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Department of  
Agriculture**

Marketing and  
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Programs

Animal and  
Plant Health  
Inspection  
Service

Plant Protection  
and Quarantine

Provisional Edition

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# Grasshopper Guidebook

## Provisional



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# Introduction

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## Purpose

This Program Guide replaces all editions of the United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA-APHIS-PPQ) Grasshopper Program Manual, which is now obsolete. This guide and its accessory documentation will provide the following:

1. Basic instructions for some APHIS administrative processes
2. Technical and operational program guidance and options
3. Some level of consistency within the APHIS Grasshopper/Mormon Cricket Suppression Program
4. Continuity with lessons learned in the past
5. An ongoing mechanism to communicate new developments and opportunities within the Grasshopper/Mormon Cricket Suppression Program

This guide will **not** provide the following:

1. All the answers to technical and operational questions
2. Restrictions that prevent program managers from making appropriate operational decisions and taking appropriate actions

## **Audience**

The Program Guide is intended to serve as a first stop for information for APHIS State Plant Health Directors (SPHDs), APHIS Office Managers, APHIS Contracting Officer's Representatives (CORs), and APHIS Project Directors. It may also be useful to public and private cooperators who manage grasshopper and Mormon cricket survey and suppression programs. We encourage State Departments of Agriculture and other potential users of this Program Guide to provide comments on how the Guide could be made more useful. Direct comments to this address:

Grasshopper Program Manager  
USDA-APHIS-PPQ  
2150 Centre Avenue, Building B-2E10  
Fort Collins, CO 80526

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## **How to Use This Guidebook**

This guidebook is available in three formats:

- ◆ Online ([http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/index.shtml](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/index.shtml))
- ◆ PDF file which can be downloaded and stored on a personal computer
- ◆ Hard copy which may be printed from the above sources



This guidebook contains many links to online resources. For that reason it is best used in electronic format while connected to the internet! If you are unable to access a link in this document, contact the PPQ Manuals Unit at 240-529-0350.



Revisions to this guidebook may be done on a continuous basis. Therefore, utilization of the online version or annual renewal of pdf and/or hard copy is recommended.

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## **Scope**

This guidebook covers grasshopper and Mormon cricket program activities on rangelands in seventeen western States (AZ, CA, CO, ID, KS, MT, ND, NE, NM, NV, OK, OR, SD, TX, UT, WA, and WY). APHIS may conduct programs on private as well as public rangelands.



## Goal of GH/MC Program

APHIS conducts surveys for grasshopper populations on rangeland in the Western United States, provides technical assistance on grasshopper management to land owners/managers, and cooperatively suppresses grasshoppers when direct intervention is necessary. APHIS would only treat grasshoppers when requested and needed. In some cases APHIS rangeland treatments protect not only the rangeland, but reduce the likelihood that the grasshoppers will move from the rangeland onto crops and other lands that border rangeland.

APHIS surveys grasshopper populations. Survey information is used by APHIS and land managers/owners to assess whether treatments may be warranted. Treatments must be requested from a Federal land management agency or a State agriculture department (on behalf of a State, a local government, or a private group or individual) that has jurisdiction over the land before APHIS could begin a treatment. Upon request, APHIS would then make a site visit to determine whether APHIS action is warranted by assessing various factors relevant to the infestation.

These factors include, but are not limited to, the pest species, maturity of the pest species population, timing of treatment, cost benefits of conducting the action, and ecological considerations.

Grasshopper surveys, conducted at certain times of the year, may show the potential for large grasshopper populations. Based on survey results, State and Federal officials may initiate early coordination of local programs and request APHIS assistance in a timely and effective cooperative effort.

APHIS' role in direct intervention of grasshopper outbreaks is to use insecticide treatments to suppress grasshopper populations to a level below that which constitutes an economic infestation. APHIS' treatment alternatives are analyzed in an Environmental Impact Statement (EIS) (see ["Scoping Methods" on page 6-1](#)). Treatments are generally carried out in conjunction with and complement Federal, State, and private efforts to prevent, control, or suppress grasshopper outbreaks. When a grasshopper infestation reaches a level of economic infestation, direct intervention may be the most viable option to protect rangeland.

## Authorities

APHIS' overall authority for this suppression program is based on Section 417 of the Plant Protection Act of 2000 (7 U.S.C. § 7717).

Section 417 of the PPA (7 U.S.C. § 7717) ([Appendix A](#)) authorizes efforts to minimize the economic impacts of grasshoppers. Section 417(a) states that subject to the availability of funds, the Secretary “shall carry out a program to control grasshoppers and Mormon crickets on all Federal lands to protect rangeland.”

Section 417(c)(1) states that “Subject to the availability of funds pursuant to this section, on request of the administering agency or the agriculture department of an affected State, the Secretary, to protect rangeland, shall immediately treat Federal, State, or private lands that are infested with grasshoppers or Mormon crickets at levels of economic infestation, unless the Secretary determines that delaying treatment will not cause greater economic damage to adjacent owners of rangeland.” Section 417(c)(2) states, “OTHER PROGRAMS.—In carrying out this section, APHIS shall work in conjunction with other Federal, State, and private prevention, control, or suppression efforts to protect rangeland.”

APHIS and three Federal Land Management Agencies (Bureau of Land Management, Forest Service, and Bureau of Indian Affairs) have signed Memoranda of Understanding (MOU) detailing cooperative efforts on suppression of grasshoppers and Mormon crickets on federally managed lands under their jurisdiction ([Appendix B](#)). These MOUs clarify that APHIS will prepare and issue to the public site-specific environmental documents that evaluate potential impacts associated with proposed measures to suppress economically damaging grasshopper populations. The MOUs also state that these documents will be prepared under the APHIS National Environmental Policy Act (NEPA) implementing procedures with cooperation and input from the federal land managers. The MOUs further state that the responsible federal land manager will request, in writing, the inclusion of appropriate lands in the APHIS suppression project when treatment on federally managed land is necessary. The federal land manager must also prepare a Pesticide Use Proposal.

APHIS and State Departments of Agriculture cooperate under MOUs that provide for cooperative efforts in suppression of grasshoppers and Mormon crickets. The specifics of the agreements may vary from state to state, but they generally franchise cooperative programming that allows the states and APHIS to utilize their unique authorities for grasshopper management.

APHIS consults with Native American tribes prior to any treatments on tribal lands or trust lands.

# 2

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## Administrative Processes

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### Funding for APHIS Surveys

Appropriations for grasshopper management may be made annually by the U.S. Congress. These appropriations cover not only survey activities, but treatment activities as well. Upon passage by Congress, the funds are then allocated by APHIS Headquarters to the Western Regional Office (WRO).

The WRO then allocates the funds to the individual work units. Allocation of funds cover costs such as salaries, benefits, travel, supplies, equipment and other expenses needed to support the program.

Allocations to the work units are based on funding requests from the work units, State Plant Health Directors (SPHDs), and regional program managers. The requests are then compiled and reconciled against the total amount of funding received in the WRO for grasshopper programs and adjustments (increases or decreases to funding requests) are made as necessary. These adjustments are made based on interaction between the regional budget analysts and the various work units.

After allocations have been made to the work units, the regional budget office monitors the spending of funds through the status of funds (SOF) process. A report showing year-to-date spending along with projected spending through the end of the fiscal year is created and sent to the work units on a monthly basis.

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## Funding for APHIS Treatments

Funding for grasshopper treatments comes from the same appropriation bill as the survey money. However, the funding for treatment programs is not allocated separately by Headquarters to the WRO. Only one allocation of grasshopper funding is made to the WRO and it covers all activities, regardless of whether it is for survey or treatments.

The determination as to what funding is provided for grasshopper treatments is determined by the need assessed by the SPHD's office along with the WRO program managers. When SPHDs or their designees determine treatments are necessary, the SPHD office prepares a Detailed Work Plan (DWP) for submission to WRO. The DWP is available at the following site:

<http://ppqwr.aphis.usda.gov/westernregion/LinkClick.aspx?link=Project+Planning+%26+Reporting+Worksheet+07.doc&tabid=266&mid=674>

The DWP is prepared as early as possible after it has been determined that treatment(s) will be necessary. The DWP is part of a three-part Project Planning and Reporting worksheet. The worksheet is discussed thoroughly on the following pages. Parts of the worksheet include:

- Part A: The detailed workplan
- Part B: Aerial contract site specific description
- Part C: Post treatment report

The requests are then compiled and reconciled against the total amount of funding received in the WRO for grasshopper programs and adjustments (increases or decreases to funding requests) are made as necessary. These adjustments are made based on interaction between the regional budget analysts and the SPHD offices.

Depending on the type of land that is treated (Federal, State, or Local), a cost share component of the program might exist in which State and Local authorities would repay APHIS for grasshopper treatments. For this reason, it is necessary to separate these costs from the survey costs. This is done by assigning a separate accounting code which is charged for all grasshopper treatment activities.

After allocations have been made to the work units, the regional budget office monitors the spending of funds through the SOF process. A report showing year-to-date spending along with projected spending through the end of the fiscal year is created and sent to the work units on a monthly basis.

## Cooperative Agreements

Cooperative agreements for grasshopper management activities may include agreements with states to conduct some aspects of grasshopper management programs in conjunction with APHIS or agreements with ranchers to provide funding to APHIS for treatments on private rangelands.

The cost share mandated by the Plant Protection Act requires process and documentation to ensure that all parties are informed and willing to meet mutual commitments.

All treatment programs on private land are initiated by the voluntary activities of ranchers, land managers, and other private land owners before the control program begins. Assistance from APHIS and/or the State is based on a commitment to share program costs before a program is initiated. Federal or State land managers must submit a letter of request for their land to be treated. Narrative work plans are prepared to describe who is accountable for what and these are attached to the agreement. All costs are tracked by the work unit and the WRO processes the bill for payment.

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## Contracting for Insecticide Applications

For overall information on aerial applications, refer to PPQ's Aerial Application Manual ([http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/downloads/aam.pdf](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/aam.pdf))

All aerial applications are contracted to private companies. A Statement of Work (SOW), formerly known as a Prospectus, is annually updated and is maintained at the following site:

<http://ppqwr.aphis.usda.gov/westernregion/Default.aspx?alias=ppqwr.aphis.usda.gov/westernregion/grasshopper>

The SOW provides all the general information that aerial applicators need for meeting contract requirements. However, specific information will be required to be developed on each treatment program. The specific information is provided in the DWP and Aerial Contract Site Specific Description.

The DWP and the Aerial Contract Site Specific Description are elements of a three-page fillable form found at the following website:

<http://ppqwr.aphis.usda.gov/westernregion/LinkClick.aspx?link=Project+Planning+%26+Reporting+Worksheet+07.doc&tabid=266&mid=674>

DWPs are submitted to the WRO to set aside funding for treatment programs. Instructions on filling out the DWP follow:

- ◆ *DWP #*: Enter the two-letter State ID, four-digit year, and two-digit number assigned by the State, starting with 01 each year.
- ◆ *Rev#*: Enter the sequential number of each revision of DWP and succeeding pages (aerial contract site specific description and post treatment report)
- ◆ *Date Revised*: Enter the calendar date of the most recent revision.
- ◆ *Est. Starting Date*: Enter the calendar date when first treatments are anticipated.
- ◆ *Counties*: Enter the names of all counties in which treatments are anticipated.
- ◆ *Pest*: Enter the common or scientific name(s) of the grasshopper species which justifies the treatment.
- ◆ *Environmental assessment name/number*: Enter the title and number of the site specific environmental assessment, which covers the upcoming treatment (see [“Environmental Assessments \(EAs\)” on page 6-5](#)).
- ◆ *Date FONSI signed*: Enter the date when the SPHD signed the finding of no significant impact, which covers the upcoming treatment (see [“Environmental Assessments \(EAs\)” on page 6-5](#)).
- ◆ *Types of environmental monitoring anticipated*: Enter none, standard, or special. Monitoring of neat and mixed insecticide is normally required. Additional monitoring may include vegetation, water, dye cards, or other items (see [“Environmental Monitoring” on page 8-1](#)). Resources needed may include personnel not available within State or specialized equipment.
- ◆ *Endangered Species Act Section 7 local consultation status*: Check box to show the status of local consultation with U.S. Fish and Wildlife Service and/or NOAA Fisheries regarding endangered species (see [“Local Informal Consultations” on page 6-6](#)).
- ◆ *Land Ownership*: For each land owner or manager category, list the designation (for example: private, BLM, Forest Service). Each land management entity will determine the contents of the rest of the cells on the same line. Total acres within the treatment block should be entered in the est. acres cell. For Letter(s) of Request, Cooperative Agreement, and Escrow Letter cells, enter Y or N (yes or no) to indicate if the document has been finalized.

- ◆ *Estimated Costs:* Enter the estimated dollar amount for total treatment costs, including personnel, travel, chemicals, aerial contracts, supplies and equipment, and other items directly billable to the proposed treatment.
- ◆ *RAATS Used?:* Click the box to indicate if Reduced Agent Area Treatment protocol will be used (see [“Reduced Agent Area Treatments \(RAATs\)”](#) on [page 7-5](#)).
- ◆ *Pretreatment Densities:* Enter the average grasshopper or Mormon cricket population density within the treatment area.
- ◆ *Remarks:* Enter any supplemental information regarding administration of the project.
- ◆ *Signature of PPQ Plant Health Director:* Sign a hard copy for the files and indicate signature on digital copies for electronic transfer.
- ◆ *Date:* Enter date of signature.

Revisions of the DWP may be required as additional information becomes available or as additional steps are taken to prepare for treatments. All revisions should be submitted to the WRO and maintained in local files.

Aerial Contract Site Specific Description is used to inform potential contractors of the specific needs on a treatment project. This document is provided to the WRO and to the contracting office in Minneapolis — Marketing and Regulatory Programs Business Services (MRPBS). The primary contact for grasshopper suppression program contracts is Jason Wilking (Phone: 612-336-3210; Fax: 612-370-2106).

Instructions specific to filling out the Aerial Contract Site Specific Description follow:

- ◆ *Type of Contract:* Refer to SOW; select the contract type most applicable to the proposed treatment project and check the appropriate box.
- ◆ *Pesticide:* Indicate the total number of gallons or pounds of insecticide to be applied. Check the appropriate box for pounds or gallons. Check plus or minus 25 percent box if a standard 25 percent variability is anticipated. Normally a contract is written for the expected amount of treatment with the understanding that the actual amount will range within 75 percent to 125 percent of the estimate. Check the appropriate box for grasshopper or Mormon cricket. List the number of acres on which treatment will be applied (not the entire total of the treatment block if RAATS is used).
- ◆ *Pesticide:* List the name of the pesticide. List application rate in pounds of bait or ounces of liquid insecticide per acre.

- ◆ *Pesticide will be delivered in:* Check appropriate box for container type. Indicate amount per container.
- ◆ *Pesticide loading equipment required:* Check Yes box if contractor is required to provide loading equipment.
- ◆ *Pesticide mixing equipment required:* Check Yes box if contractor is required to provide mixing equipment. If Yes, specify type.
- ◆ *Water Transport:* Check Yes box if contractor is required to transport water to the mixing and loading site.
- ◆ *State:* Spell out name of State (do **not** abbreviate).
- ◆ *Location of treatment block(s):* Describe the area geographically using geopolitical references as well as appropriate landmarks. Indicate if Geographic Information Systems (GIS) files can be made available to the contractor.
- ◆ *Location of pesticide storage site(s):* If **not** a full-service contract and contractor will be required to transport pesticide from a storage site to the loading/mixing site, list the physical location of the pesticide storage site.
- ◆ *Location of airstrips:* List the physical location of the airstrips.
- ◆ *Estimated average ferry distance:* List the mileage between the airstrip and the treatment block(s), including allowance for deviation to avoid congested areas if necessary.
- ◆ *Elevation range of work area:* List minimum and maximum elevations above sea level for the treatment block(s).
- ◆ *Minimum block size:* List in acres the size of the smallest treatment block in the proposed project.
- ◆ *Area not treated:* Enter an estimate of the percentage of acres within treatment blocks which will be excluded from treatment due to RAATS applications or sensitive sites.
- ◆ *Site specific information:* Roughly estimate the percentages of treatment blocks which represent criteria specified on worksheet.
- ◆ *Application Aircraft required:* Check appropriate box for fixed wing or helicopter. Indicate the category and number (C or D — see SOW for definitions) of aircraft required. If multiple aircraft will be required and must closely match one another in performance, indicate appropriately in Matched and Same Make & Model boxes.
- ◆ *Observation Aircraft required:* Check Yes box if size of project or special needs require observation aircraft.
- ◆ *Observation Speed capability:* If observation aircraft are required, enter 150 or 130 mph as appropriate for category C or D aircraft.



- ◆ *Aircraft Guidance and/or Flight Data Logging Requested:* Unless circumstances preclude their use, check the Yes box and the DGPS (tracking/recording) box. Hand flagging is not normally used in contemporary programs.
- ◆ *Estimated reporting date:* List the date at least one day before estimated starting date. On larger, complex programs, more than one day may be required for check-in and familiarization.
- ◆ *Estimated starting date:* List the date when treatments are anticipated to start.
- ◆ *Number of operational hours allowed to complete the contract:* List the number of hours including flying, loading, and mixing required to complete the contract.
- ◆ *Contracting Officer's Representative (COR):* Insert the name and phone number of the qualified COR who is nominated to be responsible for the program. The Contracting Officer will designate the COR when the contract is awarded.
- ◆ *Any additional information:* Include a map of the area if possible.

Upon completion, fax the Aerial Contract Site Specific Description to Jason Wilking or the designated contracting officer at MRPBS (612-370-2106).

Page 3 of the Project Planning and Reporting worksheet is the post treatment report. This report is to be submitted as described in [Treatment Reporting](#).

### **Contracting Officer's Representative (COR)**

The COR is the individual often called a program manager. CORs assist the contracting officer by observing and documenting program activities in the field. For a description of the COR's duties and training requirements, refer to the following site:

[http://inside.aphis.usda.gov/mrpbs/manuals\\_guides/cor/cor\\_training.html#6](http://inside.aphis.usda.gov/mrpbs/manuals_guides/cor/cor_training.html#6)

It is imperative that all States anticipating grasshopper suppression contracts maintain qualified COR personnel.

### **Contracting with Integrated Acquisition System (IAS)**

Office managers with access to IAS enter relevant information into the requisition module and call the contracting officer to notify him/her that an aerial treatment requisition has been placed. The contracting officer will use specific information in conjunction with the SOW to solicit bids from qualified aerial applicators. After receiving bids, the contracting officer will discuss bids with the COR prior to awarding the bid. Upon award of the bid, the COR and the contractor will make arrangements for reporting and treatments. Upon completion of the contract or upon completion of portions of large contracts, the COR in conjunction with the office manager will submit delivery invoices to IAS for payment.

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## **Staffing**

### **Regular Staff**

Full-time PPQ staffing in the 17 western grasshopper States provides a nucleus for technical, administrative, and program activities. Overall leadership of grasshopper programs within a State may be executed by SPHDs or delegated to Domestic Program Coordinators or other staff. PPQ Office Managers provide administrative leadership to programs within their State. PPQ Officers and Technicians provide resources for survey and treatments. Field GIS Specialists provide data management support to the States in their service areas. GIS staffing can be found at the following link:

<http://ppqwr.aphis.usda.gov/westernregion/IT/GIS/tabid/2248/Default.aspx>

WRO provides technical guidance, budgetary support, cooperative agreement management assistance, and data management support.

APHIS headquarters manages interagency issues with Federal Land Management Agencies, overall budget development, oversight of environmental documentation and monitoring, and policy coordination within the program.

### **Temporary Duty (TDY) Staff**

In outbreak situations, regular staff may not be able to accomplish treatment programs without additional trained and experienced personnel. Procedures are in place to provide experienced grasshopper program personnel through TDY assignments from their regular duty station to grasshopper suppression programs in other States. Requests for TDY assistance should be forwarded to the WRO through the Grasshopper Regional Program Manager.

## Intermittent Hiring Practices

Historically, grasshopper survey and treatment programs have utilized intermittent personnel hired under Limited Appointment (LA) Authority.

The WRO has a process in place concerning the recruitment and hiring of new LA appointments. The new hire paperwork must be submitted to the WRO in a timely manner, rather than with the intent of the employee reporting for duty within the next few business days. The WRO and MRPBS Human Resources in the Minneapolis processing department requires approximately two weeks to accurately process the new hire. The application must be filled out completely and accurately or there may be additional delays. The application process is detailed through the *Guide to Submitting New-Hire Paper Work* which can be accessed through a link on the MRPBS Human Resources Website which is under revision at this writing. The following link may provide access:

[http://www.aphis.usda.gov/mrpbs/hr\\_policies\\_procedures.html](http://www.aphis.usda.gov/mrpbs/hr_policies_procedures.html)

Documentation which should be submitted to the WRO includes the following:

- ◆ SF 306, Declaration of Federal Employment
- ◆ Form OF-612 or a resume
- ◆ College transcripts if available
- ◆ Form I-9, Employment Eligibility Verification

Once the application package is submitted to the WRO Resource Management Staff, the applicant's documentation will be evaluated for accuracy and the applicant's qualifications will be rated. If the applicant is judged to be qualified for the position, the submitting office will be notified that they may create an Excepted Appointment Not to Exceed SF-52 (Excp. Appt. NTE). Once the SF-52 is created, an e-mail will be sent by the requestor to [WRPPQRM@aphis.usda.gov](mailto:WRPPQRM@aphis.usda.gov) asking that the SF-52 be processed. The e-mail should state the SF-52 number, the requestor's name and the nature of action of the SF-52. The proper Resource Management Staff member will process the SF-52 and the requestor will receive an e-mail notification that the SF-52 has been submitted.

At times there may be a critical need to bring the intermittent employee on board quickly, however they should be interviewed and requested for hire at least two weeks before they are needed. If there are extenuating circumstances that require a short turn-around, Resource Management Assistants may be able to expedite the process in extreme situations.



# 3

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## Employee Safety

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### Hazard Assessment

All Animal and Plant Health Inspection Service (APHIS) employees should complete APHIS Form 29 <http://www.aphis.usda.gov/library/forms/pdf/aphis29.pdf> so that hazards in their workplace can be assessed. This assessment should be performed as early as possible so that testing and protective measures may be implemented if required. Fax the completed form to Federal Occupational Health (FOH) at 415/437-8008 attn: Judy Ma and to Debra Shambaugh 970/494-7501. FOH will provide notification of testing and protective measures that employees should follow.

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### Pesticide Safety

Grasshopper program workers may be exposed to insecticides, so certain precautions are necessary. Applicators must protect themselves, others, and the environment wherever and whenever they apply pesticides.

#### Personal Protection

Personal protection includes development of good work habits, familiarity with how to safely apply insecticides, and use of personal protective equipment (PPE).

### Sources of Personal Protection Information

Information on personal protection can be found in the same references that provide pesticide handling procedures. These sources include labels, the Standard Pesticide User's Guide, emergency and information services, and Agency memorandums, directives, and manuals including the APHIS Safety and Health Manual. The APHIS Safety and Health Manual is available at the following address:

[http://inside.aphis.usda.gov/mrpbs/manuals\\_guides/safety\\_health\\_wellness\\_manual/sh\\_manual\\_toc.html](http://inside.aphis.usda.gov/mrpbs/manuals_guides/safety_health_wellness_manual/sh_manual_toc.html)

This manual contains several sections that are related directly to pesticide safety, as listed below:

- ◆ Chapter 11 covers personal protection
  - ❖ Section 1 deals with personal protective equipment
  - ❖ Section 3 explains the APHIS respirator program guidelines
  - ❖ Section 4 explains the APHIS contact lens policy

### General Rules to Follow for Personal Protection

PPE is often required by pesticide labels. Common sense also dictates use of PPE to reduce exposure to insecticides. For your personal protection, follow these rules:

- ◆ Wear protective clothing, gloves, boots
  - ❖ Wear a long-sleeved work shirt
  - ❖ Wear a head covering during aerial application
  - ❖ Wear pants legs outside of your boots
  - ❖ Wear clean work clothing daily
- ◆ Keep pesticide-contaminated clothing separate from all other laundry from removal through wash cycle
- ◆ Use proper goggles and respirators during pesticide use
  - ❖ Avoid breathing a spray mist or fine airborne particles
  - ❖ Avoid pesticide contact with eyes, skin, or clothing
  - ❖ Test-fit respirators
- ◆ Use a non-absorptive headband
- ◆ Do not eat, drink, or use tobacco while working with a pesticide
- ◆ Do not take pesticides internally
- ◆ Wash hands and face before eating, drinking, or using tobacco

## APHIS Pesticide Applicator Certification

Any EMPLOYEE who applies pesticides, has the potential to apply pesticides, or oversees a program or employee that applies pesticides will be required to meet APHIS competency standards for certification as a Regulatory Pesticide Applicator, known as Pesticide Certification. Additionally, the State in which the operations occur may require State Pesticide Applicator Certification. Many States have reciprocity with APHIS for dual certification.



For any SPHD or supervisor that does not have staffing layers between you and the field program or field employee, the above applies to you.

If you are a SPHD or supervisor to which the above applies, and are not certified, contact Debra Shambaugh immediately to begin the process of Pesticide Certification.

For expired certifications; recertification will include the following:

1. Core Pesticide Training (independent study) at work location  
AND
2. Fumigation Workshop (2 days) at the Professional Development Center (PDC)

Any EMPLOYEE who is NOT certified as a Regulatory Pesticide Applicator, (or your certification status has lapsed); cannot use, supervise or monitor the use of pesticides.



See below for clarification on Seasonal employees.

Any seasonal employee applying pesticides or has the potential to apply pesticides must be:

1. Directly supervised by a Regulatory Pesticide Applicator. (Directly supervised means: Provisions must be in place for the employee to be able contact the supervisor.) Please see the CFR wording below<sup>1</sup> (Mandatory) OR
2. Certified as a Regulatory Pesticide Applicator (not Mandatory)



In addition to the above: State jurisdiction, may require anyone using pesticides to be certified. This requirement must be followed.

Initial Regulatory Pesticide Applicator Certification for all employees (including seasonals) must include the following:

1. Core Pesticide Training (independent study) at work location  
AND
2. Fumigation Workshop (2 days) at PDC.



If seasonals completed the Core Pesticide Training without the 2-day Workshop (considered abbreviated), based on a waiver from the Regional Office, they are **not** certified as a Regulatory Pesticide Applicator and must be directly supervised by a Regulatory Pesticide Applicator.

For further information, refer to the following site:

[http://inside.aphis.usda.gov/ppq/pdc/sci\\_tech/pest\\_recert\\_training.html](http://inside.aphis.usda.gov/ppq/pdc/sci_tech/pest_recert_training.html)

### Cholinesterase Testing

Cholinesterase testing may be required of program personnel to ensure they are not overexposed to cholinesterase inhibiting insecticides. FOH will provide notification for personnel who should be tested. Refer to the following site for further information:

<http://ppqwr.aphis.usda.gov/westernregion/LinkClick.aspx?link=Cholinesterase+guide2.doc&tabid=266&mid=674>

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1 CFR Title 40: Protection of Environment: PART 171-CERTIFICATION OF PESTICIDE APPLICATORS  
§ 171.6 Standards for supervision of noncertified applicators by certified private and commercial applicators. (a) Certified applicators whose activities indicate a supervisory role must demonstrate a practical knowledge of Federal and State supervisory requirements, including labeling, regarding the application of restricted use pesticides by noncertified applicators. The availability of the certified applicator must be directly related to the hazard of the situation. In many situations, where the certified applicator is not required to be physically present, "direct supervision" shall include verifiable instruction to the competent person, as follows: (1) Detailed guidance for applying the pesticide properly, and (2) provisions for contacting the certified applicator in the event he is needed. In other situations, and as required by the label, the actual physical presence of a certified applicator may be required when application is made by a non-certified applicator.



## Safe Handling of Insecticides

Safe handling of pesticides pertains to any pesticide or insecticide; however, the exact procedures to follow are determined by the type and amount of pesticide used, and the Federal, State, and local regulations that apply. Knowing where to find the appropriate information or who to contact is crucial to safely handling pesticides.

### Labels

Always read the pesticide or insecticide label before handling or using. Make sure the label being used is current. The label includes specific instructions for applying the pesticide, describes the type of protective equipment that must be worn, and states the environmental hazards that must be avoided. Directions for storage and disposal are included on the label. Instructions for transporting the pesticide may or may not be present. Many manufacturers include phone numbers for emergency first aid and general product information on the label.

### Material Safety Data Sheets (MSDS)

The MSDS for each chemical in use must be on file, present at the program site, and made available to employees upon request. The MSDS provides information about the particular insecticide and describes the chemical and physical properties. The requirements for protective equipment are explained in detail. Complete information relating to fire hazards and fire fighting procedures are given. Storage, disposal, decontamination, and spill procedures are included. The MSDS usually contains information about transporting the pesticide. MSDS may be obtained from the product manufacturer or downloaded from the following website:

<http://www.cdms.net/manuf/default.asp>

### Memoranda and Directives

PPQ and APHIS issue and distribute memoranda and directives informing personnel of changes in pesticide regulations and for establishing or clarifying policies and procedures. The information contained in these documents will usually be incorporated into the appropriate operational manual or supplements.

### PPQ Manuals

An excellent review of safety and spill information can be found in the Emergency Aid and Safety chapter of the Treatment Manual, available at the following Web site:

[http://www.aphis.usda.gov/import\\_export/plants/manuals/ports/treatment.shtml](http://www.aphis.usda.gov/import_export/plants/manuals/ports/treatment.shtml)

Another manual with information on pesticides is the Aerial Applications Manual:

[http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/downloads/aam.pdf](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/aam.pdf)

## **Emergency Information**

### **CHEMTREC Center**

The CHEMTREC Emergency Call Center is a source of emergency assistance for incidents involving chemicals and hazardous materials. The center operates 24 hours a day. The toll-free phone number is 1-800-262-8200.

### **National Pesticide Information Center (NPIC)**

The NPIC is a 24-hour service that provides accurate and prompt information to anyone, whether or not an emergency exists. Pesticide information includes product information, toxicology reviews, safety and health information, environmental effects, and cleanup procedures. The toll-free phone number is 1-800-858-7378.

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## **Other Safety Measures Involved in the Grasshopper Program**

Threats to the safety of employees include on- and off-road travel dangers and exposure to the elements of nature.

### **All Terrain Vehicle (ATV) Safety**

Grasshopper program personnel may operate ATVs in the course of their work. ATV operators should have appropriate training and PPE.

During the past 30 years, ATVs have evolved from crude, lightly powered three-wheelers into sophisticated four-wheel machines capable of speeds in excess of 50 mph. While ATVs can be a fun, labor saving investment, they can also be dangerous if operated improperly and without the proper PPE. Preparation and PPE are crucial to making any ATV ride a safe one.

Safety begins with a pre-ride inspection. Inspection of the tires, throttle, brakes, foot shifter, lights, engine stop switch, oil and fuel levels and the drive chain or drive shaft is recommended before each use. When it comes to inspecting the tires, a verification of the tire pressure should be performed. Because ATV tires are lowpressure with inflation levels of 2-6 psi, a low-pressure gauge should be used. Automotive tire pressure gauges are not accurate when used on ATVs and should not be used.

When operating an ATV, always keep both hands on the handlebars and both feet on the footrests of your ATV. Removing even one hand or foot can reduce your ability to control the ATV, or could cause you to lose balance and fall off.

## PPE for ATVs

Proper PPE is an inexpensive insurance policy against an ATV-related injury or worse. An ATV operator needs head-to-toe protection. A helmet, eye protection, boots, gloves, long pants and a long-sleeved shirt or jacket provide proper PPE for ATV operators.

A helmet is the most important piece of protective gear. An appropriate helmet must meet or exceed state safety standards and should contain a Department of Transportation (DOT), American National Standards Institute (ANSI) or Snell approval label. Care must be taken to ensure the helmet fits properly. If an open face helmet is used, then a mouth guard should be worn as well. Full-face helmets provide both head and mouth protection.

Eye protection, whether glasses, goggles or a face shield, should be approved safety eyewear bearing either the Vehicle Equipment Standard Code 8 (VESC-8) or ANSI Z87.1 marking. While tinted lenses can be used for daytime operation, clear lenses should always be used for evening rides.

Gloves provide protection and warmth during cool conditions. Padded knuckles can help prevent bruising.

For footwear, use a pair of strong, over-the-ankle boots with low heels to help prevent your feet from slipping off the footrests.

Long-sleeved shirts and long pants are the minimum level of protective clothing an ATV operator should wear.

## Heat Stress

People suffer heat-related illness when their bodies are unable to compensate and properly cool themselves. The body normally cools itself by sweating. But under some conditions, sweating just isn't enough. In such cases, a person's body temperature rises rapidly. Very high body temperatures may damage the brain or other vital organs. For further information, see the following web site:

[http://inside.aphis.usda.gov/mrpbs/safety\\_security/library/beat\\_the\\_heat.pdf](http://inside.aphis.usda.gov/mrpbs/safety_security/library/beat_the_heat.pdf)

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## **Communications**

It is important to remember that most grasshopper survey and control programs are conducted in remote areas of the western United States. Many things can go wrong during a typical survey season, most commonly flat tires, but also including injuries and vehicle breakdowns. Keeping in mind the remoteness of this work, it is important to have a good communication plan in place. A combination of several systems may be necessary. Some areas may be well suited for cell phone coverage while other areas may only be accessed via a two way radio linked with a repeater system. Make sure all employees have been trained in the proper use of the APHIS two way radio equipment (more information may be found in the Aerial Application Manual [http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/downloads/aam.pdf](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/aam.pdf)). In some areas satellite phones may be the only means of communication.

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## **General Safety**

Be sure that employees are aware that they may be stranded for long periods of time if a vehicle malfunctions. Extra water should be carried along with a first aid kit in all vehicles. It may be wise to assign personnel to certain areas of the State at the same time so help may be within a day's drive.

# 4

Grasshopper  
Guidebook -

# Survey

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## Introduction

Surveys for grasshoppers and Mormon crickets yield data used to make critical management decisions. Both nymphal and adult populations of grasshoppers may be surveyed on an annual basis in States where grasshopper outbreaks are common. In States where outbreaks are not common surveys may be required when outbreaks occur. APHIS may conduct surveys on private as well as public rangelands.

### Managing Scouts

The scout should adjust working hours to fit the most acceptable field conditions for survey activities - for example on a cool morning with heavy dew, work hours should be adjusted to start later in the morning after the dew has dried and the temperature raised. Scouts may find that a 9 am to 6 pm work schedule fits the situation better than an earlier schedule. Scouts are normally expected to conduct survey work within an 8 hour day, Monday through Friday work schedule with no overtime. It may be an option to work a 10 hour 4 day week. Authorization for overtime must be approved in advance of any work.

The scout should do the following to maximize the time actually spent surveying.

- A. Plan daily travel routes in advance. Use the county road maps to determine the routes you will take.
- B. Avoid routes that will require extensive back tracking. Circular routes or loops are most time efficient.
- C. If in doubt about road conditions or locked gates etc. Ask county personnel or another knowledgeable person's advice on good routing.
- D. Adjust your 8 or 10 hour work day to fit the most productive survey conditions taking dew & temperature into consideration.
- E. When work is more than an hour drive away from the scout's duty station, they may need to stay in temporary lodging. Excessive commuting time and miles driven result in time and expense lost to the survey effort.

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## Survey Types

### Nymphal

Nymphal surveys are conducted early in the season for these reasons:

- ◆ To locate current outbreaks
- ◆ To determine GH/MC densities and species complex in current outbreaks
- ◆ To identify economic infestations of GH/MCs
- ◆ To determine whether a control program may be beneficial

### **Detection**

Detection surveys may start as early as grasshoppers emerge in the spring. (A few grasshopper species overwinter as nymphs. In these cases nymphal detection surveys would occur in the fall.) Prior knowledge of the grasshopper situation in the local area will usually guide the extent and intensity of detection surveys. The purpose of detection surveys is to determine when and where current grasshopper populations may pose problems. Scouts who conduct detection surveys will be required to quantify populations. However, the identification of small nymphs can be very difficult. Program managers must ensure that identification of nymphal grasshoppers can be accomplished. The ultimate goal of the detection survey is to determine whether suppression treatments should be considered.

### **Delimiting**

Delimiting surveys are conducted to determine the precise area of treatment when detection surveys have indicated the need for treatment. Information collected in the delimiting survey includes the extent of the grasshopper outbreak as well as factors such as land ownership, rangeland conditions, and sensitive sites.

### **Post Treatment**

Post treatment surveys are conducted after a treatment has been applied. The purpose is to determine the effectiveness of the treatment. It is important to correlate the detection and delimiting survey results with the post treatment survey results to determine the population reduction resulting from the treatment. Therefore, the same methodologies, and if possible the same personnel, should be used for pre- and post treatment surveys.

### **Adult**

Adult surveys are usually conducted mid to late summer. Data from these surveys are used for these reasons:

- ◆ To determine GH/MC densities
- ◆ To collect grasshoppers and determine species complex
- ◆ To produce information and hazard maps that are used to project potential outbreaks or problem areas for the following year

The adult survey may simply consist of a continuation of the nymphal detection survey that started in the spring. However, there are some specialized survey types, including sentinel sites and common data set.

### **Sentinel**

Sentinel sites are not generally used by APHIS, but historically APHIS conducted sentinel site surveys. This discussion describes sentinel site surveys as they were conducted. Predetermined sites were designated and visited multiple times each season. Permanent rings were placed on the ground and a grasshopper count was taken from the rings each time. Scouts collected grasshopper density counts as well as weather information.

### **Common Data Set (CDS)**

CDS sites are permanent, predetermined sites that are visited at least once each season. The sites provide historical data on species composition and population densities. Program managers should try to locate CDS sites that represent conditions across their areas of supervision. Over the course of time it may be necessary to add and delete sites from a State's inventory. Scouts take grasshopper density data as well as species composition data at each site. If scouts are not qualified to identify species in the field, a collection is made at each site. For information on conducting CDS surveys, see the following:

<http://ppqwr.aphis.usda.gov/westernregion/LinkClick.aspx?link=Common+Dataset+Procedure.doc&tabid=266&mid=674>

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### **General Grasshopper Survey Methods**

Much information has already been written regarding different survey methods. The following link can provide more information regarding some of the individual survey methods.

[http://www.sidney.ars.usda.gov/grasshopper/Handbook/VI/vi\\_10.htm](http://www.sidney.ars.usda.gov/grasshopper/Handbook/VI/vi_10.htm)

Normally survey sites can be 5 miles or more apart and provide adequate information for grasshopper outbreak status. At each survey site, choose a sample area typical of the rangeland to be surveyed. Next, look ahead and determine the approximate route you will walk. Pick a spot on the ground about 10 paces in front of you. Choose the spot before you determine if any grasshoppers are actually present there.

Each State may have documented methods used in surveys.

#### **Visual 18 Ft<sup>2</sup> Method**

The 18ft<sup>2</sup> sample method used by many APHIS offices in the Western United States is a simple and quick way of determining the density of grasshoppers on rangelands.

Visualize a sample area surrounding the spot that is equal to 1ft<sup>2</sup> on the ground. You can use landmarks such as a stick, pebble, tuft of grass, or flower to help keep your eye focused on the sample area chosen. Once the area is set in your mind, walk slowly toward the area and determine the number of grasshoppers that are in the area by counting the grasshoppers as they flush out of the visualized sample area.



Do not count individuals that hop into the sample area while counting. When you reach the spot, probe the area with the handle of your insect net or other suitable object to make sure all individuals have flushed and been counted. Record the number counted and repeat the count at a total of 18 sample areas. The total number of grasshoppers counted in the 18 1ft<sup>2</sup> sample areas, divided by 2, gives you the number of grasshoppers per square yard.

The following methods can also be used and can provide managers with needed information that the visual method may not provide.

### **Sweep Method**

On cool mornings the visual method of survey may not be adequate. The number of grasshoppers per square yard may be estimated by making 40 full sweeps and dividing by 10 the number of captured grasshoppers. This method can seriously underestimate the number of grasshoppers if most of the grasshoppers are older than 2nd instar.

### **Egg Survey**

Egg surveys are difficult to conduct and do not provide significant survey data for population estimates. Egg surveys may identify egg beds so that treatments can be applied to newly hatched nymphs. Egg surveys are also sometimes conducted for research purposes.

### **Sequential Sampling Method**

APHIS does not normally use this method but the process can classify grasshopper infestations as high or low. For more information, see Future Considerations: The Potential for Sequential Sampling at:

[http://www.sidney.ars.usda.gov/grasshopper/Handbook/VI/vi\\_10.htm#future%20potential](http://www.sidney.ars.usda.gov/grasshopper/Handbook/VI/vi_10.htm#future%20potential)

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## **Collection Methods**

Every CDS site requires a collection unless scouts are capable of species identification in the field. Additionally, program managers should ensure that collections of grasshopper species are available to scouts for training and review.

For information on how to make a collection, go to this site:

[http://www.sidney.ars.usda.gov/grasshopper/ID\\_Tools/F\\_Guide/surveys.htm](http://www.sidney.ars.usda.gov/grasshopper/ID_Tools/F_Guide/surveys.htm)

Specimens may be collected and killed with a kill jar, frozen, or put in alcohol.

## Survey Tools

Survey tools may include some of the following based on techniques employed within the local program:

- ◆ Personal Digital Assistant (PDA)<sup>1</sup> survey kit or Integrated Survey Information System (ISIS) kit (<http://ppqcoop.aphis.usda.gov/web/Default.aspx?alias=ppqcoop.aphis.usda.gov/web/isis>)
- ◆ Global Positioning System (GPS) unit<sup>1</sup>
- ◆ County road maps, topographical maps, surface management maps, or other maps
- ◆ Pens or pencils
- ◆ Survey slips or data recording forms and clipboards
- ◆ Survey hoop (1 ft<sup>2</sup>)
- ◆ Sweep net
- ◆ Sealable plastic bags or vials
- ◆ Kill jar
- ◆ Ethyl acetate or other killing agent



Ethyl acetate is a toxic material. Scouts should ensure that open containers and fumes are not present in vehicles!

- ◆ Cooler and ice
- ◆ Plastic containers with sealable lids

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## ID Resources

### Training

USDA-APHIS-Center for Plant Health Science and Technology (CPHST) can provide training in grasshopper identification and the use of LUCID Keys. Appropriate CPHST staff can be reached on 602-437-1295. Their address follows:

USDA-APHIS-PPQ-CPHST Grasshopper  
3645 E. Wier Avenue  
Phoenix, AZ 85040

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<sup>1</sup> Aquisition of these items requires approval from PPQ IT staff.

## Publications

- ◆ General ID Guides  
[http://www.sidney.ars.usda.gov/grasshopper/ID\\_Tools/index.htm](http://www.sidney.ars.usda.gov/grasshopper/ID_Tools/index.htm)
- ◆ HOPPER HELPER provides field personnel with an easy-to-use guide for survey operations. Data gained through direct observation in field operations in southwestern North Dakota provided the basis for this guide.  
[http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Handbook/VI/vi\\_7.htm](http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Handbook/VI/vi_7.htm)
- ◆ LUCID Key  
<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Support/lucid.htm>
- ◆ The North American Grasshoppers Volume 1 Acrididae : Gomphocerinae and Acridinae (North American Grasshoppers) (Hardcover) and The North American Grasshoppers Volume II : Acrididae: Oedipodinae (North American Grasshoppers) (Hardcover) by Daniel Otte. Harvard University Press (January 28, 1985).
- ◆ Grasshopper Species Fact Sheets (Wyoming Agricultural Experiment Station Bulletin 912) by Robert E. Pfadt  
[http://www.sidney.ars.usda.gov/grasshopper/ID\\_Tools/F\\_Sheets/index.htm](http://www.sidney.ars.usda.gov/grasshopper/ID_Tools/F_Sheets/index.htm) (hard copy available from Wyoming PPQ State office)
- ◆ Grasshopper Integrated Pest Management User Handbook by Gary L. Cuninghame and Mike W. Sampson, Technical Coordinators. United States Department of Agriculture, Animal and Plant Health Inspection Services Technical Bulletin No. 1809  
<http://www.sidney.ars.usda.gov/grasshopper/Handbook/index.htm> (hard copy available from Wyoming PPQ State office)

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## Data Collection, Submission, and Utilization

### APHIS Western Region

The Western Region <http://ppqwr.aphis.usda.gov/westernregion/Default.aspx?alias=ppqwr.aphis.usda.gov/westernregion/grasshopper> requires weekly survey reports containing the following information:

Explanation/Definition of the different columns.

- ◆ State - The two letter abbreviation for the state the survey stop was taken in.
- ◆ Scout - The name of the scout who did the survey stop

## Survey

Data Collection, Submission, and Utilization

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- ◆ Date - the date of the survey stop in a windows recognized date format.
- ◆ StopNumber - a unique number to identify that stop within your workgroup.
- ◆ Y coord - the longitude listed in Decimal Degrees DD.dddddd. This should be collected with a GPS using the WGS 84 Datum
- ◆ X coord - the latitude listed in Decimal Degrees DD.dddddd. This should be collected in the WGS 84 Datum
- ◆ MCDensity - The density in  $\#/yd^2$  of Mormon crickets at that site. This should be an Integer 0 or greater. If the density is less than 1 but there is a presence indicate that by using  $1/yd^2$ . A null value indicates that Mormon Crickets were not specifically looked for at this survey stop. A zero indicates that MC was looked for and not found.
- ◆ MCInstar - The predominant instar at this location. 1 through 7 or A for adult.
- ◆ GHDensity - The density in  $\#/yd^2$  of grasshoppers at that site. This should be an Integer 0 or greater. If the density is less than 1 but there is a presence indicate that by using  $1/yd^2$ . A null value indicates that Grasshoppers were not specifically looked for at this survey stop. A zero indicates that GH was looked for and not found.
- ◆ GHInstar - The predominant instar at this location. 1 through 5 or A for adult.
- ◆ N/A/T - The type of survey that was conducted. N for Nymphal, A for Adult, or T for post Treatment. These indicators help in the mapping of different survey type
- ◆ County - The county where the surveyor thinks the survey site is located.
- ◆ Notes - Any additional information that the surveyor feels is pertinent to the survey stop.
- ◆ Other fields may be considered or added on a statewide basis.
  - ❖ Collection Taken, Yes or No

The information is either entered directly into ISIS or is submitted in spreadsheet form to the Geographic Information System (GIS) specialist serving that State. See <http://ppqwr.aphis.usda.gov/westernregion/IT/GIS/tabid/2248/Default.aspx>.

The Western Region uses these data to prepare weekly update maps on grasshopper populations in the seventeen western States. The maps are made available to APHIS management in Washington, DC as well as to APHIS field personnel. To view the maps, see <http://ppqwr.aphis.usda.gov/westernregion/Default.aspx?alias=ppqwr.aphis.usda.gov/westernregion/grasshopper>.

### **In the Field**

Scouts should use GPS devices to collect location information. The location and grasshopper density information can be recorded in many different ways. When possible, electronic data collection and recording is preferable. APHIS has developed the ISIS as a data collection tool. ISIS uses PDAs to record and transmit the data. Other PDA-based systems are also in use. Whenever possible, GPS information should be automatically transferred from the GPS to another electronic device in order to reduce location errors. In some States scouts still record grasshopper information on paper. Scouts submit data to their supervisors on a schedule determined locally. Supervisors use the data to manage ongoing survey activities and make decisions regarding need for treatments.

### **In the Office**

ISIS data may be uploaded from PDAs to the ISIS repository on a daily to weekly basis. If ISIS is not used, the survey data spreadsheets for the previous week should be submitted to GIS specialists by close of business every Monday during the survey season. Additionally, if data are not submitted to ISIS, then a narrative report is required each week. See <http://ppqwr.aphis.usda.gov/westernregion/LinkClick.aspx?link=2007+Survey+weekly+report.doc&tabid=266&mid=674>.



# 5

Grasshopper  
Guidebook -

# Decision Making

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  - CARMA page [5-2](#)
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## Introduction

Program managers include many considerations when determining whether a suppression program is justified. Experienced program managers use the following and many other factors to make decisions:

- ◆ Grasshopper population densities
- ◆ Grasshopper species composition
- ◆ Weather conditions
- ◆ Value of resources threatened by the grasshoppers
- ◆ Adequacy of available control options
- ◆ Sensitive sites around the proposed treatment area

Operational treatment decisions may include the following as well as other factors:

- ◆ Where treatments would occur
- ◆ When treatments would occur
- ◆ Who would pay for treatments
- ◆ Which insecticides would be effective
- ◆ Which insecticides would minimize nontarget effects

[Survey](#) and [Treatment Options and Operations](#) chapters in this guidebook provide information that can be used to support operational decision making. For a roster of experienced APHIS grasshopper program managers, see [Appendix C](#).

Nelson Foster's memo titled *Field and Economic Evaluation of Operation Scale Reduced Agent and Reduced Acre Treatments (RAATs) for Management of Grasshoppers on South Dakota Rangeland 1997-1999* provides excellent economic and mortality data. Especially important are Tables 5 through 8. This memo can be found at the following site:

<http://ppqwr.aphis.usda.gov/westernregion/pmwdrive/Elliston,%20R/N%20Foster%20trials/sdraats.pdf>

For additional treatment options for consideration when selecting treatments to manage damaging populations of grasshoppers on rangeland, refer to this site:

<http://ppqwr.aphis.usda.gov/westernregion/pmwdrive/Elliston,%20R/N%20Foster%20trials/GH%20Recommendations%202000cr.doc>

An additional compilation of decision-making support materials is available at this site:

<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Research/index.htm>

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## **Decision Support Tools**

Researchers have developed at least two computer-assisted decision support tools for grasshopper program managers.

### **CARMA**

The Case-based Range Management Advisor (CARMA) produces advice about the most economical responses to grasshopper infestations in western States. CARMA predicts the proportion of available forage that will be consumed by grasshoppers and estimates the economic returns of various treatment options. The information required to make the forage loss prediction includes the following:

- ◆ Date
- ◆ Selection of a site from the online map
- ◆ Range value
- ◆ Infestation history of the location
- ◆ Number of grasshoppers per square yard
- ◆ Grasshopper type and age distribution
- ◆ Relative recent precipitation and temperatures
- ◆ Total area infested (including adjacent neighbors' lands)



CARMA can be found at this site:

<http://carma.unk.edu/>

## HOPPER



HOPPER is currently under revision to provide a new user interface!

HOPPER provides a list of treatments and an estimate of cost effectiveness. To provide this information, HOPPER asks for data about your site. Then HOPPER analyzes your data using computer models. These models evaluate factors that are critical for making treatment decisions, including many that are otherwise too time consuming for field personnel to consider. The current version of HOPPER can be downloaded from the following website:

<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Support/Hopper.htm>

Check with your IT Specialist to ensure that installation on your computer meets IT requirements.

HOPPER gives you a benefit-cost ratio (BC) that you can use to help make your decisions. The BC replaces the static treatment thresholds used previously. The BC depends on many factors that change over time and locations. The BC is based on the benefits and costs incurred during a single year's operation. The single-year BC does not account for multiyear effects, such as the effect of reduced egg deposit on next year's grasshopper population density. HOPPER can calculate a multiyear BC, compounded from the single-year BC. Also, HOPPER does not account for environmental costs or benefits, value of beneficial species, and other nonforage-related values.

HOPPER's economic evaluations include only the value of forage for livestock consumption in a single season. However, there are many other factors that a rancher may consider in addition to possible multiple-year benefits. One factor is maintenance of the brood herd and long-term survivability and profitability of the operation. A 1-year loss may be acceptable over a 10- year cycle of 9 profitable years.

When the BC is 1.0 or more, treatment is economically justified, and you would treat the outbreak to protect forage. But when the BC is less than 1.0, treatment is economically unjustified, and you would not treat the outbreak just to protect the current forage crop. The final decision to treat or not depends on HOPPER's analysis and any other factors important to the ranching community and general public.

### **Economic Considerations**

For models which require cost inputs, it may be necessary to adjust for inflation/deflation. The following link will allow one to adjust economic figures from one year to another:

<http://minneapolisfed.org/research/data/us/calc/index.cfm>

# 6

Grasshopper  
Guidebook -

## Notification and Documentation

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### Scoping Methods

“Scoping” is the process through which the agency and the public identify alternatives and issues to be considered in an Environmental Impact Statement (EIS). Scoping can also be useful in the preparation of an Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI), but is not required. The process can occur formally and informally through meetings, conversations, or written comments from individuals and groups, and evolves over a period of time. Generally, informal preliminary scoping is done within an agency and formal scoping is managed as a public process.

<http://www.aphis.usda.gov/ppd/es/g7.html>

The EIS for the Grasshopper Mormon Cricket Program was completed in 2002. The Animal and Plant Health Inspection Service (APHIS), however, further involves the public in the scoping process by the publication of notices of availability for EAs and FONSI. When an individual State EA is written, a notice is published in the legals section of the local newspaper, advertising the availability of the EA during an open comment period.

## Public Meetings

Public notification is a requirement established by the National Environmental Policy Act (NEPA) for EAs. When there is evidence that a control program may take place, public meetings may be organized. The purpose of the meetings is to inform and receive comment from land managers and other stakeholders including the public; and to cooperate with the State and other agencies in planning and implementing control activities on private and public administered lands. These meetings may address the following issues:

- ◆ Existing evidence that an outbreak is likely to occur or not
- ◆ Any preliminary analysis using decision support systems
- ◆ Why to treat or not treat using results of surveys
- ◆ When and where treatment should be made
- ◆ Pesticides that may be appropriate to use
- ◆ Resources needed for a treatment
- ◆ The cost share program
- ◆ Any issues regarding environmental concerns or operational aspects

A public meeting may be useful when:

- ◆ Parties are interested in organizing cooperative control activities or requesting information
- ◆ Cooperators are requesting information on grasshopper populations, or on procedures for organizing and scheduling public meetings with ranchers and land managers
- ◆ Historical evidence indicates that an outbreak is likely to occur, based upon previous 2-3 years data and weather forecasts.

APHIS grasshopper program managers should coordinate with cooperators about how to conduct and who will conduct meetings. Regardless of which cooperator conducts the meetings, APHIS program managers are responsible for ensuring that a public meeting is held when necessary. The program manager or a cooperator, such as an extension educator may advertise the meeting. APHIS Legislative and Public Affairs (LPA) may also assist in meeting preparation, especially if contentious issues are anticipated. Meetings should be advertised to the public and cooperators through newspapers and/or the radio. Provide the date, time, location, and purpose of meeting. Anyone can attend who has an interest.

## Rancher Meetings

Rancher meetings are necessary when a rancher cost share will be required for treatments on private land. Schedule rancher meetings in late winter or early spring to allow enough lead time. The program manager or a cooperator, such as an extension educator may advertise the meeting. Anyone can attend who has an interest, concern, or information to share regarding the meeting's topics, purpose, place, and date. Those who attend should record their name, what organization or affiliation they are representing, mailing address, and phone number. A meeting agenda should be created. Assemble any available information on management options, species, expected mortality (grasshopper death), spraying conditions, susceptible species, timing, grasshopper population density and major economic species.

If necessary, present an overview of rangeland grasshopper programs. Discuss the available management options. Facilitate public comment and input. List anticipated program costs on a per acre basis. Determine if additional meetings with ranchers and cooperators are necessary to organize a program.

### Procedures and Responsibilities to Request a Cost Share Suppression Program on Private Land

The rancher group should nominate a spokesman or chairperson who will establish a bank account, and notify the State to prepare a letter of request on behalf of the ranchers who wish to participate. The letter of request must come to APHIS from the State. When the ranchers' request and financial support are obtained, APHIS will finalize the decision for treatments. APHIS will provide pertinent EAs and FONSI's if appropriate.

See example of Rancher sign up sheet ("[Rancher Grasshopper Suppression Program Agreement Sign-up Sheet](#)" on [page D-2](#)). Work with the Western Regional Office (WRO) Agreement Section to prepare the rancher cooperative agreement.

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## Notifying Bee Keepers

Some insecticides currently used for controlling grasshopper infestations are toxic to some pollinating insects. Every effort must be made to protect pollinators while implementing a control program that uses insecticide treatments. Therefore, it is the responsibility of program managers to ensure that beekeepers are notified about any anticipated insecticide treatment.

If possible, mail a notification letter well in advance of anticipated treatments. Acquire a list of registered bee keepers operating within your state. Possible sources include: agriculture departments, the yellow pages of the telephone book under “beekeepers,” and local beekeeping associations. The following topics may be included in your notification letter: Grasshopper survey map showing the infested areas and potential treatment areas, conditions that warrant a treatment, insecticides that may be used, and local contact information.

Where beekeepers are not registered, send one notice to all identified sources. If a beekeeper is operating within or near the treatment area, request they contact the program manager to make arrangements to protect the bees.

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## **Letters of Request**

Obtain request(s), in writing, from public land managers, administering agency, or from the State on behalf of private land owners for suppression treatments to be undertaken on their land. It is appropriate to work with land managers and land owners prior to their formal request for treatment. Survey of grasshopper populations and assessment of range conditions should precede a formal request.

The following web site contains examples of forms to request an evaluation for possible treatment.

<http://www.agri.state.id.us/Categories/PlantsInsects/GrasshopperMormonCricketControlProgram/ghprogramcomplaintforms.php>

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## **National Environmental Policy Act (NEPA)**

The Grasshopper Program will follow all requirements of NEPA.

### **Environmental Impact Statement**

The Rangeland Grasshopper and Mormon Cricket Suppression Program Final Environmental Impact Statement—2002 informs the decision regarding the PPQ rangeland grasshopper and Mormon cricket suppression program as required by NEPA.

[http://www.aphis.usda.gov/plant\\_health/ea/downloads/fgheis.pdf](http://www.aphis.usda.gov/plant_health/ea/downloads/fgheis.pdf)

(parsed version on website)

### **Record of Decision (ROD)**

The Record of Decision was signed by the APHIS Administrator on October 15, 2002. The Record of Decision is available at the following web site:

[http://www.aphis.usda.gov/plant\\_health/ea/downloads/rodgheis.pdf](http://www.aphis.usda.gov/plant_health/ea/downloads/rodgheis.pdf)

The EIS and ROD will remain in effect until programmatic changes or environmental changes dictate revision.

### **Environmental Assessments (EAs)**

EAs for grasshopper/Mormon cricket suppression treatments on rangeland need to be updated each year that treatments are contemplated. EAs will be completed in accordance with National and/or local Memoranda of Understanding (MOUs) between APHIS and the Federal land management agencies and/or Tribes (see [Appendix B](#)). Normally, the State Plant Health Director (SPHD) office in each State prepares the EAs in consultation with Federal Land Managers and other stakeholders. Upon completion of the EA, the SPHD or his/her designee will, if appropriate, sign a FONSI, after which suppression treatments may commence.

An EA is a concise public document that serves to (1) briefly provide sufficient evidence and analysis for determining whether to prepare an EIS or a FONSI; (2) aid an agency's compliance with NEPA when no EIS is necessary; and (3) facilitate the preparation of an EIS when one is necessary (40 CFR 1508.9). Generally, an EA leads to a FONSI or an EIS, but it could also lead to the abandonment of a proposed action. See the following links for more information.

<http://www.aphis.usda.gov/ppd/es/g2.html>

<http://www.aphis.usda.gov/ppd/es/general.html>

<http://www.aphis.usda.gov/ppd/es/guidance.html>

Specific guidance for preparation of grasshopper and Mormon cricket suppression EAs is provided in [Appendix E](#).

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## **Endangered Species Act (ESA)**

The goal of the ESA is to assure the continued existence of species that are threatened or endangered with extinction. Section 7 of the ESA requires that APHIS consult with the U.S. Fish and Wildlife Service (FWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries to determine the effect, if any, that APHIS Grasshopper Program activities may have on listed and proposed species and their critical habitats.

### **Biological Assessments (BA)**

APHIS and FWS are currently engaged in a programmatic consultation to assess the impact that the Rangeland Grasshopper and Mormon Cricket Suppression Program may have on threatened and endangered species listed, or proposed for listing, and habitat designated or proposed as critical under the Endangered Species Act in areas of the 17 Western States where APHIS grasshopper or Mormon cricket activities could occur. The BA is the document APHIS provides FWS and describes the effects of grasshopper programs on threatened and endangered species.

Historically, APHIS and the FWS have been involved in a programmatic Section 7 consultation process regarding the Rangeland Grasshopper and Mormon Cricket Suppression Program since 1985. The current programmatic consultation will update previous consultations and provide APHIS with measures that will protect listed and proposed species and critical habitats.

### **Local Informal Consultations**

Until the programmatic BA for the Grasshopper Program is completed it is necessary for State APHIS Offices to consult with their local FWS (and if necessary the NOAA Fisheries office) to assure compliance with the ESA. The local consultations must be completed prior to any treatments and completion is indicated by receipt of a letter of concurrence from FWS and/or NOAA Fisheries.





# Treatment Options and Operations

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## Introduction

When surveys and analyses have shown that economically damaging grasshopper/Mormon cricket outbreaks require treatment, and after notification processes have been completed, certain APHIS treatment options and operations may be implemented.



For employee safety when applying the following treatments, refer to “Employee Safety” on [page 3-1](#).

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## Grasshopper Rangeland Block Protection

Rangeland eligible for cooperative suppression treatments for grasshoppers includes the following:

1. Large rangeland blocks which, if treated, would protect forage, and reduce the likelihood that the block would soon be re-populated by grasshoppers from surrounding areas. Subject to available funds, the APHIS State Plant Health Director will be responsible for determining the area eligible for a grasshopper treatment and assuring compliance with any conditions that may be in the land manager's written request for treatment. Historically, large blocks have been considered to be at least 10,000 contiguous acres to minimize the likelihood of re-population from surrounding areas.
2. Incipient populations ("hot spots") of grasshoppers, which, if treated, would likely prevent subsequent wide-spread outbreaks. Subject to available funds, the APHIS State Plant Health Director will be responsible for determining the area eligible for a grasshopper treatment and assuring compliance with any conditions that may be in the land manager's written request for treatment.
3. Federal or Trust rangeland borders which, if treated, would protect the rangeland and also prevent the movement of damaging populations of grasshoppers to adjacent private agricultural land. Subject to available funds, the APHIS State Plant Health Director will be responsible for determining the area eligible for a grasshopper treatment and assuring compliance with any conditions that may be in the land manager's written request for treatment.

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## Rangeland Border/Crop Protection

In some situations, especially in the intermountain west, grasshopper outbreaks on rangelands may not justify insecticidal treatment simply to reduce the damage to the infested range. However, the infestation may significantly threaten nearby dryland or irrigated crops. In these cases stakeholders may wish for APHIS to apply an insecticide to the Federally managed rangeland that borders the crops, which will protect both the rangeland forage and the crop. A barrier as simple as a treatment down a fence row may suffice, but when significant grasshopper outbreaks are in progress a barrier treatment of up to one mile of the adjacent rangeland may be needed.

Factors to consider include the following:

- ◆ Potential for grasshoppers to move from rangeland to crops
- ◆ Drought conditions
- ◆ Food preference of the grasshopper species
- ◆ Growth stage of the grasshopper species
- ◆ Growth stage and value of the crop to be protected
- ◆ Sensitivity and labeling for the crop and surrounding resources to the available insecticides.

Grasshopper species such as *Camnula pellucida* or *Melanoplus sanguinipes* which are strong fliers as adults can pose a special risk to crops. Large grasshoppers such as *Melanoplus bivittatus* often are found on the crop edges and produce noticeable feeding damage, but they may not venture far enough into the crop field to cause significant economic damage.

Grass feeders may not pose a significant risk to non-grass crops and forbs. Forb feeders may not pose much threat to grain crops. See [http://www.sidney.ars.usda.gov/grasshopper/ID\\_Tools/F\\_Sheets/index.htm](http://www.sidney.ars.usda.gov/grasshopper/ID_Tools/F_Sheets/index.htm) for food preferences of individual grasshopper species.

Near the end of the season, adult grasshoppers may be present in high numbers but their damage to mature crops may not significantly diminish yield or quality. On the other hand, some species may do significant damage to grain crops by feeding on the maturing grain heads.

Applicators must be careful to ensure that no pesticide drift from the rangeland contacts the crop if the crop is sensitive to the insecticide or there is no tolerance for the insecticide on the crop. Because some crops are commercially pollinated by bees, care must be taken to insure that no bee yards or leafcutter bee houses, or leafcutter bee collection boards are within a hazardous distance of the treatment block.

The choice of insecticides for crop protection may be limited due to the need for quick and significant grasshopper population reductions.

## Mormon Cricket Suppression

Rangeland eligible for cooperative suppression treatments for Mormon cricket includes the following:

The rangeland area treated to suppress Mormon cricket populations varies widely based on the size and movement direction of migrating Mormon cricket bands. Subject to available funds, the APHIS State Plant Health Director will be responsible for determining the area eligible for a Mormon cricket treatment and assuring compliance with any conditions that may be in the land manager's or State's written request for treatment.

A good overview of Mormon cricket biology is available at this site:

[http://fs-sdy2.sidney.ars.usda.gov/grasshopper/ID\\_Tools/F\\_Sheets/mormoncr.htm](http://fs-sdy2.sidney.ars.usda.gov/grasshopper/ID_Tools/F_Sheets/mormoncr.htm)

Mormon crickets are especially subject to unique concern by stakeholders. Because Mormon crickets are so large and may be so numerous in outbreak populations, they capture the attention of ranchers, farmers, range managers, and the general public. Because the span of time between major outbreaks may be so long in some areas, people may have never encountered a previous outbreak within their lifetime. The individual size and appearance of Mormon crickets, the density of the gregarious cricket bands, and stories of havoc wreaked by Mormon crickets in earlier times dating back to 1848 all add to public concern.

Because the movement of Mormon cricket bands cannot be reliably predicted (<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Research/mcricket.htm>) it is often necessary to conduct suppression on remote rangeland outbreaks that are far removed from crops. Outbreaks in the early 2000's have involved millions of acres in Utah, Nevada, Wyoming, and Idaho (<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Extras/index.htm>). Sometimes the outbreak can persist for years in remote mountain locations and never move within critical distance of high value resources. Because Mormon cricket bands may move up to a mile in a day and up to 50 miles in a season, management decisions must be made with an eye toward outcomes that may be several weeks into the future. When very large outbreaks occur, the suppression effort may become a prolonged campaign that strives to protect rangeland as well as to reduce the potential for movement into crop areas during the current or future years.

## Treatment Alternatives

Program managers may select one of the three treatment alternatives considered in the 2002 Environmental Impact Statement (EIS)

[http://www.aphis.usda.gov/ppq/enviro\\_docs/pdf\\_files/fgheis.pdf](http://www.aphis.usda.gov/ppq/enviro_docs/pdf_files/fgheis.pdf):

### No Action

Under this alternative APHIS would not apply pesticides to suppress grasshopper outbreaks. APHIS could still offer technical assistance to land managers.

### Insecticide Applications at Conventional Rates and Complete Area Coverage

Insecticide applications at conventional rates and complete area coverage, is generally the approach that APHIS used for many years. Under this alternative, carbaryl, diflubenzuron (Dimilin®), or malathion would be employed.

The application rates under this alternative are as follows:

- ◆ 16.0 fluid ounces (0.50 pound active ingredient (lb a.i.)) of carbaryl spray per acre
- ◆ 10.0 pounds (0.50 lb a.i.) of 5 percent carbaryl bait per acre
- ◆ 1.0 fluid ounce (0.016 lb a.i.) of diflubenzuron per acre; or
- ◆ 8.0 fluid ounces (0.62 lb a.i.) of malathion per acre

### Reduced Agent Area Treatments (RAATs)

RAATs was developed as an alternative treatment that is more cost effective, has fewer environmental effects, and achieves a satisfactory level of grasshopper suppression. The rate of insecticide is reduced from conventional levels, and treated swaths are alternated with swaths that are not directly treated.

Either carbaryl, diflubenzuron, or malathion would be considered under this alternative at the following application rates:

- ◆ 8.0 fluid ounces (0.25 lb a.i.) of carbaryl spray per acre;
- ◆ 10.0 pounds (0.20 lb a.i.) of 2 percent carbaryl bait per acre;
- ◆ 0.75 fluid ounce (0.012 lb a.i.) of diflubenzuron per acre; or
- ◆ 4.0 fluid ounces (0.31 lb a.i.) of malathion per acre.

More information on RAATs can be found at these sites:

<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Research/lockwood.htm>

<http://www.sdvc.uwyo.edu/grasshopper/ghwywfrm.htm>

Although the EIS analyzed conventional rates and RAATs as specified above, there is flexibility in the reduction of rate from conventional rates. For instance, a conventional rate variation between 12 and 16 fluid ounces per acre is recommended depending on grasshopper density and vegetation density. Higher grasshopper densities and thicker vegetation may require higher rates.

Additionally, area coverage varies according to local situations. While 50 percent coverage is often used in RAATs programs, coverage above or below 50 percent may be appropriate, as indicated by the sites above.

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## Insecticide Choices

The following options are available for use in APHIS rangeland cooperative grasshopper suppression programs:

- ◆ **Carbaryl (Sevin®)**
  - ❖ **Bait**
  - ❖ **Spray**
- ◆ **Diflubenzuron (Dimilin® 2L) Spray**
- ◆ **Malathion Spray**

The 2002 EIS contains a rigorous review of the utilities and toxicities of these pesticides. Because of their different modes of action, and suitability under different climatic conditions, the three pesticides can be sorted as follows:

**TABLE 7-1: General Insecticide Considerations**

Grasshopper life stage	Weather conditions	Pesticide Options
Nymphs	Cool and wet	Diflubenzuron or carbaryl
Nymphs	Hot and dry	Diflubenzuron, carbaryl or malathion
Adults	Cool and wet	Carbaryl
Adults	Hot and dry	Carbaryl or malathion

References for chemical control methods and chemical control research reports can be found at this website:

<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Research/index.htm#integratedpestmanagement>



The guiding principle of insecticide selection and use is “**Read and follow the Label.**” Labels can be found at this website:

<http://www.cdms.net/pfa/LUpdateMsg.asp>

Also see “Labels” on [page 3-5](#)



Safety with insecticides is extremely important! All employees should read the Material Safety Data Sheets (MSDS) for the insecticides they are using and MSDS should always be present at the worksite. MSDSs can be found at this website:

<http://www.cdms.net/pfa/LUpdateMsg.asp>

Also see “Material Safety Data Sheets (MSDS)” on [page 3-5](#)

## Carbaryl (Sevin®)

The forms of carbaryl insecticides for APHIS use are: carbaryl bait and Sevin® XLR spray.

### Bait

The insecticide bait is formulated on wheat bran (flakes), and apple and grape pumice base (pellets or crumbles), rolled wheat, or other substrates. Bait is formulated with carbaryl at 2.0 or 5.0 percent active ingredient. Not all carbaryl baits are registered for grasshopper control on rangeland. Always read the label and be sure the product is registered for the intended use.

Carbaryl bait is not recommended for all grasshopper species. When considering the use of carbaryl bait, review the expected rates of reduction and the list of susceptible species. For data on bait acceptance and susceptibility of grasshopper species, developmental stages, and age structures, go to this website:

[http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Handbook/II/ii\\_12.htm](http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Handbook/II/ii_12.htm).

Application may be made by ground equipment or aircraft depending on the size of the infestation and the terrain. In small isolated areas, it may be feasible to spread bait by manual broadcasters, all terrain vehicles equipped with broadcasters, or truck mounted broadcasters. Always be sure application equipment is properly calibrated for the formulation/product being used. Refer to [Appendix F](#).

Carbaryl bait may be limited in its effectiveness as a crop protection agent by the level of suppression it provides and the acceptance of bait by various species.

### Facts About Carbaryl Bait

- ◆ May produce a lower mortality than other options, depending on grasshopper species
- ◆ Good option near environmentally sensitive or populated areas where the application of sprays could cause drift problems resulting in adverse environmental effects
- ◆ Is less likely to harm pollinators and other beneficial insects
- ◆ Some grasshopper species do not readily accept bait
- ◆ Mormon crickets do readily accept bait and can be adequately controlled, although at increased cost
- ◆ More costly on a per acre basis than sprays
- ◆ The mode of action is from ingestion of the bait

### Sources of Supply

Wilbur-Ellis Company  
345 California St., 27th Fl.  
San Francisco, CA 94104  
415-772-4000

Peacock Industries  
P.O. Box 750  
Hague, SK S0K 1X0  
Canada  
306-225-4691

### Environmental Hazards



Important

**Do not** apply bait within 50 feet of water using ground dispersal equipment nor within 200 feet of water by aerial application. **Do not** apply bait to any site not listed on the product label.

### Expected Rates of Suppression with Carbaryl Bait

The rate of suppression depends on the species composition. See [http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Handbook/II/ii\\_12.htm](http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Handbook/II/ii_12.htm).

### Conventional/RAATs Rates

- ◆ Carbaryl bait (wheat bran or pumice): Conventional rate is 10 lbs of 5 percent bait per acre (see EIS [http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/downloads/eis.pdf](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/eis.pdf))
- ◆ RAATs carbaryl bait rate is 10 lbs of 2 percent bait per acre (see EIS [http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/downloads/eis.pdf](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/eis.pdf))



- ◆ 1.5 lbs per acre aerial applied and 2 lbs. per acre by ground with wheat bran may also yield successful suppression for many grasshopper species

## Spray

Sevin® Brand XLR Plus is the formulation of carbaryl which is approved for grasshopper and Mormon cricket rangeland spray programs.

Carbaryl is a carbamate class compound used as a stomach and contact poison that controls a broad spectrum of insects (including all grasshopper species) on crops, pastures, rangeland, ornamental, lawn, and indoor plants.

This insecticide is a water based formulation. Note and follow label directions for mixing with water. Agitation during mixing and application is important to treatment success.

### Facts About Carbaryl Spray

- ◆ Best applied in early season spray programs beginning when the majority of grasshoppers are in the 2nd to 5th instar
- ◆ Carbaryl's mode of action is from both contact and ingestion of vegetation on which carbaryl residues are present
- ◆ Carbaryl demonstrates low to moderate toxicity to mammals, low toxicity to birds, moderate toxicity to fish, and is extremely toxic to aquatic invertebrates and many terrestrial insects
- ◆ In general, carbaryl spray is effective at lower temperatures than malathion, and grasshopper mortality can occur for approximately 14-21 days
- ◆ More costly on a per acre basis than malathion or dimilin
- ◆ In field tests, mortality reached 20 percent after 2 days, 64 percent after 5 days; 79 percent after 10-11 days; and 84 percent after 25-26 days. Mortality in excess of 90 percent has been reported in suppression programs.
- ◆ More persistent than malathion
- ◆ Can be used under cool conditions
- ◆ Rain resistant after spray has been allowed to dry

### Manufacturer

Bayer Crop Science  
P.O. Box 12014, 2 T.W. Alexander Drive  
Research Triangle Park, North Carolina 27709

## Environmental Hazards



Carbaryl spray is highly toxic to bees. **Do not** apply over water or wet lands or within 500 feet of water. **Do not** apply within 500 feet or directly over any crop not listed on the insecticide label. Keep unprotected persons out of treatment areas until spray has dried.

### Conventional/RAATs Rates

Carbaryl ULV Spray: Conventional application rate is 16 fluid ounces of carbaryl per acre (mixed with water in a 1:1 ratio). RAATs rate is 8 fluid ounces of carbaryl per acre (mixed with water in a 1:1 ratio) (see EIS [http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/downloads/eis.pdf](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/eis.pdf)).

### Diflubenzuron (Dimilin® 2L) Spray

This product is an insect growth regulator. It affects the formation/deposition of chitin in the grasshopper's exoskeleton and interrupts the grasshopper nymph's ability to molt.

This insecticide is a water and oil based formulation. Note and follow label directions for mixing with water and oil. Agitation during mixing and application is important to treatment success.

### Facts about Dimilin®

- ◆ Dimilin® is persistent on foliage, resulting in an extended period of control
- ◆ Is effective at less than an ounce per acre on grasshoppers and Mormon crickets
- ◆ Application must occur when grasshoppers or Mormon crickets are in the nymphal stage
- ◆ Dimilin® is slower acting than either carbaryl or malathion
- ◆ Mortality does not occur for 7-10 days
- ◆ Mortality reached 99 percent after 28 days in a field trial utilizing RAATs
- ◆ Nonpersistent in soil
- ◆ Dimilin® exhibits very low mammalian toxicity
- ◆ Dimilin® is non-toxic to adult bees, birds, earthworms and fish

### Manufacturer

Chemtura Corporation  
Global Corporate Headquarters  
199 Benson Road  
Middlebury, CT 06749

## Environmental Hazards



Dimilin® is a restricted use pesticide. Dimilin® is highly toxic to aquatic arthropods. **Do not** apply aerially within 500 feet of water or to intertidal areas below the high water mark. **Do not** apply by ground within 200 feet of water or to intertidal areas below the high water mark. **Do not** exceed a total of 1 fl. oz. per acre per year.

## Conventional/ RAATs Rates

Conventional application rate is 1 ounce of Dimilin® per acre with 20 ounces water and 10 ounces emulsifiable oil (see EIS [http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/downloads/eis.pdf](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/eis.pdf)).

The usual RAATs treatment rate is .75 ounce Dimilin®, 20.25 ounces water and 10 ounces emulsifiable oil.

## Malathion Spray

Malathion is an organophosphate class compound used as a contact and stomach poison that controls a broad spectrum of insects including all grasshopper species.

Malathion ULV is used undiluted in any specially designed aircraft or ground equipment that has been adapted and calibrated for ultra low-volume spraying.

## Facts about Malathion

- ◆ Cheaper on a per acre basis than carbaryl
- ◆ Malathion demonstrates moderate toxicity to mammals, moderate to slight toxicity to birds, moderate to high toxicity to some fish species and other aquatic organisms, and high toxicity to most insects including bees
- ◆ May be preferred later in the season when the majority of grasshoppers are in or nearing the fifth instar
- ◆ Provides immediate suppression at the time when grasshoppers are approaching maturity and the prevention of further forage destruction would be a high priority
- ◆ Mortality reached almost 95 percent after 2 days and over 96 percent after 5 days in a field trial
- ◆ Relatively non persistent in soil, water, plants, and animals

## Manufacturers

Helena Chemical Company  
225 Schilling Boulevard  
Collierville, TN 38017

Loveland Products  
P.O. Box 1286  
Greeley, CO 80632

Agriliance LLC.  
P.O. Box 64089  
St. Paul, MN 55164

### Environmental Hazards



Malathion is highly toxic to bees. **Do not** apply the insecticide within 500 feet of water. **Do not** apply within 500 feet of any crop not listed on the insecticide label.

### Conventional/RAATs Rates

- ◆ Conventional rate is 8 ounces per acre
- ◆ RAATs rate is 4 ounces per acre (see EIS [http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/downloads/eis.pdf](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/eis.pdf))

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## Aerial Operations

The Aerial Application Manual (AAM) is found on line at this site:

[http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/downloads/aam.pdf](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/aam.pdf)

The AAM provides general approaches that apply to all (or most) domestic, emergency and biological control programs including grasshopper control programs.

The AAM is a basic framework that describes general activities for conducting aerial treatment programs. Unfortunately, many activities take place simultaneously and not necessarily in the order they are presented in the AAM. Specific pest programs will have unique circumstances that must be planned for that may not be addressed in this manual. Professional judgment should supplement the general guidelines and models contained in the AAM.

The manual is broadly divided into tabbed sections:

- ◆ Introduction
- ◆ Program Planning
- ◆ Program Startup
- ◆ Program Supervision
- ◆ Appendixes
- ◆ Index

The Program Planning section provides general guidelines from determining the size and scope of the problem to developing work plans and arranging for personnel and equipment.

The Program Startup section provides general guidelines for onsite tasks such as logs maps, aircraft calibration and aircraft guidance.

The Program Supervision section provides general guidelines on operation plans, contractor actions and program shutdown.

The Appendixes contain equipment lists, technical information and descriptions.

What is not covered in the AAM is program specific information such as survey, pest biology or procedures adequately covered in related documents, such as this Grasshopper Guidebook.

The AAM is used primarily by State plant health directors (SPHDs) program managers and others who are responsible for preparing and / or conducting anticipated programs. The AAM will also be used by individuals who are designated as the COR responsible for administering the terms of contracts established to conduct programs, and for planning, supervising and monitoring the associated control activities. Ideally the person who will supervise the program should have a major role in the planning and organizational process.

For more information on the Aerial Application Manual please link to the address below:

[http://www.aphis.usda.gov/import\\_export/plants/manuals/domestic/downloads/aam.pdf](http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/aam.pdf)

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## Ground Operations

Because large areas are often involved in grasshopper/Mormon cricket suppression programs, aircraft applications are useful and efficient. However, ground treatments can also be made with carbaryl bait or one of the spray insecticides which are available to PPQ for grasshopper/Mormon cricket suppression. Ground treatments may be useful for small outbreaks or for treating environmentally sensitive areas where aircraft may not be able to operate with adequate precision to meet buffering requirements.

In some cases, tractors or dedicated application vehicles may be used on level grasslands. However on much of the western rangeland, four wheel drive vehicles or ATVs must be employed. Ground operations

must follow the requirements of land managers regarding driving off roads and trails, and operator safety is a paramount concern when navigating in rough terrain.

Rotary spreaders are commonly used to spread carbaryl bait for Mormon cricket and/or grasshopper suppression. Spreaders can be mounted on trucks or ATVs with load capacities varying from a few hundred pounds with the former to about 50 pounds with the latter.

Sprayers may be mounted on vehicles and used with diflubenzuron or Sevin® XLR. See ATV-RAATs at:

<http://www.sdvc.uwyo.edu/grasshopper/ghwywfrm.htm>

Calibration of sprayers on ATVs is included in [Appendix F](#).

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## **Treatment Reporting**

The high visibility and concern surrounding grasshopper/Mormon cricket treatments necessitates prompt and accurate reporting of activities, results and resources utilized. Each treatment program requires submission of a post treatment report. This report is the third page of the document found at:

<http://ppqwr.aphis.usda.gov/westernregion/LinkClick.aspx?link=Project+Planning+%26+Reporting+Worksheet+07.doc&tabid=266&mid=674>

The report corresponds to the work conducted on the detailed work plan which is the first page of the document. The reports are to be submitted to the Western Region Grasshopper Program Manager upon completion of the program and no longer than 30 days after the completion of the program.

Additionally, all treatment programs must be reported each Monday to the Western Region on the database at: <http://ppqwr.aphis.usda.gov/ghtreatments/>.

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## **Management Options for Public and Private Land Managers**

Whether public or private lands are being considered for treatment, management options remain largely similar. APHIS is a service agency providing treatment on public and private lands only through a letter of request and after an economic outbreak has been verified. At that time APHIS is guided by its Environmental Impact Statement (EIS). Specific management options identified in the EIS are limited to the following:

- ◆ No action
- ◆ Liquid chemical application at traditional rates and full area coverage
- ◆ Bait application applied aerially or by ground at traditional rates and full area coverage
- ◆ Application of reduced agent area treatments (RAATs)

### **Integrated Pest Management Approach (IPM)**

See *Grasshopper Integrated Pest Management User Handbook* at:

<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Handbook/index.htm>

The goal of IPM in rangeland grasshopper programs is to assist in sustaining long term profitability of the ranching economy in an environmentally and economically sound manner. An IPM approach to managing rangeland grasshopper programs provides a framework for selecting alternative options for preventing and suppressing grasshopper populations while minimizing the use of insecticides.

The above mentioned treatments as well as biological control and cultural control emerge as options to support the goal of protection of rangeland and forage by maintaining grasshopper populations at non-economic levels. The selection of a final management option will be based on survey, economic analysis, and environmental factors and in many cases sociological considerations.

When using an IPM approach, chemicals, grazing strategies, cultural and biological controls are all options and tools to be considered. As alternative options become more effective, grasshopper management may become more prevention oriented, which aligns with the goal and supports IPM as the preferred approach for managing rangeland grasshopper programs.

### **Cultural Control**

See *Grasshopper Integrated Pest Management User Handbook* at:

<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Handbook/V/index.htm>

Grazing management is the practice of moving livestock from field to field in a way that allows the grass or other plants they eat to recover and grow. These strategies appear to offer great potential for reducing periodic grasshopper outbreaks. There is a correlation between high grasshopper populations and overgrazed rangelands. Studies indicate that grasshopper management through controlled removal of vegetative cover appears to have promise in many situations. See the following:

<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Research/index.htm#livestockgrazing>

Controlled burns have been suggested as a means of suppressing grasshoppers. Research on this topic is ongoing. See the following:

<http://www.ars.usda.gov/pandp/people/publications.htm?personid=601>

Flooding rangeland has been suggested as an alternative for grasshopper suppression. There is no evidence of the practical application of this method.

## **Biological Control**

See *Grasshopper Integrated Pest Management User Handbook* at:

<http://fs-sdy2.sidney.ars.usda.gov/grasshopper/Handbook/I/index.htm>

Fungi such as *Beauvaria bassiana* and *Metarhizium* spp. as well as the bacteria derived toxin Spinosad, are on the horizon for new and emerging technologies as bio-insecticides for control of grasshoppers. Several isolates of these fungus species are registered with EPA and available commercially for application. However, APHIS has not concluded evaluations that would lead to their use in the rangeland grasshopper program.

*Beauvaria bassiana* and *Metarhizium anisopliae* are fungi that infect an insect through its cuticle (outer skin); the spore germinates on the surface of the cuticle and the fungus penetrates by means of mechanical pressure and of enzymes. The fungus then grows within the body of the insect and causes its death under ideal conditions. If humidity is very high, the fungus will then grow out of the insect cadaver and cover it with a layer of white (*Beauvaria*) or green (*Metarhizium*) spores. In general both have a wide host spectrum.

*Metarhizium anisopliae* var. *acridum*, is another naturally occurring fungus but one that is specific to locusts and grasshoppers. It has been registered and commercialized in Australia and South Africa, and is approved for use against locusts in Africa by UN FAO. Like *B. bassiana*, this fungus infects insects by penetrating through the insect's cuticle. Once inside the insect, it kills much faster than *Beauvaria*, because of a number of metabolites it produces. It, too, will cover the outside of the cadaver with (green) spores if humidity is high enough.



Spinosad has a mode of action that is different from most other insecticides. Spinosad, which is a macrolide metabolite produced by aerobic fermentation of an actinomycete causes excitation of the insect nervous system, leading to involuntary muscle contractions, prostration with tremors, and finally paralysis. Spinosad works by contact and by ingestion. Contact occurs either by direct application to the insect or by movement of the insect onto a treated surface. Ingestion occurs as insects feed on treated substrate (such as foliage). The insect dies within 1 to 2 days after ingesting the active ingredient.

*Nosema locustae* is a microsporidian that can naturally infect grasshoppers and has been made commercially available for grasshopper control. However, the APHIS grasshopper program does not use *Nosema locustae* because studies of the effect of *Nosema*-bran bait on grasshopper populations suggested that the microbial insecticide has little, if any, effect on grasshoppers either immediately after treatment or in subsequent years.

The application of the bio-insecticides will evolve over time along with increased understanding of the pest and systems that it regulates. Many applications are just being explored. The decision to control or not control grasshoppers and the best control method to select is clearly not a simple decision. Many factors need to be considered before a treatment option is chosen.

**Treatment Options and Operations**

Management Options for Public and Private Land Managers

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# 8

Grasshopper  
Guidebook -

# Environmental Monitoring

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## Contents

Purpose page **8-1**

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## Purpose

Environmental Monitoring is an integral component of many of PPQ's pest management programs and should be implemented on all grasshopper and Mormon cricket suppression treatments. Monitoring is mandated by APHIS Directive 5640.1 if the following conditions exist:

- ◆ A section 18 exemption was granted under FIFRA
- ◆ The APHIS administrator requests monitoring
- ◆ Monitoring was designated as a requirement in a Program's environmental documentation

Monitoring should also be conducted whenever there exist, sensitive sites or non-target species that could be adversely affected by Program activities, Program applied chemicals, or when a need exists to assess environmental risk.

The APHIS Environmental Monitoring Team (EMT) should be contacted to develop an environmental monitoring plan tailored to a Program's requirements and needs. The plan may address quality control concerns, sampling or monitoring specified in the programs Environmental Assessment or Endangered Species Act Section 7 consultation, and other components designed to help the program more efficaciously suppress pest populations. The Grasshopper Environmental Monitoring Plan can be found at the following site:

[http://ppqwr.aphis.usda.gov/westernregion/  
LinkClick.aspx?link=GH\\_EMP2007revJun21.pdf&tabid=266&mid=67  
4](http://ppqwr.aphis.usda.gov/westernregion/LinkClick.aspx?link=GH_EMP2007revJun21.pdf&tabid=266&mid=674)

Both the APHIS EMT and the Analytical and Natural Products Chemistry Lab (ANPCL) are available to assist the Program with appropriate monitoring during suppression treatment.

ANPCL is available to assist the Program by providing the following:

- ◆ Expertise in analytical chemistry to support the Grasshopper/ Mormon cricket suppression program with analyzing monitoring samples
- ◆ Supplies to collect monitoring samples, take measurements, and ship samples (see [Appendix D](#) for request form)
- ◆ Training on how to collect and ship samples, as needed
- ◆ Analytical results for samples collected to investigate incidents suspected to be related to Program activities

EMT is available to assist the Program by providing the following:

- ◆ Assistance with the negotiation of mitigation or protection measures during interagency Program consultations to address potential affects to threatened and endangered species.
- ◆ Environmental monitoring plans (EMP) to address Program and stakeholder concerns
- ◆ Training and day-to-day guidance to field personnel on how to implement EMP's.
- ◆ Recommendations on how a program might be modified to reduce adverse effects on the environment
- ◆ Communicate risks associated with APHIS programs to the public and stakeholders

The APHIS EMT can be reached at:

4700 River Road Unit 150  
Riverdale, MD 20737  
Phone: (301) 734-8247  
Fax: (301) 734 - 3308

The ANPCL can be reached at:

3505 25th Avenue  
Gulfport, MS 39501  
Phone: (228) 822 - 3111  
Fax: (228) 822 - 3113



# Appendix A

## *Plant Protection Act*

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### Contents

- Authority page **I-1**
  - (a) In General page **I-1**
  - (b) Transfer Authority page **I-1**
  - (c) Treatment for Grasshoppers and Mormon Crickets page **I-2**
  - (d) Federal Cost Share of Treatment page **I-2**
  - (e) Training page **I-2**

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### Authority

APHIS' overall authority for this suppression program is based on Section 417 of the Plant Protection Act of 2000 (7 U.S.C. § 7717).

SEC. 417 7 USC 7717 CONTROL OF GRASSHOPPERS AND MORMON CRICKETS.

#### **(a) In General**

Subject to the availability of funds pursuant to this section, the Secretary shall carry out a program to control grasshoppers and Mormon crickets on all Federal lands to protect rangeland.

#### **(b) Transfer Authority**

(1) In general.—Subject to paragraph (3), upon the request of the Secretary of Agriculture, the Secretary of the Interior shall transfer to the Secretary of Agriculture, from any no-year appropriations, funds for the prevention, suppression, and control of actual or potential grasshopper and Mormon cricket outbreaks on Federal lands under the jurisdiction of the Secretary of the Interior. The transferred funds shall be available only for the payment of obligations incurred on such Federal lands.

(2) Transfer requests.—Requests for the transfer of funds pursuant to this subsection shall be made as promptly as possible by the Secretary.

(3) Limitation.—Funds transferred pursuant to this subsection may not be used by the Secretary until funds specifically appropriated to the Secretary for grasshopper control have been exhausted.

(4) Replenishment of transferred funds.—Funds transferred pursuant to this subsection shall be replenished by supplemental or regular appropriations, which shall be requested as promptly as possible.

### **(c) Treatment for Grasshoppers and Mormon Crickets**

(1) In general.—Subject to the availability of funds pursuant to this section, on request of the administering agency or the agriculture department of an affected State, the Secretary, to protect rangeland, shall immediately treat Federal, State, or private lands that are infested with grasshoppers or Mormon crickets at levels of economic infestation, unless the Secretary determines that delaying treatment will not cause greater economic damage to adjacent owners of rangeland.

(2) Other programs.—In carrying out this section, the Secretary shall work in conjunction with other Federal, State, and private prevention, control, or suppression efforts to protect rangeland.

### **(d) Federal Cost Share of Treatment**

(1) Control on federal lands.--Out of funds made available or transferred under this section, the Secretary shall pay 100 percent of the cost of grasshopper or Mormon cricket control on Federal lands to protect rangeland.

(2) Control on state lands.--Out of funds made available under this section, the Secretary shall pay 50 percent of the cost of grasshopper or Mormon cricket control on State lands.

(3) Control on private lands.--Out of funds made available under this section, the Secretary shall pay 33.3 percent of the cost of grasshopper or Mormon cricket control on private lands.

### **(e) Training**

From appropriated funds made available or transferred by the Secretary of the Interior to the Secretary of Agriculture for such purposes, the Secretary of Agriculture shall provide adequate funding for a program to train personnel to accomplish effectively the objective of this section.



# Appendix B

## *Memoranda of Understanding (MOUs)*

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### Contents

- Bureau of Indian Affairs MOU page **B-2**
- Bureau of Land Management MOU page **B-8**
- Forest Service MOU page **B-13**

## Bureau of Indian Affairs MOU

04-8100-0941-MU

MEMORANDUM OF UNDERSTANDING  
BETWEEN

U.S. Department of the Interior--Bureau of Indian Affairs;  
U.S. Department of Agriculture--Animal and Plant Health Inspection Service

CONCERNING:

Management of Grasshoppers and Mormon Crickets on Lands Subject to the Jurisdiction of the  
Department of the Interior

ARTICLE 1 - PURPOSE

Grasshoppers and Mormon Crickets (GH&MC) periodically damage cultivated crops and range plants in most western States. Destructive GH&MC outbreaks occur on rangelands of all ownerships lands held in trust and administered by the U.S. Department of the Interior, Bureau of Indian Affairs (BIA). Some outbreaks are of local concern only, while others may serve as focal points from which pests spread to adjacent privately owned land used for grazing or cropland.

Any proposed response to GH&MC outbreaks on BIA managed lands, including suppression action, must be evaluated to determine the expected impact on trust resources and those of adjacent landowners. BIA supports cooperative and coordinated efforts for an integrated pest management approach for dealing with damaging GH&MC outbreaks.

ARTICLE 2 - OBJECTIVE

The objective of this Memorandum of Understanding (MOU) is to establish, define, and maintain relationships and responsibilities between Animal Plant Health Inspection Service-Plant Protection and Quarantine (APHIS-PPQ) and BIA in managing, and when necessary, suppressing grasshoppers and Mormon crickets on BIA-managed lands. To ensure that any proposed actions are coordinated by Federal, State, Tribal and local agencies, and private landowners for effective control, the following procedures are mutually agreed upon to clarify each agency's responsibilities.

APHIS has the responsibility to comply with National Environmental Policy Act (NEPA) for actions that APHIS may implement on BIA-managed lands. Any environmental assessment (EA) that APHIS may prepare does not authorize any actions on the part of the BIA. The BIA role in the GM&MC suppression efforts which APHIS undertakes is limited to providing information, making requests for treatments, allowing APHIS to store pesticides on BIA-managed land, and preparing/approving a Pesticide Use Proposal for APHIS' treatment action.

FIGURE B-1: Bureau of Indian Affairs MOU (page 1)



### ARTICLE 3 - AUTHORITY

The Plant Protection Act (PPA) of 2000 in Section 417 (7 U.S.C. 7717) requires the Secretary of Agriculture to control GH&MC on rangelands, subject to availability of funds. Administration of the entire PPA is delegated to the USDA/APHIS at 7 CFR 2.80 (a)(51).

APHIS is authorized by the Plant Protection Act, Sec. 431(a), Public Law 106-224, to cooperate with other Federal agencies, the governments of foreign countries, international organizations or associations, states and their political subdivisions, farmer's associations and similar organizations, and other persons to detect, eradicate, suppress, control, and prevent or retard the spread of plant pests and diseases.

### ARTICLE 4 – APHIS RESPONSIBILITIES

APHIS-PPQ agrees to/that:

- a. Provide the BIA local land managers maps and data on fall grasshopper/Mormon cricket surveys. This information will alert the local BIA manager to potential range pest problems that may occur on BIA managed and adjacent lands the following year. APHIS will designate personnel whom the BIA manager can contact if any follow-up activity is necessary.
- b. If fall surveys indicate a potential spring grasshopper or Mormon cricket threat to BIA-managed lands, APHIS will cooperate with BIA to identify the best management approach. Should that approach involve pesticides, and in conjunction with available funding, APHIS will:
  1. Provide for pesticide applications.
  2. Identify sources for the purchase and storage of insecticides. Storage of insecticides on BIA-managed lands will be in accordance with respective BIA policies. Pesticides stored on BIA-managed lands will be used only for projects in which BIA-managed lands are involved. Any excess pesticides, pesticide containers, or mixed but unused pesticide, will be disposed of by APHIS.
- c. APHIS will provide an estimate of the area (acreage that may require treatment), cost estimates, a recommendation as to whether a suppression program is advisable, and APHIS capabilities based on available funding and resources.
- d. Prepare and issue to the public and appropriate Tribal government site-specific environmental documents, as necessary, which comply with the NEPA to suppress damaging GH&MC populations. For most situations, this may include the programmatic environmental impact statement and, where deemed necessary, a site-specific EA and a Finding of No Significant Impact (FONSI). These documents will be prepared under the APHIS NEPA implementing regulations (7 CFR § 372) with coordination and input from the BIA.

FIGURE B-2: Bureau of Indian Affairs MOU (page 2)

e. Prepare a work plan, when appropriate and subject to available funding, for implementing a GH&MC suppression project on BIA-managed lands, upon receipt of a written request from the BIA for a work plan. Such projects will adhere to mitigation measures and operational procedures described by APHIS in the EA and FONSI, as well as take into consideration BIA proposed potential mitigating measures and any biological control programs underway.

f. Consult with the U. S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) as required by the Endangered Species Act of 1973, as amended.

g. Coordinate control program activities with representatives of the BIA, other Federal, State, and Tribal agencies, private land owners and other interests which would be affected by the program. APHIS will provide BIA with the necessary information pursuant to the preparation of a Pesticide Use Proposal which will be prepared by the BIA.

h. Prepare a post-treatment report including acres treated, location, pesticide and amount used, treatment effectiveness, and pertinent comments regarding project operations, problems which occurred, and the need for follow-up action.

#### ARTICLE 5 – BIA RESPONSIBILITIES

BIA agrees to/that:

a. Coordinate with APHIS to conduct any necessary public meetings.

b. Send survey maps and GH&MC population data received from APHIS to appropriate field managers, and provide APHIS State Plant Health Director with current personnel names for follow-up contacts.

c. Local BIA managers or their representatives will be identified to APHIS and will assist in evaluating and selecting GH&MC long-term management techniques that will meet the management needs of both Agencies.

d. The responsible BIA and tribal officials will request, in writing, the inclusion of the appropriate lands in the GH&MC suppression project when treatment for GH&MC is necessary on BIA-managed lands. Requests should include the dates and locations of all tribal ceremonies, and/or cultural events (i.e. Sundances, etc.), as well as sensitive “not-to-be treated” areas that will be in or near the proposed treatment block(s). In addition, requests should include information on the location and nature of any sensitive areas within the treatment area, including the location of endangered species. This request will be made in advance of any treatment to provide time for APHIS to plan and implement treatment.

e. Local BIA managers will provide written acknowledgment for each APHIS recommended GH&MC suppression plan with all its protective mitigation measures.

FIGURE B-3: Bureau of Indian Affairs MOU (page 3)

f. BIA will provide expertise and information, e.g., description of the land, identification of sensitive areas, locations of T&E species, and other resource issues to APHIS interdisciplinary teams in order to complete site-specific environmental analyses for projects that propose to suppress GH&MC infestations on BIA-managed lands. APHIS can implement treatments once APHIS approves the NEPA decision document it prepared.

g. Approve or disapprove, prior to implementation of APHIS treatments, the Pesticide Use Proposal.

h. BIA will forward both biological opinions received from APHIS and APHIS prepared site-specific environmental documents, if needed, to all affected BIA Field Office Managers.

i. Assist APHIS with GH&MC suppression operations, when feasible, by providing personnel, if available, transportation, temporary office space, and temporary storage of equipment and supplies; approving use of airstrips; supplying landownership maps; and providing information about location of outbreaks and access routes.

j. Notify APHIS State Plant Health Director when any new or potentially threatening infestation is discovered, and request follow-up evaluations and pest management recommendations.

k. Make available airstrips on BIA managed lands in cases where long ferry distances between commercial airstrips and GH&MC control and suppression areas would adversely affect project economics, and allow temporary storage of pesticides on trust lands when such storage is cost effective and in accordance with federal and tribal regulations. When feasible, permit access to BIA emergency radio network for GH&MC program personnel.

#### ARTICLE 6 – MUTUAL RESPONSIBILITIES

a. Yearly coordination meeting will be held between APHIS and BIA Headquarters personnel or their designees to discuss and evaluate the previous year.

b. APHIS personnel are under APHIS' administrative direction and will work cooperatively with personnel of the BIA. Personnel of BIA will remain administratively responsible to the BIA and will work cooperatively with personnel of APHIS.

c. In the event that an exchange of funds is anticipated, an Interagency Agreement (APHIS Form 672) would then be developed, referencing this MOU. This one-year Interagency Agreement would detail the exchange of funds for the specified period of time.

#### ARTICLE 7 - ADMINISTRATION

a. Nothing in this MOU will be construed as affecting the authorities of the participants or as binding beyond their respective authorities or to require any of the participants to obligate or expend funds in excess of available appropriations.

FIGURE B-4: Bureau of Indian Affairs MOU (page 4)

b. All questions pertaining to the cooperative work of the two Agencies arising in the field will be discussed by the local representatives of APHIS-PPQ and BIA, and that areas of disagreement will be referred to the State Director or Regional Director for each agency.

c. This MOU shall supersede all existing GH&MC MOUs, supplements, and/or amendments thereto relating to efforts to protect crops, forests, and other agricultural resources from plant pests.

#### ARTICLE 8 – STATEMENT OF NO FINANCIAL OBLIGATION

Signature of this MOU does not constitute a financial obligation on the part of APHIS. Each signatory party is to use and manage its own funds in carrying out the purpose of this MOU. Transfers of funds or items of value is not authorized under this MOU.

The parties of this MOU will contribute, insofar as their available resources permit, and as mutually agreed upon, funds, personnel, facilities, supplies, equipment, and all other items necessary to properly carry out the objectives of this agreement.

#### ARTICLE 9 – LIMITATIONS OF COMMITMENT

This MOU and any continuation thereof shall be contingent upon the availability of funds appropriated by the Congress of the United States. It is understood and agreed that any monies allocated for purposes covered by this MOU shall be expended in accordance with its terms and the manner prescribed by the fiscal regulations and/or administrative policies of the party making the funds available. If fiscal resources are to transfer, a separate agreement must be developed by the parties.

#### ARTICLE 10 – CONGRESSIONAL RESTRICTION

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom, unless it is made with a corporation for its general benefit.

#### ARTICLE 11 - AMENDMENTS

This MOU may be amended at any time by mutual agreement of the parties in writing.

#### ARTICLE 12 - TERMINATION

This MOU may be terminated by either party upon sixty (30) days written notice to the other party.

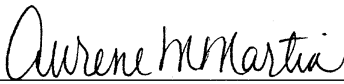
FIGURE B-5: Bureau of Indian Affairs MOU (page 5)

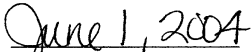
ARTICLE 13 – EFFECTIVE DATE AND DURATION

This MOU shall become effective upon date of final signature and shall continue for five years from signature date.

APPROVED:

U.S. Department of the Interior  
Bureau of Indian Affairs

  
\_\_\_\_\_  
Aurene Martin – Principal Deputy  
Assistant Secretary – Indian Affairs

  
\_\_\_\_\_  
Date

U.S. Department of Agriculture  
Animal and Plant Health Inspection Service

  
\_\_\_\_\_  
Deputy Administrator

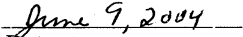
  
\_\_\_\_\_  
Date

FIGURE B-6: Bureau of Indian Affairs MOU (page 6)

## Bureau of Land Management MOU

BLM MOU # \_\_\_\_\_  
APHIS PPQ MOU # 03-8100-0870-MU

### MEMORANDUM OF UNDERSTANDING

among:

U.S. Department of the Interior–Bureau of Land Management;  
U.S. Department of Agriculture–Animal and Plant Health Inspection Service

concerning:

Management of Grasshoppers and Mormon Crickets on Lands Subject to the Jurisdiction of the Department of the Interior

- I. Purpose: Grasshoppers and Mormon crickets (GH&MC) periodically damage cultivated crops and range plants in most western States. Destructive GH&MC outbreaks occur on rangelands of all ownerships including public lands administered by the U.S. Department of the Interior, Bureau of Land Management (USDOI/BLM). Some outbreaks are of local concern only, while others may serve as focal points from which pests spread to adjacent privately owned land that is used for grazing or cropland.

The BLM is responsible for the protection and management of BLM public lands. Forest, timber, wildlife, recreation, wilderness, minerals, and water resources are produced from these lands under the multiple-use concept. The GH&MC outbreaks threaten BLM resources. Any proposed response, including suppression action, must be evaluated to determine the expected impact on BLM resources and those of adjacent landowners. The BLM supports cooperative and coordinated efforts for an integrated pest management approach for dealing with damaging GH&MC outbreaks.

- II. Objective: The objective of this Memorandum of Understanding (MOU) is to define and maintain the relationships and responsibilities between Animal Plant Health Inspection Service–Plant Protection and Quarantine (APHIS-PPQ) and USDOI/BLM in managing, and when necessary, suppressing grasshoppers and Mormon crickets on BLM managed lands. To ensure that any proposed actions are coordinated by Federal, State, local (i.e., Tribal, etc.) agencies, and private landowners for effective control, the following procedures are mutually agreed upon to clarify each agency's responsibilities.

The APHIS has the responsibility to comply with NEPA for actions that APHIS may implement on BLM lands. Any environmental assessment (EA) that APHIS may prepare does not authorize any actions on the part of the BLM. The BLM does not provide any approvals for APHIS actions on BLM lands. The BLM role in the GM&MC suppression efforts that APHIS undertakes is limited to providing information, making requests for treatments, allowing APHIS to store pesticides on BLM land, and preparing/approving a Pesticide Use Proposal for APHIS' treatment action.

FIGURE B-7: Bureau of Land Management MOU (page 1)

III. Authority: The Plant Protection Act (PPA) of 2000 in Section 417 (7 U.S.C. 7717) authorizes the Secretary of Agriculture to control GH&MC on rangelands. Administration of the entire PPA is delegated to the USDA/APHIS at 7 CFR 2.80 (a)(51).

IV. Procedure:

A. APHIS-PPQ agrees to/that:

- a. Provide the BLM local land managers maps and data on fall grasshopper/Mormon cricket surveys. This information will alert the local BLM manager to potential range pest problems that may occur on BLM and adjacent lands the following year. The APHIS will designate personnel whom the BLM manager can contact if any follow-up activity is necessary.

If fall surveys indicate a potential spring grasshopper or Mormon cricket threat to BLM lands, APHIS will cooperate with BLM to identify the best management approach. Should that approach involve pesticides, and in conjunction with available funding, APHIS will:

1. Provide for pesticide applications.
2. Identify sources for the purchase and storage of insecticides. Storage of insecticides on BLM lands will be in accordance with respective BLM policies. Pesticides stored on BLM lands will be used only for projects in which BLM lands are involved. Any excess pesticides, pesticide containers, or mixed but unused pesticide, will be disposed of by APHIS.

The APHIS will provide an estimate of the area (acreage that may require treatment), cost estimates, a recommendation as to whether a suppression program is advisable, and APHIS capabilities based on available funding and resources.

- b. Prepare and issue to the public site-specific environmental documents, as necessary, that comply with the NEPA to suppress damaging GH&MC populations. For most situations this may include the programmatic environmental impact statement and, where deemed necessary, a site specific EA and a Finding of No Significant Impact (FONSI). These documents will be prepared under the APHIS NEPA implementing regulations (7 CFR § 372) with coordination and input from the BLM.
- c. Prepare a work plan for, and when appropriate and subject to available funding, implement a GH&MC suppression project on BLM lands, upon receipt of a written request from the BLM for a work plan. Such projects will adhere to mitigation measures and operational procedures described by APHIS in the EA and FONSI, as well as take into consideration BLM

FIGURE B-8: Bureau of Land Management MOU (page 2)

proposed potential mitigating measures and any biological control programs underway.

- d. Consult with the Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) as required by the Endangered Species Act of 1973, as amended.
- e. Coordinate control program activities with representatives of the BLM, other Federal and State agencies, private landowners and other interests that would be affected by the program. The APHIS will provide the BLM with the necessary information pursuant to the preparation of a Pesticide Use Proposal that will be prepared by the BLM.
- f. Prepare a post-treatment report including acres treated, location, pesticide and amount used, treatment effectiveness, and pertinent comments regarding project operations, problems that arose, and the need for follow-up action.
- g. In the event that an exchange of funds is anticipated, an Interagency Agreement (APHIS Form 672) would then be developed, referencing this MOU. This 1-year Interagency Agreement would detail the exchange of funds for the specified period of time.

B. The BLM agrees to that:

- a. State Directors will send survey maps and GH&MC population data received from APHIS to appropriate field managers, and provide APHIS State Plant Health Director with current personnel names for follow-up contacts.
- b. Local managers or their representatives will assist in evaluating and selecting GH&MC long-term management techniques that will meet the management needs of both Agencies.
- c. The responsible BLM official will request, in writing, the inclusion of the appropriate lands in the GH&MC suppression project when treatment for GH&MC is necessary on BLM lands. This request will be made in advance of any treatment to provide time for APHIS to plan and implement treatment. Requests should include information on the location and nature of any sensitive areas within the treatment area, including the location of endangered species.
- d. Local managers will provide written acknowledgement for each APHIS recommended GH&MC suppression plan with all its protective mitigation measures.
- e. The BLM will provide expertise and information, e.g., description of the land, identification of sensitive areas, locations of T&E species, and other resource

FIGURE B-9: Bureau of Land Management MOU (page 3)



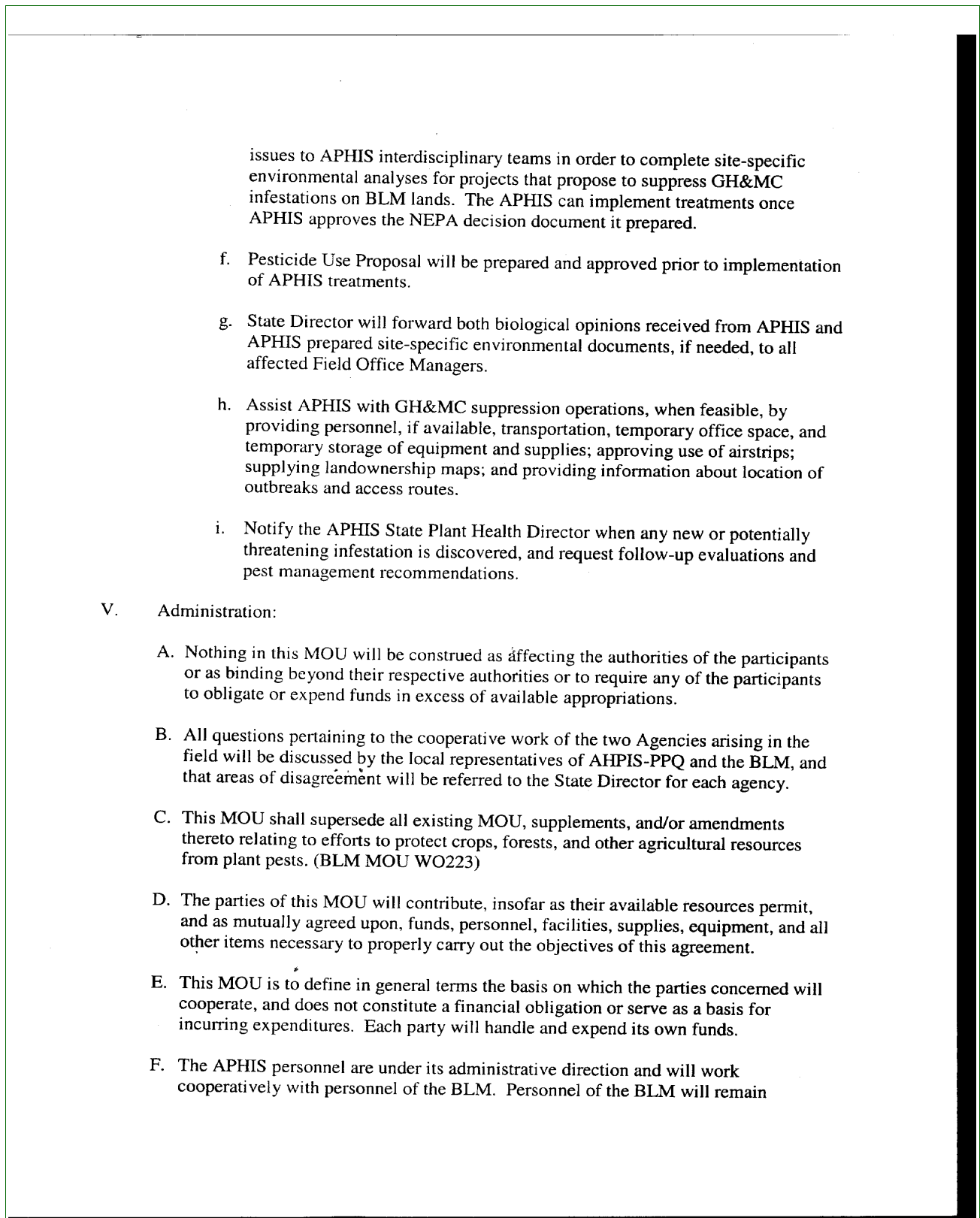


FIGURE B-10: Bureau of Land Management MOU (page 4)

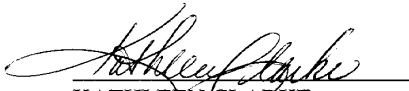
administratively responsible to the BLM and will work cooperatively with personnel of APHIS.

- G. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement or to any benefit that may arise there from, unless it is made with a corporation for its general benefit.
- H. Yearly coordination meeting will be held between APHIS and BLM Headquarters personnel of their designees to discuss and evaluate the previous year.
- I. This MOU shall become effective upon date of final signature and shall continue for up to five years from signature date but may be modified or discontinued at the request of either party. Requests for termination or any change shall be submitted in writing to the other party for consideration not less than 30 days in advance of the desired effective date.


APPROVED:

U.S. Department of the Interior  
Bureau of Land Management

U.S. Department of Agriculture  
Animal and Plant and Health Inspection  
Service

  
KATHLEEN CLARKE  
Director

Date: 2-26-03

  
RICHARD L. DUMBLE  
Deputy Administrator

Date: 2-27-03

(This MOU supersedes BLM MOU W0223)

FIGURE B-11: Bureau of Land Management MOU (page 5)

## Forest Service MOU

02-IA-11132020-106

MEMORANDUM OF UNDERSTANDING  
between  
THE UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
and  
THE UNITED STATES DEPARTMENT OF AGRICULTURE  
ANIMAL AND PLANT HEALTH INSPECTION SERVICE  
for  
SUPPRESSION OF GRASSHOPPERS AND MORMON CRICKETS  
ON NATIONAL FOREST SYSTEM LANDS

Cultivated crops and range plants in most Western States are periodically damaged by grasshoppers and Mormon crickets (GH&MC). Destructive GH&MC outbreaks occur on rangelands of all ownerships including National Forest System (NFS) lands administered by the United States Department of Agriculture (USDA), Forest Service (FS). Some outbreaks are of local concern only, which others may serve as focal points from which pests spread to adjacent privately owned grazing or cropland. The Plant Protection Act (PPA) of 2000 in Section 417 (7 U.S.C. 7717) authorizes the Secretary of Agriculture to control GH&MC on rangelands. Administration of the entire PPA is delegated to the USDA, Animal and Plant Health Inspection Service (APHIS) at 7 CFR 2.80(a)(51).

The FS is responsible for the protection and management of NFS lands. Forage, timber, wildlife, recreation, wilderness, minerals, and water resources are produced from these lands under the multiple-use concept. GH&MC outbreaks may threaten FS resources. Any proposed response, including suppression action, must be evaluated to determine the expected impact on FS resources and those of adjacent landowners. The FS supports cooperative and coordinated efforts for an integrated pest management approach for dealing with damaging GH&MC outbreaks. An APHIS role exists in the detection, evaluation, and suppression components of GH&MC management on NFS lands and is the subject of this Memorandum of Understanding.

FIGURE B-12: Forest Service MOU (page 1)

The following procedures clarify the responsibilities of each agency.

A. Subject to available funding, personnel resources, and program policy APHIS agrees:

1. Provide to the FS the name of local APHIS personnel knowledgeable of GH&MC programs.
2. To provide the FS with a maps of potential GH&MC problems. The maps will be based on spring and fall field surveys of GH&MC populations.
3. Complete the Rangeland Grasshopper and Mormon Cricket Suppression Program Final Environmental Impact Statement for the APHIS GH&MC program in accordance with the National Environmental Policy Act (NEPA), and the CEQ regulations (40 CFR 1500-1508) and sign the Record of Decision.
4. Prepare and issue to the public site-specific environmental documents that comply with the National Environmental Policy Act to suppress economically damaging GH&MC populations. For most situations this will include a site-specific Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI). These documents will be prepared under the APHIS NEPA implementing regulations with cooperation and input from FS.
5. Develop statements of work and identify available commercial sources for full-service contracts to provide, store, and aerially apply pesticides for the suppression of economically damaging GH&MC populations.
6. When requested by the FS, provide an estimate of the area (acreage that may require treatment), cost estimates, a recommendation as to whether a suppression program is advisable, and APHIS capabilities based on available funding and resources.
7. Prepare a work plan for, and implement a GH&MC suppression project on FS lands, upon receipt of a written request from the FS for efficacious and cost effective treatments. Such projects will adhere to mitigation measures and operational procedures described by APHIS and FS in the EA and FONSI. Protective measures for Threatened and Endangered Species as required by the U.S. Fish and Wildlife Service and National Marine Fisheries Service, Land and Resource Management Plans, and other relevant decisions will also be implemented.
8. As circumstances warrant, coordinate GH&MC Program activities and meet with stakeholders including representatives of the FS, other agencies, State Departments of Agriculture, and private landowners who have an interest in GH&MC Program activities.

FIGURE B-13: Forest Service MOU (page 2)

9. Prepare a post-treatment report including acres treated, location, pesticide and amount used, treatment effectiveness, and pertinent comments regarding project operations, problems that arose, and the need for follow-up action.

10. In the event that an exchange of funds is anticipated, an Interagency Agreement (APHIS Form 672) would then be developed, referencing this MOU. This 1-year Interagency Agreement would detail the exchange of funds for the specified period of time.

B. The FS Agrees:

1. That Regional Foresters will send survey maps and GH&MC population data received from APHIS to appropriate Forest Supervisors and provide APHIS State Plant Health Director with current FS personnel names for follow-up contacts.

2. That the Forest Supervisors or their representatives will assist in evaluating and selecting GH&MC suppression techniques that will meet the management needs of both Agencies. Although APHIS has lead responsibility to complete a national programmatic environmental impact statement (EIS) for the GH&MC program and for selecting the technology to be used in the program, the FS will serve as a cooperating agency and provide required resource information and participate in the review process of the programmatic EIS.

3. If requested by APHIS in a timely fashion and if the skills are available, FS will provide expertise to APHIS interdisciplinary teams to complete, site-specific environmental analyses for projects that propose to control GH&MC infestations on NFS lands. The role of the FS will be as a cooperating agency in the conduct of environmental analyses. The FS will approve a pesticide use proposal for APHIS to treat GH&MC infestations under these circumstances. APHIS can implement treatments once APHIS approves the NEPA decision document and the FS approves the pesticide use proposal.

4. That Forest Supervisors will forward both biological opinions received from APHIS and APHIS-prepared site-specific environmental documents, if needed, to all affected District Rangers.

5. To fully consider APHIS responsibilities and integrated pest management needs on intermingled and adjacent lands when reviewing GH&MC management programs on NFS lands.

FIGURE B-14: Forest Service MOU (page 3)

6. That the responsible FS official will request, in writing, the inclusion of the appropriate lands in the APHIS GH&MC suppression project when treatment for GH&MC is necessary on NFS lands. This request will be made in advance of any treatment to provide time for APHIS to plan and implement treatment. Requests should include information on the location and nature of any sensitive areas within the treatment area and recommendations to APHIS concerning the requirements of the Endangered Species Act of 1973, as amended.

7. To assist APHIS with GH&MC suppression operations, when feasible, by providing personnel if available, transportation, and temporary storage of equipment and supplies; approving use of airstrips; supplying land ownership maps; and providing information about location of outbreaks and access routes. Such use of FS personnel will be held at the minimum necessary to accomplish the GH&MC suppression project(s).

8. Notify the APHIS State Plant Health Director when any new or potentially threatening infestation is discovered, and request follow-up evaluations and pest management recommendations.

C. It Is Mutually Agreed:

1. That GH&MC suppression project(s) initiated under this Memorandum of Understanding will conform to APHIS and FS policies and will be approved by appropriate FS and APHIS line officers.

2. That all questions pertaining to the cooperative work of the two Agencies arising in the field will be discussed by the local representatives of APHIS and the FS, and that areas of disagreement will be referred to the Regional Forester and to the appropriate APHIS Regional Director for resolution.

3. That either party may furnish needed equipment which is otherwise unavailable and will retain its ownership.

4. That this Memorandum of Understanding is intended to define the general terms under which concerned parties will cooperate and does not constitute a financial obligation.

5. That the responsibilities assumed by cooperating parties are contingent upon availability of funds appropriated for this purpose.

6. That no member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom, unless it be made with a corporation for its general benefit.

FIGURE B-15: Forest Service MOU (page 4)


7. That this Memorandum of Understanding shall supersede the Memorandum of Understanding dated July 16, 1987, between the FS and the APHIS.

8. This Memorandum of Understanding shall become effective upon date of final signature and shall continue for up to five years from signature date, but may be modified or discontinued at the request of either party. Requests for termination or any change shall be submitted in writing to the other party for consideration not less than 30 days in advance of the desired effective date.

United States Department of  
Agriculture, Forest Service

United States Department of  
Agriculture, Animal and  
Plant Health Inspection Service

  
DALE BOSWORTH  
Chief

  
BOBBY R. ACORD  
Administrator

Date: 5/30/02

Date: 5/29/02

FIGURE B-16: Forest Service MOU (page 5)







# Appendix C

## *Program Managers and Points of Contact*

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Program Managers page **C-1**

Points of Contact page **C-3**

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### Program Managers

#### **Arizona**

Dewey Murray

[Dewey.w.murray@aphis.usda.gov](mailto:Dewey.w.murray@aphis.usda.gov)

602-431-8930

#### **California**

Danny Hamon

[Danny.j.hamon@aphis.usda.gov](mailto:Danny.j.hamon@aphis.usda.gov)

916-930-5530

#### **Colorado**

Lisa Peraino

[Lisa.j.peraino@aphis.usda.gov](mailto:Lisa.j.peraino@aphis.usda.gov)

303-371-3355

#### **Idaho**

Rob McChesney

[Rob.r.mcchesney@aphis.usda.gov](mailto:Rob.r.mcchesney@aphis.usda.gov)

208-378-5797

#### **Kansas**

Russ McKinney

[Russell.a.mckinney@aphis.usda.gov](mailto:Russell.a.mckinney@aphis.usda.gov)

785-270-1380

#### **Montana**

Joe Merenz

[Richard.j.merenz@aphis.usda.gov](mailto:Richard.j.merenz@aphis.usda.gov)

406-449-5210

### **New Mexico**

Shawn Carson  
[Shawn.r.carson@aphis.usda.gov](mailto:Shawn.r.carson@aphis.usda.gov)  
505-527-6985

### **Nebraska**

Vicki Wohlers  
[Vicki.b.wohlers@aphis.usda.gov](mailto:Vicki.b.wohlers@aphis.usda.gov)  
402-434-2345

### **Nevada**

Marilyn Tomkins  
[Marilyn.l.tomkins@aphis.usda.gov](mailto:Marilyn.l.tomkins@aphis.usda.gov)  
775-851-8818

### **North Dakota**

Dave Hirsch  
[David.c.hirsch@aphis.usda.gov](mailto:David.c.hirsch@aphis.usda.gov)  
701-250-4473

### **Oklahoma**

Blaine Powell  
[Blaine.powell@aphis.usda.gov](mailto:Blaine.powell@aphis.usda.gov)  
405-609-8840

### **Oregon**

Gary Brown  
[Gary.w.brown@aphis.usda.gov](mailto:Gary.w.brown@aphis.usda.gov)  
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### **South Dakota**

Amy Mesman  
[Amy.s.mesman@aphis.usda.gov](mailto:Amy.s.mesman@aphis.usda.gov)  
605-224-1713

### **Texas**

George Nash  
[George.h.nash@aphis.usda.gov](mailto:George.h.nash@aphis.usda.gov)  
512-916-5241

### **Utah**

Greg Abbott  
[Gregory.c.abbott@aphis.usda.gov](mailto:Gregory.c.abbott@aphis.usda.gov)  
435-896-4772

### **Washington**

Steve Miller  
[Steven.m.miller@aphis.usda.gov](mailto:Steven.m.miller@aphis.usda.gov)  
509-353-2950

### **Wyoming**

Bruce Shambaugh  
[Bruce.a.shambaugh@aphis.usda.gov](mailto:Bruce.a.shambaugh@aphis.usda.gov)  
307-432-7979

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## **Points of Contact**

### **CPHST**

Nelson Foster  
[Nelson.r.foster@aphis.usda.gov](mailto:Nelson.r.foster@aphis.usda.gov)  
602-437-1295 Ext. 225

### **Aircraft and Equipment Operations**

Tim Roland  
[Timothy.j.roland@aphis.usda.gov](mailto:Timothy.j.roland@aphis.usda.gov)  
956-580-7270

### **PPQ Western Region**

Roeland Elliston  
[Roeland.j.elliston@aphis.usda.gov](mailto:Roeland.j.elliston@aphis.usda.gov)  
970-494-7572

Debra Shambaugh  
[Debra.a.shambaugh@aphis.usda.gov](mailto:Debra.a.shambaugh@aphis.usda.gov)  
970-494-7560

### **PPQ Headquarters**

Charles Brown  
[Charles.l.brown@aphis.usda.gov](mailto:Charles.l.brown@aphis.usda.gov)  
301-734-4838

### **MRPBS**

Jason Wilking  
[Jason.l.wilking@aphis.usda.gov](mailto:Jason.l.wilking@aphis.usda.gov)  
612-336-3210





# Appendix D

## *Forms*

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- [Rancher Grasshopper Suppression Program Agreement Sign-up Sheet](#) page **D-2**
- [Environmental Monitoring Supplies Checklist](#) page **D-3**

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## Rancher Grasshopper Supression Program Agreement Sign-up Sheet

Name (print): \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_

County: \_\_\_\_\_ Total acres for treatment: \_\_\_\_\_

Telephone number: \_\_\_\_\_ Cell phone number: \_\_\_\_\_

Email: \_\_\_\_\_ Fax: \_\_\_\_\_

Legal description of area where treatment is requested: (Example: Township 14N, Range 19W, Section 12), Please indicate the number of acres of rangeland and cropland, respectively, in the block.

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Please attach map(s):

Signature: \_\_\_\_\_

## Environmental Monitoring Supplies Checklist

ENVIRONMENTAL MONITORING SUPPLIES CHECKLIST					
SUPPLIES TO BRING EACH TIME YOU GO TO A SAMPLING SITE					
Monitoring plan/SOP's		Obtain from EMT	Thermometer		
Field log notebook			Ice chest/wet or blue ice		Obtain locally
Compass			Baby wipes		
Wind gauge			2060 monitoring forms		
Indelible marker			Packing/strapping tape		

A.R.S.E. (Run-off Sampling)			Dye Cards		
Plexiglas cover			Oil sensitive dye cards		
8"x 8" mesh screen			Water sensitive dye cards		
Tent pegs/nails			5' bamboo poles/stakes		
Funnels attached to caps			Paper/alligator clips		
500 ml bottles			Tacks		
4" PVC pipe, 14" long			4" x 4" plastic bags		
Post hole digger			12" x 12" plastic bags		
Pea gravel			Tweezers/forceps		
Large rocks/bricks			disposable gloves		
Bamboo pole/flagging tape			Water Samples		
collapsible cubitainer			Dissolved oxygen kit		
Sodium sulfate (small vials)			collapsible cubitainer		
pH paper/pH meter			Sodium sulfate (small vials)		
Sulfuric acid (squeeze bottle)			pH paper/pH meter		
Styrofoam Acoffin®			Sulfuric acid (squeeze bottle)		

Vegetation/Fish/Insect Samples			Sediment Samples		
Pruning sheers/scissors			Dredge tied to strong rope		
Aluminum foil envelopes			3 gallon galvanized pail		
Strapping tape			Hand trowel		
			3" mesh screen		
			Aluminum foil envelopes		

Sampling Supply Checklist / Order Form

B1

**FIGURE D-17: Environmental Monitoring Supplies Checklist (page 1)**

Soil Samples			Swab/Wipe Samples		
Soil core sampler			3" x 3" sterile cotton pads with resealable plastic bag		
3 gallon galvanized pail			Metric ruler		
Hand trowel			Pencil		
3" mesh screen			Disposable gloves		
Aluminum foil envelopes			Isopropyl alcohol		Obtain locally
Baby wipes					

Neat (Pure) Chemical Formulations			Miscellaneous Supplies		
Amber glass bottle			Labels		
Parafilm			Styrofoam coolers/mailers		
Small mailing tubes			Freezer		Obtain locally
Cat litter/packing material			Dry ice		Obtain locally
Disposable pipette			Resealable plastic bags:		
Pipetting bulb			4" x 4"		
Disposable gloves			6" x 6"		
Protective eyewear			8" x 8"		
			12" x 12"		

**Program:** \_\_\_\_\_ **Requested by:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Phone:** \_\_\_\_\_

**Address:** \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

**To order supplies, indicate the quantity of each items needed. Fax a copy of this form to ANPCL at 228-822-3209 or 228-822-3137. If fax machines are not working, leave a message with the ANPCL supplies manager at 228-822-3106. Please realize that it may be difficult to completely fill order for large quantities of materials.**

**Note: This is not an exhaustive supply list...items that are not listed here may be available through ANPCL.**

**FIGURE D-18: Environmental Monitoring Supplies Checklist (page 2)**





# Appendix E

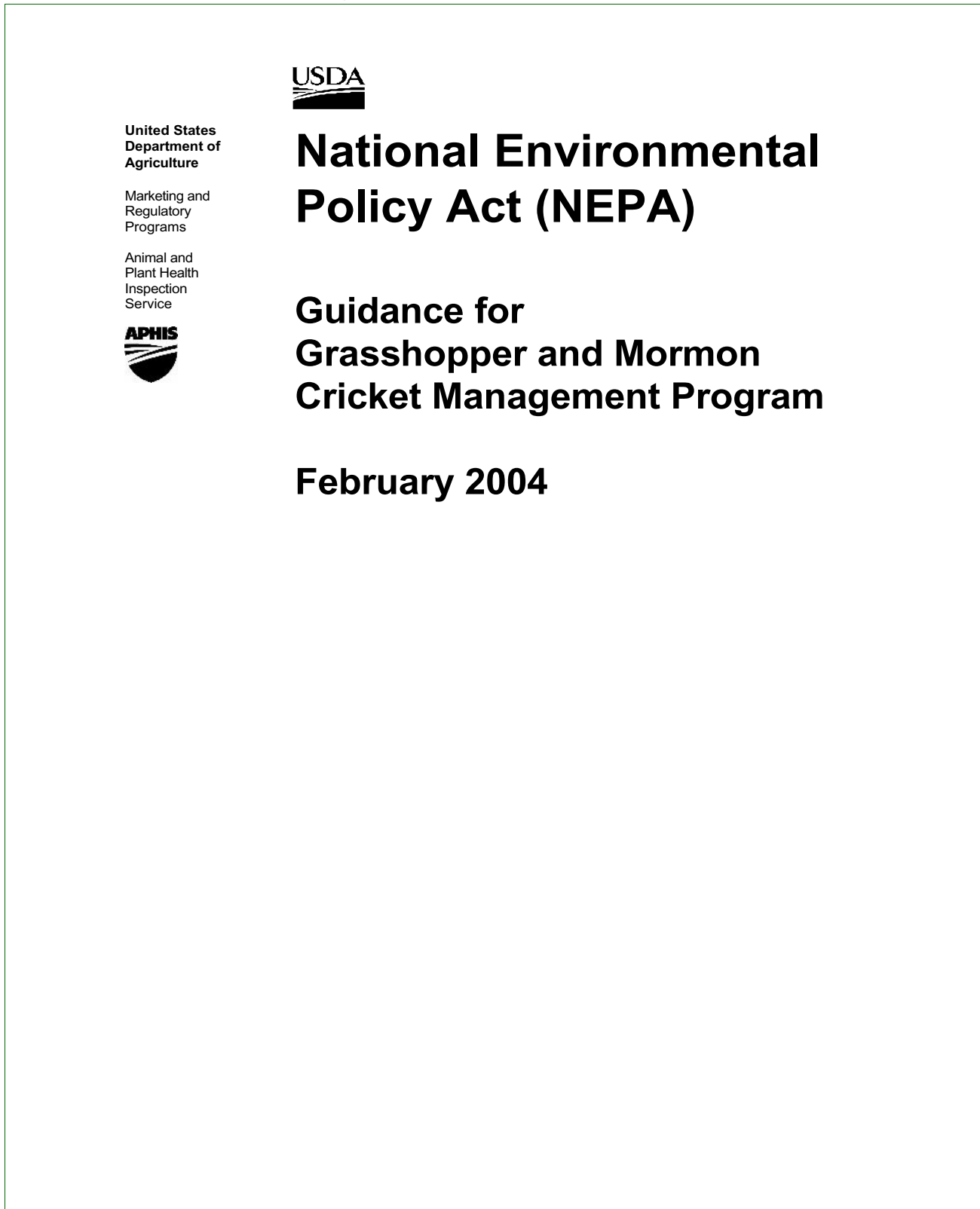
## *APHIS Guidance on Preparation of Environmental Assessments for Grasshopper and Mormon Cricket Programs*

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National Environmental Policy Act (NEPA) page **E-2**

## National Environmental Policy Act (NEPA)



**FIGURE E-1: National Environmental Policy Act (cover page)**

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**FIGURE E-2: National Environmental Policy Act (table of contents)**

## I. Introduction

This guidance document is intended to equip Grasshopper Management Program officials in the field with sufficient information and examples of National Environmental Policy Act (NEPA) compliance approaches, documents, and processes to enable them independently to get a good start on, if not handle completely, the NEPA process in the course of dealing expeditiously with grasshopper and Mormon cricket (hereafter referred to as grasshoppers) outbreaks wherever they may occur.

The NEPA process serves many purposes. An environmental assessment may be prepared to aid an agency's compliance with the Code of Federal Regulations (CFR) when no environmental impact statement is necessary (40 CFR § 1508.9(a)(2)). NEPA directs agencies of the Federal government to "make available to States, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment" (42 United States Code (U.S.C.) § 4332(2)(G)). Providing timely information and advice to citizens at the State and local levels is especially important where, as in the case of grasshopper management, officials are dealing with insecticide use. In most circumstances, the best way in which to involve and educate citizens of States dealing with grasshopper outbreaks is through the public NEPA environmental assessment process.

## II. NEPA Process

APHIS normally engages in a "conventional" environmental assessment process, consistent with regulations implementing NEPA, for almost all of its actions classified as normally requiring the preparation of environmental assessments (EA's). See 7 CFR § 372.5(b) for APHIS' NEPA Implementing Procedures. However, a conventional process does not accommodate the needs of the Grasshopper Management Program. This Program conducts ongoing surveillance activities to ensure detection of and swift response to grasshopper outbreaks. Surveillance activities may cover broad territories, sometimes an entire State, and usually take place where grasshopper outbreaks have occurred earlier or are reasonably anticipated to occur. If grasshopper outbreaks are identified, surveys are quickly performed in an effort to delimit the affected area. As soon as surveys firmly establish the boundaries of the affected area, action to deal with the pest threat usually has to be undertaken immediately. In these situations, there seldom is enough time to engage in a conventional EA process. Thus, a two-stage EA process has been designed to accommodate such situations.

1

FIGURE E-3: National Environmental Policy Act (page 1)

### 1. Stage 1

The first stage takes place while surveillance activities covering broad territories are being conducted. In cooperation with State officials, potential environmental effects of standard program operations (all of which integrate environmental safeguards) on all aspects of environmental quality are considered. Options for dealing with critical issues-waste disposal, for example, are explored and developed. To the extent possible, other environmental review and consultation requirements, those mandated by Section 7 of the Endangered Species Act, for example, are satisfied. An environmental assessment (EA) documenting this examination is prepared. (See appendix A for a template and an example of an EA.) As appropriate, a finding of no significant impact (FONSI) is signed by the APHIS decisionmaker and, together with the underlying EA, made available to the public; a 30-day comment period normally is prescribed. (See appendix B for a template and example of a FONSI.) If comments are received during the comment period, they should be considered when received, but will be addressed further in stage 2 of the process. However, if comments are received that could invalidate the FONSI, contact the NEPA liaisons for advice.

### 2. Stage 2

Following detection of grasshopper outbreaks within the surveillance territory covered under the initial EA and signed FONSI, a second stage of the environmental assessment process is undertaken to re-examine potential program effects on the quality of the human environment. This examination, while conducted swiftly, is more focused because the affected area has been delimited through surveys to a very substantial degree. Still, given the need to take action immediately to deal with the grasshopper outbreak, there generally is insufficient time at this stage to involve the public as it might otherwise be in a more conventional environmental assessment process designed to address and consider potential impacts in the delimited area.

The second stage of the environmental assessment process in these situations is intended mainly to ensure that significant impacts in the delimited area will not be experienced; if a determination to this effect can be made, it is documented and made available to the public, which again would have an opportunity to comment. This supplemental determination would probably be only a page or two in length and would analyze the specific outbreak area. (See appendix C for a template of this supplemental determination document.) In addition, the determination would include responses to comments received on the EA and FONSI in stage 1. If, at this second stage, the decisionmaker cannot confirm the previous FONSI, then the "emergency circumstances" provisions of the NEPA implementing regulations could be invoked, as appropriate.

Emergency circumstance provisions are described below.

2

**FIGURE E-4: National Environmental Policy Act (page 2)**

- 3. Emergency Circumstance Provisions** Where emergency circumstances make it necessary to take an action with significant environmental impact without observing the provisions of the Council on Environmental Quality's (CEQ) NEPA implementing regulations, APHIS should consult with CEQ about alternative arrangements to deal with actions necessary to control the immediate impacts of the emergency (40 CFR § 1506.11). The Grasshopper Management Program NEPA liaisons will conduct the consultation on emergency circumstances with CEQ. However, it is important that PPQ program personnel contact the NEPA liaisons as soon as possible if this circumstance should arise.

### III. Public Notice

NEPA requires that an agency involve the public, to the extent practical, in preparing environmental documents (40 CFR § 1501.4 and § 1503.1, 7 CFR § 372.8). Public involvement in the environmental process can occur through the opportunity for public comment, either in writing or orally, on an environmental document. (Although documentation of NEPA considerations for a categorically excluded action is recommended, public notice on such is not required by NEPA.)

- 1. Initial Public Involvement** For stage 1 of the NEPA process, if time permits, the involved program manager may elect to solicit the public's concerns before beginning the actual preparation of an EA. Typically, this involves sending a notice to known interested parties and/or publishing a notice in area newspapers.
- 2. Notifying the Public of an EA and FONSI** After an EA and FONSI (if appropriate) are prepared and the FONSI has been signed by the APHIS decisionmaker, the program will announce to the public their availability for a 30-day comment period. The FONSI must be made available to the public before a proposed action is implemented (40 CFR § 1501.4(e)(1) and § 1506.6).
- 3. Holding Public Meetings** A local meeting can be held at the discretion of PPQ to provide the public an opportunity to comment on the proposed action (40 CFR § 1506.6(c)). Public meetings can be used to supplement the comment period on the proposed action. When the comment period closes, the APHIS decision maker will need to review and consider all comments, both written and those received orally at public meetings, before making a decision on the proposed action.

FIGURE E-5: National Environmental Policy Act (page 3)

**4. Satisfying  
Public Notice  
During Stages  
1 and 2**

An EA and FONSI are both defined as environmental documents (40 CFR § 1508.10). An agency must provide a notice of availability of the environmental document(s) to the public (7 CFR § 372.8(3)) and 40 CFR § 1501.4(e)(1)). PPQ will be responsible for notifying the public that the documents are available. Timely public notice of a FONSI ensures that the public has ample opportunity to be informed of the actions that will be taken.

The CEQ NEPA Implementing Regulations (40 CFR § 1506.6) and APHIS NEPA Implementing Procedures (7 CFR § 372.8(b)(3)) recommend ways for availing notice of an environmental document to the public, some of which are mentioned below. In most cases, public notice of the availability of a FONSI and its accompanying EA can be satisfied through a regional or local newspaper (those of general circulation) or other local media. Additional methods recommended for availing these documents are as follows:

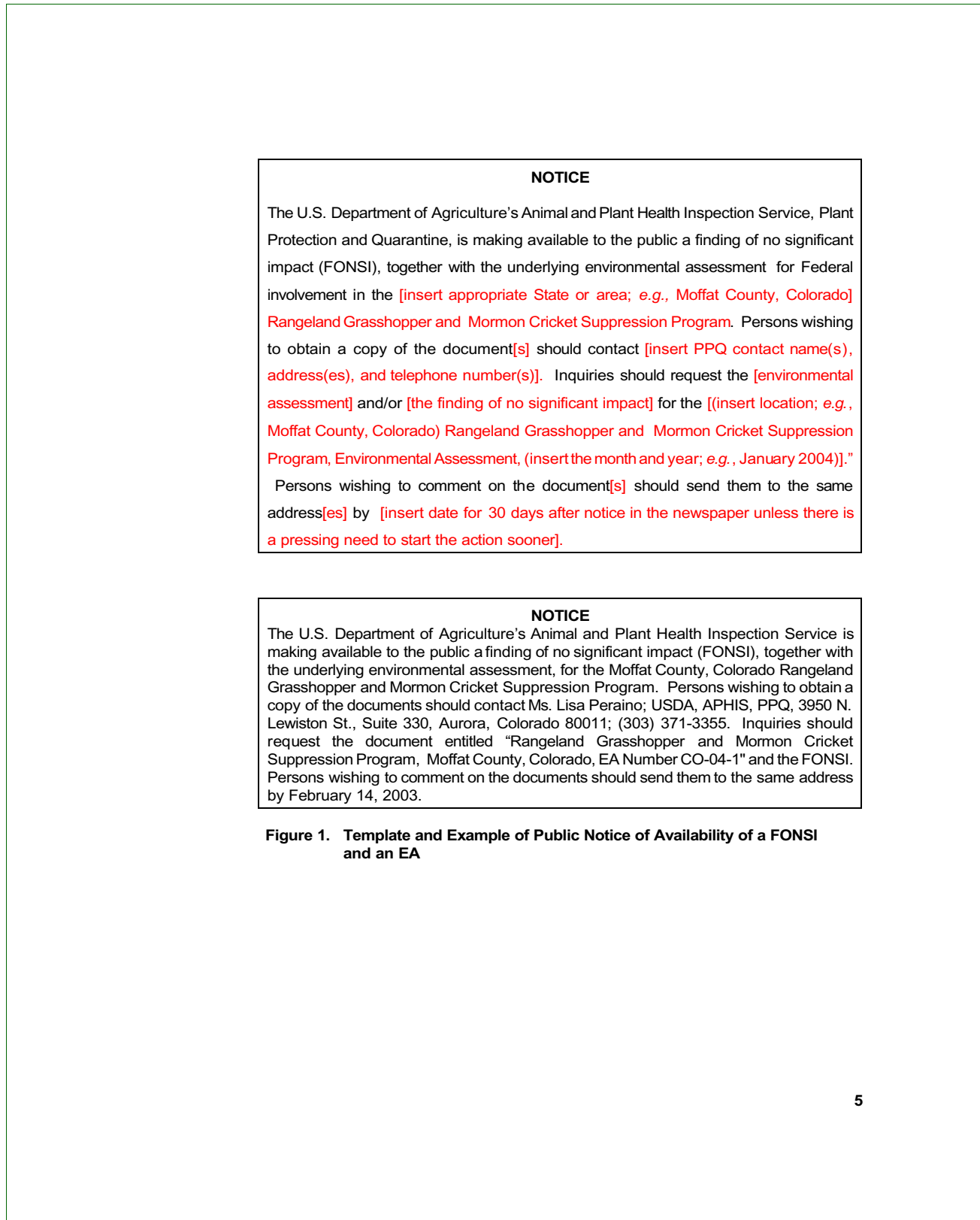
- notice to tribes when effects may occur on reservations,
- notice to potentially interested community organizations, including small business associations,
- publication in newsletters that may be expected to reach potentially interested persons,
- direct mailing or door-to-door delivery to owners and occupants of nearby or affected property,
- posting of notice on- and off-site in the area where the action is to be located.

Newspaper notices are more appropriate for local proposals. When public notice of the availability of a FONSI and EA will be handled through local or regional media, contact the newspaper's classified advertisement department to provide information for publishing a notice. This type of announcement is generally advertised under the Legal Notices section of the classified advertisement section. It is suggested that the notice be advertised for at least 2 days. An example of the minimal information required for public notice is provided in Figure 1 below.

In Stage 2, the determination document prepared when specific treatment sites are located can be provided to persons who commented on the initial EA prepared under Stage 1 or may be made available by any of the methods described above. Whatever method that will be used to inform the public of the determination document must be described in the "About this process" section of the EA.

4

**FIGURE E-6: National Environmental Policy Act (page 4)**



**Figure 1. Template and Example of Public Notice of Availability of a FONSI and an EA**

**FIGURE E-7: National Environmental Policy Act (page 5)**



## IV. APHIS NEPA Liaisons

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Chief, Environmental Services  
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Riverdale, MD 20737-1238  
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## V. Repository for Environmental Documents

For agency reporting and informational purposes, Environmental Services (ES), Policy and Program Development (PPD), maintains a repository of APHIS environmental documents, including a database. After approval by the decisionmaker, provide one copy of the EA and the signed FONSI to:

USDA, APHIS, PPD, ES  
4700 River Road, Unit 149  
Riverdale, MD 20737-1238

FIGURE E-8: National Environmental Policy Act (page 6)





# Appendix F

## *Calibrating Ground Equipment*

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### Contents

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ATV Sprayer Calibration Worksheet (page 3)	page <b>F-6</b>

## SPREADER CALIBRATION

### CONSTANTS

1. Swath width
2. Rotor height above ground
3. 5,280 linear feet per mile
4. 43,560 square feet per acre
5. Rotor speed - RPMs

### VARIABLES

1. Ground speed of vehicle
2. Hopper gate opening
3. Material applied (pellets, bran)
4. Desired rate of application

### CALCULATIONS

1. Determine swath width: spread tarps and measure widest distance where pellets land. The idea is to know how far the pellets fly, not how far they bounce and roll. Collect and replace the pellets into the hopper.

2. Calculate the area covered by the spreader over a fixed distance:  
Multiply swath width times distance driven (both in feet), then divide by 43,560.  
 $20(\text{arbitrary swath width for calculation}) \times 5280 (\text{distance driven}) \text{ divided by } 43560 = 2.42 \text{ acres}$

3. Calculate amount of bait needed to cover this area:  
Multiply acreage by desired rate of application.  
 $2.42 \times 10 \text{ pounds per acre} = 24.2 \text{ pounds of bait}$

4. Now we're at the question: How do we juggle ground speed and hopper gate opening to apply this amount of bait ??? First, we need to determine our ground speed. 5 mph is maximum that can be maintained over rough ground and brush. 10 mph is maximum for trails and 2-tracks. 15 mph can be maintained over most gravel roads. Second, a mile and 24.2 pounds are too large to deal with. We need to reduce these to numbers we can manage in a parking lot and office. Three percent might work.  
 $.03 \times 5280 = 158.4 \text{ linear feet. This is a good distance for 5 mph calibration.}$   
 $158.4 \times 20(\text{our arbitrary swath width}) = 3168 \text{ square feet}$   
 $3168 \text{ divided by } 43560 = .073 \text{ acre}$   
 $.073 \times 24.2(\text{at } 10 \text{ lbs per acre}) = 1.77 \text{ pounds} = 28.32 \text{ ounces}$

5. The next step is to ACCURATELY measure the time in seconds needed to drive the ATV 158.4 feet. This requires at least two people. In a large parking lot or smooth open area, measure 158.4 feet EXACTLY and mark the starting and ending points clearly. The ATV driver should get the ATV up to the desired

FIGURE F-1: Spreader Calibration (page 1)

speed before getting to the starting point. A stopwatch is started when the front tire hits the starting mark and stopped when the front tire hits the ending mark, and the elapsed time recorded. It's a good idea to drive over the course three times and average the times.

6. Now we need to determine the setting on the hopper gate. **Safety goggles and mask are strongly recommended**. Two people are needed for this – one to hold a sturdy bag to collect the bait thrown from the spreader, and one to operate the stopwatch and the switch for the rotor. When the bag holder is ready (CAUTION: keep fingers away from spinning rotor), the rotor is run for the number of seconds determined in step five. If any bait escapes the bag, start over. The bait dispensed in that amount of time is collected into the bag and weighed **ACCURATELY**. In our example, the correct weight is 28.32 ounces. If this is not the amount collected, adjust the gate opening accordingly. When you get close, it's a good idea to collect two or three samples and average their weights. Practically speaking, it's probably impossible to make the spreaders consistently put out exactly 28.32 ounces all the time.

#### Equipment Needed

Tarps (large) enough to cover 50 to 60 feet width			
Stop Watch	Safety goggles	Safety Mask	
Bait	Strong bag(s)	Long tape measure	4-wheeler w/spreader
Spray paint or stakes		good scale	calculator
Duct tape (to use around bottom of hopper)			gloves
Note book			

**FIGURE F-2: Spreader Calibration (page 2)**

## ATV Sprayer Calibration Worksheet

Date: \_\_\_\_\_ Sprayer Unit: \_\_\_\_\_ Treatment area: \_\_\_\_\_

### Step 1. Measure effective swath width

- No wind
- Maximum pressure to nozzles
- **Do not perform this step at engine idle speed.** Run engine at moderate RPM to give full power to pump and pressure to nozzles.

Effective swath width = \_\_\_\_\_ Feet

### Step 2. Determine Acres per Minute (APM)

$$\text{APM} = \frac{\text{MPH (treatment speed)} \times \text{Swath width (feet)}}{495}$$

$$\text{_____ APM} = \frac{\text{MPH} \times \text{feet}}{495}$$

### Step 3. Determine Gallons per Minute nozzle output (GPM)

- Collect sprayer output. Use a bucket to collect output for 60 seconds.
- Maximum pressure to nozzles
- **Do not perform this step at engine idle speed.** Run engine at moderate RPM to give full power to pump and pressure to nozzles.

GPM = \_\_\_\_\_

### Step 4. Determine Gallons per Acre output (GPA) using results from Steps 2 and 3.

$$\text{Gallons per Acre (GPA)} = \frac{\text{Gallons per Minute (GPM from step 3)}}{\text{Acres per Minute (APM from step 2)}}$$

$$\text{_____ GPA} = \frac{\text{GPM}}{\text{APM}}$$

FIGURE F-3: ATV Sprayer Calibration Worksheet (page 1)

**Step 5. Determine the number of Acres per Tank full you can spray (APT)**

$$\text{Acres per tank (APT)} = \frac{\text{Capacity of tank (gallons)}}{\text{Gallons per Acre (GPA from step 4)}}$$

$$\text{_____ APT} = \frac{\text{Gallons capacity}}{\text{GPA}}$$

**Step 6. Determine amount of chemical to add per tank (CPT)**

$$\text{Chemical to add} = \text{Rate of chemical per acre} \times \text{Acres per Tank (APT from step 5)}$$

$$\text{_____ Ounces of chemical per acre rate} \times \text{_____ Acres per Tank (APT)}$$

$$\text{Ounces of Chemical to add to tank} = \text{_____ Ounces}$$

**Step 6a. Determine amount of additives to add per tank.**

Use same formula as step 6.

**Dimilin 2L:** Recommended tank mix additives are:

$$6.0 \text{ oz canola oil per acre} \times \text{APT (from step 5)} = \text{_____ oz. canola added to tank}$$

$$2.0 \text{ oz crop oil concentrate per acre} \times \text{APT (from step 5)} = \text{_____ oz. COC added to tank}$$

**Sevin XLR Plus:** No recommended tank mix additives. Mix directly with water.

**Step 7. Determine the number of protected acres (RAATS acres) you can treat with one tank (PA/T)**

$$\text{Protected acres per tank (PA/T)} = \frac{\text{Acres per Tank (APT from step 5)}}{\% \text{ of area treated}}$$

$$\text{_____ PA/T} = \frac{\text{APT}}{\% \text{ of area treated}}$$

- Examples: .6 = 60% of pasture treated (skip less than one swath)  
 .5 = 50% of pasture treated (skip every other swath)  
 .4 = 40% of pasture treated (skip more than one swath)

**FIGURE F-4: ATV Sprayer Calibration Worksheet (page 2)**

## Calibration by area covered

Swath width	X 5,280 equals	Divided by 43,560	X 10 lbs/acre
10 feet	52,800 square feet	1.2 acres	12 lbs
20 feet	105,600 square feet	2.4 acres	24 lbs
30 feet	158,400 square feet	3.6 acres	36 lbs
40 feet	211,200 square feet	4.8 acres	48 lbs
50 feet	264,000 square feet	6.06 acres	60.6 lbs

Example: An ATV with a 20 foot swath and a 50 lb full hopper treats a one mile fence line. How full should the hopper be at the end of one pass? (Answer: 52% or 26 lbs.)

## Calibration by Time

Speed X Swath Width divided by 495 equals acres per minute

	20 foot swath	30 foot swath	40 foot swath
5 mph	0.2 acres/min.	0.3 acres/min.	0.4 acres/min.
10 mph	0.4 acres/min.	0.6 acres/min.	0.8 acres/min.
20 mph	0.8 acres/min.	1.2 acres/min.	1.6 acres/min.

Example: an ATV mounted spreader with a 40 foot swath traveling at 5 mph will treat 4 acres in ten minutes. The hopper holds 50 lbs and the desired rate is 10 lbs per acre. How long can it treat at 5 mph before running out of bait? (Answer: about 12.0 - 12.5 minutes)

## Visual check

The weight of an average Wilbur-Ellis Sevin bait pellet is approximately 0.217 grams, which works out to about 0.5 pellets per square foot or 4.5 pellets per square yard at ten lbs per acre.

FIGURE F-5: ATV Sprayer Calibration Worksheet (page 3)



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