observations.

c. Frequency: Weekly

3**. Pest Management Techniques.**

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Mowing grass to maintain the proper height for the variety of grass present may result in control of some broadleaf weeds by preventing flower and seed formation. Mowing grass too short will weaken it, making it more likely to be infested with weeds. Some weeds have the ability to adapt to mowing condition by flowering just above the surface of the ground, but below the height of most commercial mowers or will spread by rhizome or root sprouting.

(b) Conducted by: Building occupants.

(2) Type: Biological. None.

(3) Type: Cultural.

(a) Method and Location: Proper fertilization and watering of grassy areas promotes good grass growth. This practice will prevent many broadleaf weeds from invading and propagating.

(b) Conducted by: Roads and grounds, building maintenance or facility personnel.

b. Herbicide.

(1) Basis for Treatment: Weeds impacting lawns aesthetics

(2) Method and Location: Spot application only with hand sprayer

(3) Conducted by: Pest management technicians

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Weeds are killed within two weeks following treatment. This is a selective weed killer and will not kill most grasses.

(5) Control Standard: Weeds are killed within two weeks following treatment.

4. Precautions for Sensitive Areas: See the pesticide label for precautions. Avoid contact with foliage, green stems or fruit of crops, desirable plants, and trees. Avoid drift which could damage desirable plants. Do not spray if wind is greater than 5 mph

5. Prohibited Practices: None.

6**. Environmental Concerns:** None.

7. Remarks: Awareness should exist regarding the fact that fertilization and watering may promote healthier grassy areas but could also have the unintended consequence of promoting grub production which, in turn, could attract/promote moles and skunks.

INTEGRATED PEST MANAGEMENT OUTLINE NO. 25

PEST: Invasive and Noxious Weeds.

SITE: Training sites, ranges and other sites such as forests and wooded areas.

1. Purpose: To control invasive and noxious weeds in order to minimize damage to property, preserve ranges and training areas, protect native habitats, and comply with State laws.

2. Surveillance.

a. Conducted by: Pest management personnel, range personnel and environmental staff.

b. Methods: Visual observations.

c. Frequency: Ongoing through the growing season (March through September).

3**. Pest Management Techniques.**

a. Non-chemical.

(1) Type: Mechanical and Physical.

(a) Method and Location: Weed eaters and mowing are used but are labor-intensive. This practice is used to reduce flower and seed production, but is not always practical because of limited access with mowing equipment in some outlying areas. Hand pulling has been used in limited growth areas.

(b) Conducted by: Maintenance personnel.

(2) Type: Biological. Release of root and seed weevils to control purple loosestrife at American Lake and Johnson Marsh. Migration of Scotch broom beetles to control seed germination from release sites off-site.

(3) Type: Cultural. None.

b. Herbicide. Note: Contractors have the option of selecting pesticides but must obtain approval for use by contracting officer or the contracting officer representative and the Command Pest Management Consultant.

(1) Basis for Treatment: Presence of invasive or noxious weed on the installation.

(2) Method and Location: Hand or power sprayer. Chemical is applied to unwanted vegetation in accordance with label directions.

(3) Conducted by: In-house and contractor certified pesticide applicators.

(4) Product Name: Consult individual installation IPMP.

(5) Control Standard: Vegetation is killed within two weeks following treatment.
s.

4. Precautions for Sensitive Areas: See the pesticide label for precautions.

5. Prohibited Practices: None.

6**. Environmental Concerns:** None.

7. Remarks: Coordination is made with local County and State agricultural personnel concerning these and other noxious weeds found in the vicinity of the installation.

APPENDIX C

PESTICIDES ANTICIPATED TO BE USED ON ARMY FACILITIES

All pesticides used on Army installations are approved prior to use. Installations update their pesticide use proposal each fiscal year, outlining the pesticides to be used during that fiscal year. Pesticides are approved on a case-by-case basis based upon the site of application, intended pests and local conditions and laws. If other pesticides, in addition to the pesticide listed in the pesticide use proposal, are required during the course of the fiscal year, those pesticides are approved by USAEC on a case by case basis using an Out-of-Cycle Pesticide Use request. In all cases, pesticides are only approved provided they are registered by the EPA and the state in which the installation is located.

APPENDIX D

RELEVANT LAWS, REGULATIONS, AND PLANS

Land Use

The *Sikes Act* of 1960, 16 U.S.C. 670a-670o, last amended in November 1997, authorizes the Secretary of Defense to plan, develop, maintain, and coordinate wildlife, fish, and game conservation and rehabilitation in military reservations in accordance with Integrated Natural Resources Management Plans mutually agreed upon by the Secretary of Defense, the Secretary of the Interior, and the appropriate State agency designated by the State in which the reservation is located [16 U.S.C. 670a(a)]. This act also requires that military lands be managed to provide sustained multipurpose uses and to provide the public access, as appropriate, for those uses.

The *Wilderness Act*, 16 U.S.C. 1133, mandates that each agency administering any area designated as wilderness be responsible for preserving the wilderness character of the area. When the agency uses the area for another purpose, it is to do so in a manner that preserves the wilderness character.

The *Agriculture and Food Act (Farmland Protection Policy Act)* of 1981 (7 U.S.C. 4201 et seq.) states that the Department of Agriculture and other Federal agencies will take steps to assure that the actions of the Federal government do not cause the irreversible loss of United States farmland by converting it to nonagricultural uses when other alternatives are feasible.

DoD Directive 4715.3, Environmental Conservation Program, prescribes DoD policies, procedures, and standards for the conservation, management, and restoration of land and renewable natural resources consistent with and in support of the military mission and in consonance with national policies.

EO 11989, Use of Off-Road Vehicles (ORVs) on The Public Lands, specifies that ORVs may not be used without special use and location designation.

The *Coastal Zone Management Act* of 1972, 16 U.S.C. 1451-1464, last amended in November 1990, is the Federal legislation that governs the preservation and management of coastal waters in the nation.

The *Cave Resources Protection Act*, Public Law 100-691 (16 U.S.C. 4301 et seq.; 102 Stat. 4546), establishes requirements for the management and protection of caves and their resources on Federal lands, including allowing the land managing agencies to withhold the location of caves from the public and requiring permits for any removal or collection activities in caves on Federal lands.

The *Public Rangeland Improvement Act*, Congress establishes a national policy and commitment to inventory and identify current public rangeland conditions and trends

and to manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible for all rangeland values in accordance with management objectives and land-use planning processes.

The *National Trail System Act* of 1968, as amended, provides for the establishment of National Recreation and National Scenic and National Historic Trails. The Secretaries of, Interior or Agriculture may establish national Recreation Trails on land wholly or partly within their jurisdiction, with the consent of the involved State(s) and other land managing agencies, if any. National Scenic and National Historic Trails may only be designated by an act of Congress.

Air Quality

The *Clean Air Act* of 1972, as amended, regulates the prevention and control of air pollution. It requires States to develop State Implementation Plans (SIPs) that establish source-specific limitations for pollutants and that assign permitted levels of air pollution per locality for the State. The States may also set more stringent ambient air quality standards than the NAAQS. The CAA also provides the EPA with powers to regulate hazardous air pollutants. Title VI of the CAA amendments limits the emissions of chlorofluorocarbons, halons, and other halogenated chemicals that contribute to the destruction of atmospheric ozone.

Noise

The *Noise Control Act* of 1972 (40 CFR 202-205) established a national policy to promote an environment free from noises that jeopardize the public's health and welfare. The Act requires compliance with State and local noise laws and ordinances, except for military equipment or weapons designed for combat use.

DoD Directive 4165.57, Air Installation Compatible Use Zones (AICUZ) of November 1977. The AICUZ program is designed to work with local communities on controlling the land uses around military installations. Its objectives are to assess the environmental impact of aircraft operations with regard to generated noise and accident potential produced by proposed actions and both on and off-base noise sources, comply with Federal regulations, ensure the installation's mission is compatible with local land uses, and minimize environmental noise impact through engineering, operational controls, siting and architecture.

Chapter 7 of AR 200-1 establishes the *Installation Compatible Use Zone (ICUZ)* program as part of long-range land-use planning. Installations may be required to complete an ICUZ study to identify and control noise impacts.

Soils

The *Soil Conservation and Domestic Allotment Act* of 1935 establishes the goals of decreasing soil erosion and maintaining the navigability of rivers.

The *Soil and Water Resources Conservation Act* of 1977 promotes practices that conserve soil, water, and related resources that are beneficial to the nation.

Water Resources

The *Clean Water Act* (CWA), as amended through the enactment of the Great Lakes Legacy Act of 2002 (Public Law 107-303, November 27, 2002), requires that a permit be obtained for each point source pollutant discharge into surface waters. Discharge of pollutants is regulated under the National Pollutant Discharge Elimination System (NPDES). Permitting authority is usually delegated to the individual States by the EPA. Wastewater must be treated so that it meets permit standards before it can be discharged. The CWA also requires that some types of facilities develop and maintain Spill Prevention Control and Countermeasure Plans. Persons in charge of facilities must also report discharges of harmful quantities of oil or a hazardous substance to navigable waters or adjoining shorelines to EPA's National Response Center. Reportable discharge amounts vary by State and in some States the applicable State agency is the primary contact/responder. The CWA also regulates the discharge of dredged or fill material into waters of the United States.

Section 10 of the *Rivers and Harbors Act* of 1938 regulates the discharge of dredged or fill material into navigable waters.

The *Wild and Scenic Rivers Act* (16 U.S.C. 1271-1287, October 2, 1968, as last amended in 1996) restricts Federal agencies from conducting projects or supplying licenses that would have a direct adverse effect on designated Wild and Scenic Rivers.

The *Fish and Wildlife Coordination Act*, (16 U.S.C. 661-667 et seq of March 10, 1934 as last amended in 1996) requires Federal agencies to consult with the Fish and Wildlife Service and State fish and wildlife agencies where the "waters of any stream or other body of water are proposed or authorized, permitted, or licensed to be impounded, diverted or otherwise controlled or modified" by any agency under a Federal permit or license. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources.

The *Safe Drinking Water Act* requires the EPA to set primary drinking water regulations in terms of Maximum Contaminant Levels (MCL) for any pollutants that may have adverse effects on human health. Water supply facilities are required to regularly analyze treated water and to notify customers if the water quality falls below these standards.

Section 404 of the Clean Water Act, 33 U.S.C. 1344, requires that all discharges of dredged and fill material in the waters of the United States, including wetlands, must meet the requirements of EPA's 404(b)(1) guidelines (40 CFR 230) and obtain water

quality certification from the State (33 U.S.C. 1341), unless exempted by Congress through implementation of Section 404(r).

EO 11988, Floodplain Management, requires that Federal agencies preserve the natural and beneficial values served by floodplains while managing Federal lands. Activities in floodplains must be evaluated for their impacts during project planning, and alternative sitings outside the floodplain must be considered.

The *Watershed Protection and Flood Control Act* of 1954, as amended (16 U.S.C. 1001 et seq.), states that the Federal government will cooperate with States, soil or water conservation districts, flood prevention or control districts, and other local agencies to prevent damages; further the conservation, development, and use of land; and, thereby, preserve, protect and improve the nation's land and water resources and quality of environment.

The *Food Security Act* of 1985 (Farm Bill) (16 U.S.C. 3811 et seq.) encourages the removal of marginal agricultural lands from production and provides opportunities for wetland habitat restoration and protection. It allows for wetlands on private lands to be set aside in conservation easements in exchange for debt relief to the landowners. Additionally, this act states that farmers who convert wetlands for planting after enactment are ineligible for most farmer program subsidies.

Biological Resources

The *Migratory Bird Treaty Act* of 1918, 16 U.S. Code (U.S.C.) 703-711, last amended in December 1989, is a Federal law that enforces international conventions to protect migratory birds and game animals to which the United States is a party. Among other provisions, unless permitted by regulations, it is unlawful to pursue, hunt, take, capture, kill; attempt to take, capture, or kill; or possess any migratory bird included in the terms of the conventions for the protection and conservation of migratory birds and game mammals between the United States and Soviet Union (now Russia), the United States and Mexico, and the United States and Japan (16 U.S.C. 703). This law includes essentially all species of birds, not just those typically considered migratory. Exceptions include Rock Dove (pigeon) and European Starling.

The *Bald and Golden Eagle Protection Act* (16 U.S.C. 668-668c) makes it illegal to import, export, or take bald or golden eagles, or to sell, purchase or barter their parts or products made from them, including their nests or eggs.

The *Lacey Act* (18 U.S.C. 42; 16 U.S.C. 3371-3378) provides authority to the Secretary of the Interior to designate injurious wildlife and ensure humane treatment of wildlife shipped to the United States. Further, it prohibits the importation, exportation, transportation, sale, or purchase of fish and wildlife taken or possessed in violation of State, Federal, Indian tribal, and foreign laws.

Executive Order (EO) 11987, Exotic Organisms, requires executive agencies to restrict the introduction of exotic species into natural ecosystems that they own or lease and encourage the States to prevent such introductions.

The *Federal Noxious Weed Act*, Public Law 93-629 (7 U.S.C. 2801 et seq., 88 Stat. 2148), enacted January 3, 1975, established a Federal program to control the spread of noxious weeds. The Secretary of Agriculture was given the authority to designate plants as noxious weeds by regulation, and the movement of all such weeds in interstate or foreign commerce was prohibited except under permit. The secretary was also given authority to inspect, seize, and destroy products and to quarantine areas, if necessary, to prevent the spread of such weeds. The Secretary was also authorized to cooperate with other Federal, State, and local agencies; farmers associations; and private individuals in measures to control, eradicate, or prevent or retard the spread of such weeds.

Military Reservations and Facilities: Hunting, Fishing, and Trapping (Public Law 86-337, 10 U.S.C. 2671) requires that all hunting, fishing, and trapping on DoD Component installations/civil works (CW) facilities be in accordance with the fish and game laws of the State in which it is located and that appropriate State licenses for these activities be obtained.

The *Airborne Hunting Act*, Public Law 92-159, approved November 18, 1971 (85 Stat. 480), and subsequently amended by Public Law 92-502, approved October 28, 1972 (86 Stat. 905), prohibits shooting, or attempting to shoot, or harassing any bird, fish, or other animal from aircraft except for certain specified reasons, including protecting wildlife, livestock, and human life as authorized by a Federal- or State-issued license or permit. States authorized to issue permits are required to file reports with the Secretary of the Interior.

The *Waterfowl Depredations Prevention Act* (7 U.S.C. 442-445; Chapter 512; July 3, 1956; 70 Stat. 492) authorizes the Secretary of the Interior to use surplus grain owned by the Commodity Credit Corporation to feed waterfowl to prevent crop damage. Findings regarding possible crop damage are to be made by the Secretary of the Interior, and grain is to be used to lure waterfowl away from crops while not exposing them to the risk of being shot over areas to which they have been lured.

The *Anadromous Fish Conservation Act* of 1965 (16 U.S.C. 757a et seq.) authorizes the Secretaries of the Interior and Commerce to enter into cooperative agreements with the States and other non-Federal interests to conserve, develop, and enhance anadromous fish, including those in the Great Lakes, and to contribute up to 50percent as the Federal share of the cost of carrying out such agreements. Among other efforts, the U.S. Fish and Wildlife Service (USFWS) is authorized to conduct studies and make recommendations to EPA concerning measures for eliminating or reducing polluting substances detrimental to fish and wildlife in interstate or navigable waters or their tributaries.

In the *Wild, Free-Roaming Horses and Burros Act* (16 U.S.C. 133d-1340), Congress found that wild, free-roaming horses and burros are living symbols of the historic and pioneer spirit of the west; that they contribute to the diversity of life forms within the nation and enrich the lives of the American people; and that these horses and burros are fast disappearing from the American scene. Congress declared a policy that wild free-roaming horses and burros will be protected from capture, branding, harassment, or death; and they are to be considered in the area where presently found as an integral part of the natural system of the public lands.

Endangered Species

The *Endangered Species Act* (ESA) of 1973, 16 U.S.C. 1531-1547, et seq., last amended in October 1988, prohibits the importation, exportation, taking (harassing, harming, capturing, or killing), and commercialization in interstate or foreign commerce of fish, wildlife, and plants that are listed as threatened or endangered species. The act also implements the provisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Under ESA, all Federal departments and agencies must seek to conserve endangered species and threatened species and must use their authorities to further the purposes of this act. To this end, they are required to ensure that any actions that they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or adversely modify or destroy their critical habitat.

Wetlands

EO 11990, Protection of Wetlands, requires Federal agencies "to avoid ... adverse impacts associated with the destruction or modification of wetlands … wherever there is a practicable alternative." Projects in wetlands will include "all practicable measures to minimize harm to wetlands ...."

Cultural Resources

The *National Historic Preservation Act* of 1966, as amended, established the national historic preservation program, which implements the Federal government's policy on historic preservation. The National Historic Preservation Act created the Federal system for identifying and registering historic properties, established a Federal-State partnership to promote the preservation of such properties, and gave Federal agencies responsibility for considering the effects of their actions on such properties.

At the State level, the *State Historic Preservation Officer (SHPO)* provides assistance in determining cultural significance and eligibility for the National Register, but may also nominate properties, irrespective of ownership. The SHPO must be consulted whenever there is a Federal undertaking and during development of cultural resources plans. States may also issue regulations designating State historical sites.

EO 11593, Protection and Enhancement of the Cultural Environment, requires Federal agencies to administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations. Federal agencies must initiate measures necessary to direct their policies, plans, and programs in such a way that Federally owned sites, structure, and objects of historical, architectural, or archeological significance are preserved, restored, and maintained for their inspiration and benefit of the people. Most provisions of this EO have been codified in the National Historic Preservation Act.

Under the *Public Buildings Cooperative Use Act* of 1976, last amended November 1988, the Administrator of General Services must, among other duties, acquire and use space in suitable buildings of historic, architectural, or cultural significance, unless use of such space would not prove feasible and prudent compared with available alternatives (40 U.S.C. 601a(a)(1)).

The *Archaeological Resources Protection Act* (ARPA) of 1979, 16 U.S.C. 470aa-470mm, last amended in October 1988, secures for the present and future benefit of the American people the protection of archaeological resources and sites that are located on public lands and Indian lands. The law fosters increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals having collections of archaeological resources and data that were obtained before 1 October 1979 (16 U.S.C. 470aa(b)). The act provides felony-level penalties for unauthorized excavation, removal, damage, alteration, or defacement of any archeological artifacts more than 100 years old on Federal lands and establishes a permitting system to authorize excavation or removal by qualified applicants.

The *Antiquities Act* of 1906, 16 U.S.C. 431-433, authorizes the President of the United States to declare historic landmarks, historic and Prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Federal government to be national monuments (16 U.S.C. 431). Permits for the examination of ruins, the excavation of archaeological sites, and the gathering of objects of antiquity upon the lands under their respective jurisdictions may be granted by the Secretaries of the Interior, Agriculture, and Army to institutions deemed properly qualified to conduct such examination, excavation, or gathering, subject to such rules and regulations as they may prescribe (16 U.S.C. 432). The Antiquities Act is partially superceded by ARPA.

The *Historic Sites Act* of 1935 makes it national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of citizens.

DoD Directive 4710.1, Archaeological and Historic Management, states that it is DoD policy to integrate archeological and historic preservation requirements of applicable laws with the planning and management of DoD activities. It assigns

responsibilities and briefly lists management procedures.

The *Native American Graves Protection and Repatriation Act* of 1990 requires consultation with the appropriate Native American tribes before excavating or removing Native American human remains and associated objects from Federal lands. This act also requires Federal agencies to inventory all Native American human remains and burial objects under their control and to repatriate those remains and objects to the appropriate Native American tribes. It also prohibits the intentional removal of Native American cultural items from Federal or tribal lands, except under an ARPA permit and in consultation with the appropriate Native American groups.

The *American Indian Religious Freedom Act* of 1978, Public Law 95-341 (42 U.S.C. 1996), states that it will be the policy of the United States to protect and preserve American Indian rights to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and native Hawaiians. These rights include, but are not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremony and traditional rites.

The Religious Freedom Restoration Act of 1993, states that the government shall not substantially burden a person's exercise of religion, unless it's the least structure means of furthering a compelling government interest.

Environmental Justice and Protection of Children

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low- income Populations requires that an environmental analysis team determine if the proposed action or any alternatives would create "disproportionately high and adverse human health or environmental effects on a minority or low-income population."

EO 13045, Protection of Children from Environmental Health Risks and Safety Risks directs Federal agencies to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and to ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

The *Americans with Disabilities Act* of 1990 provides a clear and comprehensive national mandate to eliminate of discrimination against individuals with disabilities and to provide clear, strong, consistent, enforceable standards addressing discrimination against these individuals.

Hazardous Materials

The *Occupational Safety and Health Act*, 29 U.S.C. 651-678, is a Federal statute

that governs the issues related to occupational safety and health. The Act is administered by the Occupational Safety and Health Administration (OSHA). The purpose and policy of this Act is to ensure every working man and woman in the nation has safe and healthful working conditions. This entails providing for those procedures that will help achieve the objectives of this act and accurately describe the nature of the occupational safety and health (29 U.S.C. 65 1 (b)(9)(10)(12)). Established procedures include (1) the development and publication of occupational safety and health standards, (2) an effective enforcement program, and (3) appropriate reporting procedures with respect to occupational safety and health.

The *Toxic Substances Control Act* (TSCA) of 1967, 15 U.S.C. 2601-2629, places on chemical manufacturers the responsibility to provide data on the health and environmental effects of chemical substances and mixtures and gives EPA comprehensive authority to regulate the manufacture, use, distribution, and disposal of chemical substances. Additionally, TSCA addresses asbestos, indoor radon, and lead-based paint issues.

The *Hazardous Materials Transportation Act* (HMTA) of 1975, 49 U.S.C. 1801-1819, et seq., is the Federal legislation that governs the transportation of hazardous materials in the nation. The objective of the HMTA according to the policy stated by Congress is "…to improve the regulatory and enforcement authority of the Secretary of Transportation to protect the Nation adequately against risks to life and property which are inherent in the transportation of hazardous materials in commerce." The HMTA empowered the Secretary of Transportation to designate as hazardous material any "particular quantity or form" of a material that "may pose an unreasonable risk to health and safety or property."

The *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) of 1980, as amended by the *Superfund Amendments and Reauthorization Act* (SARA) of 1986, 42 U.S.C. 9601-11050, 10 U.S.C. 2701-2810 et seq., provides EPA with the authority to clean up hazardous waste sites and details the procedures and standards which must be followed in remediating those sites. In addition, CERCLA contains provisions specifying when releases of hazardous substances must be reported and the procedures to be followed for the cleanup of Federal installations.

The *Emergency Planning and Community Right-to-Know Act* (EPCRA) of 1986 requires the use of emergency planning and designates State and local governments as recipients for information regarding chemicals and toxins used in the community.

EO 12843, Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances, requires Federal agencies to maximize the use of safe alternatives; evaluate the present and future uses of ozone-depleting substances, including assessing existing and future needs for such materials and evaluating the use of and plans for recycling; and revise their procurement practices

and implement cost-effective programs both to modify specifications and contracts that require the use of ozone-depleting substances and to substitute non-ozone-depleting substances to the extent economically practical.

The *National Fire Code, Flammable and Combustible Liquids Code*. The National Fire Protection Association (NFPA) prohibits the storage of Class I and Class II liquids in plastic containers in general-purpose warehousing

Pesticides and Residues

The *Federal Insecticide, Fungicide, and Rodenticide Act* (FIFRA) 1972 as amended, title 7 U.S.C. 136-136y, deals with the sale, distribution, transportation, storage, and use of pesticides. The Federal Environmental Pesticide Control Act of 1972, enacted as Public Law 92-516, amended the 1947 FIFRA (Public Law 80-102, June 25, 1947, 61 Stat. 163). The 1972 amendments established a program for controlling the sale, distribution, and application of pesticides through an administrative registration process under the Administrator of EPA. The amendments provided for classifying pesticides for "general" or "restricted" use. Restricted-use means that EPA has determined that the pesticide may cause adverse effects on the environment, even when it is applied exactly according to label instructions. This damage may include injury to the pest manager or other people unless additional precautions are taken. Restricted-use pesticides may only be applied by or under the direct supervision of a certified applicator.

The Law further stipulated that the application of pesticides must not jeopardize the existence of threatened or endangered species (40 CFR 171.9 and 50 CFR 402). Additionally, facilities are required to dispose of any pesticide, pesticide container, or pesticide residue in a manner consistent with labeling, not including open dumping or burning (40 CFR 165.7). The 1972 amendments also authorized States to regulate the sale or use of any pesticide within a State, provided that such regulation does not permit any sale or use prohibited by the Act. State pesticide regulatory programs are to be at least as stringent as FIFRA. State and local programs typically contain regulations that are tailored to an industry or activity which is prevalent or particularly sensitive in a State. Although DoD and Army regulations are generally more stringent, there may be cases where State and local pesticide regulations provide more stringent standards or specifically identify a requirement that may be qualitatively regulated under the Federal program. State and local pesticide programs generally include regulations that address the following topics:

(a) restrictions or requirements for the sale, distribution, or use of selected pesticides;

(b) disposal requirements for excess pesticides and pesticide wastes, such as pesticide containers;

(c) restrictions on the control of specific animal or insect species;

(d) specifications for bulk pesticide storage tank or storage facilities;

(e) operational requirements for selected application methods and

(f) record keeping and applicator certification requirements.

The *Food, Drug, and Cosmetics Act*, 21 U.S.C. Section 346a, et seq., EPA sets the tolerances for pesticide residues in food.

Food Quality Protection Act (FQPA) of 1996, The Secretary of Agriculture, in cooperation with the Administrator, shall implement research, demonstration, and education programs to support adoption of Integrated Pest Management. Integrated Pest Management is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks. The Secretary of Agriculture and the Administrator shall make information on Integrated Pest Management widely available to pesticide users, including Federal agencies. Federal agencies shall use Integrated Pest Management techniques in carrying out pest management activities and shall promote Integrated Pest Management through procurement and regulatory policies, and other activities.

The *Nonindigenous Aquatic Nuisance Prevention and Control Act* of 1990 (16 U.S.C. 4701) established a broad, new Federal program to prevent the introduction and control the spread of introduced aquatic nuisance species and the brown tree snake. The USFWS, the U.S. Coast Guard, EPA, the Army Corps of Engineers, and the National Oceanic and Atmospheric Administration were all assigned major, new responsibilities, including membership on an Aquatic Nuisance Species Task Force established to develop a program of prevention, monitoring, control, and study of nonindigenous aquatic nuisance species.

EO 11987, Exotic Organisms, requires that executive agencies, to the extent permitted by law, restrict the introduction of exotic species into the natural ecosystems on lands and waters that they own, lease, or hold for purposes of administration; and encourage the States, local governments, and private citizens to prevent the introduction of exotic species into natural ecosystems of the United States. Executive agencies, to the extent permitted by law, must restrict the use of Federal funds, programs, or authorities used to export native species for the purpose of introducing such species into ecosystems outside the United States where they do not naturally occur.

The *Federal Noxious Weed Act* of 1974 (7 U.S.C. 2801 et seq.) provides for the control of noxious plants on land under the control or jurisdiction of the Federal government.

DoD Instruction 4150.07 Pest Management Program, sets DoD policy to establish and maintain safe, effective, and environmentally sound IPM programs to prevent or control pests and disease vectors that may adversely affect readiness or military operations by affecting the health of personnel or damaging structures, material, or property.

AR 200-1 .Pest Management, implements the Army's pest management program to meet legal compliance requirements, comply with DoD and national policies, and support the military mission.

Solid Waste

The *Resource Conservation and Recovery Act* (RCRA) of 1976 governs the disposal of solid waste. Subtitle D of this act, as last amended in November 1984, Public Law 98-616, 42 U.S.C. 6941-6949a, establishes Federal standards and requirements for State and regional authorities respecting solid waste disposal. The objectives of this subtitle are to assist in developing and encouraging methods to dispose of solid waste that are environmentally sound and that maximize the use of valuable resources recoverable from solid waste. The objectives are to be achieved through Federal technical and financial assistance to States and regional authorities for comprehensive planning (42 U.S.C. 6941).

DoD Directive 4165.60, Solid Waste Management - Collection, Disposal, Resource Recovery and Recycling Program. Sets DoD policy and procedures for the DoD comprehensive program of solid waste collection, disposal, material recovery, and recycling in consonance EPA guidelines, NEPA and RCRA.

Hazardous Waste

RCRA, Subtitle C, Public Law 98616 (42 U.S.C. 6921-6939b), establishes standards and procedures for the handling, storage, treatment, and disposal of hazardous waste. It requires the reporting of hazardous waste, as well as permitting for its storage, transport, and disposal. Part C also includes provisions for oil recycling and Federal hazardous waste facilities inventories. RCRA prohibits the placement of bulk or non-containerized liquid hazardous waste or free liquids containing hazardous waste into a landfill. It also prohibits the land disposal of specified wastes and the disposal of hazardous waste through underground injection within 1/4 mi [0.40 km] of an underground source of drinking water.

The *Federal Facility Compliance Act* (FFCA) of 1992 provides for a waiver of sovereign immunity with respect to Federal, State, and local procedural and substantive requirements relating to RCRA solid and hazardous waste laws and regulations. Additionally it defines hazardous waste in relation to public vessels, expands the definition of mixed waste, addresses the issue of munitions, and discusses waste discharges to federally owned treatment works (FOTWs).

Pollution Prevention

The *Pollution Prevention Act* of 1990 encourages viewing waste more broadly to reduce pollution. All pollutants are to be minimized and waste creation is to be controlled, not only during the production process, but also in designing products that will have less impact on the environment while in use and after disposal.

EO 12873, Federal Acquisition, Recycling, and Waste Prevention, dated 20 October 1993, mandates waste prevention and recycling as a part of a Federal agency's daily operations. It requires each agency to set a goal for solid waste prevention and a goal for recycling to be achieved by 1995. Agencies are also required to set goals for increasing the procurement of recycled and other environmentally preferable products.

EO 12088, Federal Compliance with Pollution Standards, dated 13 October 1978, requires Federally owned and operated facilities to comply with applicable Federal, State, and local pollution control standards.

EO 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, dated 3 August 1993, requires that appropriate Federal facilities develop written pollution prevention plans. Federal agencies are required to conduct assessments of their facilities as necessary to verify development of these plans and of the facilities' pollution prevention program. Federal agencies will also develop voluntary goals to reduce the total releases of toxic chemicals to the environment. Off-site transfers of such chemicals for treatment and disposal are to be publicly reported.

APPENDIX E

EXAMPLES OF ACCEPTABLE IPM PROCEDURES

A. General Techniques.

1. Mechanical and Physical Control.

a. Mechanical and physical control either alters the environment in which a pest lives, traps or removes pests where they are not wanted, or excludes pests. Examples of this type control include harborage elimination through caulking or filling voids, mechanical traps or glue boards, screens and other barriers to prevent entry into buildings, mechanical weed removal, and hand removal.

b. A special case of physical control includes control burns. Many natural habitats evolved with wild burns that were typically of a high frequency but of a "cool burn" in nature. Ecosystem management attempts to replicate this pattern in both frequency and intensity.

2. Cultural Control. Strategies in cultural control involve manipulating environmental conditions to suppress or eliminate pests. Eliminating food and water for pests through good sanitary practices is the most important cultural control method generally employed. General cleanliness in buildings, break rooms, storage areas, and the like, may prevent many pest populations from becoming established or from increasing beyond a certain size.

3. Biological Control. Biological control uses predators, parasites, or disease organisms to control pest populations. Organisms used for biological control are tested and approved for use by the U.S. Department of Agriculture. Release of nonnative species into the environment must be coordinated with (and may require the approval of) the appropriate Federal, State, and local agencies. Examples of biological control practices on Army installations:

Fort Lewis and Fort Drum for Purple Loosestrife - three biological control agents *(Galerucella calmariensis, Galerucella pusilla, Hylobius transversovittatus)* has been released for biological control of Purple Loosestrife.

Fort Hunter Liggett (FHL) for Yellow Star-thistle – five organisms are currently introduced at FHL for biological control of yellow star-thistle:

- *Eustenopus villosus* (hairy weevil)
- *Bangasternus orientalis* (seed-head weevil)
- *Larinus curtus* (flower weevil)
- *Urophora sirunaseva* (seed head fly)
- *Chaetorellia succinea* (false peacock fly)

These organisms attack flower heads of star-thistle and produce larvae that develop within the seed head and feed on seeds.

In March 2004, the introduction of the yellow star-thistle rust fungus *Puccinia jaceae* var. *solstitialis* was made at FHL. This organism reduces plant vigor and seed output.

Fort Jackson for Imported Red Fire Ants – *Pseudacteon tricuspis,* a phorid fly, has been released at Fort Jackson for the control of Imported Red Fire Ants. The fire ant decapitating phorid flies kill adult fire ants by developing in the ant's head.

There are three typical approaches to biological control classical biological control, conservation, and augmentation of natural enemies.

4. Chemical Control. Pesticides kill living organisms, both plants and animals. At one time, they were considered to be the most effective control available, but pest resistance has rendered many ineffective. In recent years, the trend has been to use pesticides that have limited residual action. While this has reduced human exposure and lessened environmental impact, the cost of pesticide use has risen due to the need for more frequent applications. Only hand application techniques performed by a certified applicator on relatively small sites are addressed in this document. DoD pesticide applicators must complete the DoD certification program to work on federally owned lands. Contract pesticide applicators must be State certified.

B. Pest Specific Management Procedures.

Example management procedures for specific pests are provided in Appendix A. These outlines incorporated IPM procedures and are provided as guidance for pest managers. These outlines are based on proven procedures that have been reviewed by pest management experts.

C. New Technologies for Integrated Pest Management

1. New pest control technologies have been found to be very promising for use in IPM programs. These techniques have been found to effectively control pests without the use of pesticides; however, new studies show that the overall level of pest control is enhanced when combined with pesticides. In addition, pesticide use is substantially reduced when combined with these new technologies, reducing pesticide quantities in some cases to one quarter to one eighth of previous quantities.

2. Heat has proven to be an effective non-toxic technique to control pests such as cockroaches, termites, fire ants, and stored product pests. Thermal cockroach control was developed as an alternative to traditional pesticide application for chronic cockroach infestations with high levels of resistance to pesticides in food service facilities. Even though this technique requires a relatively high initial investment, it does provide dramatic long-term reduction of difficult to control pesticide resistant cockroach populations with a minimal amount of pesticide use.

3. Using hot water for vegetation control. Hot water technologies have been evaluated as potential alternatives to herbicides for weed control. Super heated water is sprayed on the unwanted plants. The hot water damages the plant's protective waxy layer and causes the plant to die from dehydration. Hot water when applied to vegetation functions similarly to a post emergent herbicide killing the green vegetative portion of the plant above the ground. Since there are no residual toxic chemicals involved in controlling weeds with hot water, this control methodology provides a pesticide free option in specific areas where weed control is required near sensitive areas such as child day care centers, recreational areas, or water impoundments.

4. Using geographic information system (GIS) technology, spatial analysis and precision targeting techniques have been proven to enhance control while reducing pesticide use. A major challenge in pest management is getting the pesticide to the pest population while minimizing the impact of pesticides on the environment. To ensure maximum control, pesticides are generally applied to the entire area of suspected infestation. As a result, more pesticide is being used than necessary to control a pest population. The ability to document the spatial distribution of a pest population allows pest control personnel to focus controls on areas where they would be most effective. In one trial, 11 percent of an area was treated resulting in a 96 percent reduction in the pest. This ability to focus pest control (precision targeting) efforts on the pest populations dramatically improves pest management and reduces the amount of pesticides being applied to the environment.