United States Department of Agriculture

Gypsy Moth Program Manual

Some processes, equipment, and materials described in this manual may be patented. Inclusion in this manual does not constitute permission for use from the patent owner. The use of any patented invention in the performance of the processes described in this manual is solely the responsibility of the user. APHIS does not indemnify the user against liability for patent infringement and will not be liable to the user or to any third party for patent infringement.

When using pesticides, read and follow all label instructions.

Second Edition Issued 2019

Gypsy Moth Manual

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1

Introduction

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Purpose of the Gypsy Moth (GM) Program Manual

The Animal and Plant Health Inspection Service–Plant Protection and Quarantine (APHIS–PPQ) is involved in the Gypsy Moth Program for the following reasons:

- To detect isolated infestations at low population levels
- To eradicate isolated infestations on State and private lands
- To prevent the artificial spread of gypsy moth to noninfested areas

NOTICE

See Glossary on page Glossary-1 for definitions of terms such as artificial spread, and for abbreviations such as APHIS or PPQ

The *Gypsy Moth Program Manual* is a source of information on the gypsy moth and a reference for the methods and procedures for survey, regulatory, outreach, and control activities.

Damage Caused by the Gypsy Moth

Gypsy moth is one of the most destructive pests of shade, fruit, and ornamental trees as well as hardwood forests. In the period of 1980 to 1989, the gypsy moth defoliated close to one million or more forested acres each year.

Besides being a pest of trees, gypsy moth larvae are a nuisance to people.

- Larvae of the gypsy moth excrete digested leaf material while feeding in the tree canopy. For this reason, people will avoid the use of wooded parks and yards during the larval season
- Dead larvae produce foul odors
- The nuisances caused by the gypsy moth hinder the ability of people to enjoy the outdoors
- When gypsy moth populations are dense, larvae become hyperactive during the day. Heavily infested areas teem with larvae on trees, telephone poles, vehicles, fences, houses, clotheslines, and above-ground swimming pools. People avoid going outdoors for fear of stepping on caterpillars crawling on sidewalks and in play areas.

Background on the Gypsy Moth

Accidentally introduced into the United States in 1869 in Medford, Massachusetts, the pest spread rapidly throughout New England. Within the period of 1869 to 1890, the gypsy moth quickly developed into a serious problem in Massachusetts. The damage caused by gypsy moth was one of the key reasons Congress passed the Plant Quarantine Act of 1912.

In spite of early eradication efforts, the gypsy moth is now widely established. Maps of the generally infested area and a list of areas under quarantine are available on the APHIS website.

Research development and implementation of survey, regulatory, and control programs have made the gypsy moth one of the most studied insects in the field of pest management.

Cooperation in the Gypsy Moth Program

Since the end of the last century, Federal, State, Tribal, and local government agencies have worked cooperatively to control gypsy moth populations (by containment, suppression, or eradication, alone or in combination). Cooperative programs will continue to be the focus of the U.S. Department of Agriculture (USDA).

Dispersal of the Gypsy Moth

With the current mobility of our population, the sprawling suburbanization of once-forested areas, and the insidious nature of the pest, the job of preventing the establishment of isolated infestations by artificial spread is a difficult one. Household moves, especially the movement of outdoor articles such as lawnmowers and grills, are an important pathway for the long distance movement of gypsy moth. To contain the gypsy moth, an effective job will require the following: 1) public education on the problem; 2) public support in preventing gypsy moth movement; and 3) early detection and eradication of isolated infestations.

Potential Damage from the Gypsy Moth

All temperate hardwood growing areas of North America are potentially at risk from attack by the gypsy moth. Despite all attempts to prevent its movement, the gypsy moth continues to increase its range along the leading edge of the quarantine area.

Scope of the *Gypsy Moth Program Manual*

Chapters

The manual includes the following chapters:

- Chapter 1: Introduction
- Chapter 2: Survey
- Chapter 3: Regulatory
- Chapter 4: Slow the Spread Action/Transition Area Activities
- Chapter 5: Public Outreach
- Chapter 6: Eradication Treatments

Appendices

The appendices contain information directly associated with gypsy moth activities. They provide useful, supplemental information adding to the thoroughness provided by the manual.

The Appendices are as follows.

- Appendix A—How to Assemble Traps
- Appendix B—GM Data Collection
- Appendix C—Specimen Submission Protocol
- Appendix D—Compliance Agreements (CAs)
- Appendix E—Guidelines for Environmental Documents
- Appendix F—Procedures for Composting Bark
- Appendix G—Protocols for Regulated Logs Originating in the Gypsy Moth Quarantine Area
- Appendix H—Accurate Statement
- Appendix I—Qualified Certified Applicator (QCA) Document
- Appendix J—Emergency Action Notification (EAN) PPQ Form 523
- Appendix K—After Action Review

Users of the Gypsy Moth Program Manual

This manual will serve both as a field manual for employees performing program activities and as a reference for program managers and staff officers. Primary users of this manual will be Plant Protection and Quarantine (PPQ) Officers, Staff Officers, and State and Federal cooperators who are involved in carrying out the Gypsy Moth Program on a day-to-day basis.

Secondary users of the manual are Federal, State, county, and local regulatory officials, private industry, and part-time employees temporarily assigned to program activities.

Related Documents

The following documents are related to the Gypsy Moth Program.

- Gypsy Moth Management in the United States, a cooperative approach - Final Environmental Impact Statement - 1995)
- Gypsy Moth Management in the United States, a cooperative approach - Final Supplemental Environmental Impact Statement - 2012)
- Code of Federal Regulations (7 CFR 301.45)
- Your Move Gypsy Moth Free (Program Aid 2147)
- Environmental Assessments
- Gypsy Moth Proposal: Redirection of the Gypsy Moth Program and Attachment A—National Survey Plan for Gypsy Moth
- Insecticide Labels and Labeling
- National memorandums of understanding (MOUs)
- Safety Data Sheets (SDS)
- State laws that allow access to private property
- State memorandums of understanding (MOUs)
- USDA Departmental Regulation No, 4400-1, Departmental Occupational Safety and Health Management, dated January 6, 1983

NOTICE

Under Animal and Plant Health Inspection Service (APHIS) policy, only certified pest control operators may use or supervise the application of insecticides used in regulatory and control activities

- USDA Departmental Regulation No. 4400-2, Hazard Communication Programs, dated October 14, 1986
- USDA Departmental Regulation No. 5023-1, Chemical Hazard Communication, dated October 10, 1986
- USDA Hazard Communication, A Guide for Federal Agencies, August 1987
- Wildlife and Fisheries Regulations (Endangered Species Act)

Conventions

Conventions are established by custom and are widely recognized and accepted. Major conventions used in this manual follow.

Advisories

Advisories are used throughout the manual to bring important information to the user's attention. Please carefully review each advisory. The definitions coincide with the American National Standards Institute (ANSI) with the goal of making the warnings easy to recognize and understand, thus limiting the human and dollar cost of foreseeable errors and accidents, and are in the format shown below.

DANGER

DANGER indicates imminent risk of death or serious injury.

WARNING

WARNING indicates possible risk of serious injury.

CAUTION

CAUTION indicates minor to moderate risk of injury.

NOTICE

NOTICE alerts readers of important information or Agency policy.

SAFETY

SAFETY indicates general instructions or reminders related to safety.

Boldface

Boldface type is used to emphasize important words throughout the manual. These words include but are not limited to: **cannot, do not, does not, except, lacks, must, neither, never, nor, not, only, other than**.

Bullets

Bulleted lists indicate that there is **no** order of priority to the information being listed. Bulleted lists are **always** in alphabetical order.

Change Bars

Black change bars in the left margin are used to indicate changes and appear on revised pages. Change bars **do not** always appear when text is merely deleted. Change bars from the previous update are deleted when the chapter, appendix, or glossary is revised.

Contents

Every chapter has a table of contents (mini TOC) listing only the first- and second-level headings within the chapter.

Control Data

Control data are located at the top and bottom of each page to help manual users keep track of where they are in the manual and be aware of updates to specific chapters, sections, appendices, etc., in the manual. At the top of each page is the chapter title and first-level heading for that page. At the bottom of each page is the transmittal number (month, year, number), manual title, and page number. To track revisions to the manual, use the control data.

Decision Tables

Decision tables are used in some chapters of the manual. The first and middle columns in each table represent conditions, and the last column represents the action to take after all conditions listed for that row are considered. Begin with the column headings and move left-to-right. If the condition **does not** apply, then continue one row at a time until you find the condition that does apply (refer to Table 1-1).

Table 1-1 How to Use Decision Tables

If you:	And if the condition applies:	Then:
Read this column cell and row first	Continue in this cell	TAKE the action listed in this cell
Find the previous condition **did not** apply, then read this column cell	Continue in this cell	TAKE the action listed in this cell

Examples

Examples are used to clarify a point by applying it to a real-world situation. Examples **always** appear in boxes as a means of visually separating them from the other information contained on the page.

EXAMPLE Examples are graphically placed boxes within the text as a means of visually separating information from other information contained on the page. Examples **always** appear in a box like this.

Footnotes

Footnotes comment on or cite a reference to text and are referenced by number. The footnotes used in the manual include general text footnotes, figure footnotes, and table footnotes.

General text footnotes are located at the bottom of the page after a thin green line half the width of the page and flow numerically throughout a chapter.

When space allows, figure and table footnotes are located directly below the associated figure or table. However, multi-page figures and tables or tables or figures covering the entire length of a page **cannot** accommodate footnote numbers and footnote text on the same page. If a table or figure continues beyond one page, the associated footnotes will appear on the page following the end of the figure or table. Each table's footnotes are individually numbered, e.g., a chapter may have three tables and within each table is a single footnote, then each footnote will be indicated with the number 1.

Heading Levels

Within each chapter there are four heading levels. The first-level heading is indicated by a horizontal line across both the left and right columns with the heading language across the left and right columns directly underneath. The body text after a first-level heading is located **inside** the margined text area, one line after the heading language. The second- and third-level headings are inside the margined text area with the body text following underneath. The fourth-level heading is inside the margined text area followed by a period and leading into the text.

Hyperlinks to Tables, Figures, and Headings

Figures, headings, and tables are cross-referenced in the body of the manual and are in hypertext (blue) font.

EXAMPLE Refer to Table 1-2 on page 1-10 to determine where to report problems with the manual.

Indentions

The manual indents content information, lengthy quotes, and entry requirements summarized from CFRs, import permits, or policies.

Italics

The following items are italicized throughout the manual:

- Publication names
- Scientific names of commodities

Numbering Scheme

A two-level numbering scheme is used to indicate pages, tables, and figures. The first number represents the chapter. The second number represents the page, table, or figure. This numbering scheme allows for easier updating and adding pages without having to reprint an entire chapter. Dashes are used in page numbering to differentiate page numbers from decimal points.

Transmittal Number

The transmittal number contains the month, year, and a consecutively-issued number (beginning with -01 for the first edition and increasing consecutively for each update to the edition). The transmittal number is changed **only** when the specific front matter, chapter, or back matter is updated. If **no** changes are made to a specific chapter, the transmittal number for that chapter remains the unchanged. The transmittal number changes for the entire manual **only** when a new edition is issued or changes are made to the entire manual.

EXAMPLE 06/2015-08 is the transmittal number for this update and is located in the control data on the pages in this chapter.

- 06 is the month the update was issued
- 2015 is the year the update was issued
- 08 is the chapter's edition number

Using the Manual

Review the TOC of the manual to get a feel for the scope of covered material. Use the TOC in each chapter (mini TOC) to find the needed information. If the TOC or mini TOC are **not** specific enough, turn to the index to find the topic and corresponding page number.

Reporting Issues with or Suggestions for the Manual

The Gypsy Moth Program Manual provides users with information to determine where to report issues, disagreements, or improvements that directly affect the contents of the manual. Refer to Table 1-2 to report suggestions, issues, situations, and disagreements that directly affect the contents of the manual.

Table 1-2 Reporting Issues with or Suggestions for the Gypsy Moth Program Manual

If You:	Then:
◆ Are unable to access the online manual ◆ Have a suggestion for improving the format (layout, spelling, etc.)	CONTACT PPQ Manuals Unit via email at IRM.ISMU.Manuals.Feedback@usda.gov
◆ Disagree with a policy or procedure ◆ Have an urgent situation requiring an immediate response	CONTACT Kathryn Bronsky at kathryn.e.bronsky@usda.gov

Manual Updates

The most up-to-date version of the Manual will always be available online at the PPQ Manuals Unit Web site. The PPQ Manuals Unit issues stakeholder announcements for immediate manual updates via GovDelivery. These will be numbered consecutively—allowing you to know if you have missed something.

The stakeholder announcements contain the following information:

- Hyperlink to the Gypsy Moth Program Manual
- List of the revised pages (and/or tables) by number and purpose of the revision(s)

Knowing What is Revised

Except for changes to the Index, revisions will be marked with black change bars in the left margin of the changed page.

Preventive Safety Measures

Safety measures involving personnel, the public, and the use of equipment are the responsibility of all persons working on the Gypsy Moth Program. Supervisors must advise employees of safety and health regulations and notify employees of known hazardous conditions. Employees must comply with all safety and health regulations. When necessary, wear protective equipment and report hazardous situations to your supervisor. Contact your supervisor immediately when an accident or personal injury has occurred.

Safety Reminders When Trapping

- Respect all property
- **Do not** place traps in locations where you feel there is a dangerous or threatening situation
- Wear a high visibility vest
- Wear safety glasses when working or walking in wooded areas
- Wear nitrile gloves when handling lures
- Prevent slips, trips, and falls by being aware of your surroundings and footing
- Avoid contact with poisonous plants
- Beware of aggressive animals (e.g., dogs, bulls, etc.) near the trap site
- Carry plenty of drinking water
- Use preventive measures to avoid tick and insect borne diseases
- In areas with poisonous snakes, wear snake leggings and carry a snake bite kit

Vehicle Safety Reminders

- Always use your seat belts
- Obey all traffic laws
- Follow all relevant policies regarding use of cell phones and other devices while driving
- Carry sufficient repair tools (jack and lug wrench) and safety equipment (flares and first aid kit)
- Carry wooden blocks to block your tires when parking on a steep slope
- Check the condition of the vehicle before starting daily activities
- Check to see that passage is clear before backing up the vehicle
- Drive slowly when roads are unfamiliar, winding, narrow, or unpaved
- Keep your vehicle free of debris and unsecured items
- Obey the posted speed limits. DO NOT SPEED
- Select a safe parking place for the vehicle while servicing traps or when leaving the vehicle
- Park your vehicle facing your exit route in case you need to exit the area quickly
- Tell your supervisor immediately whenever you are involved in an accident

Chapter

2

Survey

Contents

Introduction

Gypsy moth surveys are conducted by APHIS to:

- Detect outlying introductions of the pest to new areas
- Delimit outlying detections to determine control treatment needs, and
- Support regulatory decision making and actions

The Gypsy Moth Program relies on effective survey tools, strategies, and methods to provide critical information that guides all other aspects of program delivery. The annual national detection survey is necessary to find outlying introductions of the pest in uninfested areas in a timely manner in order to ensure that the introductions do not result in large, established breeding populations that would be difficult and costly to eradicate. Delimiting surveys are used to define the outer boundaries of an infestation or to ensure that small, outlying populations go extinct on their own due to natural factors such as predation and a lack of success in finding mating partners. Egg mass and other special types of surveys are useful in determining population levels and densities of infestations or for other particular purposes.

Because the information gathered through survey work underpins the rest of the Gypsy Moth Program's efforts, it is important to conduct the various types of survey properly. Properly run surveys provide quality information to the program, and conversely, a poorly run survey will yield lower quality, less useful information that would compromise overall program effectiveness. This chapter provides guidance on how to properly plan and conduct a gypsy moth survey in your area.

Materials Needed for Gypsy Moth Surveys

The following is a list of materials needed to conduct a gypsy moth survey (you may not need all items listed).

- Colored pencils or pens for mapping moth finds
- PPQ Form 391, Specimens for Determination
- Delta traps
- GM lures (sex attractant for traps)
- First aid kit
- Grease pencil for writing on trap or preprinted labels
- Grid overlay, calipers, or ruler
- Gypsy moth door hanger for landowner notice

- High visibility vest
- Maps (County, city, plat, etc.)
- Mobile data device and Global Positioning System (GPS) unit
- Nitrile gloves
- Pliers to remove staples from trees
- PPQ Form 343 (Trapping Record) or local form
- Safety glasses if hiking in wooded areas
- Small backpack
- Snake leggings
- Standard stapler, standard staples for assembling traps
- Staples (9/16", heavy duty), heavy duty staple gun, string, zip ties—where owners will not allow staples (for hanging traps)
- Surveyor's flagging ribbon (marking tape), crayon, or marker for marking trap locations
- Tick and insect repellent, and sunscreen
- Trap record sheets

Planning the Survey

The National Gypsy Moth Survey is a resource-efficient survey which is designed to detect infestations before expansive land areas have to be treated. The steps involved in planning a survey follow.

Step 1: Determine type of survey to be conducted (e.g., detection or delimiting)

If you are planning a detection survey see that section for categorizing sites. If you are planning a delimiting survey, determine the trapping density following the guidelines in the delimiting survey section.

Step 2: Determine Trapping Requirements

When determining trapping requirements, consider the frequency for trapping an area and the last time the area was trapped. If an area must be trapped every two years and the area was trapped last year, **do not** trap the area in the current year. Available funding and other resources must be considered when planning and conducting surveys.

Step 3: Determine Survey Needs (Personnel and Supplies)

The following formulas will determine trap needs and personnel for survey activities:

Step 3a: Formula for Determining Trap Needs

Number of square miles in a category multiplied by number of traps per square mile (trap density). Divide the total by the trapping frequency (in years) to get the number of traps required per year.

$$\frac{\text{\# sq. mi. x trap density (\# traps per sq. mi.)}}{\text{trapping frequency in years}} = \text{total no. of traps required}$$

EXAMPLE Figure trap needs for Category 1 which is 250 sq. mi. in total area.

For a Category 1 area which is 250 sq. mi. and trapped every two years, 125 traps are needed.

$$\frac{\text{250 sq. mi. x 1 (\# traps per sq. mi.)}}{\text{2 (trapping frequency)}} = \frac{250}{2} = 125 \text{ traps}$$

Step 3b: Formula for Determining Personnel Needs

Divide the trap total by the number of traps a trap tender can service under the conditions experienced in a specific State. For detection surveys, a national average is 400 traps per trap tender. In areas with difficult terrain, the average falls to 250 traps per trap tender. For delimiting surveys, the average is 750 traps per trap tender; for transition zone surveys, the average is 600 traps per trap tender.

$$\frac{\text{trap total (= total number of traps)}}{\text{\# of traps a trap tender can service}} = \text{total trap tenders required}$$

EXAMPLE Figure how many trap tenders to hire for the season when conducting a detection survey that requires 1,200 traps.

$$\frac{\text{1,2000 traps (traps requiring service)}}{\text{400 (\# of traps a trap tender can service)}} = \text{3 (total no. of trappers)}$$

Step 4: Prepare a Trapping Budget

After determining the needed traps and trap tenders, prepare a trapping budget.

Budget for the following expenses (adjust for inflation, e.g., pay and mileage increases):

- Travel costs for trap tenders
- Trap tenders' hours
- Trap and lure costs
- Other materials (staples, staplers, maps)

Conducting the Survey

Here is an overview of the steps involved in conducting a survey:

Step 1: Establish Trapping Grid for Survey

Establish the trapping grid well in advance of the survey season (late winter/ early spring) to allow adequate time for review and consultation prior to trap placement.

Using geographic information systems (GIS) to establish the base grid density is very useful, though not required. In addition, GIS systems can adjust the scale of the map to allow for greater resolution when placing traps in higher densities. Use of an established grid ensures appropriate distribution of traps throughout the established survey area.

As traps are set, GPS coordinates should be captured and many find it useful to physically plot the trap locations on a map, as a backup measure. As traps are set, they should be numbered consecutively within a county, to aid in monitoring and retrieval. Alternatively, you may be using preprinted bar codes to identify a specific or individual trap.

NOTICE

Never pre-number traps and set them randomly from a box or bag!

Table 2-1 shows distances for various trap densities.

Table 2-1 Distances for Various Trap Densities

Traps per Square Mile	Distance Between Traps (ft)	Distance Between Traps (m)
00.25	10,560	3,219
01.00	5,280	1,609
16.00	1,320	402
25.00	1,056	322
36.00	880	268

Figure 2-1 shows traps plotted for a detection survey.

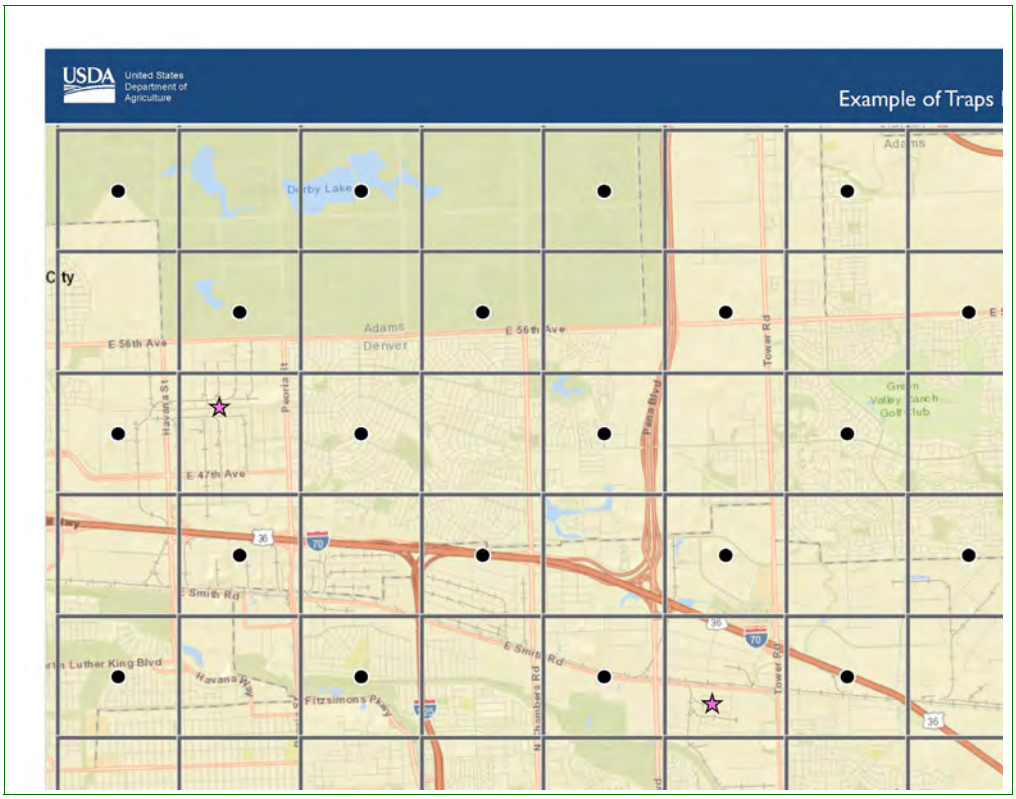


Figure 2-1 Example of Traps Plotted for Detection Survey

Step 2: Select Sites for Placing Traps

Using the map with the trapping cells identified, set individual trap as close to the center of designated cell. While not essential, try to place traps on preferred hosts when available. Host trees are grouped according to gypsy moth preference and are as follows:

Hosts Preferred by All Larval Instars

- Apple
- Aspen
- Basswood
- Birch (except yellow and black)
- Boxelder
- Larch
- Linden
- Mountain ash
- Oaks (all types)
- Speckled alder

- Sweet gum
- Willow

Step 3: Set Traps and Mark Location

Step 3a: Setting Traps

The timing for setting traps is critical. Phenology models may be available to assist with determining the proper timing for trap placement.

NOTICE

Directions for assembling traps are in How to Assemble Traps on page A-1. The gypsy moth lures will remain active at most three years from the date of manufacture (typically identified on each package) and if stored in the freezer.

The grid locations are already marked on a map. Use discretion in selecting the exact location of the traps. Many factors determine where to set a trap in a given area. Once traps are placed, record the GPS coordinates of the trap location within the grid. If a suitable trap location cannot be found within the grid, document the reason why in accordance with local protocols.

General Rules for Setting Traps

Consider the following general rules when setting traps.

1. If possible, obtain property owners' permission before placing a trap. If not possible, leave a door hanger or other program information with the trap.
2. Male moths usually frequent woodlands rather than open areas where there are no trees or shrubs.
3. If available, woodland edges are good sites for trap placement. If there is a choice, place the trap on the windward side so the prevailing wind currents will carry the scent (pheromone) into the woods.
4. If there are no woodlands or residential areas within a reasonable distance (500 to 1,000 feet) from the plotted map location, then the best location for a trap is at the end of a hedge row or tree leading to a wooded area.
5. Place traps four to five feet high (or eye level if less than five feet) on tree trunks because most flight occurs near ground level. In areas frequented by small children and animals such as cattle and bears, place the trap out of their sight and reach. Because of vandalism, trap placement is especially important when trapping Category S areas (such as recreational parks, campgrounds, and tourist attractions).
6. If possible, place traps in shady areas. **Do not** set the trap where foliage or branches will block the trap openings.
7. Complete trap record including a sketch showing specific trap location.

8. Avoid setting traps on or in the following situations.
   A. Close to gravel road (place trap at least 50 feet away from well-traveled roads)
   B. Properties that are for sale
   C. Parks or open areas where people can easily see the traps
   D. Properties with aggressive dogs
   E. Private property without the owner's permission
   F. School properties or along passageways where students walk
   G. Sites where GPS coordinates cannot be obtained
   H. Sites where farm animals may damage or destroy traps
   I. Sites where road construction is scheduled or in progress
   J. Sites within locked gates
   K. Sites obscured by tree branches
   L. Trees having poison ivy vines
   M. Trees marked for cutting or removal

The distance between traps depends on the selected trap density and the extent of favored host trees available. To the degree possible, place the traps in a uniform array on choice hosts or in a preferred habitat.

Delta traps (Figure 2-2) are most effective when attached directly to the trunk of a host tree. The preferred way to attach a trap to the tree is tying a string around the tree and hanging the clip on the string or stapling the trap to the tree. Hang the traps at breast height unless vandalism or animal damage is a problem, in which case they should be hung higher.

Milk carton traps (Figure 2-3) are used in Slow the Spread (STS) and other surveys to monitor gypsy moth population levels when the pest is known to be present in the area.

Figure 2-2 Delta Trap

Figure 2-3 Milk Carton Trap

Step 3b: Marking Trap Locations

Mark trap locations to expedite trap tending as well as supervisory and quality control activities. Use plastic flagging ribbon or marking crayon. To mark a trap location, tie a piece of flagging ribbon to a telephone pole, tree trunk, or other suitable object at the roadside. The ribbon should be visible from the road when approached from either side. Mark trap location only when necessary because it might lead others to the trap causing vandalism.

Brightly colored plastic tape (fluorescent orange) has proven to be the best flagging ribbon. The marking crayon must be sufficiently soft to mark wet trees. Place a small piece of flagging ribbon near the trap.

In urban areas where streets are named and houses are numbered, use the house address and GPS coordinates for locating traps. Do not mark trap location with ribbons or marking crayons in urban areas. Also, use restraint in marking roadside rest areas, picnic areas, tourist attractions, and other high-use areas where the ribbon will detract from the site's appearance.

Step 4: Check the Traps

For detection surveys, check each trap at least once during the middle of the trapping season. For delimiting surveys, check traps more frequently, preferably every 10-14 days. Under ideal conditions, trap checking will start when the male moths start flying. Where vandalism is likely, check the traps more often. Phenology models can be useful for determining the proper timing for initial trap checks.

Plan your trap checking route before leaving the office. Select a route that will eliminate overlapping travel. Mapping software can be useful in planning your trap-checking route.

When checking traps, have a supply of replacement traps and lures to replace all vandalized and missing traps. When replacing a trap, number the replacement trap with the same number as the original trap with an additional indicator (such as the letter "R," e.g., 416-R) highlighting that it is a replacement trap.

When checking traps, do the following.

1. Check overall trap condition and replace badly damaged traps.
2. When trap contains a suspect moth, remove the trap without disturbing the specimen. Note on the trap record sheet the date and exact location of recovery and inform the supervisor.
3. Record the trap inspection by noting the date on the trap and the PPQ Form 343 (Trapping Record) or local trap record sheet.

4. Write the following information on the trap: Trap numbers, county, trapper's initials, date trap set, and each date the trap is checked.

Check the trap by looking in both ends. There is no need to remove it from the tree. Look into the trap to see if there are any male moths. If a suspect male is present, remove and replace the trap.

Step 5: Submit Gypsy Moth Suspects

Submit the trap with the suspect moth to your supervisor for submission to the Center for Plant Health Science's Otis laboratory for confirmation and further identification to determine if it is European or Asian gypsy moth. Alternatively, your supervisor may direct you to submit the specimen to the Otis lab directly. Refer to Appendix C on page C-1 for specimen submission guidelines. Record on the bottom of the trap the date, time, results, GPS coordinates, and any pertinent observation or action taken.

Record the date and all circumstances about the catch of suspect moths on the trap record sheet or in the USDA approved database. Accurate information is essential to the trapping program.

Complete the form each time you check the trap and find a gypsy moth. The data you report is as important as the trap placement.

Step 6: Remove Traps

At the end of the trapping season remove all traps set and examine each for gypsy moths. Carefully look for missing traps. If a trap number cannot be read, rewrite the number on the bottom of the trap.

When removing the trap, remove all other materials (string, lures, staples, wire) used in trapping. Also, remove all flagging tape. Give all traps removed to the person in charge of the survey. For each trap containing a suspect moth, provide the following information: location (State, county, town and GPS coordinates); trap number; trap tender's name or identification number; date; and host tree name. Open traps on final check because moths can be missed when just looking through the trap ends. Flatten empty, used traps and dispose of by burning in an incinerator or by burying at a sanitary landfill. Be sure to destroy the lures with the traps.

Step 7: Report Survey Results

Refer to GM Data Collection on page B-1 for instructions on reporting survey data into the USDA approved database as soon as possible and on a regular basis as detailed in your cooperative agreement or no later than December 31st, whichever is earlier.

Step 8: Interpret Survey Results

If you found gypsy moth during your survey, use the guidance on interpreting survey results in the sections about specific survey types.

Survey Records and Maps

To document the detection survey, accurate and complete survey records and maps must be maintained.

Records

Maintain a record of all trap locations including any descriptive information needed to help locate traps (trap site map or PPQ Form 353). Include information such as date set, date inspected, and date removed, as well as trap catches. Record this information on a trap record sheet or mobile device and enter the information into the USDA approved database promptly.

Keep a separate record of any egg-mass surveys conducted. Use local guidelines for proper record maintenance.

In developing local guidelines for survey records, determine what information is needed and the most efficient manner for recording each item.

Record all trap locations and positive trap findings; verify trap locations on the map. Traps for which no moth catches are reported are assumed to be negative for the season.

Record trapping data throughout the season, as frequently as possible, into the USDA approved database. Refer to GM Data Collection on page B-1 for instructions on reporting into the database.

Maps

For surveys, digital GIS maps or county or city maps are satisfactory.

Consecutively number every trap location within each county. The type, number, and distribution of maps will vary according to local needs.

Prepare trap maps before the trapping season (the preferred method) using a grid system to assure proper trap distribution. Use GIS software, a grid, calipers, a ruler, or an overlay to plot trap location. When you use the grid system of plotting trap locations before field placement, adjust trap locations in the field. Capture GPS coordinates and/or make corrections on all maps to show the actual trap locations.

Please ensure that the map contains a legend detailing the program starting date, completion date, name of trapper, and any other pertinent information.

When using maps for postseason decision making, show both negative and positive trap catches on the map. When determining the pattern of trap catches and establishing treatment boundaries, the negative traps are very important.

Revising Quarantine Maps

Quarantine revisions should be determined in consultation with national program management. National program management will follow established protocols for quarantine expansion activities through issuance of Federal Orders, web listing of the change(s), map revisions, and/or publication of interim or proposed rules in the Federal Register.

Detection Survey

Purpose

The purpose of a detection survey is to determine by trapping: 1) where isolated infestations of gypsy moth occur; and 2) where further delimiting surveys are required. Detection surveys are designed to find isolated infestations of gypsy moths as soon as possible after introduction; small infestations of gypsy moth are less expensive and easier to eradicate than large infestations.

Due to differences in habitat, host availability, and differing patterns of movement of regulated articles (refer to Regulated Articles on page 3-2) from infested areas, not all areas within a State have the same potential for becoming infested. The risk of potential introduction and establishment will determine the areas in which a detection survey is needed. High-risk areas should include areas receiving regulated articles and containing preferred host trees. Before conducting the detection survey, the first task is to categorize areas within the State in regard to infestation risk. The European Gypsy Moth Risk Model can help with identification of high risk areas. Refer to Protocol on page 2-14 for more details about the European Gypsy Moth Risk Model.

The time at which a detection survey starts and ends will depend upon the climatic conditions in the area. At the least, the trapping period should cover the entire projected flight period of gypsy moth in the area. Phenology models may be available to assist in determining flight periods. Please contact your State Plant Health Director for model availability. In practice, because gypsy moth string lures last several months in the field, detection trapping for gypsy moth can potentially be scheduled by the calendar in any given area, if appropriate buffers are included to account for variations in weather from year-to-year on timing of development. However, whenever captured moths will be analyzed genetically, traps should be checked as quickly as possible after the end of the local flight season. This minimizes in-trap degradation of moths and helps ensure successful analyses.

Protocol

Step 1: Categorize Areas within a State (per the National Survey Plan)

Use the criteria that follow to determine the total number of square miles in each category per county. The categories will determine the density and frequency of trapping in a particular area. Alternatively, each State may use the European Gypsy Moth Risk Model which is an improved option for accomplishing this task. Not only does it provide detailed demographic and host information but it also allows local risk data layers to be added by a GIS specialist for a customized survey plan. Examples of such data include location of railroads, campground data, postal address forwarding data, etc. Contact your GIS specialist for more guidance on using this model.

Using the European Gypsy Moth Risk Model (link) can aid in establishing the appropriate grid density (1/mi^2; 1/2mi^2; etc.) based on the Category of the survey area. Plan to trap for gypsy moth in all categories except Category 4.

The following sections contain the detailed criteria for determining categories.

Category S (Special Site)—Sites where infestations are most likely to be artificially introduced

These are sites with a history of receiving regulated articles from quarantine areas or transition counties (those not yet quarantined, but along the population front) and are also exposed to movement of infested vehicles (e.g., travel trailers, semi-trucks) from quarantine areas. These sites should be the highest priority for states to survey. There are two levels of special sites:

1. Category S-Regulatory Sites- Sites knowingly receiving regulated articles from gypsy moth quarantine areas either under certificate, Accurate Statement or Limited Permit.

   Category S-Regulatory Sites include the following:

   - Nurseries
   - Firewood dealers and distributors
   - Saw mills, pulp mills, and veneer mills

   Regulatory sites should have a minimum of two random set traps placed on the site. Additional traps may be necessary depending on size of the facility, but no more than 12 traps. When possible place traps in all four cardinal directions on the property (N, S, W, E).

   Mills that are under compliance agreements to receive regulated materials from quarantine areas must have two to four random set traps placed on the perimeter of the facility within property ownership (if possible) each year.

These traps are necessary to monitor compliance and potential new introductions to the surrounding area.

For mills under a compliance agreement in areas where gypsy moth populations are not known to exist and where a standard detection grid is not present, an additional 4 to 10 traps should be placed in the area surrounding the mill. These additional traps should not be closer than 2 kilometers (1.25 miles) to the mill, or further than 10 kilometers (6.25 miles) from the mill site. Category S-High Risk Sites-Sites likely exposed to movement of infested vehicles and outdoor household articles (OHA) from quarantine areas.

2. Category S-High Risk Sites include the following:
   - ❖ Campgrounds
   - ❖ Commercial areas with interstate shipment
   - ❖ Rail transfer stations
   - ❖ Recreational vehicle and travel trailer parks
   - ❖ State and Federal Parks
   - ❖ Tourist attractions

   For Category S, the trapping density and frequency are as follows:
   - ❖ Trapping density: Random set (no more than 1 trap per site or per square mile) for non-regulatory sites, 2 to 12 traps for regulatory sites as described above.
   - ❖ Trapping frequency: Annually if for regulatory purposes, or every two years as part of the National Gypsy Moth Survey.

Category 1—Areas having high potential for introduction of gypsy moth (people and/or Regulated Articles moving from infested areas into non-infested areas); the area must have a suitable habitat (host trees) to support a gypsy moth population

Category 1 areas include the following:

- ❖ Affluent residential areas
- ❖ Cities with military bases or major universities
- ❖ Residential areas with high amount of relocations
- ❖ U.S. Census population growth areas
- ❖ High tourist areas such as National and State parks
- ❖ Wooded, suburban residential areas
- ❖ Nursery, mill or firewood dealers that receive regulated materials from or near quarantine areas.

EXAMPLE Counties surrounding large metropolitan areas such as Chicago, San Francisco, Louisville, Atlanta, Raleigh, and Portland

For Category 1, the trapping density and frequency are as follows:

- Trapping density: One trap per square mile
- Trapping frequency: Every two years

Category 2—Areas having moderate potential for introduction of gypsy moth; the area has a suitable habitat (host trees) to support a gypsy moth infestation

Category 2 areas include the following:

- Areas with moderate populations such as small cities
- Contiguous wooded areas that are accessible to people
- Large, urban areas with limited habitat

EXAMPLE Blue Ridge areas of Virginia, West Virginia, Tennessee, North Carolina, and Georgia. Ozark areas of Missouri and Arkansas

For Category 2, the trapping density and frequency are as follows:

- Trapping density: One trap every four square miles (0.25 traps per sq. mi.)
- Trapping frequency: Every two years

Category 3—Areas with a low risk of introduction and a suitable habitat to support an infestation

Category 3 areas include the following:

- Noncontiguous wooded areas
- Rural agricultural areas with widely scattered small towns

EXAMPLE The corn belt areas of Iowa, Illinois, Indiana, and Ohio

For Category 3, the trapping density and frequency are as follows:

- Trapping density: One trap every four square miles (0.25 traps per sq. mi.)
- Trapping frequency: Every four years

Category 4—Areas with a lack of habitat or potential for introduction

EXAMPLE Great Plains grassland/wheat areas, semiarid high desert areas, and dry desert areas

For Category 4, the trapping density and frequency are as follows:

- Trapping density: None of these areas should be trapped

- ❖ Trapping frequency: NA

Step 2: Conduct Survey

Use guidelines in Conducting the Survey on page 2-5.

Step 3: Interpret Survey Results

If you found gypsy moth during your survey, the decision to delimit in the following year will be made in consultation with national program management based on the following factors.

- ◆ Available resources
- ◆ Host vegetation
- ◆ Number trapped in current year
- ◆ Number trapped in previous year
- ◆ Potential for artificial dispersal

Delimiting Survey

Purpose

The delimiting survey will determine: 1) the presence or absence of an infestation; and 2) the approximate size of an infestation, if present. When a single trap (or several loosely associated traps) catch an isolated[1] or multiple moths, conduct a delimiting survey. The delimiting survey will usually be done in the following year, but if caught early enough in the current trapping season, some delimiting traps may be placed that same season to try to define the size of the infestation.

Important Features

- ◆ The standard delimiting survey trap array is 16 traps per square mile. Special circumstances, such as the presence of sensitive areas or habitats containing endangered species, may require a trap array of 26 to 36 traps per square mile. The delimiting array should cover at least 4 square miles around the positive site or extend out to the next negative trap.
- ◆ The positive trap (or positive traps) will be at the center of the trap array. The survey results from the detection survey will supply information for positioning the trap array.

1 Triggers for a delimiting survey may be dependent upon proximity to the leading edge of the gypsy moth infested area, i.e. a single moth catch well removed from the leading edge may trigger an egg mass survey followed by a delimiting survey and/or treatment the following year, while a single moth find nearer to the leading edge may not trigger any delimiting survey.

- When conducted after an eradication effort, a delimiting survey is called a post treatment survey. Use the delimiting survey or mass trapping survey instructions for conducting a post treatment survey.

Protocol

Step 1: Conduct the Survey

Refer to guidelines in Conducting the Survey on page 2-5.

Examine the map from the previous year's detection survey showing all positive traps. When plotting trap locations on a new map, consider the scale of the map and the required trapping density (i.e., 16 to 36 traps per square mile). Center the grid on the suspect infestation. Generally, 4 square miles of delimitation will be sufficient or a ½- to 1-mile boundary (dependent on trapping category in use in the area of detection). If the suspect area is spread out, it will be necessary to trap a larger area.

Plot trap locations well in advance of the survey season (late winter/early spring). Plotting the traps on planned grids allows for results comparison from location to location. Do not place traps arbitrarily in the field.

When moths are captured during a detection survey, a delimiting survey may be conducted the following year in the vicinity of the trap catches. In delimiting surveys, traps are typically deployed at densities of 16-36 traps per square mile over areas of from 1 to 4 square miles. Larger areas may be delimited as indicated by results of the detection survey. The pattern of trap catches can be used to estimate the approximate area of infestation.

Uniform grid spacing provides consistent information which will help pinpoint infestations. If feasible, use appropriate mapping software to create delimitation grids at the desired density with trap numbers plotted on the map at the grid points. If it is necessary to plot a map by hand, use a large scale map such as topographic map or a county or city map with even spacing. Some counties have roads laid out on a square grid with road intersections reliably at regular grid spacing. Even spacing is important to prevent data gaps and maintain consistency of the information for evaluation.

The scale on a topographic or similar large-scale map is appropriate for the delimiting survey.

Figure 2-4 shows traps plotted for a delimiting survey.

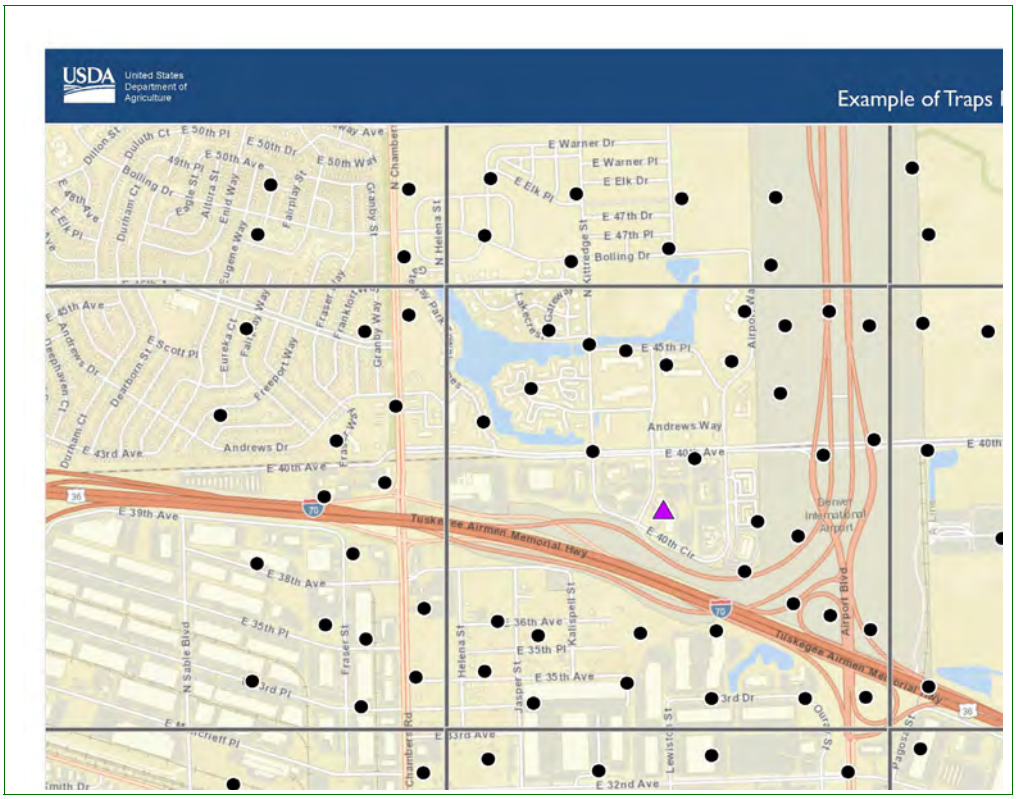


Figure 2-4 Example of Traps Plotted for Delimiting Survey

Step 2: Select Sites for Placing Traps

Using the map with the trapping sites plotted, select individual trap sites as close to the plot locations as possible. If a trap cannot be hung on a host tree, another vertical surface, such as a telephone pole, can be used to hang the trap, preferably within 100 meters of a host. Never hang the traps on branch tips.

Step 3: Interpret Survey Results

If the traps do not capture gypsy moth during the delimiting survey, assume there is no detectable infestation in the area delimited. If the traps have positive finds, decisions about appropriate follow up actions will be made in consultation with national program management.

Other Survey Tools

Introduction

This section contains information on survey methods that **do not** use pheromone traps. Specifically, this subsection covers procedures for two survey methods:

- Egg mass surveys
- Larval detection surveys

Egg-mass surveys and larval detection surveys are often done to supplement an adult trapping survey and confirm that reproducing populations are present.

Egg Mass (and other life stage) Surveys

Purpose

Egg mass surveys are done for several reasons:

- To confirm an infestation by providing convincing evidence (egg masses) that reproduction has occurred
- To determine the population level in a specific area so the status may be changed (e.g., non-infested to transition area; transition area to generally infested regulated area)
- To determine the population level near a high-risk site so the correct control and/or regulatory actions can be applied

When to Survey

The best time to conduct an egg mass survey is after leaf drop; however, egg mass surveys can be done any time after the females have finished depositing eggs. Phenology models may be available to assist with timing of the survey. A preliminary survey may help to determine if the females are present and laying eggs; the buff egg masses and the white female moths are easy to see on tree trunks and branches.

Where to Survey

Egg-mass surveys, which involve the counting of egg masses, are useful in areas with moderate or high infestation levels.

Egg-mass surveys are particularly desirable when: 1) egg masses are the only life stage present; 2) survey results are needed immediately, as for treatment decisions; and/or 3) populations are high enough to make the effort worthwhile.

Usually, egg mass surveys will not detect low-level populations with reliability; therefore, egg-mass surveys are of limited value in areas with low-level populations. (Larval trapping is a better survey method in areas with light levels of infestation.)

Egg-mass surveys in the following areas are most likely to detect infestations.

- Areas adjacent to and downwind from known infested areas
- Areas close to known infested areas, particularly those areas where traps catch numerous moths
- Areas such as Federal and State parks, used by recreational vehicles
- Areas where suspect possible introductions have been reported because of observed defoliation, sightings of females, or some other indicator
- Areas where establishments receive regulated articles
- Areas where numerous household moves originating in the quarantine area occur
- Areas with preferred hosts

How to Survey

A well-established infestation may exist even though few, if any, egg masses are easily seen. Therefore, surveyors must know the characteristics of the egg masses and the preferred egg-laying sites.

Preferred egg-laying sites are in the following locations:

- In bark cavities, under loose bark, and in bark crevices
- On branches on the ground or on the underside of any type of ground litter, such as tin cans
- On logs—including firewood
- On outdoor household articles (OHAs), such as birdhouses and picnic tables
- On signs
- On stone walls and in the crevices of stone walls
- On the underside of rocks not tight to the ground
- On tree trunks in sheltered spots, such as under limbs
- Under the siding and eaves of buildings

In fact, egg masses may be found anywhere near trees in areas with preferred hosts.

Larval skins and pupal cases may be found even when egg masses are not.

Basic Procedures for Egg Mass Surveys

The following sections discuss the three basic procedures for egg mass surveys.

1. Egg Mass Surveys Using Targeted Visual Surveys (Transects) on page 2-22
2. Egg Mass Surveys Using Small Plots on page 2-22
3. Egg Mass Surveys Using General Observation Technique on page 2-23

Egg Mass Surveys Using Targeted Visual Surveys (Transects)

Egg mass surveys for regulatory purposes are usually targeted visual surveys.

Targeted Visual Surveys (transects) examine an area of 50 feet by 20 feet, 10 feet on either side of a 50-foot centerline. The total area examined is 1,000 ft^2, roughly equivalent to the 1,089 ft^2 in the 1/40 of an acre plots in the next technique.

Before the egg mass survey, do the following:

1. Know how to identify and locate the egg masses.
2. Select the sites where gypsy moth egg masses are most likely to be (use the criteria on the previous page).
3. Inform others of your intended survey area.

Procedure for the targeted visual survey—at each survey site, do the following:

1. Select an object, such as a tree or rock, 50 feet away.
2. Walk slowly toward the selected object, scanning 10 feet to each side, in front, and overhead. Examine all preferred egg laying sites (refer to How to Survey on page 2-21).
3. Count all observed egg masses.
4. Record all critical information, such as number of egg masses, site, method, and date of survey.

Egg Mass Surveys Using Small Plots

Before the egg mass survey, do the following:

1. Know how to identify and locate the egg masses.
2. Plan to place plots at the sites where gypsy moth egg masses are most likely to be (refer to the criteria from Where to Survey on page 2-20). Plots must be at least 300 feet apart. If circular, the plots will have a radius of 18.6 feet; therefore, they will be 1/40 of an acre (1,089 ft^2).
3. Prepare a stake which will be driven into the center of the circular plot; this stake will have a radius-marking line of 18.6 feet attached. With its attached line stretched, this stake will help locate points within, on, and

outside the circumference of each plot. (If four additional stakes are placed, equidistant, on the circumference, these stakes, along with the center stake, will form quadrants.)

4. Inform others of your intended survey area.

Procedure for the small-plot egg-mass survey—at each survey site, do the following:

1. Place the stake in the center of the plot.
2. Use the attached line to establish the circumference of the plot (or boundary of the quadrants).
3. Examine the plot (or quadrant). Start on a known radius and work around the circle. Scan in front, to the sides, and overhead. Examine all preferred egg-laying sites (refer to How to Survey on page 2-21).
4. Count all observed egg masses.
5. Record all critical information, such as number of egg masses, site, method, and date of survey.

Egg Mass Surveys Using General Observation Technique

Before the egg mass survey, do the following:

1. Know how to identify and locate the egg masses.
2. Select a positive trap (or select an area suspected of being infested) as a starting point.
3. Inform others of your intended survey area.

Procedure for the general observation technique—at each survey site, do the following:

1. Start at the positive trap (or within the area suspected of being infested).
2. Examine transit lines placed on the main compass points (north, northeast, east, southeast, south, southwest, west, and northwest). Examine all preferred egg laying sites (refer to How to Survey on page 2-21) out to a distance of 0.5 miles.
3. Count all observed egg masses.
4. Record all critical information, such as number of egg masses, site, method, and date of survey.

No more than two days should be spent at any one site unless unusual circumstances warrant a longer evaluation time.

Egg Mass Surveys for Regulatory Purposes

Typically eggs mass surveys for regulatory purposes are done in areas surrounding establishments handling regulated articles. These surveys allow the environs of the establishments to be examined.

The following environs are of particular interest:

- Areas in and around campgrounds
- Forest edges near Christmas tree plantations
- Forest edges near mills
- Forest edges near nurseries

Each egg mass survey for regulatory purposes will provide information to guide quarantine decisions for the establishment handling the regulated articles. Typical quarantine decisions involve the following:

- Is gypsy moth present in the environs of the establishment?
- If gypsy moth is present, do the environs of the establishment need to be treated?

Before the survey, know what egg masses look like and where to find them.

To assess population levels at each survey site, refer to the Egg Mass Surveys Using Targeted Visual Surveys (Transects) on page 2-22 to survey for egg masses. Walk in areas with preferred host trees, if possible.

Procedure for the Survey for Regulatory Purposes

1. Begin the survey in areas that are of importance (forest edges, campgrounds, campground edges).
2. Select an object transecting an area with preferred hosts.
3. Walk slowly toward the selected object, scanning in front, to the sides, and overhead. Examine all preferred egg-laying sites (refer to How to Survey on page 2-21).
4. Count all observed new egg masses.
5. Record all critical information, such as number of egg masses, site, method, and date of survey.
6. Repeat above steps as needed in the environs of the establishment.
7. Determine the appropriate regulatory action.

Larval Detection Survey

Purpose

Larval trapping has the following uses:

- To assess gypsy moth larval development
- To contribute to research
- To determine the presence or absence of a reproducing population
- To determine where and when to apply control methods (chemical or behavioral methods for eradication)
- To evaluate treatments

If desired, use larval trapping along with or in place of egg-mass surveys to determine an area to be treated.

Larval trapping takes advantage of the fact that later instars seek hiding places that larval traps provide (refer to Figure 2-5).

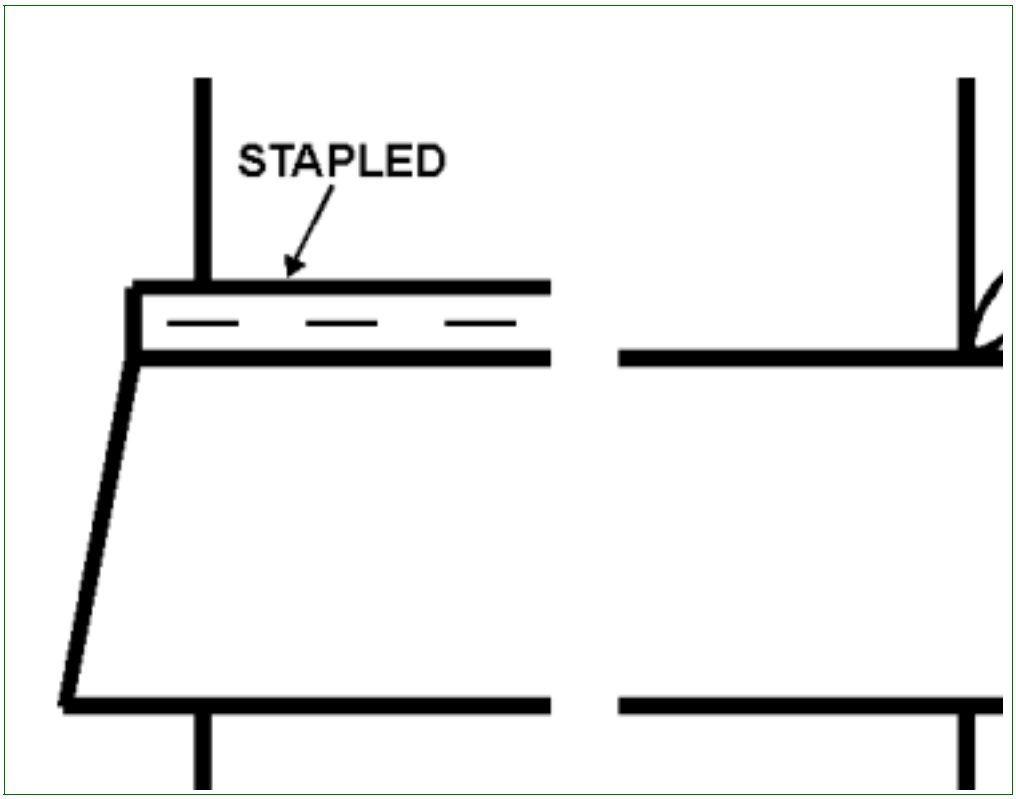


Figure 2-5 Example of a Larval Trap on a Host Tree

How to Trap Larvae

Place traps by stapling (or tying) at chest height the upper corners of pieces of tar paper or burlap to host trees to form a skirt. The burlap or tar paper should be at least nine inches wide and long enough to go around the trunk of the tree. Ensure the burlap or tar paper completely encircles the tree trunk, but remains loose fitting. If white oak is present, use this tree for larval trapping.

Place the larval traps on the trunk of a tree shortly before egg hatch is predicted.

After larvae emerge, check under the burlap or tar paper for larvae and pupae. Larval traps should be checked two or three times a week. Larvae should be collected, identified, counted, and recorded by tree site.

NOTICE

Earlier instars I-III tend to stay higher in the tree; likely there won't be many under bands until they become instar IV or V.

For best results, check during daylight hours (preferably between 10 a.m. and 3 p.m.) on hot, sunny days.

The larval traps should also be checked after the larval period because the larvae often pupate under the covering of the larval trap.

STS/Transition Area Survey

Introduction

The STS/transition area is an area between the quarantine area and the uninfested area; because of natural dispersal, the area is in transition from uninfested to generally infested. In States in which the U.S. Forest Service Gypsy Moth "Slow the Spread" (STS) Program is operational, gypsy moth surveys are conducted as part of that program. However, in States in which the STS program is not implemented, it is critically important to detect infestations as early as possible. Early detection of infestations will prevent the movement of infested articles from the transition area and will provide data to support regulatory decisions. Visit the Slow the Spread of the Gypsy Moth website for more information about the STS Program.

To detect infestations in the transition area, several survey types are useful:

1. Trap Surveys on page 2-26
2. Transition Area Egg Mass Surveys on page 2-27
3. Larval Detection Survey on page 2-24

Trap Surveys

Initiating Factors

Trap surveys are performed to locate established populations in the transition area. If resources permit, the trap surveys are performed throughout the transition area; if resources are limited, trap surveys are performed in areas near the generally infested quarantine area.

In addition to locating infestations, the trap survey will help determine when a county in the transition area should be shifted to the quarantine area.

Recommended Trapping Density

The recommended trapping density is either of the following:

- 2-3 km grid (STS action area)—equal to 1 trap per 1.5-3.5 km^2
- 3-5 km grid (STS monitoring area)—equal to 1 trap per 3.5-5.1 km^2

Trapping Period

The timing for setting traps is critical. Set traps before male moths emerge. Phenology models may be available to assist with determining the proper timing for trap placement.

Trap Type

In a trap survey, use delta traps or milk carton traps. Milk carton traps are available but currently are **not** used in APHIS funded survey work.

Trap Servicing Frequency

If at all possible check each trap at least once during the middle of the trapping season. Under ideal conditions, trap checking will start when the male moths start flying. Where vandalism is likely, check the traps more often. Phenology models can be useful for determining the proper timing for initial trap checks.

Moth Identification

If the suspect moths were trapped where Asian gypsy moths are not likely to be introduced, send the suspect moths to a designated trained identifier.

Transition Area Egg Mass Surveys

Initiating Factors

Egg mass surveys are desirable when: 1) egg masses are the only life stage present; and 2) populations are high enough to make the effort worthwhile.

A basic problem with egg mass surveys is that egg mass surveys usually will not detect low-level populations.

Egg Mass Survey Methods

Several egg mass survey methods are available. These methods are described in Other Survey Tools on page 2-20.

Chapter

3

Regulatory

Contents

Purpose of Regulatory Activities

The purpose of regulatory activities is to prevent the artificial spread (spread caused by human activity) of the gypsy moth from quarantine areas to non-infested areas. Refer to Areas Quarantined in the United States for Gypsy Moth for county-by-county listings.

Regulatory Methods

Preventing the artificial spread of gypsy moth is accomplished by inspecting and treating, if necessary, regulated articles (defined below). Regulated Articles may be infested by any life stage of gypsy moth—egg masses, larvae, pupae, and/or adults.

Regulated Articles

The following regulated articles require inspection and certification:

- Christmas trees (including holiday greenery)
- Logs (including firewood), pulpwood, bark, and bark products
- Mobile homes and associated items
- Nursery stock (trees with roots, shrubs with roots and persistent woody stems, unless they are greenhouse grown throughout the year)
- Outdoor household articles (OHAs)
- Any other products, articles, or means of conveyance that pose a high risk of artificial spread of gypsy moth as determined by an APHIS employee or a State official

Movement of regulated articles to non-infested areas is restricted unless an inspection and/or treatment of the regulated articles is conducted to minimize the risk of transporting gypsy moth life stages to non-infested areas.

Regulated articles may move unrestricted, without treatment or inspection, throughout contiguous quarantine areas.

Regulatory Considerations

There are a number of factors to consider when planning a regulatory program to prevent the artificial spread of gypsy moth from quarantine areas to non-infested areas. Factors such as the type of regulated articles, quantity in the shipment, frequency of shipments, availability of personnel, available treatments, and the impact of the regulatory activities on regulated industries.

Regardless of these considerations, mitigation procedures must be conducted and appropriate documentation must accompany all loads of regulated articles leaving quarantine boundaries.

Quantity, Type, and Frequency of Shipments

If establishments regularly ship large quantities of regulated articles outside the quarantine area, the establishments may operate under a compliance agreement (CA). If establishments infrequently ship regulated articles from the gypsy moth quarantine area, USDA Plant Protection and Quarantine (PPQ) and/or State personnel will inspect and certify individual shipments.

Personnel Available

The personnel available will affect regulatory activities. The following individuals, if authorized, may conduct visual examinations, treat, and certify regulated articles:

- PPQ Officers
- State personnel- state plant regulatory personnel
- Employees of establishments under CAs
- Qualified certified applicators (QCAs)- pesticide applicators operating under a compliance agreement
- Private citizens (only for Outdoor Household Articles (OHAs))

All eligible personnel **must** follow the instructions in this manual to permit the movement of regulated articles.

Documentation

The movement of regulated articles from a quarantine area into or through a non-infested area will require documentation by one of the following:

- Federal Certificate
  - PPQ Form 527 (self adhesive labels)
  - PPQ Form 540 (booklet of certificates)
  - Rubber stamp (provided or approved by USDA)

- ❖ Electronic stamp (provided or approved by USDA)

- ◆ Limited Permit
  - ❖ PPQ Form 530 (booklet of Limited Permits)
  - ❖ PPQ Form 537 (self adhesive labels)
  - ❖ Rubber stamp (provided or approved by USDA)
- ◆ Electronic stamp (provided or approved by USDA) Qualified Certified Applicator (QCA) Document on page I-1
- ◆ Self-Inspection Checklist (PPQ Form 377), contained in: It's the Law: Before Moving, Check for the Gypsy Moth," Program Aid No. 2147 (for OHAs)
- ◆ Signed Accurate Statement on page H-1 (for logs, pulpwood, bark, and bark products)

Operation Under Compliance Agreements

Any person engaged in the business of growing, handling, or moving regulated articles may enter into a compliance agreement to facilitate the movement of such articles. Compliance agreements are particularly helpful when establishments regularly ship large quantities of regulated articles outside of quarantine areas.

The purpose of a compliance agreement is to bring a person or firm into full compliance with the applicable requirements for handling regulated material. A compliance agreement provides a written and signed agreement confirming their understanding of the methods, conditions, and procedures necessary for compliance with the gypsy moth quarantine (7 CFR 301.45).

A compliance agreement will specify safeguards necessary to prevent spread of the gypsy moth, such as disinfestation practices or application of chemical materials in accordance with the Treatment Manual.

A compliance agreement template has been developed for commonly encountered businesses and activities. Operating procedures designed to meet regulatory requirements at individual facilities may be captured in an appendix that details those procedures. On occasion, unique situations may arise where a standard compliance agreement template is not suitable and a unique compliance agreement must be developed. These unique compliance agreements must be developed in consultation with program management.

An example of the compliance agreement template is in Compliance Agreements (CAs) on page D-1.

PPQ Officers and/or State personnel will train employees of the business operating under a compliance agreement. Additionally, the signer of the compliance agreement may provide training to employees as needed.

Employees of businesses will only be able to inspect and certify regulated articles when their establishment is under an active compliance agreement and the employees have successfully completed appropriate training.

Employees who have successfully completed training and are operating under compliance agreements will be able to perform the following:

- Complete appropriate documentation
- Handle regulated articles and complete mitigation procedures according to a standardized procedure
- Treat, if necessary, in a safe and effective manner to destroy gypsy moth life stages

On an as-needed basis, PPQ Officers and/or State personnel will monitor the employees of the cooperating establishments to ensure compliance.

High-risk Sites

A high-risk site is a site where the gypsy moth is present on the premises, on Regulated Articles, and/or in the surrounding area. High-risk sites are likely to provide a pathway for human-assisted spread of gypsy moth to non-infested areas.

There are three categories of high-risk sites and establishments based on the type of regulated articles and documentation required for movement. Sites and establishments listed below provide examples of potential high-risk sites and establishments in each category, however these lists are not exhaustive.

Category One High-risk Sites and Establishments

Category one high-risk sites and establishments commonly operate under a State or Federal compliance agreement. At category one high-risk sites and establishments both the premises and the regulated articles must be inspected by a State or Federal official. Category one high-risk sites and establishments include, but are **not** limited to:

- Nurseries
- Christmas tree plantations

Category Two High-risk Sites and Establishments

Category two high-risk sites and establishments commonly operate under a State or Federal compliance agreement. At category two high-risk sites and establishments only regulated articles must be inspected. Category two high-risk sites and establishments include, but are not limited to:

- Processing facilities and associated yards for logs, pulpwood, bark, and bark products
- Wood chip mills and associated yards
- Logging sites
- Firewood and associated production and distribution yards
- Wood waste and associated disposal yards
- Modular buildings, dealerships, rental facilities, transporters, and associated holding areas, (e.g., mobile homes, mobile offices and prefabricated housing)

Category Three High-risk Sites and Establishments

Category three high-risk sites and establishments typically do not operate under State or Federal compliance agreements. At category three high-risk sites and establishments the emphasis is on outreach and self-inspection. Category three high-risk sites and establishments include, but are not limited to:

- Moving companies
- Military bases (due to potentially infested vehicles and cargo)
- Campsites and locations that host recreational vehicles

Movement of Regulated Articles from High-risk Sites and Establishments

PPQ Officers or State personnel will inspect high-risk sites and establishments before entering into compliance agreements and periodically thereafter. When a compliance agreement is established, PPQ Officers or state personnel will train company employees on provisions of the compliance agreement, treatment options for regulated articles, and documentation requirements.

Regulated articles can be moved from category one or category two high-risk sites or establishments if the company is operating under an active compliance agreement, regulated articles have been appropriately treated/visually examined, and appropriate documentation is completed.

Regulated articles can be moved from category three high-risk sites and establishments after completing a visual examination. Regulated articles

moved from a category three high-risk site or establishment **must** be accompanied by appropriate documentation (e.g., APHIS program aid 2417).

Refer to Compliance Agreements (CAs) on page D-1 for the CA template for high-risk sites.

Inspection and treatment of high-risk sites, establishments, and regulated articles are discussed in detail in the following sections dedicated to specific site and establishment types and associated regulated articles.

Nursery Stock and Christmas Trees

The procedures outlined below are used to certify these items:

- Trees and shrubs grown or stored outdoors in a nursery
- Christmas trees grown as "balled and burlapped" nursery stock
- Christmas trees grown for the cut Christmas tree market, which are **not** classified as nursery stock

NOTICE

Trees and shrubs that have been continuously grown in a greenhouse under conditions where no gypsy moth infestation would be possible as determined by an inspector may be issued a certificate without piece-by-piece inspection. Refer to 7 CFR 301.45-5(a) and (a) (4).

Operation under Compliance Agreements

Any person engaged in the business of growing, handling, or moving regulated articles may enter into a compliance agreement to facilitate the movement of such articles. Compliance agreements are particularly helpful when establishments regularly ship large quantities of regulated articles outside of quarantine areas.

The purpose of a compliance agreement is to bring a person or firm into full compliance with the applicable requirements for handling regulated material. A compliance agreement provides a written and signed agreement confirming their understanding of the methods, conditions, and procedures necessary for compliance with the gypsy moth quarantine (7 CFR 301.45).

A compliance agreement will specify safeguards necessary to prevent spread of the gypsy moth, such as disinfestation practices or application of chemical materials in accordance with the Treatment Manual.

A compliance agreement template has been developed for commonly encountered businesses and activities. Operating procedures designed to meet regulatory requirements at individual facilities may be captured in an appendix

that details those procedures. On occasion, unique situations may arise where a standard compliance agreement template is not suitable and a unique compliance agreement must be developed. These unique compliance agreements must be developed in consultation with program management.

An example of the compliance agreement template is in Compliance Agreements (CAs) on page D-1.

PPQ Officers and/or State personnel may provide guidance and training to employees of the business operating under a compliance agreement. Additionally, the signer of the compliance agreement may provide training to employees as needed.

Employees of businesses will only be able to inspect and certify regulated articles when their establishment is under an active compliance agreement and the employees have successfully completed appropriate training.

Employees who have successfully completed training and are operating under compliance agreements will be able to perform the following:

- Complete appropriate documentation
- Handle regulated articles and complete mitigation procedures according to a standardized procedure
- Treat, if necessary, in a safe and effective manner to destroy gypsy moth life stages

On an as-needed basis, PPQ Officers and/or State personnel will monitor the employees of the cooperating establishments to ensure compliance.

Inspection of Nurseries and Christmas Tree Plantations

The purpose of inspection of nurseries and Christmas tree plantations is to determine what mitigation procedures may be required to occur prior to shipment from the quarantine area.

Timing of Inspections

For regulatory purposes, inspections can occur whenever movement of regulated articles is planned. The presence of any gypsy moth life stage (egg mass, larva, pupa, or adult) found on or near a regulated article constitutes a high risk of artificial spread. Inspectors will rely on their knowledge of current population densities in the immediate area and previous history of the high-risk site to help determine the timing of inspections.

In general, annual inspections for egg masses involving the premises and surrounding areas tend to occur after leaf fall in the autumn, when egg masses are no longer hidden by leaves, and may continue until leaves expand to

provide cover in the spring, or larvae have dispersed. Larval inspections occur during and after dispersal from the egg mass. Phenology models are available to assist in determining timing of the larval development stages.

Method of Inspection

Inspections may include the premises, the regulated articles, and all preferred hosts in the surrounding area for signs of gypsy moth. What is included and how the inspection is performed is determined by the type of establishment to be inspected and the regulated articles to be moved. Whether the inspection is all encompassing or only of the regulated articles, it should be noted that egg masses can be found on all surfaces, and may be hidden in cracks or crevices. For a description of preferred gypsy moth egg laying sites, refer to Where to Survey on page 2-20.

Inspection Results

Inspectors will use their judgment and the inspection criteria listed below to determine if conditions favor the artificial spread of gypsy moth. Mitigation procedures for small and large quantities of regulated articles are detailed below.

- One egg mass (or more) found on the regulated articles or within 3 meters (10 feet) of the articles
- Twelve or more egg masses per hectare (5 or more per acre) are found within approximately 30 meters (100 feet) of the articles
- Heavy larval infestations found within 1,600 meters (1 mile) which could result in infestation through blow-in or larval migration into the site

When any of the above conditions (or similar threatening conditions) exist, the following must occur:

- The PPQ Officer can issue an Emergency Action Notification (EAN) PPQ Form 523. The EAN will state the required action(s) that must be performed to allow shipment. Refer to the PPQ Treatment Manual for more information on available treatments; or
- A compliance agreement that stipulates appropriate mitigation procedures will be required

If **no** life stages of gypsy moth are found during the inspection, certificates may be issued for the regulated articles.

Treatment of Category One High-risk Sites

When required, the premises of category one high-risk sites will be treated with insecticide applications. Treatment is the responsibility of the regulated establishment. Insecticide applications may be either: 1) aerial applications; or 2) ground applications by hydraulic sprayers or mist blowers.

Aerial applications are usually preferred to ground applications. Aerial applications give better insecticidal coverage to the forest canopy and surrounding areas. Aerial applications are usually used to treat in or near the following high-risk sites: recreational areas; mills; nurseries; and Christmas tree plantations.

Ground application using a hydraulic sprayer is the preferred method for treating mobile home parks or isolated areas in nurseries.

When to Treat

Apply the insecticide when general egg hatch is completed in the area. Make applications when first, second, and third instar larvae are present. Phenology modeling could also be used to help determine the proper timing of insecticide applications. Proper timing of the treatment is essential. Pesticide effectiveness is reduced when the larvae are beyond the third instar. Best results are obtained if application can be delayed until general foliage of preferred hosts is one–third to one–half grown. If possible, apply treatments immediately before movement of regulated articles.

Treating the High-risk Site

Treat the infested portion of the high-risk site. Treat the surrounding area to a depth equal to the effective range of the spray equipment in use. A minimum depth of 70 feet will usually suffice to keep migrating late instar larvae from re-infesting the site. If re-infestation does occur, additional treatments will be necessary. In heavily infested sites, 2 or 3 applications 7 to 10 days apart may be necessary. Ensure that all necessary permits and permissions have been obtained prior to treatment.

Treatment Documentation

Records of all treatments must be retained for two years or according to State documentation retention requirements, whichever is greater, and made available to the inspector upon request.

After a high-risk site treatment and following any appropriate post-entry requirement for the treatment, a PPQ Officer or State official will re-inspect the site following the inspection protocols described above to determine the effectiveness of the treatment. If the treatment was (and is) effective, the PPQ officer or State official will note the action taken on the EAN and then rescind the EAN.

Mitigation Procedures for Small Quantities of Regulated Articles

Small quantities of regulated articles are defined as a quantity of regulated articles that can be 100% inspected by a State or Federal official in one working day.

Small quantities of regulated articles from a quarantine area must be inspected on a piece-by-piece basis by either: 1) workers at the establishments under PPQ direction; 2) PPQ Officers; or 3) State personnel. For example, piece-by-piece inspection is used for assembly-yard inspection of articles such as collected native plant material.

During a piece-by-piece inspection, inspect all surfaces including bark crevices where egg masses may be attached. When egg masses or larvae are found, treat either by: 1) physical removal after spraying with Golden Pest Spray Oil; or 2) insecticide application. The preferred treatment for egg masses will be physical removal after spraying with Golden Pest Spray Oil (refer to the instructions under Treatments on page 3-33).

Mitigation Procedures for Large Quantities of Regulated Articles

Large quantities of regulated articles are defined as a quantity of regulated articles that would require more than one working day to be 100% inspected by a State or Federal official.

Large quantities of regulated articles from a quarantine area are usually not inspected on a piece-by-piece basis. Large quantities of regulated articles are treated by: 1) treating the nursery or Christmas tree plantation as a high-risk site; 2) spraying the regulated articles with an insecticide; or 3) fumigating the regulated articles.

Spray Treatments for Large Quantities of Regulated Articles

For larvae on plants in large quantities of regulated articles, the following insecticides are among the products registered for spray treatments: acephate; carbaryl; diflubenzuron; phosmet; spinosad; and tebufenozide.

Fumigation for Large Quantities of Regulated Articles

Refer to the PPQ Treatment Manual for procedural instructions on conducting methyl bromide (MB) fumigations.

NOTICE

Some evergreen species, especially narrow-leafed evergreens and some azaleas, may be injured by MB fumigation. Plants in a dormant state are more tolerant to fumigation.

Trees and shrubs can be fumigated with MB at natural atmospheric pressure (NAP) using either a short or long exposure schedule. **Do not** use MB containing chloropicrin.

NOTICE

APHIS will **not** be responsible for damage of any type that results from a fumigation or an attempted fumigation.

Table 3-1 MB Treatment Schedule (at NAP) for egg masses of *Lymantria dispar* (gypsy moth) on deciduous, dormant woody plants (except for broadleaved genera such as *Azalea*, *Berberis*, *Camellia, Ilex*, and *Photinia*)[1]

Temperature	Dosage Rate (lb/1,000 ft^3)	Minimum Concentration Readings (oz.) At:
90-96°F	2 lbs	2 hrs
80-89°F	2.5 lbs	2 hrs
70-79°F	3 lbs	2 hrs
60-69°F	3 lbs	2.5 hrs
50-59°F	3 lbs	3 hrs
40-49°F	3 lbs	3.5 hrs

1 This table is similar to treatment T201-d-1 in the *Treatment Manual.*

Table 3-2 MB Treatment Schedule (at NAP) for egg masses of *Lymantria dispar* (gypsy moth) on dormant evergreens (including conifers) and certain broadleaved genera such as *Azalea*, *Berberis, Camellia, Ilex*, and *Photinia*[1]

Temperature	Dosage Rate (lb/1,000 ft^3)	Minimum Concentration Readings (oz.) At:
90-96°F	1.5 lbs	2 hrs
80-89°F	2 lbs	2 hrs
70-79°F	2.5 lbs	2 hrs
60-69°F	2.5 lbs	2.5 hrs
50-59°F	2.5 lbs	3 hrs
40-49°F	2.5 lbs	3.5 hrs

1 This table is similar to treatment T201-b-1 in the *Treatment Manual.*

Table 3-3 MB Treatment Schedule at NAP (Chamber or Tarpaulin) for egg masses of *Lymantria dispar* on cut conifer Christmas trees[1] (page 1 of 2)

Temperature	Dosage Rate (lb/1,000 ft^3)	Minimum Concentration Readings (oz.) at:				
		0.5 hr	2.5 hrs	3 hrs	4 hrs	4.5 hrs
75°F or above	1.5 lbs	18	12	—	—	—
70-74°F	2 lbs	24	16	—	—	—
60-69°F	2.5 lbs	30	—	24	—	—
60-69°F	3 lbs	36	24	—	—	—

Table 3-3 MB Treatment Schedule at NAP (Chamber or Tarpaulin) for egg masses of *Lymantria dispar* on cut conifer Christmas trees[1] (page 2 of 2)

Temperature	Dosage Rate (lb/1,000 ft^3)	Minimum Concentration Readings (oz.) at:				
		0.5 hr	2.5 hrs	3 hrs	4 hrs	4.5 hrs
50-59°F	3 lbs	36	—	—	24	—
50-59°F	4 lbs	48	32	—	—	—
40-49°F	3.5 lbs	42	—	—	—	28
40-49°F	5 lbs	60	40	—	—	—

1 This table is similar to treatment T313-d-1 in the *Treatment Manual.*

NOTICE

ON PINE: If treating pine Christmas trees for both gypsy moth egg masses and pine shoot beetle, use the schedule for pine shoot beetle because it is more potent.

Logs, Pulpwood, Holiday Greenery, Bark and Bark Products

The procedures outlined below are used to certify these items:

- Bark and bark products
- Firewood
- Logs (includes logs for veneer, saw timber, etc.)
- Pulpwood (includes bolts, edgings, trimmings, slabs, etc.)
- Other forest products

Operation under Compliance Agreements

Any person engaged in the business of growing, handling, or moving regulated articles may enter into a compliance agreement to facilitate the movement of such articles. Compliance agreements are particularly helpful when establishments regularly ship large quantities of regulated articles outside of quarantine areas.

The purpose of a compliance agreement is to bring a person or firm into full compliance with the applicable requirements for handling regulated material. A compliance agreement provides a written and signed agreement confirming their understanding of the methods, conditions, and procedures necessary for compliance with the gypsy moth quarantine (7 CFR 301.45).

A compliance agreement will specify safeguards necessary to prevent spread of the gypsy moth, such as disinfestation practices or application of chemical materials in accordance with the treatment manual.

Compliance agreement templates have been developed for commonly encountered businesses and activities. Operating procedures designed to meet regulatory requirements at individual facilities may be captured in an appendix that details those procedures. On occasion, unique situations may arise where a standard compliance agreement template is not suitable and a unique compliance agreement must be developed. These unique compliance agreements must be developed in consultation with program management.

An example of the compliance agreement template is in Compliance Agreements (CAs) on page D-1.

PPQ Officers and/or State personnel will train employees of the business operating under a compliance agreement. Additionally, the signer of the compliance agreement may provide training to employees as needed.

Employees of businesses will only be able to inspect and certify regulated articles when their establishment is under an active compliance agreement and the employees have successfully completed appropriate training.

Employees who have successfully completed training and are operating under compliance agreements will be able to perform the following:

- Complete appropriate documentation
- Handle regulated articles and complete mitigation procedures according to a standardized procedure
- Treat, if necessary, in a safe and effective manner to destroy gypsy moth life stages

On an as-needed basis, PPQ Officers and/or State personnel will monitor the employees of the cooperating establishments to ensure compliance.

Procedures for the Movement of Sawlogs

The Society of American Foresters defines a sawlog as “a log that meets minimal regional standards of diameter, length, and defect, intended for sawing.”

Although not mentioned specifically, veneer logs are subject to the same requirements as sawlogs.

Shipping Facilities

People or firms that regularly move sawlogs to destinations outside the quarantine area must operate under a compliance agreement. A compliance agreement provides a written and signed agreement confirming their understanding of the methods, conditions, and procedures necessary for compliance with the gypsy moth quarantine (7 CFR 301.45).

Compliance Agreements (CAs) on page D-1 contains an example of a compliance agreement.

Mitigation Procedures

Sawlogs originating from a quarantine area may be moved outside of the quarantine area if they have been examined according to a standardized procedure (refer to below). Sawlogs **must** be accompanied by a signed Accurate Statement stating that 100% of the exterior surfaces were visually examined no more than five days prior to the date of movement.

Inspectors (PPQ officers or State personnel) or employees of establishments operating under a compliance agreement will examine the entire exterior surface area (100% visual examination) of each sawlog in the shipment.

The "laid out" method is the recommended method for 100% visual examination of the entire surface area of all sawlogs. During the piece-by-piece examination, all exposed surfaces and crevices on the sawlog will be examined for egg masses, larvae, and pupae. Alternative inspection methods **must** be approved by APHIS or State personnel. If any gypsy moth life stages are present, qualified personnel will apply a suitable treatment before shipment.

Suitable treatments are listed under Treatments on page 3-33.

⚠ WARNING

Log inspection involves work in a log-handling yard, so obey the following safety precautions:
–Always wear a hardhat and steel-toe workboots
–Always listen and watch for yard equipment
–Because log stacks are often unstable, **never** go on or near log stacks
–Comply with any other safety precautions required by the facility

Laid Out Visual Screening Procedure. Using the "laid out" method, PPQ Officers, State officials, or individuals operating under a compliance agreement will ensure that no gypsy moth life stages are present by conducting a 100% visual examination. The 100% visual examination must occur no more than five days prior to the movement of sawlogs out of quarantine areas. If the sawlogs are not moved within five days of the original examination, they must be re-examined and moved within five days of the re-examination.

Procedure for a "laid out" 100% visual examination:

1. Plan in advance to have the sawlogs "laid out" with personnel and equipment on hand to clean and turn the logs.
2. Walk between the rows, examining the upper surface of sawlogs in the near row and the side surface of logs in the next row. If eggs masses are found, saturate with Golden Pest Spray Oil (EPA Reg. No. 57538-11) and remove

using a wire brush or paint scraper. Be sure to vigorously brush or scrape the entire egg mass from the surface. If larvae or pupae are found, remove and destroy.

3. Have the sawlogs turned, so that the upper surface becomes the bottom.
4. Repeat Step 2. Examine (and treat if necessary) the surfaces that were not previously examined, completing a 100% visual examination of all exterior surfaces.
5. Arrange for shipment within five days by shippers under compliance agreement.
6. Document the inspection by completing a signed Accurate Statement on page H-1.

Sawlogs originating within the gypsy moth quarantine can be moved outside quarantine boundaries when:

- A 100% visual examination of the external surface area is completed and,
- The sawlogs are either free of gypsy moth life stages or treated to eliminate life stages and,
- Required documentation is securely attached to the waybill or other shipping documents accompanying the article

Time of Visual Examination. A person operating under a compliance agreement must perform a 100% visual examination of all sawlog surfaces no more than five days prior to shipment out of quarantine boundaries.

Required Documentation

To ship sawlogs two types of documents are acceptable:

1. Federal Certificate – issued by PPQ officers or trained personnel operating under a compliance agreement for the movement of sawlogs if the material was handled, utilized, processed, or treated in a manner determined by PPQ officers or state officials that removes or destroys all gypsy moth life stages prior to leaving the quarantine area.
2. A signed Accurate Statement on page H-1 issued by trained personnel operating under a compliance agreement when a 100% visual examination is conducted. Visual examination must occur within five days for movement outside of the quarantine area.

Documentation must be attached to shipping documents accompanying the sawlogs. These documents are provided to the receiving facility upon delivery of the sawlogs for the receiving facility's records.

Accurate Statement forms will be provided by PPQ Officers and/or State personnel during the establishment of a compliance agreement. Individuals

operating under a compliance agreement will complete Accurate Statements and attach it to the shipping documents. Individuals operating under a compliance agreement may reproduce or request additional Accurate Statement forms as needed.

Sawlogs originating outside of quarantine areas may transit directly through quarantine areas without an Accurate Statement if: 1) the point of origin is clearly indicated by shipping documents, 2) its identity has been maintained, and 3) it has been safeguarded against infestation while in quarantine areas during the months of April through August.

Receiving Facilities

Receiving facilities located in non-quarantine areas will be able to receive sawlogs from quarantine areas if the receiving facility has an active compliance agreement specifying handling practices. In addition, the receiving facility must accept sawlogs only from loggers or shippers under compliance agreement.

Compliance Agreements (CAs) on page D-1 contains an example of the compliance agreement template for a receiving mill.

Required Documentation

Sawlogs must arrive at the receiving facility with a signed Accurate Statement or Federal Certificate attached to the waybill or other shipping documents accompanying the shipment.

Receiving facilities outside of quarantine areas operating under a compliance agreement must ensure that sawlogs are delivered with appropriate documentation attached to the shipping documents. If the required documentation does not accompany the shipment, the receiving facility **must** notify PPQ or State personal immediately.

Procedures for the Movement of Pulpwood

The Society of American Foresters defines pulpwood as “roundwood, whole-tree chips, or wood residues that are used for the production of wood pulp.”

Shipping Facilities

Firms that regularly move pulpwood to destinations outside the quarantine area must operate under a compliance agreement. A compliance agreement provides a written and signed agreement confirming their understanding of the methods, conditions, and procedures necessary for compliance with the gypsy moth quarantine (7 CFR 301.45).

Compliance Agreements (CAs) on page D-1 contains an example of a compliance agreement.

Mitigation Procedures

Pulpwood may be moved if: 1) fumigated; or 2) moved to receiving mills under compliance agreement by shippers under compliance agreement.

Fumigation. refer to the PPQ Treatment Manual.

Movement to Receiving Mills. Movement of pulpwood from a quarantine area to a non-infested area involves special handling by: 1) employees at the sending site; 2) employees of the shipping companies; and 3) employees at the receiving mill.

Employees at establishments moving pulpwood out of a quarantine area **must** inspect the shipment to ensure the following:

- Only shippers who are under compliance agreement will transport pulpwood
- Shipments will leave the quarantine area accompanied by appropriate documentation
- Pulpwood shipments will only go to receiving mills in non-infested areas when the receiving mills are under compliance agreement

Shipments remaining within contiguous quarantine areas **do not** have any restrictions.

Required Documentation

To ship pulpwood three types of documents are acceptable:

1. Federal Certificate – issued by PPQ Officers or trained personnel operating under a compliance agreement for the movement of sawlogs if the material was handled, utilized, processed, or treated in a manner determined by PPQ Officers or state officials that removes or destroys all gypsy moth life stages prior to leaving the quarantine area.
2. Limited Permit – issued by PPQ Officers or trained personnel operating under a compliance agreement to allow the movement of pulpwood to receiving facilities outside the quarantine area operating under a compliance agreement for specified handling, utilization, processing, or treatment.
3. A signed Accurate Statement on page H-1 – issued by personnel operating under a compliance agreement when a 100% visual examination is conducted. When a 100% visual examination of the entire surface area of the pulpwood shipment is not possible, all readily visible surfaces of the shipment will be examined. Visual examination must occur within five days of movement outside of the quarantine area.

Documentation **must** be attached to shipping documents accompanying the pulpwood. These documents are provided to the receiving facility upon delivery of the pulpwood for the receiving facility's records.

Documentation forms will be provided by PPQ Officers and/or State personnel during the establishment of a compliance agreement. Individuals operating under a compliance agreement will issue the documentation and attach it to the shipping documents. Individuals operating under a compliance agreement may reproduce or request additional forms as needed.

Receiving Facilities

Employees of mills receiving pulpwood operating under compliance agreement must ensure the following:

- Shipments of pulpwood from quarantine areas will arrive from suppliers under compliance agreement and with correct documentation
- Pulpwood will be stored, handled, and processed in accordance with all State requirements

Required Documentation

The documentation that accompanies pulpwood to receiving facilities is dependent upon the mitigation procedures conducted at the shipping facility. Depending on circumstances, pulpwood may arrive at receiving facilities with the following documentation:

1. Federal Certificate – is issued for the movement of pulpwood if the material was handled, utilized, processed, or treated in a manner determined by PPQ officers or state officials that removes or destroys all gypsy moth life stages prior to leaving the quarantine area.
2. Limited Permit – is issued to allow the movement of pulpwood to receiving facilities outside the quarantine area operating under a compliance agreement for specified handling, utilization, processing, or treatment.
3. A signed Accurate Statement on page H-1 – is issued when a 100% visual examination is conducted. When a 100% visual examination of the entire surface area of the pulpwood shipment is not possible, all readily visible surfaces of the shipment will be examined. Visual examination must occur within five days of movement outside of the quarantine area.

All required documentation must be kept for two years or a time period specified in the receiving facility compliance agreement, whichever is greater.

Procedures for Movement of Wood Chips, Bark Chips, and Bark Products

The federal gypsy moth quarantine (7 CFR 301.45) provides the following definitions:

Bark. The tough outer covering of the woody stems of trees, shrubs, and other woody plants as distinguished from the cambium and inner wood.

Bark products. Products containing pieces of bark including bark chips, bark nuggets, bark mulch, and bark compost.

Shipping Facilities

Firms that regularly move wood chips with bark attached, bark chips, and bark products to destinations outside the quarantine area must operate under a compliance agreement. A compliance agreement provides a written and signed agreement confirming their understanding of the methods, conditions, and procedures necessary for compliance with the gypsy moth quarantine (7 CFR 301.45).

Compliance Agreements (CAs) on page D-1 contains an example of a compliance agreement.

Mitigation Procedures

Wood chips, bark chips, and bark products, including biofuel, may be moved if: 1) composted; or 2) produced by a hammermilling process; or 3) moved to receiving mills under compliance agreement by shippers under compliance agreement.

Mitigations procedures will vary depending on the end use of the regulated products.

Composting. Wood chips, bark chips, and bark products can be composted to mitigate the risk of spreading gypsy moth. For complete details of approved composting procedures, refer to Procedures for Composting Bark on page F-1.

A general description of the composting procedure follows. Composting treatments require a starting compost pile of at least 200 cubic yards. The compost pile will remain undisturbed until the internal temperature reaches 120 °F (49 °C) for at least four continuous days or 100 °F (37.8 °C) for at least six continuous days. The compost pile will then be turned so that the outer layer, to a depth of three feet, becomes the core material. The turned compost pile will then remain undisturbed until temperature requirements are achieved.

Hammermilling Process. Bark chips, bark mulch, and other bark products may be produced by debarking of logs, followed by chip size reduction using a hammermill. A hammermill consists of a large steel drum containing a rapidly rotating shaft on which hammers are mounted. The rotor and hammers are spun at a high speed inside the drum while the bark is being fed into the drum via a feed hopper. The impact of the hammers on the bark pulverizes the bark into smaller pieces which then exit the drum through a sizing screen. A common form of the hammermill is a tub grinder. Bark chips or bark mulch of

common commercial dimensions produced by this process are considered fully mitigated and can be shipped without further restriction.

Movement to Receiving Facilities. Wood chips, bark chips, and bark products can be moved to receiving facilities operating under a compliance agreement for specified handling, utilization, processing, or treatment.

Employees at establishments moving wood chips, bark chips, and bark products out of a quarantine area must inspect the shipment to ensure the following:

- Only shippers who are under compliance agreement will transport wood chips, bark chips, and bark products
- Shipments will leave the quarantine area accompanied by appropriate documentation
- Shipments will only go to receiving facilities in non-infested areas when the receiving mills are under compliance agreement

Shipments remaining within contiguous quarantine areas **do not** have any restrictions.

Required Documentation

To ship wood chips, bark chips, and bark products two types of documents are acceptable:

1. Federal Certificate – Issued for the movement of bark products if the material was handled, utilized, processed, or treated in a manner determined by PPQ Officers or State officials that removes or destroys all gypsy moth life stages prior to leaving the quarantine area. For example, bark products that have been composted, processed through hammermill machinery, or otherwise fully mitigated are eligible to move under a certificate.
2. Limited Permit – Issued to allow the movement of untreated wood chips, bark chips, and bark products to receiving facilities operating under a compliance agreement for specified handling, utilization, processing, or treatment.

Documentation **must** be attached to shipping documents accompanying the wood chips, bark chips, and bark products. These documents are provided to the receiving facility upon delivery of the wood chips, bark chips, and bark products for the receiving facility's records. If treated bark products are sold to a consumer, the certificate may be attached to the invoice or packaging.

Documentation forms will be provided by PPQ Officers and/or State personnel during the establishment of a compliance agreement. Individuals operating

under a compliance agreement will issue the documentation and attach it to the shipping documents. Individuals operating under a compliance agreement may reproduce or request additional forms as needed.

Receiving Facilities

Mitigation Procedures: Employees of the receiving facilities operating under compliance agreement must ensure the following:

- Shipments of bark products from quarantine areas will arrive from suppliers under compliance agreement and with correct documentation
- Wood chips, bark chips, and bark products will be processed in accordance with any State requirements

Required Documentation. Documentation that accompanies wood chips, bark chips, and bark products to receiving facilities is dependent on the mitigation procedures conducted at the shipping facility. Wood chips, bark chips, and bark products may arrive at receiving facilities with the following documentation:

1. Federal Certificate – Issued for the movement of wood chips, bark chips, and bark products if the material was handled, utilized, processed, or treated in a manner determined by PPQ Officers or State officials that removes or destroys all gypsy moth life states prior to leaving the quarantine area.
2. Limited Permit – Issued to allow the movement of untreated wood chips, bark chips, and bark products to receiving facilities operating under a compliance agreement for specified handling, utilization, processing, or treatment.

Procedures for the Movement of Holiday Greenery

Holiday greenery is defined as wreaths, garlands, and bulk boughs typically made of, but not limited to, fir, spruce, pine, and cedar species commonly sold for decorative purposes.

Shipping Facilities

People or firms that regularly move holiday greenery to destinations outside the quarantine area **must** operate under a compliance agreement. A compliance agreement provides a written and signed agreement confirming their understanding of the methods, conditions, and procedures necessary for compliance with the gypsy moth quarantine (7 CFR 301.45).

Compliance Agreements (CAs) on page D-1 contains an example of a compliance agreement.

Mitigation Procedures

Holiday greenery originating from a quarantine area may be moved outside of the quarantine area if:

- Articles harvested measure less than ½" in diameter.
- Articles are harvested from an area determined to be free from gypsy moth life stages by Federal or State personnel (field inspections and/or inspection of boughs at collection site).
- Articles are moved to a receiving facility under compliance agreement for inspection by shippers under compliance agreement.

Required Documentation

Documentation **must** be attached to the waybill or other supplying documents accompanying the shipment. Documentation forms will be provided by PPQ Officers and/or State personnel during the establishment of a compliance agreement. Individuals operating under a compliance agreement will issue the documentation and attach it to the shipping documents. Individuals operating under a compliance agreement may reproduce or request additional forms as needed. To ship holiday greenery two types of documents are acceptable:

1. Federal Certificate – would be issued for the movement of holiday greenery if articles were inspected and found free of GM life stages based off USDA APHIS or State personnel field inspection results. A fumigation was the mitigation procedure used as treatment. A self-inspection of the articles by trained personnel operating under a compliance agreement was completed.
2. Limited Permit – would be issued to allow the movement of articles to receiving facilities operating under a compliance agreement for specified handling, utilization, processing, or treatment.

Receiving Facilities

Mitigation Procedures: Employees of the holiday greenery receiving facilities operating under compliance agreement **must** ensure the following:

- Shipments from quarantine areas will arrive from suppliers under compliance agreement and with correct documentation
- Holiday greenery will be processed according to State requirements

Required Documentation

The documentation that accompanies holiday greenery to receiving facilities is dependent on the mitigation procedures conducted at the shipping facility. Holiday greenery may arrive at receiving facilities with the following documentation:

1. Federal Certificate – 1) Articles are found free of GM life stages or treated as indicated in State's field inspection report. 2) Articles are fumigated prior to shipment. 3) Articles are self-inspected by trained personnel under a compliance agreement prior to shipment.

2. Limited Permit – If the articles are **not** inspected prior to movement, and are transported to a receiving facility under compliance agreement for specified handling, utilization, processing or treatment.

Procedures for Movement of Other Forest Products

Defined as: All forest products **not** included in Logs, Pulpwood, Holiday Greenery, Bark and Bark Products on page 3-13 that are capable of moving gypsy moth life stages.

Other forest products may include: Birch bark, non-timber forest products, etc.

Since other forests products may include various non-timber articles typically moving in small quantities, these should be handled on a case by case basis. Guidance provided for the other articles covered in this chapter may provide a starting point for determining appropriate procedures for allowing movement of these articles. Program management should be consulted when these situations are encountered.

Outdoor Household Articles (OHAs)

OHAs include any article associated with a household that has been kept outside the home. OHAs include, but are not limited to, the following:

- Awnings
- Barbecue grills
- Bicycles
- Boats
- Doghouses
- Firewood (when permitted under other applicable State and Federal regulations)
- Garbage containers
- Garden tools
- Outdoor furniture
- Recreational vehicles (RVs)
- Tents
- Tires
- Trailers

NOTICE

Firewood is an at-risk pathway for the movement of a number of pests in addition to gypsy moth. For this reason some States have State-level requirements for the movement of firewood.

Self-Inspection Checklist (PPQ Form 377)

This checklist is contained in: It's the Law: Before Moving, Check for the Gypsy Moth, Program Aid No. 2147 (for OHAs). PPQ Form 377 contains a list of OHAs on which gypsy moth life stages are often found and therefore **must** be inspected. However, any list is likely to be incomplete, because gypsy moth females can lay their eggs on any surface and the larvae of gypsy moth can rest or pupate on any article.

Containerized moving services are an emerging pathway for the human assisted movement of gypsy moth. Outdoor household articles (OHAs) should be inspected and a self-inspection checklist (in It's the Law: Before Moving, Check for the Gypsy Moth, Program Aid No. 2147) **must** be completed. The self-inspection checklist must accompany the moving container throughout the move to the final destination. In addition, the interior and exterior of the container must be inspected and all gypsy moth life stages must be removed prior to exiting the quarantine area.

Outreach to Establishments Shipping OHAs

When OHAs are to be shipped from a quarantine area into or through a non-infested area, the OHAs **must** be treated as regulated articles. Prior to the move, OHAs **must** be inspected (and treated, if necessary).

To regulate the movement of OHAs from quarantine areas, PPQ and/or State personnel are encouraged to contact the following establishments:

- All moving companies in the State
- All truck and trailer rental companies in the State
- Media: radio, television, and newspapers

At all the establishments, PPQ and/or State personnel will distribute information, such as the Self-Inspection Checklist (PPQ Form 377), contained in: It's the Law: Before Moving, Check for the Gypsy Moth, Program Aid No. 2147 (for OHAs), and explain the gypsy moth quarantine. At the moving companies and truck and trailer rental companies, PPQ and/or State personnel will leave: 1) information for distribution to homeowners and renters who must be regulated; and 2) a current list of qualified certified applicators (QCAs) authorized to work in the State. Refer to Inspection by Qualified Certified Applicators (QCAs) under Compliance Agreements (CAs) on page 3-26 for more information.

Because OHAs are the most likely means of artificial spread, a strong public relations campaign is particularly important. The public must be informed through the media. PPQ personnel can obtain assistance in dealing with the media from Legislative and Public Affairs (LPA), a unit within APHIS.

Self-Inspection by Homeowners or Renters

Employees of moving companies, rental companies, and contract carriers must contact, well before their moves, the homeowners or renters who must be regulated. The homeowners or renters who must be regulated are the homeowners or renters who are moving OHAs from a quarantine area into or through a non-infested area. The homeowners and renters who must be regulated must be informed of their right to inspect their own OHAs. PPQ officers and/or State personnel are responsible for ensuring moving companies, rental companies, and contract carriers are provided with outreach materials, have access to It's the Law: Before Moving, Check for the Gypsy Moth, Program Aid No. 2147, and are aware of the regulations.

Homeowners or renters who must be regulated can inspect their own OHAs if they use the procedures in It's the Law: Before Moving, Check for the Gypsy Moth, Program Aid No. 2147 (for OHAs). Homeowners and renters who must be regulated can obtain this Program Aid from the APHIS web site, PPQ officers, State personnel, employees of moving companies, rental companies, and contract carriers.

Inspection by Qualified Certified Applicators (QCAs) under Compliance Agreements (CAs)

If the homeowners or renters who must be regulated **do not** desire to conduct a self-inspection, QCAs operating under CAs can inspect OHAs.

Operating under CAs, QCAs who inspect OHAs will be: 1) trained by PPQ or State personnel; 2) licensed as pesticide applicators in each State in which they operate; 3) responsible to PPQ personnel for preparation and distribution of certifying documents; and 4) monitored by PPQ or State personnel to ensure the quality of inspections.

Inspections will be done no more than five days prior to the move during the high-risk period between the months of April through August and no more than 14 days prior to the move between September through March.

Pre-Inspection Procedure

Step 1: Ask the homeowner or renter who must be regulated to do the following:

Identify and assemble all OHAs (including firewood) to be inspected in one location or make the OHAs accessible for inspection.

Step 2: Assemble all tools necessary for the inspection

- Certifying documents to record the inspection
- Drop cloth to lie on when examining the undersides of OHAs
- Flashlight, preferably a small, high-intensity flashlight, to illuminate nooks and crannies
- Hand mirror, preferably small and plastic-covered for safety, to examine the undersides of OHAs
- Paint scraper or wire brush to scrape off egg masses
- Probe, preferably thin and flexible, possibly a screwdriver, to probe nooks and crannies
- Tools, such as Phillips and standard screwdrivers, to disassemble OHAs, if necessary
- Tools, such as a lug wrench, a jack, and blocks, to remove wheels to check wheel wells and brakes, if necessary
- Work clothes, such as coveralls

Inspection Procedure

Infested OHAs are more likely when there are indications of a large gypsy moth population in the surrounding area. However, even when there is no indication of a gypsy moth population, infestation of OHAs is still possible. Therefore, always do a thorough examination of each article.

Step 1: Thoroughly examine each OHA and any household article that has been outdoors.

The examination of each article (OHA or any exposed article) **must** include the entire surface area, including nooks and crannies. Use probes and flashlights to examine the nooks and crannies. Turn articles over to examine the lower surfaces. Remember that gypsy moth females favor sheltered surfaces for egg laying. If the articles cannot be turned over, examine by crawling underneath on a drop cloth, using a hand mirror, and/or probing with a screwdriver.

If necessary, disassemble articles that are likely to harbor gypsy moth. Pay special attention to articles in close proximity to egg masses, larvae, or pupae.

Although they may not be typical OHAs, be sure to examine the following articles as if they were OHAs:

- Articles left outside
- Articles stored in areas open to the outside
- Articles stored in areas with an opening to the outside
- Articles stored indoors, but used outdoors

As articles are examined, separate the infested items from non-infested items.

Step 2: Treat the infested articles; as an alternative, infested articles can be treated during their examination.
The gypsy moth life stage most likely to be encountered while inspecting OHAs is gypsy moth egg masses. Treat egg masses by saturating them with Golden Pest Spray Oil and removing any egg masses with a paint scraper or wire brush. Refer to Treatments on page 3-28 for more details on treating infested articles.

Step 3: Safeguard the inspected articles.
If any inspection is **not** done on moving day, safeguard the articles from re-infestation. Safeguard the inspected articles by one or more of the following means:

- Cover with plastic sheeting or plastic bags
- Pack immediately in moving van or truck and enclose or cover
- Store articles indoors

Disposable plastic bags or plastic sheeting will safeguard articles for several days before a move. On moving day, remove plastic bags and/or sheeting from regulated articles and discard.

Step 4: Document the inspection.
Refer to Documentation for OHA Inspections on page 3-29.

Treatments

Four treatment options are described below.

Physical Removal of Egg Masses (Preferred for OHAs)

Use a wire brush or paint scraper to remove an egg mass from an OHA. Be sure to brush or scrape vigorously to remove all of the egg mass; however, **do not** brush or scrape so vigorously that the OHA is damaged.

Physical Removal of Egg Masses after Spraying

Apply Golden Pest Spray Oil to an egg mass, using: 1) a sprayer with an adjustable nozzle; 2) a paint brush; or 3) a similar brush. Thoroughly saturate the egg masses to the point of runoff so the egg mass is “soaked.” The Golden Pest Spray Oil will penetrate rapidly destroying even the innermost eggs. Then, physically remove the egg mass, using a wire brush or paint scraper. Vigorously brush or scrape all of the egg mass from the surface.

NOTICE

The methods above are preferred over insecticide use or fumigation.

Fumigation of Egg Masses

The Treatment Manual contains the Treatment Schedule for OHAs.

Spraying of Larvae

When physical removal of larvae is not practical, a contact insecticide labeled for the treatment of gypsy moth larvae may be used. Follow label instructions carefully.

Documentation for OHA Inspections

Four types of documents are acceptable:

1. Federal Certificate issued by PPQ and State personnel
2. Limited Permit issued by PPQ and State personnel
3. QCA document plus an attached copy of the document (Qualified Certified Applicator (QCA) Document on page I-1)
4. Self-Inspection Checklist (in It's the Law: Before Moving, Check for the Gypsy Moth, Program Aid No. 2147 (for OHAs) – for homeowners or renters who self-inspect

Mobile Homes, Mobile Offices, and Associated Items

Mobile homes and associated items are only regulated when they are moved from a quarantine area into or through a non-infested area. To move a mobile home or mobile office from a quarantine area into or through a non-infested area, an inspection is necessary before the move. Additionally, certifying documents are necessary during and after the move.

Preparation for the Regulation of Mobile Homes and Mobile Offices

To regulate the movement of mobile homes and mobile offices from quarantine areas, PPQ and State personnel will cooperate in the following activities:

Contacting All Mobile Home or Mobile Office Haulers

All mobile home or mobile office haulers who move mobile homes from quarantine areas to non-infested areas will be contacted and placed under compliance agreement (CA). Entities moving mobile homes, mobile offices or other mobile structures, if not under CA, must contact State or Federal officials prior to the move to make arrangements for inspection and disinfestation (if needed) of the mobile office or structure prior to the move. Establishments routinely involved in such movement may be placed under CA.

Under the terms of the CAs, the CA holder will only move mobile homes or mobile offices from a quarantine area to non-infested areas after gypsy moth inspections have been performed and documented. Under the CAs, the CA

holder will know how to complete the inspections and how to handle the certifying documents.

Contacting the State Department of Transportation

In some States, permits are required to move a mobile home or mobile office or mobile office. Contact with the State transportation office will allow access to copies of the permits facilitating making arrangements for inspections.

Contacting the Operators of Mobile Home Parks or Mobile Office Dealers

Contact with the operators of mobile home parks and dealers can allow access to mobile home owners. Operators of parks or dealers can inform departing customers of the need for inspections and the options available for completing those inspections.

Contacting Pesticide Applicators

Contact with individual pesticide applicators and with organizations for pesticide applicators will allow access to pesticide applicators who would be interested in becoming qualified certified applicators (QCAs). QCAs are pesticide applicators who will be allowed to inspect mobile homes or mobile offices under CAs.

Pre-inspection Procedure

Step 1: Before the move, contact the departing mobile home or mobile office owner.

Explain the threat posed by the gypsy moth and the need to inspect departing mobile homes or mobile offices. Arrange the inspection. Before the inspection, ask the owner of the mobile home or mobile office or mobile office to do (or arrange) the following:

- Make the exteriors of the mobile home or mobile office and of all associated items accessible for inspection
- Make the interior of the mobile home or mobile office available for inspection, if necessary
- Provide equipment and labor to ensure rapid access to wheel wells, brakes, undersides, and other inaccessible places on the day of inspection
- Remove all skirting

Step 2: Assemble all necessary tools and equipment.

- Binoculars—to examine suspected, distant egg masses
- Federal Certificates (Form 540)
- Flashlight, preferably a small, high-intensity flashlight—to illuminate crevices and other concealed areas

- Ground cover— to lie on when examining the undersides of the mobile homes
- Hand mirror, preferably small and plastic-covered for safety—to examine the undersides of the mobile homes
- Ladder—to examine the roof and areas under the eaves
- Paint scraper (putty knife), preferably small and flexible—to scrape off egg masses
- Probe, preferably thin and flexible, possibly a screwdriver—to probe crevices and other concealed areas
- Tools, such as Phillips head and standard screwdrivers—to remove panels, if necessary
- Wire brush (if a paint scraper is not used)—to scrape off egg masses
- Work clothes, such as coveralls, hardhat, and goggles

Inspection Conditions

Inspections require the following conditions:

- If possible, the inspection **must** occur on moving day during blow-in and egg-laying seasons (during the months of April through August); if not possible, the inspection must occur no more than five days prior to the move
- Mobile home or mobile office and associated items **must** be accessible to the inspector
- Weather conditions **must** be favorable

Safety and Inspections

To prevent injury, use the following procedures when performing inspections:

- Always check for venomous spiders or other wildlife that may pose a threat (snakes, stinging insects, etc.
- Always put blocks under the wheels of the mobile home or mobile office to be inspected
- Always wear coveralls
- Always wear a hardhat, gloves, and safety glasses
- Beware of sharp edges, particularly flashing and siding edges. Never run your hand over edges that could be sharp
- Never crawl under a mobile home or mobile office on jacks
- Use a flashlight to illuminate a dark area before entering
- Use mirrors, instead of entering tight corners

Inspection Procedure

Step 1: Examine the vegetation around the mobile home or mobile office for gypsy moth life stages.

If the vegetation in the surrounding area is infested, the mobile home or mobile office is also likely to be infested. Associated items and parts of the mobile home or mobile office near infested vegetation deserve close attention. However, even when there is no indication of a gypsy moth population in the surrounding area, infestation of the mobile home or mobile office is still possible. Therefore, all inspections must be exacting and complete.

Step 2: Examine the mobile home or mobile office and associated items for gypsy moth life stages.

Look in, on, and under everything. The examination **must** cover all exterior surfaces, including surfaces deep within crevices and other concealed areas. Use probes and flashlights to examine all concealed areas.

Examine lower surfaces very carefully. For egg laying, gypsy moth females favor sheltered under surfaces. Examine the underside of a mobile home or mobile office by crawling on a drop cloth, using a hand mirror, and/or probing with a screwdriver.

Inspect the following with particular care:

- Air conditioners (remove covers)
- Awnings (open if necessary)
- Blocks on which the mobile home or mobile office rest
- Chimney flashing and rain guard
- Compressors
- Drainpipes
- Slide out expansion unit (open if necessary)
- Flashings
- Fuse boxes, circuit breaker box, and/or electrical connections (open if necessary)
- Hitch, including the underside of the I-beams and junctions
- License plate (remove if necessary)
- Moldings (probe if necessary)
- Mud flaps
- Patio room and any associated OHAs that will be moved
- Propane gas tanks (including under the gas cap)

- Roof and eaves
- Shutters (remove or probe behind as necessary)
- Skirting
- Steps (including under-surfaces)
- Taillights
- Underside of the mobile home, including floor boards, frame, and tubing
- Vents
- Wheels, including the inside of the rim and brake drums (if accessible)
- Window sills (top and bottom)

NOTICE

Commonly overlooked sites for larvae and egg masses on mobile homes include the following:
• chimney caps
• flashing
• lip of the lower wall
• wheels, especially the inner sides

When necessary, articles likely to harbor gypsy moth **must** be disassembled prior to the inspection. The disassembly can be done by the owner of the mobile home, workers contracted by the owner of the mobile home, or the inspecting QCA.

Step 3: Treat the infestation.

Refer to information on Treatments on page 3-33.

Step 4: Document the inspection.

Refer to the information on Documentation for Mobile Home or Mobile Office Inspections on page 3-34.

Treatments

Three treatment options are described below.

Physical Removal of Egg Masses

Use a wire brush or paint scraper to remove an egg mass. Be sure to brush or scrape vigorously to remove all of the egg mass; however, **do not** brush or scrape so vigorously that the finish is damaged.

Treatment and Physical Removal of Egg Masses

If you cannot be certain that scraping will remove 100% of the egg mass, then use the following protocol:

To apply Golden Pest Spray Oil to an egg mass, use: 1) a sprayer with an adjustable nozzle; 2) a paint brush; or 3) a similar brush. Thoroughly saturate the egg masses to the point of runoff so the egg mass is "soaked."

The Golden Pest Spray Oil will penetrate, rapidly destroying even the innermost eggs. Then, physically remove the egg mass, using a wire brush or paint scraper. Vigorously brush or scrape as much of the egg mass as possible from the surface. **Do not** brush or scrape so vigorously that the finish is damaged.

Spraying of Larvae with Insecticide

When larvae are present, use an insecticide labeled for the treatment of gypsy moth larvae when removal by brush or paint scraper is not practical.

Follow insecticide label instructions carefully.

Documentation for Mobile Home or Mobile Office Inspections

To ship mobile homes or mobile offices, two types of documents are acceptable:

1. Federal Certificate – issued by PPQ officers state personnel after the mobile home or office has been inspected and all life stages of gypsy moth have been removed.
2. QCA document – issued by a qualified certified applicator operating under a compliance agreement (refer to Qualified Certified Applicator (QCA) Document on page I-1) after the mobile home has been inspected and all life stages of have been treated and removed.

Chapter

4

Slow the Spread Action/ Transition Area Activities

Contents

Introduction

The Slow the Spread (STS) Action/Transition Area occupies a band that starts at approximately the outer edge of the quarantine area and extends outward 100 kilometers to the non-infested area. The quarantine area is characterized by a virtually continuous gypsy moth population that can periodically reach outbreak levels. The non-infested area lacks an established gypsy moth population. Gypsy moth populations in the STS Action/Transition Area are usually low level, discontinuous populations that do not typically reach outbreak levels. The purpose of this chapter is to provide guidelines for program activities in the STS Action/Transition area.

This chapter contains information on the following topics:

- Information on the STS Foundation and its activities
- Regulatory activities in the STS Action/Transition area
- Criteria for adding an area to the quarantine

Significance and History of the STS Foundation and Action Area

The STS Foundation is a non-profit organization whose membership consists of those states along the leading edge of the gypsy moth quarantine area. The purpose of the STS Foundation is to conduct activities designed to retard the natural spread of gypsy moth out of the quarantine area in order to protect outlying areas from damage caused by the pest. This mission is accomplished through intensive survey activities within the action area, along with regulatory activities, eradication treatments, and population suppression treatments. These activities have resulted in more than a 60% reduction of natural spread rates from an average of 13 miles a year to an average of less than five miles per year.

The U.S. Forest Service provides 75% of the funding for the STS Foundation and its activities. The remaining funds are provided by member states, along with a grant from APHIS for regulatory activities within the STS Action/ Transition Area.

STS Action/Transition Area Regulatory Activities

To prevent the long-distance spread of gypsy moth, the policy of APHIS is to prevent the establishment of isolated, outlying infestations. Usually, isolated infestations result from human-assisted dispersal of the pest through the movement of infested articles. Articles likely to be infested are considered Regulated Articles. To prevent the human-assisted spread of gypsy moth, APHIS and State program partners enforce quarantines on regulated articles when they are moved from the quarantine area to non-infested areas. Because logs and many other regulated articles tend to move fairly short distances from the quarantine area into the STS Action/Transition Area for processing and other purposes, regulatory activities within the STS Action/Transition Area are a vital component of the STS effort. These regulatory activities may include:

- Entering into compliance agreements with regulated establishments
- Issuing Federal Certificates for the movement of regulated articles that have been fully mitigated
- Monitoring gypsy moth population levels at and near facilities receiving logs from the quarantine area
- Inspections of nursery stock and other products to ensure pest freedom prior to movement
- Conducting special operations, like weigh station blitzes

Nurseries and Christmas Tree Plantations

Nursery stock and plant products are a high risk pathway for the movement of gypsy moth. Since gypsy moth populations may exist at low levels in the STS Action/Transition Area, nurseries in the STS Action/Transition Area, particularly those dealing in preferred hosts, must be inspected often enough to ensure that infested material is not being shipped.

In addition to a visual examination of plant products and the growing plants, trapping should be done in the vicinity of the nursery to detect the presence of gypsy moth.

For a more detailed description of how to inspect nurseries and Christmas tree plantations in the STS Action/Transition Area, refer to Inspection of Nurseries and Christmas Tree Plantations on page 3-8. Trapping activities should be conducted in coordination with the STS program and other relevant program partners to assure proper trapping densities and to avoid duplication of effort.

Mills and Log Yards

Mills and other facilities within the STS Action/Transition Area often receive logs that originate within the quarantine area. These mills and facilities must operate under compliance agreements.

In addition, two or more traps should be set at each mill receiving logs from within the quarantine area, along with the traps set in the vicinity of the mills per normal STS Action/Transition Area protocols. These traps are intended to monitor gypsy moth population levels at the receiving mill, in accordance with APHIS policy for regulating receiving mills (refer to Protocols for Regulated Logs Originating in the Gypsy Moth Quarantine Area on page G-1. For additional information about regulatory activities at mills, please refer to the appropriate section(s) of the Regulatory chapter.

Criteria for Adding Areas to the Quarantine

The decision to add an area to the quarantine will be based on the detection of a sufficient number of male moths and/or other life stages to support a State and Federal consensus that the area is indeed generally infested.

Trap Survey Results (Male Moths Alone)

When more than ten male moths are caught in the majority of traps placed throughout the area for two consecutive years, consider adding the infested area to the quarantine area. Milk carton traps are frequently used for STS/ transition area survey work due to the milk carton trap's much larger capacity compared to a delta trap.

Remember, the transfer will require consensus between Federal and State officials.

Trap Survey and Other Survey Results

When adult trapping captures multiple male moths and other survey methods detect alternate life stages, consider adding the infested area to the quarantine area.

Remember, the transfer will require consensus between Federal and State officials.

Egg-Mass Survey Results

When multiple egg masses are detected as the result of an egg mass survey, consider adding the area to the quarantine area.

Remember, adding to the quarantine area will require consensus between Federal and State officials.

Updating the Quarantine

After the decision has been reached to add an area to the quarantine, the APHIS Gypsy Moth National Policy Manager will work with appropriate personnel to add that area to the Federal quarantine following existing protocols for doing so.

Chapter

5

Public Outreach

Contents

Introduction

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA APHIS PPQ) is involved in the Gypsy Moth Program for the following reasons:

- To detect isolated infestations at low population levels
- To eradicate isolated infestations on State and private lands
- To prevent the human-assisted spread of gypsy moth to non-infested areas

The original gypsy moth regulations were first published in 1912 during the tenure of Agriculture Secretary James Wilson. Over a century later, the regulations continue to help safeguard our trees and forests from this devastating pest.

Outreach is fundamental to the core activities of the gypsy moth program, providing an essential and unifying thread across the survey, regulatory, and control actions. Wide sweeping and broad, gypsy moth outreach can be big and bold or small and subtle but all communication should facilitate one or more of the following objectives:

- Increase awareness of the pest and the gypsy moth program
- Enhance understanding of the pest and gypsy moth program
- Garner public and stakeholder support for the gypsy moth program
- Encourage compliance with gypsy moth regulations and quarantine requirements

While survey, regulatory, and control may be designated as the responsibility of a select few, outreach is a universal job function. We all play a role in the gypsy moth outreach mission.

Key Messages

Gypsy moth key messages align program partners and support the delivery of accurate and consistent messages to our stakeholders, regulated industries and the public.

Background

The European gypsy moth is native to Europe and first arrived in the United States in Massachusetts in 1869.

- The gypsy moth is one of the most destructive pests of trees and shrubs to ever be introduced into the United States. Gypsy moth caterpillars have voracious appetites for more than 300 species of trees and shrubs, posing a danger to North America's forests.
- The first Federal gypsy moth quarantines were enacted in 1912 in New England and today nearly half of the lower 48 States in the east are partially or entirely quarantined for the pest.
- The gypsy moth can spread on its own and when people unknowingly move an adult moth, larva or egg mass. Due to our mobile society, the majority of new gypsy moth infestations are associated with the movement of outdoor household articles by the public.
- Gypsy moth caterpillars defoliate trees, leaving trees vulnerable to diseases and other pests that can eventually kill the tree. Early detection is critical to limiting the spread of gypsy moth.
- Gypsy moth prefers approximately 150 primary hosts but will feed on more than 300 species of tree and shrubs.

The Pest

- Gypsy moth egg masses are covered with buff or yellowish hair from the abdomen of the female and average about 1 ½ inches long and about ¾ of an inch wide.
- Newly hatched gypsy moth caterpillars are black and hairy. As they mature, caterpillars develop a mottled yellow to gray pattern with tufts of bristle-like hairs and a pattern of five pairs of blue dots and six pairs of red dots along their back.
- Male and female adult moths look very different; a male moth is about ¾ of an inch long, brown in color with a darker brown pattern on their wings. Females are larger and nearly white with dark saw-toothed patterns on their wings. Female European gypsy moths cannot fly.
- Tree defoliation; when gypsy moth population density reaches high levels, the caterpillars consume large quantities of foliage resulting in partial or complete defoliation of the forest.
- Gypsy moth prefers approximately 150 primary hosts including aspen, birch, cedar, cottonwood, larch, oak, poplar, willow, and fruit trees.

Survey

- Two USDA agencies, APHIS and the Forest Service (FS), partner with various State agencies to conduct gypsy moth surveys.
- APHIS is responsible for surveying in areas not known to be infested to detect new gypsy moth infestations. The FS concentrates its gypsy moth efforts along the front line of the known infested areas to monitor the pest population and initiate control efforts.
- The goal in surveying is to find new gypsy moth infestations early, before populations can establish, grow, and spread. Public cooperation in survey in vitally important to ensure a full and complete survey.
- Gypsy moth traps are green, orange, or brown and are made of plastic-coated cardboard. The “delta” trap looks like a miniature pup tent with openings on each end (Figure 2-2 on page 2-9). The other version of the trap is taller and larger, looks like a milk carton, and is named accordingly Milk carton traps are **not** used in APHIS funded survey work.
- Traps are baited with a lure that attracts the male moth. Once the male moth enters a trap, it is either caught in the sticky lining (delta trap) or killed by a small, insecticidal strip (milk carton).
- The gypsy moth traps pose **no** risk to people, pets, or wildlife.

Regulatory

- USDA regulates the movement of potentially infested material or articles from gypsy moth quarantine areas to other areas of the United States.
- Gypsy moth regulated articles include Christmas trees, logs, posts, pulpwood, bark and bark products, nursery stock, mobile homes, and outdoor household articles such as lawn furniture, yard equipment, outdoor toys, and the like.
- To help prevent the further spread of this destructive pest, USDA requires homeowners to inspect outdoor household goods and remove any adult gypsy moths, pupae, larvae, or egg masses they find prior to moving from a quarantine area to a non-quarantine area.
- Public and industry compliance with the gypsy moth regulations is based on: 1) awareness of the existence of the regulations; 2) knowledge about the contents of the regulations; and 3) cooperation with the regulations.

Control

- The USDA continues to fight the spread of gypsy moth. Today, through the Slow the Spread (STS) Program we are retarding the spread along the infestation's leading edge and eradicating outbreaks outside currently infested areas.
- The Gypsy Moth Program uses several strategies and tools to control the pest.

  Mass trapping strategically places pheromone gypsy moth traps (to attract male moths) in a dense grid pattern across the treatment area. The objective of mass trapping is to capture male gypsy moths before they have a chance to locate and mate with the flightless female moths.

  The objective of mating disruption is to saturate the treatment area with enough pheromone sources to confuse the male moths and thereby prevent them from finding and mating with female moths.

  This can be accomplished by either ground or aerial application of the pheromone, Disparlure.

  Bacillus thuringiensis kurstaki (Btk) is a biopesticide (natural product) used to target gypsy moth larvae. The word biopesticide is a combination of the words "biological and pesticide". In most cases, Btk is aerially applied, however in small gypsy moth infestations (less than five acres), Btk may be applied using ground equipment. When gypsy moth larvae eat vegetation treated with Btk, a toxin is released in their stomach. This toxin eventually starves or poisons the larvae.

Gypchek, a gypsy moth nucleopolyhedrosis virus (NPV) product, is also used to target larvae. NPV is applied with aerial or ground application equipment. Gypsy moth larvae eat the virus-coated leaves and become infected. These larvae die and decompose leaving virus particles for additional larvae to eat and also become infected. Gypchek infects and kills only gypsy moth larvae. This product is used in areas where other moths and butterflies may be rare or endangered.

There are also a number of traditional pesticides that are labeled for gypsy moth and are occasionally used for control.

What the Public Can Do

- Know the quarantines in your area and learn to leave gypsy moth and other pests behind especially if you're relocating to a new area.
- If you live outside of a gypsy moth quarantine area, report findings of gypsy moth egg masses and other life stages on trees, lawn furniture, fences, walls, or elsewhere to Federal or State agriculture officials.
- Become familiar with and cooperate with all restrictions imposed because of a gypsy moth detection.
- Allow authorized agricultural workers access to property to install and inspect gypsy moth monitoring traps.

General Outreach Activities and Initiatives

Listed below are some common outreach and education initiatives to support an agency's gypsy moth program:

- Refer to online Agency resources via Legislative and Public Affairs (LPA) (HungryPests.com, Facebook and Twitter) to facilitate communication and to provide access to current/breaking information regarding survey, detection, quarantine areas, etc.
- Develop and staff a toll-free gypsy moth hotline to address State-specific regulations and messages.
- Identify and distribute informational gypsy moth materials to prevent duplication of effort and ensure consistency in messaging.
- Keep the media informed regarding program activities, reference single program point-of- contact, and online resources.
- Keep local officials, local government, community leaders, tribal leaders, etc. informed about the program and solicit their participation in advancing program messages.
- Periodically meet with program staff for feedback to identify problems, concerns, etc. Engage and encourage open dialogue.

- Request/create specialized communication vehicles if needed and order (or print) available USDA-provided items.
- If needed, develop and arrange for publication of news releases for mainstream, electronic, and alternative media.

Outreach Material

Gypsy moth program materials are available free of charge to support outreach and education.

Public Meetings or Informational Open Houses

Public meetings or informational open houses take place when deemed necessary and/or appropriate. These meetings address public concerns, communicate the program strategy and actions, and help to garner community support and compliance. Program personnel work collectively to coordinate scheduling, secure suitable facilities, ensure the delivery of adequate notification, and provide collateral materials (handouts, fact sheets, informational posters, etc.) for the meeting.

- Craft plain language letters or announcements regarding time, date, location, and purpose of public meeting.
- If mailing, use tax rolls for names and addresses (**Note**: Tax rolls apply to owners, not necessarily residents).
- Use online communication.
- Allow adequate lead time between announcement and the event.
- In resort areas, allow for absentee homeowner issues.
- Adhere to schedule; start on time/end on time.
- Keep presentation short and simple; allow ample time for Q & A.

Public venues may include additional participation from:

- Political representatives and community leaders who are familiar with local concerns and recognized by the local community.
- State and Federal program representatives who can respond to questions about gypsy moth, survey, quarantine restrictions, and control measures.
- Representatives from cooperating State universities who can answer questions about the biology of gypsy moth, its host range, and potential impact in the United States.
- County, city, and local cooperators who can respond to questions about their roles.

Media Relations

The APHIS PPQ and LPA staff should be notified regarding gypsy moth program initiatives (survey, quarantine, control). National media calls (from high profile media outlets) must be coordinated with APHIS LPA. To avoid conflicting and confusing statements, all outgoing information should be processed through a single designated spokesperson. It is recommended that one primary media spokesperson be designated by the State cooperator to work with the gypsy moth LPA spokesperson. Spokespersons should thoroughly understand all aspects of the program, such as survey, regulatory, and management activities.

Regulated Industries

The gypsy moth is one of the most destructive pests of trees and shrubs in the United States impacting trade and commerce across a number of industries. Below are a few common industries affected by the pest.

- Forest products industry
- Moving industry
- Nursery and landscape industry
- Christmas tree industry

Outreach Opportunities and Suggestions

Quarantine Areas

- Increase awareness about communication tools on the HungryPests.com site - reach out to teachers, camp counselors, home-school organizations, scout leaders, after-school program leaders, etc.
- Create a gypsy moth communication kit and/or presentation for use or lending
- Leverage notable national recognitions or celebrations such as Earth Day, Arbor Day, Tree Check Month, etc. to engage target audiences
- Include one key message at the bottom of your email signature line – replace monthly

Non-quarantine Areas

- Contact local business' human resource departments to solicit their support to educate their newly hired employees relocating to the area about gypsy moth
- Solicit real estate agencies to include links to online gypsy moth resources on their websites and provide key messages to their staff.
- Partner with municipal public works departments to educate them about gypsy moth and other invasive forest pests.
- Ask recreational areas and tourist destinations to include a gypsy moth alert on their website

Gypsy Moth Program Publications

Outreach Materials:

- Your Move Gypsy Moth-Free Website
- Factsheet/Checklist: It's the Law: Before Moving, Check for the Gypsy Moth
- Gypsy Moth Partner Toolkit

Chapter

6

Eradication Treatments

Contents

Purpose

The purpose of APHIS's eradication activities is to prevent the establishment of gypsy moth in the pest-free area. Eradication of isolated, outlying populations of gypsy moth is critical in containing and mitigating human-assisted spread of and damage caused by the pest. Eradication is the complete extermination of a pest population. USDA policy is to detect and eradicate populations of gypsy moth that are found outside the generally infested area and the Slow the Spread (STS) action area.

Other types of pest population control activities do occur as part of the overall State/Federal strategy to address gypsy moth in the United States. In particular, within the generally infested area and the STS action area treatments are applied with the objective of suppressing or reducing, but not eliminating, gypsy moth population levels.

In keeping with the 1990 USDA Departmental Policy 5600-01 and the 2009 Interagency Gypsy Moth Memorandum of Understanding between APHIS and the USDA Forest Service (Forest Service Agreement No. 09-SU-11132546-079) APHIS will cooperatively fund the eradication of isolated infestations if the isolated infestations are: 1) 640 acres or smaller; 2) on non–Federal land; and 3) not adjacent to Federal lands.

Suppression efforts in the infested areas where eradication is no longer feasible are the responsibility of the USDA Forest Service (FS) and individual States. APHIS does not fund efforts to control the gypsy moth by suppression.

Evaluating the Need for an Eradication Treatment

Review Season's Trapping Data

At the end of each gypsy moth survey season, trap data should be reviewed for the purpose of identifying sites where gypsy moth was detected. Sites having multiple catches in a single trap or traps with gypsy moth catches in close proximity to one another are sites that require particular attention. Such sites may indicate reproducing populations and the site should be revisited to search for further evidence of a reproducing population. Additional evidence of a reproducing population may include the presence of non-adult life stages or the results of delimiting surveys as referenced in the survey chapter. Non-adult life stages are typically confirmed through the discovery of one or more egg masses or a pupal exuvia (aka "pupal cases"). If evidence of a reproducing population is found, the site should be proposed as an eradication site. A proposal based on repeated trap catches will usually be predicated on how many moths are caught over multiple seasons and how close together (geographically) the catches are.

When the initial internal discussions result in a decision to pursue conducting an eradication treatment national Gypsy Moth Program management **must** be informed and consulted.

Internal Staff Discussions

In addition to the review of trap data, the process of formulating an eradication proposal should encompass internal discussions by the lead agency. The lead agency is the agency responsible for carrying out the eradication treatment. Initial internal discussions should include all relevant factors including, but not limited to, the topography of the proposed treatment site, land use patterns in the area, the population density (rural, urban, etc.), and relevant social, political, and demographic factors. This initial assessment should be based on the best information available.

The initial internal discussions should also consider factors that determine whether proposed eradication treatments would be applied aerially or from the ground. Important factors to consider include but may not be limited to:

- The size of the proposed treatment block
- The type of terrain within the block
- The number and types of potential safety hazards (e.g. radio transmission towers or low hanging power lines)
- Public perceptions and acceptance of different treatment methods
- Relative costs involved
- Availability of equipment and personnel properly trained in its use (whether in-house or through use of contractors)

Outreach needs should also be discussed. During preliminary outreach discussions consideration should be given to all of the factors mentioned above and any additional concerns that would need to be addressed such as any non-English speaking demographic groups in the area.

Cooperator Involvement

Cooperators are those entities necessary for planning and execution of an eradication treatment. Cooperators are not always State, Federal, or tribal government agencies. Cooperator roles may include developing budgets and securing funding, conducting environmental reviews, assisting with outreach, ensuring compliance with regulatory requirements, and performing treatment operations. Relationships with some cooperators may already exist, however, it is likely that new cooperators will need to be identified and engaged as well. Some examples of other cooperator partnerships are tribes that may be affected by the treatment, public agencies owning land within the treatment area, and organizations positioned to conduct outreach to unique demographic groups (e.g., homeless and foreign language populations). If pesticide use is anticipated, engaging State and/or local health agencies is vital.

Mapping

Accurate maps are required to properly plan and conduct an eradication treatment. Needed maps will include:

- Locations of adult moths and other life stages detected
- Proposed and, when decided, actual treatment boundaries
- Locations of concern such as schools, health care facilities, and environmentally sensitive areas
- Locations of safety hazards for treatment applicators

Geographic information system (GIS) technologies can also be used to provide other types of information such as interactive maps that allow an individual to enter their address to determine if their property lies within a treatment area.

External Review of Plan

Once the work plan for an eradication treatment has been drafted, having that plan reviewed by an external group of people familiar with gypsy moth eradication activities may be beneficial. This external review may not be formal or a matter of record, however, this review process can provide suggestions for plan improvements, be used to bolster public support and acceptance of the plan, and assist in defending any legal challenges that may arise.

Preliminary Proposal

By mid-autumn or early winter a preliminary eradication proposal should be ready for announcement. This announcement should include a statement of findings (e.g., trapping results), the need for action, a preferred alternative under the Gypsy Moth 1996 Final Environmental Impact Statement FEIS) and 2012 Supplemental Environmental Impact Statement (SEIS), a map of the proposed eradication site(s), and likely timing. One should bear in mind that all proposals are preliminary or draft until a decision document such as a Finding of No Significant Impact (FONSI) has been signed.

Outreach and Stakeholder Interaction

Public support for any eradication project is vital. Outreach should be used as an opportunity to educate, inform, build trust, and cooperation with affected stakeholders.

A well thought out outreach and communication plan is an important component of any eradication project. An inadequate outreach and communication plan may lead to confusion and speculation among stakeholders resulting in a lack of public support and cooperation for the

project. Program partners involved in planning and implementing the eradication project should develop and adhere to a set of core messages in order to avoid cross-messaging or confusion. Outreach efforts should be an integral part of the gypsy moth eradication project and be initiated during the early stages of the planning process.

Please refer to Public Outreach on page 5-1 for more information on conducting outreach activities.

Federal Financial Assistance

Once a preliminary proposal has been developed, adequate funding for the proposed treatment must be secured. The preliminary proposal can serve as the basis for the development of a work plan and financial plan for the proposed treatment. The work plan and financial plan must detail the need for the project, including how it aligns with USDA strategic goals and priorities. The work plan should also describe the work to be done, the project partners involved, and the expected results and benefits. The financial plan must detail the expenses that will be incurred and any State cost share contributions. Once the work plan and accompanying financial plan have been drafted they should be submitted to the State Plant Health Director for the state in question or, if the treatment block is larger than 640 acres, to the appropriate U.S. Forest Service official for review and the obligation of the corresponding Federal funds. This process often takes several weeks to several months and is contingent on the availability of Federal funds.

Environmental Review

National Environmental Policy Act (NEPA)

All Federally proposed gypsy moth eradication activities or those proposed in cooperation with a Federal agency are required to comply with NEPA. NEPA, enacted in 1970, requires federal agencies to assess the environmental impacts of their proposed actions prior to making a final decision on their implementation. APHIS' Gypsy Moth Program uses Environmental Impact Statements and Environmental Assessments to meet NEPA requirements. These documents are described below.

Final and Supplemental Environmental Impact Statement (FEIS and FSEIS)

In 1995, the USDA issued the FEIS, "Gypsy Moth Management in the United States: a cooperative approach", which describes and evaluates methods of gypsy moth control available for use in USDA cooperative eradication programs. In 2012, the USDA issued a FSEIS supplement to the 1995 edition, "Gypsy moth management in the United States: a cooperative approach: final supplemental environmental impact statement". The 2012 FSEIS included the evaluation of additional gypsy moth treatments not included in the 1995 FEIS.

Environmental Assessment (EA)

The EA provides the basic background information necessary for the site-specific analysis of the potential environmental effects resulting from the proposed gypsy moth eradication project. The EA, sometimes prepared by the State cooperator and other times prepared by APHIS, should include:

- The need for the proposed eradication
- Treatment alternatives
- The environmental impacts of the proposed action
- A listing of the agencies and persons consulted

The preparation of the EA must be tiered (linked) to the FEIS and the FSEIS in accordance with the Council on Environmental Quality regulations for implementing the National Environmental Policy Act of 1969 (NEPA) (40 CFR 1502.20 and 40 CFR 1508.28). On completion of the EA copies are made available for public comment by posting notices in local news outlets, and copies at libraries and agency web sites. A 30 day comment period is typical. For more detailed guidelines on the preparation of the EA refer to Environmental Assessment (EA) on page E-1.

Finding of No Significant Impact (FONSI)

After reviewing the completed EA and the public comments, if APHIS determines that the proposed actions will not have a significant environmental impact, the agency will issue a FONSI.

Endangered Species Act (ESA) and Section 7

ESA requires all actions proposed by Federal agencies and their cooperators to protect and conserve listed endangered and threatened species. Section 7 of the ESA titled "Interagency Cooperation" directs Federal agencies to consult with the U.S. Fish & Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) for any actions that may affect listed species. The results of the consultation should be included in a section of the EA.

Informal Consultation

During early stages of the eradication treatment planning process the lead federal agency or cooperator will request an informal consultation with USFWS and NMFS to determine if any listed species may occur within the proposed treatment area and what effects the proposed actions may have on those species. The request for interagency consultation should begin sometime in November or early December of the year prior to the proposed treatments. If during the consultation the determination is made that the proposed actions are "not likely to affect" listed species then the consultation is concluded and the proposal is allowed to move forward. A letter of concurrence from USFWS and NMFS is not required. However, if the determination is that the proposed treatments "may affect" a listed species, then a written biological assessment or biological evaluation will be required to help make a final determination on the effects of the proposed actions.

Biological Assessment (BA) or Biological Evaluation (BE)

A BA or BE is a written analysis documenting the agencies conclusions on the effects of the proposed treatments. For the purposes of the discussion on gypsy moth eradication the BA and BE will be treated as one. Section 7 requires that the BA make one of three determinations; 1) no effect, 2) may affect, but not likely to adversely affect, or 3) may affect and is likely to adversely affect listed species. If the findings of the BA are that the proposed actions "may effect, but not likely to adversely affect" then a letter of concurrence from USWFS and NMFS to document compliance with Section 7 is required before moving forward with the proposed treatment.

Section 7 Formal Consultation

If the BA concludes that the proposed eradication treatment "may affect and is likely to adversely affect" listed species then the proposing agency must request a Formal Consultation with USFW and/or NMFS to determine if the proposed action will jeopardize the continued existence of a listed species. On completion of the formal consultation USFW/NMFS will issue a written opinion.

Clean Water Act (CWA)

If an eradication site includes "Waters of the United States" (refer to Definition of "Waters of the United States" Under the Clean Water Act) then programmatic coverage is needed under the National Pollutant Discharge Elimination System.

National Pollutant Discharge Elimination System (NPDES)

The NPDES states the following: The NPDES permitting program regulates discharges from pesticide applications consistent with section 402 of the CWA. Point source discharges of biological pesticides and chemical pesticides that leave a residue into waters of the U.S. are required to comply with NPDES requirements. EPA and the states issue Pesticide General Permits to offer coverage for pesticide operators. Activities not eligible for coverage under the Pesticide General Permit may be eligible for coverage under an individual permit.

State-level Equivalent Laws and Regulations

Eradication treatment project coordinators are responsible for compliance with State-level environmental laws and regulations. For a list of environmental regulatory agencies for U.S. States and territories, refer to Health and Environmental Agencies of U.S. States and Territories.

NOTICE

Failure to comply with the FEIS, FSEIS, NEPA, ESA, CWA or any other State and Federal regulations may result in an injunction or lawsuit.

Operation Implementation

Safety

The project leader must designate a safety officer or take on the role themselves at the onset of the proposed eradication project. A safety plan is necessary and can be modeled via online resources if one is already available. Fundamentals of a safety plan include:

- Location of emergency medical resources
- Accident reporting structure
- Preparedness measures linked to preventing accidents

Operational Checklists

With a safety plan as the first checklist item, divide the checklist into before treatment, during treatment, and after treatment sections. The checklist should consider all possible elements of the various resource needs, operational activities and follow-up actions for the treatment. These elements include but are not limited to:

- Funding
- Permitting
- Legal
- Regulatory requirements

- Comment periods
- Decision documents
- Outreach
- Ground/aerial logistics
- After Action Review

Legal

Every aspect of a treatment operation may be challenged in court. The project leader should involve their organization's legal representative from the beginning of the process. Bear in mind that public disclosure laws vary across States and all communications may be subject to public disclosure.

Bids for Contracted Treatments

Treatments are usually performed by a third-party contractor. The lead agency must create the contact specifications for the treatment contract and work with their contracting officer to solicit bids. Contract elements should include but are not limited to:

- Size and boundaries of the area to be treated
- Specialized navigational capabilities
- Application equipment
- Product to be applied
- Application rates

The bid solicitation and contracting process can take considerable time and much of it may be outside of the contracting agency's control so that process should be started as soon as possible.

Logistics

This involves many things, such as:

- Phenological modeling of gypsy moth to assist with treatment timing
- Weather monitoring to assist with timing of treatment application
- Use of the Incident Command System and/or processes if deemed necessary
- Location of operational headquarters
- In-field communication plan
- Real-time outreach & notification to people requesting spray-day notifications
- Identification of:

- ❖ Location(s) for product storage
- ❖ Location(s) for mixing of spray solutions and filling of application equipment
- ❖ Spill response plans and equipment
- ❖ Positioning of field observers and other staff
- ❖ Placement of spray cards

- ◆ Hotels (if needed)
- ◆ Vehicles

Security

Ensuring the safety and security of the public and program personnel is critical at every step of the process—from open house/public meeting events to staging areas (airports, helipads), to treatment areas (neighborhood streets) themselves. Private security or deputized law enforcement officers may be utilized at key areas to protect both program personnel and the public. Local law enforcement should be notified that operations are planned before every treatment whether ground or aerial. The FAA should be notified when aerial treatments are planned. Drone aircraft are a potential threat to flight operations and appropriate precautions should be taken.

Other Considerations

Every eradication treatment project is unique and there may be other project elements that also require planning and execution, such as state-level emergency declarations to conduct aerial spraying to Federal permits for flying near bald eagle nests. This may also include budgeting for legal costs in case legal challenges occur. A good way to learn about unusual needs that arise is consulting with colleagues who have experience conducting gypsy moth treatments.

Operations

Some of the planning and preparation steps described above will move into the implementation or operational phase while other steps are still in process. For example, public engagement activities often begin shortly after the need for an eradication treatment has been determined and prior to the completion of the needed environmental documentation. Ultimately, these planning and preparation steps lead to the actual application of the chosen treatment product. Timing of the treatment application(s) is dependent on several factors, the primary considerations being the phenology of the insect and the life stage a given treatment product targets.

After Action Reviews (AARs)

Operations should be reviewed following each eradication treatment and at the end of the treatment period to assess what went well and what can be improved on in any future operations. AARs typically begin with a brief description of the actions taken or response being reviewed. It should include the intent of the review and what benefits it can provide for future actions in improving the processes and outcomes. The AAR is then followed up with a few basic questions.

AARs can be conducted electronically or in the traditional paper format. An example of an AAR can be found in Appendix K on page K-1.

Post-treatment Delimiting

After treatments have been applied it is critical to monitor the success (or failure) of a eradication treatment by setting a delimiting array of traps at and around the treatment site during the year the treatment was applied and for no fewer than two additional years. Delimiting surveys should continue until three consecutive years with no trap catches or other signs of a lingering infestation remain. Detailed information on planning and conducting delimiting surveys can be found in the Survey chapter under Delimiting Survey on page 2-17.

Appendix

A

Appendix A

How to Assemble Traps

Contents

Materials for Assembling Delta Traps

Gather the following materials:

- Delta trap
- Disparlure[1] dispenser (string or strip)
- Paper clips
- Stapler
- Staples, wire, hammer, nails, or string for hanging the trap

Procedures for Assembling Delta Traps

Use the following instructions for assembling the delta trap.

Step 1: Staple the Lure to the "X" on the Nonsticky Side

Step 2: Pull the Trap Open; Pull Sticky Sides Away from Each Other

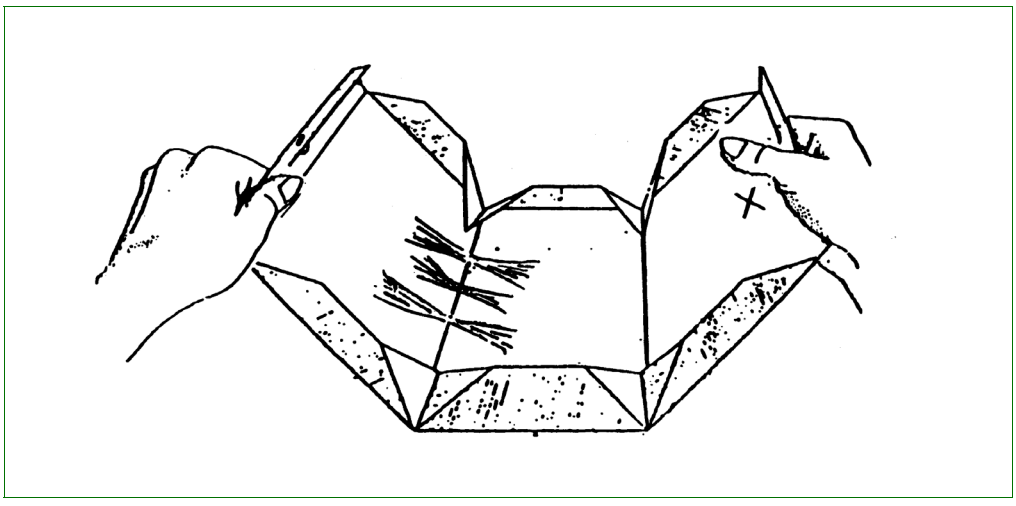


Figure A-1 Example of Step 2 for Assembling Delta Traps

1 The gypsy moth lures will remain active at most three years from the date of manufacture (typically identified on each package) and if stored in the freezer.

Step 3: Fold the Trap into a Triangle

Fold top flap over and staple or paper clip together

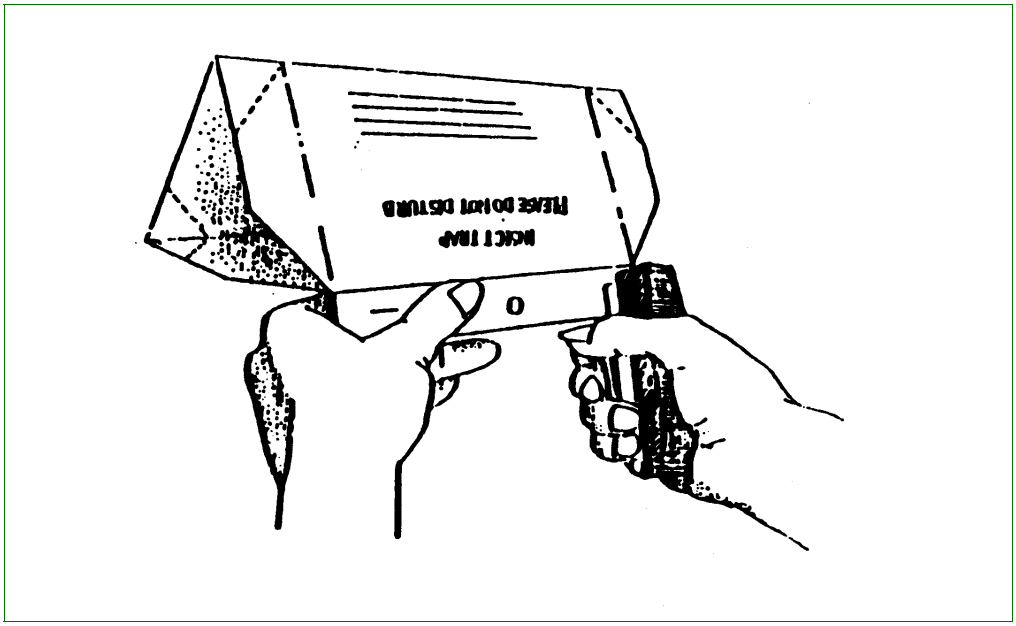


Figure A-2 Example of Step 3 for Assembling Delta Traps

Step 4: Fold In Corners at Both Ends

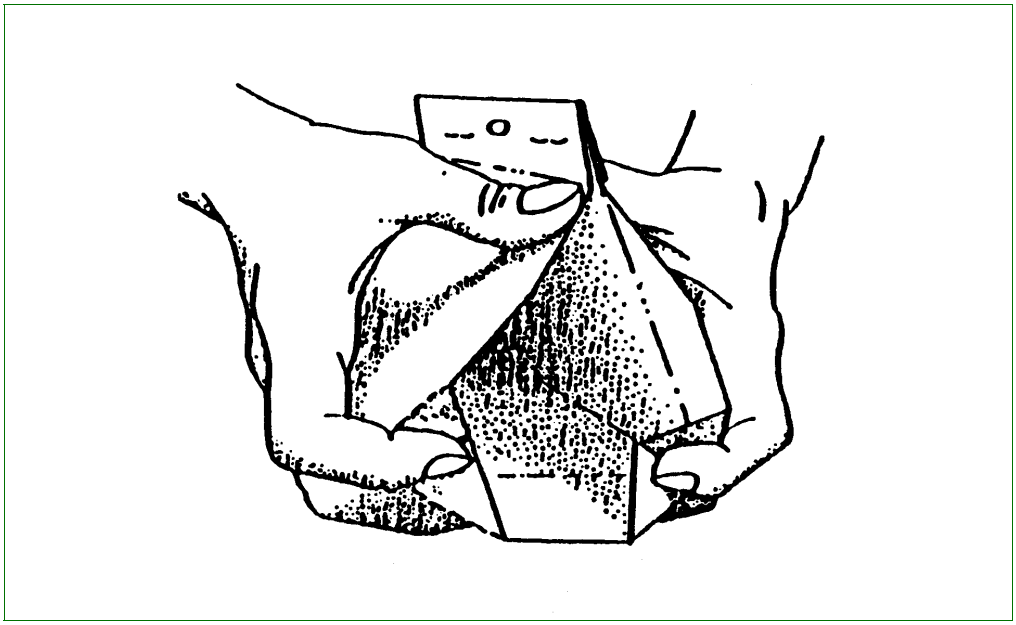


Figure A-3 Example of Step 4 for Assembling Delta Traps

Step 5: Fold In Sides at Both Ends

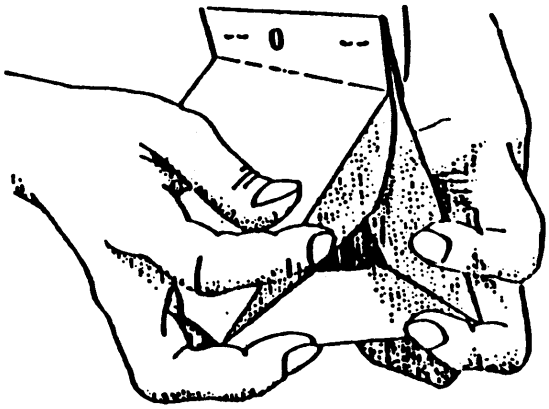


Figure A-4 Example of Step 5 for Assembling Delta Traps

Step 6: Hang or Staple Trap in Place (4 to 5 feet off the ground)

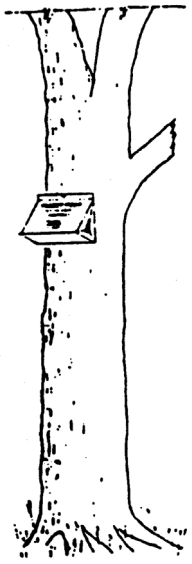


Figure A-5 Example of Step 6 for Assembling Delta Traps

Appendix

B

Appendix B

GM Data Collection

Contents

Introduction

Program data may be collected using pen and paper or in digital format. Regardless of the equipment and method used to collect data, all survey data must be entered into the Integrated Plant Health Information System (IPHIS) by December 15 of a given year. Compliance agreements should also be entered into IPHIS, as described below.

Survey Data, Essential Fields

Table B-1 lists the essential fields that **must** be collected during survey activities, and the potential domains that can populate those fields. Other data fields can be collected if useful at the State or local office level.

Table B-1 Essential Fields

Field Name	Description	Domain
Global ID	System-assigned record ID	N.A., system-assigned
Install Date	Date and time of trap installation	N.A., user-assigned
Location Name	Name of general location of one or more traps	N.A., user-assigned
Site Name	Name of specific site for one trap in a location	N.A., user-assigned
Comments	Notes about trap placement or how to access a site (optional)	N.A., user-assigned
Trap Status	Indicates whether trap site is currently in use	◆ Active ◆ Inactive
Survey Name	Survey name in IPHIS all-in-one templates	◆ Delimiting ◆ Detection (Inland) ◆ Port-Waterway Inside Quarantine ◆ Port-Waterway Outside Quarantine
Target Pest	Pest targeted at this trap site	◆ AGM ◆ EGM
Survey Category	Survey category as outlined in program guidelines, related to risk and purpose	◆ EGM Category 1 (High Risk) ◆ EGM Category 2 (Moderate Risk) ◆ EGM Category 3 (Low Risk) ◆ EGM Category S (Special Site) ◆ Risk Model Survey Design ◆ EGM Visual ◆ AGM Visual ◆ AGM Trapping
Treatment	Survey timing in relation to treatment (optional)	◆ Pre-Treatment ◆ Post-Treatment
Trap Density	Prescribed number of traps per square mile for this site (optional)	◆ 1/4 sq mi ◆ 1/sq mi ◆ 4/sq mi ◆ 9/sq mi ◆ 16/sq mi ◆ 25/sq mi ◆ 36/sq mi ◆ other
Port Name	If a port environs survey, name of port	N.A., user-assigned
State	State in which site is located	N.A., derived through post-processing
County	County in which site is located	N.A., derived through post-processing
created_user	Account name of user who created record	N.A., system-assigned
created_date	Date and time of record creation	N.A., system-assigned
last_edited_user	Account name of last user to edit record	N.A., system-assigned
last_edited_date	Date and time of last edit	N.A., system-assigned

Table B-2 Survey Activities

Field Name	Description	Domain
Global ID	System-assigned record ID	N.A., system-assigned
TrapGuid	System-assigned foreign key to Trap Sites table	N.A., system-assigned
Activity Date	Date and time of activity	N.A., user-assigned
Activity	Type of activity performed	◆ MONITOR ◆ REPLACE TRAP ◆ REPLACE TRAP (MISSING) ◆ REMOVE ◆ REMOVE (MISSING) ◆ INACCESSIBLE
Comments	Unusual or special circumstances about this activity (optional)	N.A., user-assigned
created_user	Account name of user who created record	N.A., system-assigned
created_date	Date and time of record creation	N.A., system-assigned
last_edited_user	Account name of last user to edit record	N.A., system-assigned
last_edited_date	Date and time of last edit	N.A., system-assigned

Adding Custom Fields

Because the essential fields above will not meet everyone's needs, individual offices may add custom fields. Please keep in mind the following when adding custom fields:

- Please let your SPHD/Field Operations Gypsy Moth Manager know of any added custom fields so it can be evaluated for inclusion in the national system template for future years. If it works for one office, it may be useful for another.
- Keep in mind that adding custom fields can affect reporting. Please avoid adding custom fields that are similar to existing fields to avoid issues in reviewing data. If you need changes to an existing field, please let your SPHD/Field Operations Gypsy Moth Manager know.

Gypsy Moth Regulatory Activities

Enter all gypsy moth compliance agreements into IPHIS as soon as possible. The basic agreement is customizable. In addition, record all compliance inspections in IPHIS. Instructions are available in IPHIS Message Forums>Gypsy Moth>Gypsy Moth Regulatory Data.

Quality Assurance

All offices are expected to review the data inputted into IPHIS for accuracy. This is essential to ensure the data in the system accurately portrays field activities so that reports are correct, as these will be used for future program review and planning.

Appendix

C

Appendix C

Specimen Submission Protocol

Gypsy Moth Molecular Methods

Submission of Suspected Gypsy Moth for Molecular Diagnostics

Specimens that are suspected of being gypsy moth, *Lymantria dispar*, should be submitted to the Center for Plant Health Science and Technology Otis Laboratory for molecular detection. DNA degrades quickly when exposed to ambient conditions, therefore it is critical that samples be collected regularly, stored in a freezer, and submitted for diagnostics as soon as possible. When these measures are not followed specimens arrive in poor condition, decreasing the chance of obtaining usable DNA, which leads to diagnostic assay failure and the inability to identify specimens.

All specimens collected outside of the quarantine or at a port of entry will be analyzed. A sub-sample of specimens collected within the quarantine will be analyzed. Each trap being submitted to Otis, regardless of quarantine status should be sent with PPQ Form 391 (refer to Item A, Figure C-1 on page C-8). Forms should be submitted via email. If sending a large quantity (>10) of specimens from within the quarantine an Excel file reflecting the fields listed in Item B (Figure C-2 on page C-9) is an acceptable alternative to individual form submission. Specimens should be shipped via next day delivery for arrival Tuesday through Friday to:

Otis Laboratory Gypsy Moth Diagnostics
1398 W. Truck Rd
Buzzards Bay, MA 02542

Email submission form(s) and shipment tracking information to:
PPQ.CPHST.Otis.Gypsy.Moth.Diagnostics@usda.gov

All inquiries regarding gypsy moth diagnostics can be directed to the above email.

Specimen Shipment Requirements

Egg Masses

- A permit to move live pests is required in all shipments of egg masses—permit available via Otis
- Ship individual egg masses separately—**do not** mix egg masses

- **Do not** treat egg masses with oil
- Ship egg masses dry in a sealed secondary container
- Label each egg mass with the collection number that corresponds to PPQ Form 391

Delta Traps

- **Do not** disassemble the traps or remove moths from the trap
- Package traps to avoid crushing during shipment
- Label each trap with the collection number that corresponds to PPQ Form 391

Molecular Diagnostics of Gypsy Moth

Standard Gypsy Moth Diagnostic Assay

Lymantria dispar asiatica/japonica (AGM) cannot reliably be distinguished morphologically from *Lymantria dispar dispar* (EGM). The Standard Gypsy Moth Diagnostic Assay is used to distinguish AGM from EGM on a genetic level. DNA is extracted from each specimen and amplified using PCR (polymerase chain reaction). Two genetic markers are used in the assay: the nuclear marker FS1 and a mitochondrial marker.

Processing Timelines for Standard Gypsy Moth Diagnostic Assay. Upon arrival, specimens will be processed using the priority system below:

Table C-1 Priority System for Processing Specimens for Standard Gypsy Moth Diagnostic Assay

Specimen Origin	Priority	Estimated Processing Time
Port interceptions[1]	Urgent	24 hours[2]
Specimens from outside EGM quarantine	Prompt	24–72 hours
Specimens from within EGM quarantine	Routine	Reported at the end of survey season

1 Includes specimens received from CBP or found in close proximity to ports.

2 Specimens received Friday cannot be processed until the following Monday.

FS1 Marker. The FS1 marker is present in two copies of DNA within the gypsy moth genome and can occur in two variations: North American (NA) or Asian (A). The two FS1 copies can be identical (homozygous) or different (heterozygous) in a specimen. Three genotypes are possible: a moth can be homozygous North American (possessing two North American copies), homozygous Asian, or heterozygous (containing one copy each of the North American and Asian FS1 markers). DNA may fail to amplify during PCR,

usually due to poor specimen condition. In this case, no conclusion can be made about the FS1 marker.

The North American FS1 genotype is most frequently found in gypsy moth from North America. However, the Asian genotype is also present in the U.S. population at a low percentage (approximately 3 to 6% depending upon geographic location in the continental U.S.). In Eastern Asia only the Asian FS1 genotype is present.

Table C-2 FS1 Marker Outcomes

FS1 Copy 1	FS1 Copy 2	Genotype
North American (NA)	North American (NA)	North American
North American (NA)	Asian (A)	Heterozygote
Asian (A)	Asian (A)	Asian
No DNA amplification		Unknown

Mitochondrial Marker. The mitochondrial marker is composed of a single section of DNA. The amplified DNA is exposed to two restriction enzymes (Nla III and Bam HI-HF) that have the ability to cut DNA at specific sites. DNA may fail to amplify during PCR, usually due to poor specimen condition. In this case, no conclusion can be made about the mitochondrial marker. Successful assays are characterized by four haplotypes based on identified enzyme cut patterns.

1. North American (NA): Neither enzyme can cut the DNA fragment (Nla-, Bam-)
2. A1: Nla III cuts the DNA fragment into two pieces, Bam HI-HF does not cut the DNA (Nla+, Bam)
3. A2: Both enzymes cut the DNA fragment, resulting in four pieces (Nla+, Bam+)
4. A3: Nla III cannot cut the DNA, Bam HI-HF cuts the DNA into two pieces (Nla-, Bam+)

The North American haplotype is most frequently found in gypsy moth from North America. Similar to the Asian genotype in the FS1 maker, the A1 mitochondrial haplotype is also found in the U.S. population at a low percentage.

Table C-3 Mitochondrial Marker Outcomes

Nla III	Bam HI-HF	Haplotype
Nla-	Bam-	North American
Nla+	Bam-	A1
Nla+	Bam+	A2
Nla-	Bam+	A3
No DNA amplification		Unknown

Standard Gypsy Moth Diagnostic Assay Determination. The final determination for each specimen is made by interpreting the combined outcomes of the Standard Gypsy Moth Diagnostic Assay for each marker. The table below details all possible outcomes.

Table C-4 Standard Diagnostic Assay Outcomes

FS1 Marker	Mitochondrial Marker	Final Determination
North American	North American	*Lymantria dispar dispar*
North American	A1	*Lymantria dispar dispar*
North American	A2	*Lymantria dispar dispar*
North American	A3	*Lymantria dispar dispar*
Heterozygote	North American	*Lymantria dispar dispar*
Heterozygote	A1	*Lymantria dispar dispar*
Heterozygote	A2	Unknown, pending DNA barcoding analysis
Heterozygote	A3	*Lymantria dispar dispar*
Asian	North American	*Lymantria dispar dispar*
Asian	A1	Inconclusive, pending DNA barcoding analysis
Asian	A2	*Lymantria dispar asiatica/japonica*
Asian	A3	*Lymantria dispar asiatica/japonica*
No DNA amplification	North American, A1, A2, A3	Unknown, diagnostic assay failed
North American, Heterozygote, Asian	No DNA amplification	Unknown, diagnostic assay failed
No DNA amplification	No DNA amplification	Unknown, diagnostic assay failed

Secondary Analysis of Regulatory Significant Samples

Specimens of regulatory significance that fail the Standard Gypsy Moth Diagnostic Assay can be re-analyzed using DNA barcoding. Specimens received from within the quarantine that fail the Standard Gypsy Moth Diagnostic Assay will not be DNA barcoded, except upon direct request.

Processing Timelines for DNA Barcoding. After initial diagnostic assay failure, specimens will be processed according to the priority system below:

Table C-5 Priority System for Processing Specimens for DNA Barcoding

Specimen Origin	Priority	Estimated Processing Time
Port interceptions	Urgent	3–5 days
Specimens from outside quarantine	Prompt	1–3 weeks

DNA Barcoding. DNA barcoding is a molecular tool that uses PCR and DNA sequencing to identify a specimen. The tool is based on the COI marker, a section of mitochondrial DNA that is effective in distinguishing animals of different species. The technique relies on obtaining the unknown specimen's COI DNA sequence and comparing it to sequences of known species that are available in public databases, GenBank and BOLD Systems.

For gypsy moth detection five potential outcomes have been categorized:

1. Identification as *Lymantria dispar asiatica/japonica*
2. Identification as *Lymantria dispar dispar*
3. Identification of the specimen as an organism **other than** a gypsy moth
4. Inconclusive identification resulting from the specimen failing to match any known reference DNA barcode
5. Unknown identity due to DNA sequencing failure

Specimens are categorized as sequencing failures when a readable sequence cannot be obtained; the primary cause is often attributed to poor specimen condition. A detailed explanation of the possible DNA barcoding outcomes are available in the Molecular Diagnostic Outcomes flow chart (Item C, Figure C-3 on page C-10).

Result Reporting

Results will be reported in accordance with the established timelines based on specimen origin and the guidelines detailed below.

Port Interceptions and Specimens of Regulatory Significance

Standard Gypsy Moth Diagnostic Assay results will be reported to NIS Urgents email group. According to the agreed upon communication protocol, the Otis Gypsy Moth Diagnostic Certifier will courtesy copy the results provided to NIS to the following individuals: State Plant Health Director, State Plant Regulatory Official, original submitter, Otis Laboratory Director, National Policy Manager and National Operations Manager. DNA barcoding results will be provided by forwarding the original Gypsy Moth Standard Diagnostic Assay results and listing all updated information in red.

Result Templates

Standard Diagnostic results will be reported using the template below:

Otis ID:
Interception # or Collection #:
Life Stage:
Date Collected:
Date Received:
Interception Location:
FS1 marker:
Mitochondrial markers:
Determination: Determinations will be reported in accordance with the Standard Diagnostic Assay Outcomes table on page 3.
Remarks: If specimen failed to amplify a description of the condition will be provided.
Viability: All egg masses are assumed to be likely viable unless the eggs are all empty shells or if there are no eggs present in the sample.
Attachment: A completed and signed PPQ Form 391 will be attached.

DNA Barcoding results will be reported using the template below:

Updated DNA Barcoding Result
Otis ID:
Interception # or Collection #:
Life Stage:
Date Collected:
Date Received:
Interception Location:
FS1 marker
Mitochondrial markers:
Determination: Determinations will be reported in accordance with the DNA Barcoding section of the Molecular Diagnostic Outcomes flow chart (Item B).
Remarks: If specimen failed to amplify a description of the condition will be provided.
Viability: All egg masses are assumed to be likely viable unless the eggs are all empty shells or if there are no eggs present in the sample.
Attachment: An updated and signed PPQ Form 391 will be attached.

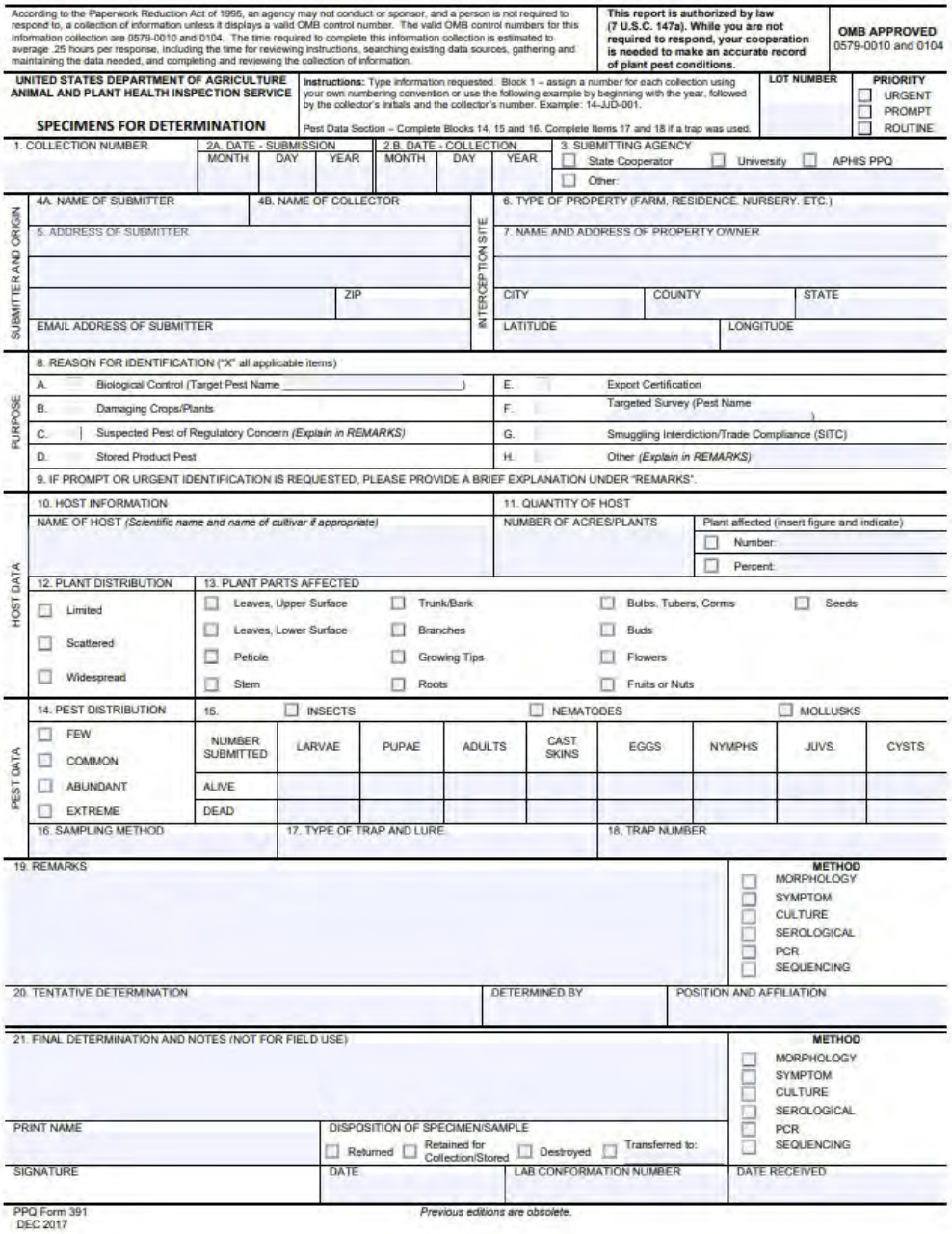
Specimens within the EGM Quarantine

Standard Gypsy Moth Diagnostic Assay results will be reported by State to the State Plant Health Director, State Plant Regulatory Official, original submitter, Otis Laboratory Director, National Policy Manager, and National Operations Manager.

Results will be returned in an Excel file and will include the following categories:

- Otis Identification Number
- Collection Number
- Date Received
- Date Collection
- State
- County
- City
- Latitude
- Longitude
- FS1 Marker
- Mitochondrial Marker
- Final Determination

This document has been reviewed and approved by: Gypsy Moth Cross Functional Working Group.



According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control numbers for this information collection are 0579-0010 and 0104. The time required to complete this information collection is estimated to average .25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

This report is authorized by law (7 U.S.C. 147a). While you are not required to respond, your cooperation is needed to make an accurate record of plant pest conditions.

OMB APPROVED 0579-0010 and 0104

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE

SPECIMENS FOR DETERMINATION

Instructions: Type information requested. Block 1 – assign a number for each collection using your own numbering convention or use the following example by beginning with the year, followed by the collector's initials and the collector's number. Example: 14-JJD-001.

Pest Data Section – Complete Blocks 14, 15 and 16. Complete items 17 and 18 if a trap was used.

LOT NUMBER

PRIORITY: ☐ URGENT ☐ PROMPT ☐ ROUTINE

1. COLLECTION NUMBER

2A. DATE - SUBMISSION: MONTH | DAY | YEAR

2.B. DATE - COLLECTION: MONTH | DAY | YEAR

3. SUBMITTING AGENCY: ☐ State Cooperator ☐ University ☐ APHIS PPQ ☐ Other:

SUBMITTER AND ORIGIN

4A. NAME OF SUBMITTER

4B. NAME OF COLLECTOR

5. ADDRESS OF SUBMITTER

ZIP

EMAIL ADDRESS OF SUBMITTER

INTERCEPTION SITE

6. TYPE OF PROPERTY (FARM, RESIDENCE, NURSERY, ETC.)

7. NAME AND ADDRESS OF PROPERTY OWNER

CITY | COUNTY | STATE

LATITUDE | LONGITUDE

PURPOSE

8. REASON FOR IDENTIFICATION ("X" all applicable items)

A. ☐ Biological Control (Target Pest Name _____)
B. ☐ Damaging Crops/Plants
C. ☐ Suspected Pest of Regulatory Concern *(Explain in REMARKS)*
D. ☐ Stored Product Pest
E. ☐ Export Certification
F. ☐ Targeted Survey (Pest Name _____)
G. ☐ Smuggling Interdiction/Trade Compliance (SITC)
H. ☐ Other *(Explain in REMARKS)*

9. IF PROMPT OR URGENT IDENTIFICATION IS REQUESTED, PLEASE PROVIDE A BRIEF EXPLANATION UNDER "REMARKS".

HOST DATA

10. HOST INFORMATION

NAME OF HOST *(Scientific name and name of cultivar if appropriate)*

11. QUANTITY OF HOST

NUMBER OF ACRES/PLANTS

Plant affected (insert figure and indicate): ☐ Number: ☐ Percent:

12. PLANT DISTRIBUTION: ☐ Limited ☐ Scattered ☐ Widespread

13. PLANT PARTS AFFECTED: ☐ Leaves, Upper Surface ☐ Leaves, Lower Surface ☐ Petiole ☐ Stem ☐ Trunk/Bark ☐ Branches ☐ Growing Tips ☐ Roots ☐ Bulbs, Tubers, Corms ☐ Buds ☐ Flowers ☐ Fruits or Nuts ☐ Seeds

PEST DATA

14. PEST DISTRIBUTION: ☐ FEW ☐ COMMON ☐ ABUNDANT ☐ EXTREME

15. ☐ INSECTS ☐ NEMATODES ☐ MOLLUSKS

NUMBER SUBMITTED	LARVAE	PUPAE	ADULTS	CAST SKINS	EGGS	NYMPHS	JUVS.	CYSTS
ALIVE								
DEAD								

16. SAMPLING METHOD

17. TYPE OF TRAP AND LURE

18. TRAP NUMBER

19. REMARKS

METHOD: ☐ MORPHOLOGY ☐ SYMPTOM ☐ CULTURE ☐ SEROLOGICAL ☐ PCR ☐ SEQUENCING

20. TENTATIVE DETERMINATION | DETERMINED BY | POSITION AND AFFILIATION

21. FINAL DETERMINATION AND NOTES (NOT FOR FIELD USE)

METHOD: ☐ MORPHOLOGY ☐ SYMPTOM ☐ CULTURE ☐ SEROLOGICAL ☐ PCR ☐ SEQUENCING

PRINT NAME

DISPOSITION OF SPECIMEN/SAMPLE: ☐ Returned ☐ Retained for Collection/Stored ☐ Destroyed ☐ Transferred to:

SIGNATURE | DATE | LAB CONFORMATION NUMBER | DATE RECEIVED

PPQ Form 391
DEC 2017

Previous editions are obsolete.

Figure C-1 PPQ Form 391 (Specimens for Determination)

Excel Template for Submission within EGM Quarantine											
Submitter Name	Submitter E-mail Address	Submitting Agency	Collection Number	Date of Collection	State	County	City	Collection Site	Latitude	Longitude	Estimated Number of Samples

Figure C-2 Excel Template for Submission

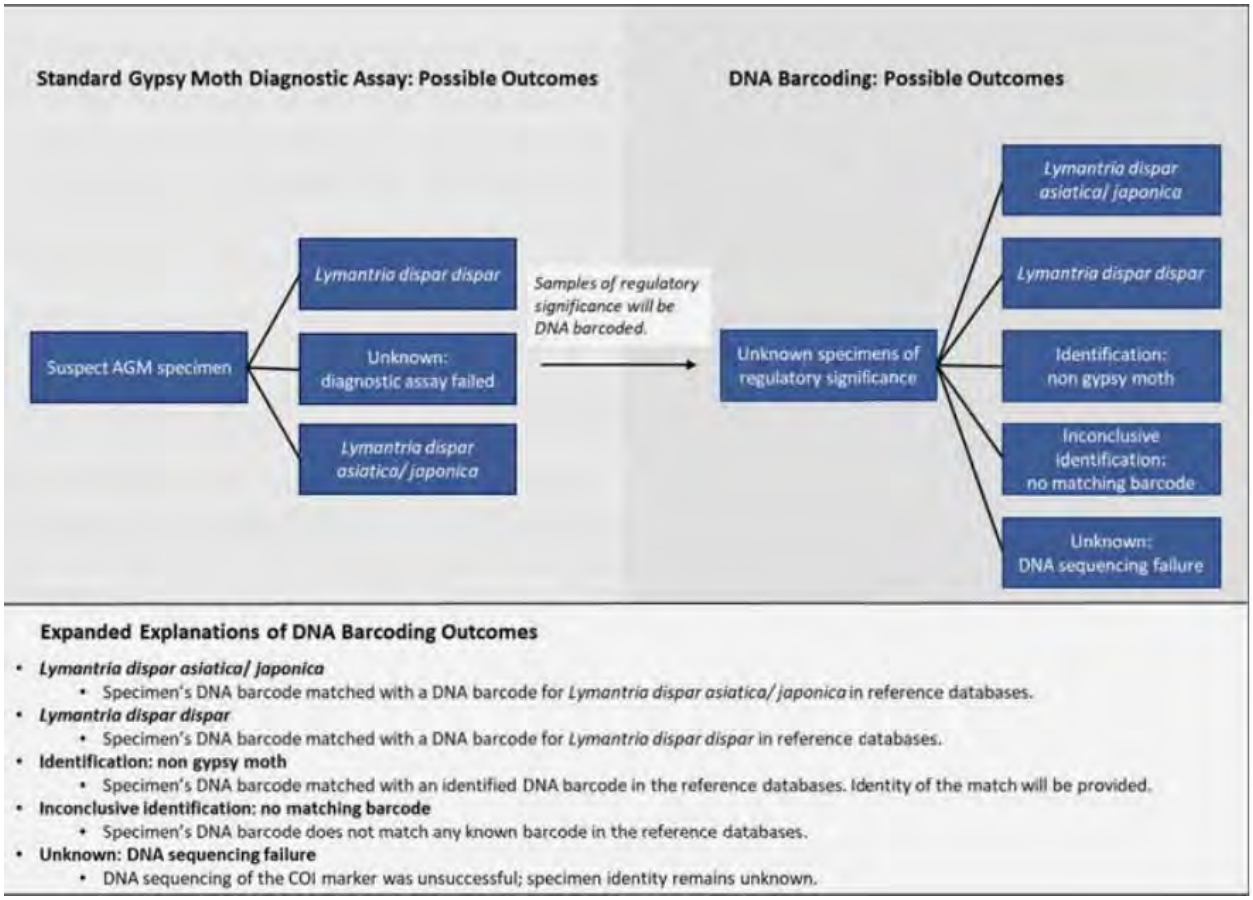


Figure C-3 Molecular Diagnostic Outcomes

Appendix

D

Appendix D

Compliance Agreements (CAs)

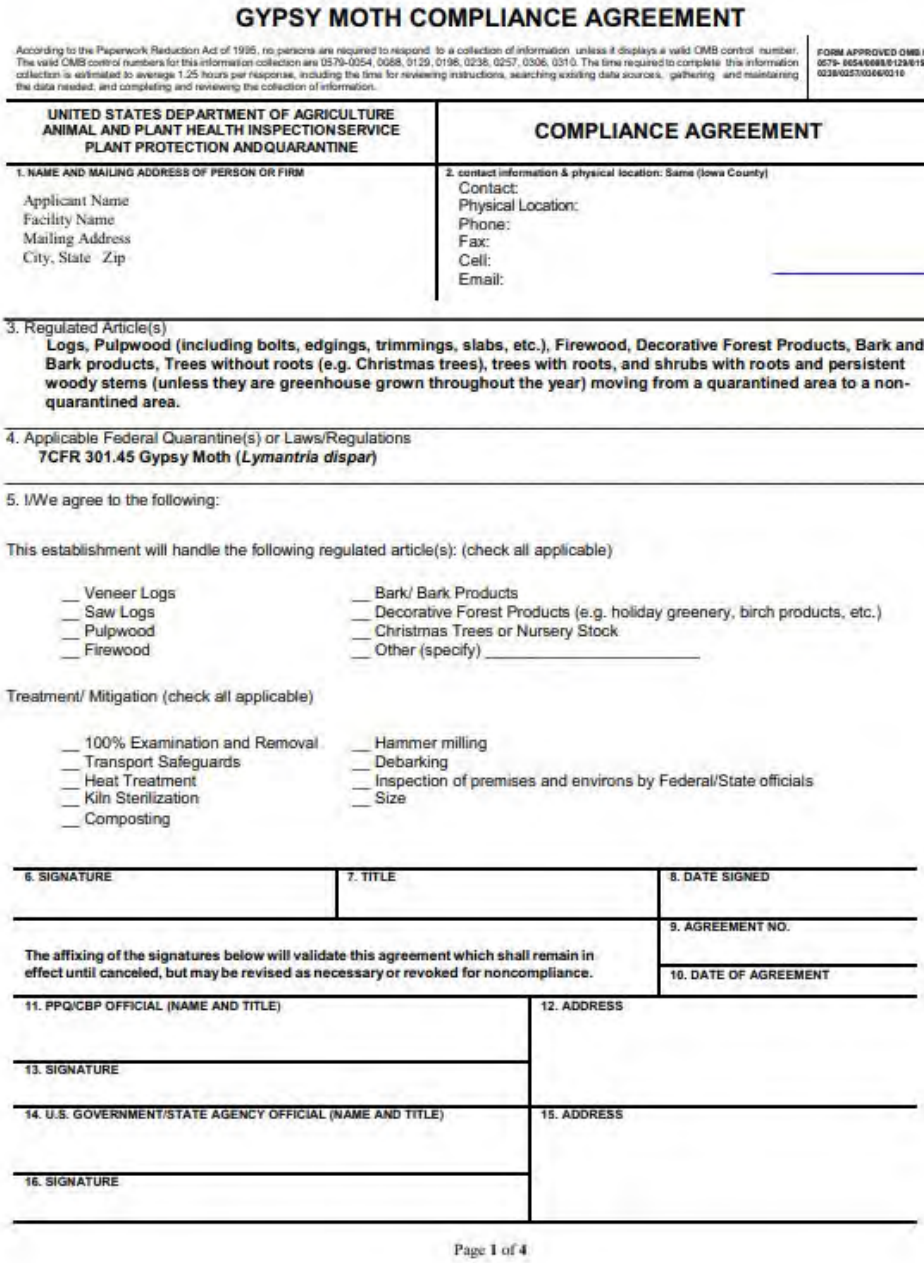
PPQ Form 519, Compliance Agreement (CA)

Each Compliance Agreement (CA) will be documented on PPQ Form 519 - Compliance Agreement. An example of PPQ Form 519 is on the following page.

The agreement section on PPQ Form 519 may reference attached information. The attached information may be adapted to meet local conditions.

The Gypsy Moth Program uses a standard compliance agreement template that covers the majority of regulated activities and articles. On those rare occasions when a unique circumstance arises that requires a custom compliance agreement, consult program management for guidance and approval.

Standard Compliance Agreement Template



GYPSY MOTH COMPLIANCE AGREEMENT

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control numbers for this information collection are 0579-0054, 0068, 0129, 0198, 0238, 0257, 0306, 0310. The time required to complete this information collection is estimated to average 1.25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

FORM APPROVED OMB NUMBER 0579- 0054/0068/0129/0198/ 0238/0257/0306/0310

UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE PLANT PROTECTION AND QUARANTINE	COMPLIANCE AGREEMENT
1. NAME AND MAILING ADDRESS OF PERSON OR FIRM Applicant Name Facility Name Mailing Address City, State Zip	2. contact information & physical location: Sams (Iowa County) Contact: Physical Location: Phone: Fax: Cell: Email:

3. Regulated Article(s)
Logs, Pulpwood (including bolts, edgings, trimmings, slabs, etc.), Firewood, Decorative Forest Products, Bark and Bark products, Trees without roots (e.g. Christmas trees), trees with roots, and shrubs with roots and persistent woody stems (unless they are greenhouse grown throughout the year) moving from a quarantined area to a non-quarantined area.

4. Applicable Federal Quarantine(s) or Laws/Regulations
7CFR 301.45 Gypsy Moth (*Lymantria dispar*)

5. I/We agree to the following:

This establishment will handle the following regulated article(s): (check all applicable)

__ Veneer Logs
__ Saw Logs
__ Pulpwood
__ Firewood
__ Bark/ Bark Products
__ Decorative Forest Products (e.g. holiday greenery, birch products, etc.)
__ Christmas Trees or Nursery Stock
__ Other (specify) _____

Treatment/ Mitigation (check all applicable)

__ 100% Examination and Removal
__ Transport Safeguards
__ Heat Treatment
__ Kiln Sterilization
__ Composting
__ Hammer milling
__ Debarking
__ Inspection of premises and environs by Federal/State officials
__ Size

6. SIGNATURE	7. TITLE	8. DATE SIGNED
		9. AGREEMENT NO.
The affixing of the signatures below will validate this agreement which shall remain in effect until canceled, but may be revised as necessary or revoked for noncompliance.		10. DATE OF AGREEMENT

11. PPQ/CBP OFFICIAL (NAME AND TITLE)	12. ADDRESS
13. SIGNATURE	
14. U.S. GOVERNMENT/STATE AGENCY OFFICIAL (NAME AND TITLE)	15. ADDRESS
16. SIGNATURE	

Page 1 of 4

Figure D-1 Gypsy Moth Compliance Agreement (page 1)

Addendum to Gypsy Moth Compliance Agreement

Compliance Agreement #

Compliance Stipulations _____ (initial/date)

1. This establishment will ship regulated material from the federal Gypsy Moth quarantine area ONLY after applicable treatment/mitigations are completed at the establishment's expense. Explanations and schedules are detailed below.
2. Regulated articles that have undergone the approved treatment/mitigation process may be shipped throughout the year (except as noted).
3. This establishment will ensure that each shipment of regulated material moved out of the quarantine area is accompanied by a completed federal Certificate (PPQ Form 540), Limited Permit (PPQ Form 530), or other authorized documentation.
4. This compliance agreement shall remain in effect for one year, but may be revoked for noncompliance.
5. The USDA and/or state Departments of Agriculture retain the right to conduct inspection of regulated articles and monitor inspection and treatment/mitigation procedures.
6. The USDA and/or state Departments of Agriculture retain the right to examine invoices, shipment, movement, treatment, and other relevant records at any time.
7. The Plant Protection Act (July 2000) provides authority to USDA to assess civil penalties for violation of Gypsy Moth quarantine regulations (7CFR 301.45). Penalties may be assessed to a maximum of $50,000 per violation for individuals, and $250,000 per violation of other entities such as organizations and businesses. When a violation is done knowingly, criminal penalties under Title 18 of the United States Code may also be assessed by the Federal District Courts. Criminal penalties may include monetary penalties, imprisonment, or both. Section b.1A of 7U.S. Code Section 7734 specifies the Public Law covering "Penalties for Violation."
8. If the establishment named in block 1 fails to comply with the provisions of this compliance agreement and/or Gypsy Moth quarantine regulation, this compliance Agreement may be canceled.
9. The USDA reserves the right to revise or cancel the compliance agreement at any time.
10. Compliance agreements are non-transferable. The establishment must notify the USDA of any change regarding ownership, location, company name, or processing of material.
11. The establishment agrees to keep its employees informed about the Gypsy Moth quarantine borders and about Gypsy Moth quarantine regulations.
12. The establishment also agrees to instruct its employees in the identification of Gypsy Moth life stages.
13. The establishment agrees to inform USDA APHIS PPQ of any suspected Gypsy Moth infestation occurring outside the established federal quarantine boundaries.
14. The USDA retains the right to conduct inspections of regulated articles, monitor inspection procedures, and examine shipment, treatment and Federal Certificate records at any time.

Use of Electronic Stamp of the Federal Certificate _____ (initial/date)

1. An electronic/imprinted Federal Certificate may be used in lieu of PPQ Form 540 or PPQ Form 527. This file or printout will be provided by USDA APHIS PPQ for use by the establishment.
2. The size of the shield may be modified for use on packaging/forms, but must remain large enough to be legible.
3. A copy or imprint utilizing the shield must be provided to PPQ for approval prior to use.

Record Keeping _____ (initial/date)

1. The establishment will ensure that each shipment of regulated material moved interstate is accompanied by the appropriate completed form (Certificate, Limited Permit, Accurate Statement, etc).
2. This establishment will insure that all federal Certificates, Limited Permits, and other approved forms are safeguarded from misuse, unauthorized use, and loss.
3. Certificates (PPQ Form 540) and Limited Permits (PPQ 530) may not be duplicated without the approval of USDA APHIS PPQ.
4. All federal Certificates (PPQ Form 540) and Limited Permits (PPQ Form 530) must be accounted for, including voids.
5. All records must be maintained for 36 months.
6. All document requests will be filled within 48 hours of the initial request.
7. Inspector copies of Federal Certificates, Limited Permits, and other forms must be forwarded to the issuing office once per month or as otherwise directed.
8. The establishment must keep records of materials shipped or received, dates of shipments, quantities shipped or received, and destination or origin.

Figure D-2 Gypsy Moth Compliance Agreement (page 2)

Addendum to Gypsy Moth Compliance Agreement

Compliance Agreement #

Treatments and Mitigations

1. 100% Examination and Removal _____ (initial/date)
   a. All surfaces and sides will be examined and all life stages of Gypsy Moth will be completely removed and destroyed.
   b. Only regulated articles that are 100% free of Gypsy Moth life stages will be moved out of the Gypsy Moth quarantine area
   c. Log Inspections:
      i. If shipped under a Federal Certificate or an equivalent State-approved form, log inspections must be conducted no more than five days prior to the date of movement during the months of April through August and no more than 14 days prior to the date of movement from September through May.
      ii. If shipped under an Accurate Statement, log inspections must be conducted not more than five days prior to shipping.
      iii. Logs will only be moved to mills authorized by a compliance agreement to receive logs from areas regulated for gypsy moth.
   d. Decorative Forest products
      i. Regulated articles less than ⅛ inch in diameter are exempt.
   e. Shipments out of the quarantine area must be accompanied by one of the following forms of documentation:
      i. Federal Certificate (PPQ Form 540 or equivalent)
      ii. Accurate Statement
      iii. Equivalent state-approved form

2. Transport Safeguards for Untreated Commodities _____ (initial/date)
   a. Shipments will only be moved to receiving facilities operating under a PPQ compliance agreement for specified handling, utilization, processing, or treatment.
   b. Only shippers operating under PPQ compliance agreement will transport commodities to receiving mills outside the Gypsy Moth quarantine area.
   c. Shipments will leave the Gypsy Moth quarantine area accompanied by the appropriate documentation.
   d. Shipments out of the quarantine area must be accompanied by one of the following forms of documentation:
      i. Limited Permit (PPQ Form 530)
      ii. Accurate Statement
      iii. Equivalent state-approved form

3. Heat Treatment _____ (initial/date)
   a. Regulated articles must be heated to an internal temperature of 132.8°F (56°C) for at least 30 minutes.
   b. Treatment facilities shall maintain records of all treatments conducted.
   c. Other regulated pests may require a more stringent heat treatment standard, in which case the more stringent standard must be applied.
   d. Approved facilities will use appropriate heat treatment protocols to mitigate risks associated with regulated articles.
   e. Shipments out of the quarantine area must be accompanied by one of the following forms of documentation:
      i. Federal Certificate (PPQ Form 540 or equivalent)
      ii. Equivalent state-approved form

4. Kiln Sterilization (T404-b-4) _____ (initial/date)
   a. Kiln Sterilization can be used for lumber up to a Maximum thickness of three inches using the following specifications:

Dry Bulb Temperature (F°)	Wet Bulb Depression (F°)	Relative Humidity (%)	Moisture Content (%)	Thickness of Lumber (inches)	Treatment time after kiln reaches conditions (hours)
140	7	82	13.8	1	3 hrs
				2	5 hrs
				3	7 hrs

Figure D-3 Gypsy Moth Compliance Agreement (page 3)

130	16	60	9.4	1	10 hrs
				2	12 hrs
				3	14 hrs
125	15	61	9.7	1	46 hrs
				2	48 hrs
				3	50 hrs

b. After kiln sterilization, the wood will be checked with a moisture meter to verify that it is at or below the appropriate moisture meter content listed above. Two readings will be taken per stack of wood:
   i. One near the top of the stack
   ii. One near the bottom of the stack.

   These readings will be recorded along with the date/time and quantity of wood treated. This information will be provided to USDA APHIS PPQ on a monthly basis
c. If the wood does not meet moisture content guidelines, it will NOT be in compliance unless it undergoes additional kiln sterilization and can then demonstrate that the moisture requirement has been met.
d. Shipments out of the quarantine area must be accompanied by one of the following forms of documentation:
   i. Federal Certificate (PPQ Form 540 or equivalent)
   ii. Equivalent state-approved form

5. Composting _____ (initial/date)
   a. Complete details of approved composting procedure can be found in the Gypsy Moth Program Manual Appendix L.
   b. General description of the composting processing is as follows:
      i. The starting compost pile must be at least 200 cubic yards.
      ii. The compost pile will remain undisturbed until the internal temperature reaches one of the following:
         1. 120°F (49.0°C) for 4 continuous days
         2. 100°F (37.8°C) for 6 continuous days
      iii. The compost pile will then be turned to create a second compost pile.
         1. The outer layer of the initial compost pile, to a depth of 3 feet, will become the core material of the second compost pile.
         2. The inner core of the initial compost pile will become the outer layer of the second pile.
      iv. The second compost pile will remain undisturbed until the internal temperatures reach those listed above.
   c. Other regulated pests may require a more stringent treatment standard, in which case the more stringent standard must be applied.
   d. Shipments out of the quarantine area must be accompanied by one of the following forms of documentation:
      i. Federal Certificate (PPQ Form 540 or equivalent)
      ii. Equivalent state-approved form

6. Hammer Milling _____ (initial/date)
   a. Bark chips, bark mulch, and other products containing bark may be produced by debarking of logs followed by chip size reduction using a hammer mill.
   b. Chips or mulch produced by this method must be of common commercial dimensions.
   c. Shipments out of the quarantine area must be accompanied by one of the following forms of documentation:
      i. Federal Certificate (PPQ Form 540 or equivalent)
      ii. Equivalent state-approved form

7. Debarking _____ (initial/date)
   a. Regulated articles will have 100% of all bark removed prior to movement out of the Gypsy Moth quarantine area.
   b. Shipments out of the quarantine area must be accompanied by one of the following forms of documentation:
      i. Federal Certificate (PPQ Form 540 or equivalent)
      ii. Equivalent state-approved form

Figure D-4 Gypsy Moth Compliance Agreement (page 4)

8. Inspection of Premises and Environs by Federal/State official _____ (initial/date)
    a. Regulated articles such as Christmas trees, evergreen boughs, branches, and woody nursery stock may be shipped out of the Gypsy Moth quarantine area only after determination by PPQ or state inspectors that the premises and environs of the growing location(s) is 100% free of all viable Gypsy Moth life stages.
    b. Determination of freedom from all viable Gypsy Moth life stages will be based on visual survey performed by PPQ and/or state inspectors and, if necessary, treatment of the premises and environs of the growing location(s).
    c. Required treatments will be applied as directed by PPQ and/or state inspectors.
    d. Records of all treatments must be retained for two years or according to state documentation retention requirements, whichever is greater, and will be made available to PPQ or state officials upon request.
    e. Only regulated material from approved growing locations are authorized to be moved out of the Gypsy Moth quarantine area.
    f. Shipments out of the quarantine area must be accompanied by one of the following forms of documentation:
        i. Federal Certificate (PPQ Form 540 or equivalent)
        ii. Equivalent state-approved form

Shipping Requirements _____ (initial/date)

1. Shipments out of the quarantine area must be accompanied by one of the following forms of documentation:
    a. Federal Certificate (PPQ 540 or equivalent)
    b. Limited Permit (PPQ Form 530)
    c. Accurate Statement (Logs and Pulpwood only)
    d. Equivalent state-approved form

2. Documentation must be attached to shipping documents such as packing slip or invoice, which accompanies the regulated articles to their destination.

3. Documentation (Certificate, Limited Permit, Accurate Statement, etc.) must be provided to the receiving facility upon delivery of each shipment of regulated material from the Gypsy Moth quarantine area.

4. Regulated articles moving out of the Gypsy Moth quarantine area to an approved facility for further treatment/mitigation:
    a. Must be shipped by a transporter operating under a PPQ compliance agreement for shipping
    b. Must be accompanied by one of the following:
        i. Accurate Statement (logs and pulpwood only)
        ii. Limited Permit (PPQ Form 530 or equivalent)
        iii. Equivalent State-approved form.

Figure D-5 Gypsy Moth Compliance Agreement (page 5)

Addendum to Gypsy Moth Compliance Agreement

Compliance Agreement #

Receiving Facilities _____ (initial/date)

1. Receiving facilities located in non-quarantined areas may receive regulated articles from areas quarantined for Gypsy Moth only if the approved receiving facility has an active compliance agreement specifying handling procedures.
2. Receiving facilities may only accept regulated articles from loggers or shippers who are under USDA compliance agreement to move regulated articles out of the Gypsy Moth quarantine area.
3. Regulated articles must arrive at the receiving facility with one of the following signed documents attached to the waybill or other shipping documents accompanying the shipment:
    a. Federal Certificate (PPQ Form 540 or equivalent)
    b. Limited Permit (PPQ Form 530)
    c. Accurate Statement (Logs and pulpwood only)
    d. Equivalent state-approved form

    If required documentation does not accompany the shipment, the receiving facility must notify PPQ or state personnel immediately.
4. Mitigation Procedures
    a. Regulated articles will be stored, handled, and processed in accordance with all state requirements.

Figure D-6 Gypsy Moth Compliance Agreement (page 6)

Appendix

E

Appendix E

Guidelines for Environmental Documents

Contents

Environmental Assessment (EA)

The EA should be tiered (that is, linked) to the detailed Final Environmental Impact Statement (FEIS) on the gypsy moth. This allows the reader to refer to the FEIS as needed, and allows USDA-APHIS-PPQ to cite the FEIS instead of repeating information and data contained within the FEIS.

The EA must describe the potential effects on human health and the environment of the eradication program on a site-specific basis. In general, the document includes a description of the need for the proposed action, the alternatives to the proposed action, and the environmental effects of the proposed action and its alternative. The site-specific EA should be as concise as possible, but still contain all the information necessary for the responsible official to make an informed decision.

For further information on environmental documents, please refer to the APHIS Environmental Compliance Manual (November 2016).

For recent EAs and FONSIs, which may be used as examples in developing these documents, refer to Gypsy Moth Programs Environmental Assessments.

For easy and quick reference, the following section provides an outline of information and analyses which may be included in an EA. This format is a suggestion based on the structure of recent EAs, and may be modified if a different structure is preferred or better suits the proposed treatment program.

This section is followed by a more detailed discussion of the important components of an EA.

Suggested Outline of a Gypsy Moth EA

Title Page

1. Introduction
2. Purpose and Need
    A. Public Outreach
    B. Authorizing Laws
    C. Decisions to be Made
    D. Responsible Officials
3. Alternatives
    A. No Action
    B. Proposed Action
4. Affected Environment
    A. Natural Resources
    B. Biological Resources
    C. Human Health and Safety
5. Environmental Impacts
    A. No Action
    B. Proposed Action
6. Other Issues
    A. Cumulative Impacts
    B. Threatened and Endangered Species
    C. Historic Preservation
    D. Environmental Justice
7. List of Preparers
8. Listing of Agencies and Persons Consulted
9. References
10. Appendices

Title Page

- The title page should state that the document is an Environmental Assessment (EA), or, in the case of a treatment proposed for a location which already has an EA on file, a Supplemental Environmental Assessment (SEA)
- Location refers to the county and State where treatment will occur
- List the agencies involved (lead agency first). “Agencies” refers to the USDA-APHIS-PPQ and the State
- Date of treatment – use the month in which treatment is expected to take place

1. Introduction

- Gypsy moth pest status (why it needs to be controlled in the treatment area)
- Overview of USDA-APHIS-PPQ gypsy moth eradication program
- Overview of gypsy moth life cycle
- History of current outbreak (when detected, where detected, number detected)

2. Purpose and Need

Explain the purpose for the action to be taken (e.g. eradication rather than slow the spread or keeping damage below an economic threshold). Explain the need for the proposed action. Reasons for action should include any relevant biological, economic, and health factors such as the following: value of the host plants, loss of recreational value of shade trees, adverse effects on other species in the treatment area, etc.

Briefly include the following:

- An overview of the proposed site-specific treatment program
- The history of gypsy moth eradication/control in that specific State, especially in that treatment block
- If other treatment blocks are located in the same geographic region, mention them with a brief description
- A reference to the 1995 Final EIS and 2012 Supplemental EIS, and that the EA is tiered to these documents
- A statement that the EA is being prepared pursuant to NEPA

A. Public Outreach

- Describe public involvement, such as notification letters, open houses, newspaper notices, etc.

- Describe precautionary measures that will be taken such as poison control hotlines, emergency facilities, and law enforcement involvement.

B. Authorizing Laws

Through several Federal laws, the USDA has broad discretionary, statutory authority to conduct gypsy moth management activities. List and briefly describe each, as concisely as possible. Refer to a recent gypsy moth EA for suggested phrasing.

Applicable laws include:

- Plant Protection Act of 2000 (7 U.S.C. section 7701)-authorizes USDA to conduct treatments for gypsy moth control.
- Cooperation with State Agencies in Administration and Enforcement of Certain Federal Laws (7 U.S.C. section 450)-works with the Plant Protection Act to allow USDA to conduct gypsy moth treatments.
- Cooperative Forestry Assistance Act of 1978 (P.L. 95-313)-authorizes Federal and State cooperation in forest pest and disease management.
- 1990 Farm Bill (P.L. 101-624)-reauthorizes the basic charter of the Cooperative Forestry Assistance Act of 1978.
- National Environmental Policy Act (NEPA) of 1969-requires detailed environmental analysis of any proposed Federal action that may affect the human environment.
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) of 1947 (as amended)-requires insecticides used in the US to be registered by the EPA.
- Endangered Species Act, Section 7-prohibits Federal actions from jeopardizing federally listed threatened, endangered, or candidate species, or adversely affecting critical habitat of these species.
- National Historical Preservation Act, Section 106 and 36 CFR part 800: Protection of Historic Properties-requires that the State Historic Preservation Officer be consulted about proposed treatment activities.
- List State statutes which authorize the treatment program.

C. Decisions to be Made

- Briefly discuss the interaction of the USDA and State, and responsibilities for each.
- Specific decisions are:
  - Should there be a cooperative treatment program, and if so, what type?
  - Is the proposed action likely to have any significant impacts requiring further analysis in an EIS if treatments occur?

D. Responsible Officials

- Name the supervisory official (and contact information) for USDA-APHIS-PPQ.
- Name the supervisory official (and contact information) for the State.

3. Alternatives

Briefly describe the proposed alternative in the introduction to this chapter.

A. No Action

- The No Action Alternative is the alternative which continues the present course of action.
- No Action means that USDA-APHIS-PPQ would not cooperate with the State in the proposed treatment program.
- Briefly discuss why this is not the preferred alternative (for example, gypsy moth populations and defoliation will increase).

B. Proposed Alternative

- The Proposed Alternative (sometimes called the Preferred Alternative) is the alternative which USDA-APHIS-PPQ considers that best meets the purpose and need; for example, best eradicates gypsy moth in the treatment area.
- Describe the proposed treatment alternative, and mention that USDA-APHIS-PPQ will cooperate with the State to accomplish it.

4. Affected Environment

Briefly describe the site-specific environment based on the terminology of the gypsy moth FEIS. This chapter typically contains sections which are described immediately below.

A. Natural Resources

Briefly describe the physical location of the proposed treatment, including the land type, soils, water, and air resources (for example, if the treatment block is near a watershed, or near agricultural land, or soils do not drain well).

B. Biological Resources

Briefly describe the biological organisms in the proposed treatment block, including any sensitive plants and animals. Include a description of any threatened or endangered plants and animals. Mention any organisms which are likely to be nontarget species of the treatment—that is, any plants or animals which might potentially be affected by the proposed treatment. For gypsy moth, that might include any lepidopteran larvae undergoing larval development at the time of the proposed treatment, particularly if they are threatened or endangered.

C. Human Health and Safety

Briefly discuss the demographics of the area in and near the treatment block:

- How many people reside there?
- Are there any schools, hospitals, parks, or other places where people might gather?
- Is the area residential, or is there some industrial development?
- At the time of treatment, is there potential for people to be physically exposed?
- Are there any Federal, State, or tribal lands located within the treatment block?

5. Environmental Consequences

- Mention that both alternatives may have potential environmental consequences (effects).
- Potential environmental consequences will determine whether or not the proposed alternative will be selected, so this section should be prepared with careful analysis.

A. No Action

Discuss the potential environmental effects (consequences) if the No Action Alternative is selected (that is, if the proposed treatment does not take place). Depending on the situation, this might include an increase in gypsy moth population in the treatment block, an increase in defoliation of trees in the treatment block, loss of recreational resources such as camping and hiking sites which are defoliated by gypsy moth.

B. Proposed Action

Discuss the potential environmental effects if the proposed treatment does take place. Depending on the situation, this might include protection of recreational wooded areas, pesticide drift, pesticide residues in bodies of water, potentially exposed immunologically sensitive individuals.

6. Other Issues

A. Cumulative Impacts

Cumulative impacts refers to an aggregate of impacts to human health and the environment over time, and include reasonably foreseeable future actions. These may include impacts from previous gypsy moth management actions, pesticide impacts from other non-Gypsy Moth programs, and impacts to the local environment from other actions that incrementally increase the impact of any gypsy moth program actions.

B. Threatened and Endangered Species

- Are there any listed threatened and endangered species or designated critical habitat within the treatment block? If so, cite them. If not, state that there are not.
- If there are threatened or endangered species within the treatment block, USDA-APHIS generally prepares a Biological Assessment (BA) analyzing the potential jeopardy to the species which might be posed by the proposed treatment. Consult ERAS at Riverdale, MD, for assistance with preparation. The BA is then submitted to the U.S. Fish & Wildlife Service for concurrence or denial.

C. Historical Preservation

Are there any historic properties in or near the treatment block? If so, state the number of properties and any potential effect of the proposed treatment on them. If there are no historic properties, state that there are none. This generally requires consultation with the State historic preservation office.

D. Executive Orders

- *12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*

  Are there any minority and/or low-income populations living within the treatment area? If so, what are the potential effects of the proposed treatment program on them? Are the potential impacts to these populations disproportionately greater than those potential impacts to the general population? Potential issues might include access of such populations to media sources announcing the proposed treatment, or ethnic populations for whom English is not their first language. Cite any standard operating procedures or mitigations of potential impacts that reduce these potential effects.

- *13045: Protection of Children from Environmental Health Risks and Safety Risks*

  Does the proposed treatment pose a potential risk to environmental health and safety of children living in the treatment area? Are the potential impacts to children living in the treatment area disproportionately higher than the impacts to other subgroups of the population living in this area? For example, consider the location of child care centers or schools in the area. Cite any standard operating procedures or mitigations of potential impacts that reduce these potential effects.

7. Preparers

List the names of those who worked on the EA, including the APHIS Plant Health Director, the representative of the State department of agriculture, and other cooperators (1 to 2 pages). For each preparer, list qualifications (professional training, years of experience, area of expertise), and responsibility for a particular part of the EA.

8. Agencies and Persons Consulted

List the names and addresses of any agencies and persons who provided input to the EA, including:

- State department of agriculture
- USDA-AHIS-PPQ offices in the region of treatment and in Riverdale, MD
- If consulted, the State historic preservation office, State department of health, and State department of natural resources

9. References

List any references (citations) used in the EA. This includes reports from other agencies such as EPA and USFWS, as well as publications from scientific journals. Refer to a recent EA for style.

10. Appendices

Include items in appendices which are specific to the treatment plan, such as:

- Map of treatment block
- Letters to and from federal and/or state agencies
- Public scoping notices—refer to the gypsy moth FEIS, Appendix C—Public Involvement and Issues, for more detailed information
- Treatment product labels and Safety Data Sheets (SDS)

These items will vary depending on the proposed treatment and the judgment of the individuals who are responsible for the treatment, allowing for flexibility in the preparation of this section.

Finding of No Significant Impact (FONSI)

The purpose of a Finding of No Significant Impact (FONSI) is to provide a concise statement that the proposed action will not have a significant effect on human health or the environment. It cites analyses in the EA and analyses incorporated from the associated programmatic EIS by reference to justify the finding. The FONSI is essentially a one-to two-page summary of the results of the EA.

Contents of a gypsy moth eradication program FONSI include the following:

- Location of treatment block
- Estimated date of treatment
- Size of treatment block
- Proposed treatment alternative
- Description of public outreach and summary of public comments
- Statement of any threatened and endangered species in treatment block
- Statement of any effect on children, low-income populations, or minorities
- Concluding statement that treatment program will not pose a significant risk to human health or the environment

To develop a FONSI for a gypsy moth eradication program, use the FONSI outline on the following page. This outline is only a suggested outline for a FONSI. As with the EA, the FONSI format may be modified.

FONSI Examples

On the following pages are examples of a generic FONSI and a completed FONSI.

FINDING OF NO SIGNIFICANT IMPACT
(for)
[EXACT LOCATION BY COUNTY, STATE, OR CITY, SPECIFIC LOCATION(S), AS APPLICABLE]

[YEAR] APHIS Cooperative Gypsy Moth Eradication Program Environmental Assessment

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) prepared an environmental assessment (EA) evaluating the impacts of a treatment for gypsy moth in (location). The EA is incorporated into this Finding of No Significant Impact (FONSI) by reference and is available at the APHIS website at https://www.aphis.usda.gov/planthealth/ea or from

USDA-APHIS-PPQ

(address of PPQ office in the affected area)

The draft EA evaluated the potential impacts to human health and the environment from the proposed treatment of a (size)-acre block in the (area) of (county, state), with (treatment alternative), for gypsy moth control. The use of (treatment alternative) was previously evaluated in an Environmental Impact Statement as one of six alternatives for treating gypsy moth and was found to be most effective at treating gypsy moth outbreaks similar to the one described in (county, state). The EA was made available to the public for a 30-day public comment period beginning on (date), on the APHIS website at https://www.aphis.usda.gov/planthealth/ea/. Notice of the availability was published in (list of newspapers). (Brief description of any comments and APHIS responses). The analysis in the EA suggests that the treatment of gypsy moth in the (size)-acre block in (county, state) with (treatment alternative) will not result in significant impacts to human health and the environment.

(If applicable, mention consultation with the U.S. Fish and Wildlife Service about any threatened and endangered species).

There are no disproportionate adverse effects to minorities, low-income populations, or children, in accordance with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," and Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks." The potential for impacts to historic properties, including sites of tribal importance were evaluated pursuant to Section 106 of the National Historic Preservation Act. (Mention any historic sites in the proposed treatment block).

_____ _____
AUTHORIZING FEDERAL OFFICIAL'S NAME DATE

_____
TITLE

_____
UNIT or DIVISION

Figure E-1 Example of a Generic FONSI

Finding of No Significant Impact Gypsy Moth Eradication Program
in Henepin County, Minnesota
Environmental Assessment
May 2017

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) prepared an environmental assessment (EA) evaluating the impacts of a treatment for gypsy moth in Henepin County, Minnesota. The EA is incorporated into this Finding of No Significant Impact (FONSI) by reference and is available at the APHIS website at https://www.aphis.usda.gov/planthealth/ea or from

USDA-APHIS-PPQ
900 American Blvd. East, Suite 204
Bloomington, MN 55420

The draft EA evaluated the potential impacts to human health and the environment from the proposed treatment of a 329-acre block in the Henepin County, Minnesota, with the microbial insecticide *Bacillus thuringiensis* kurstaki (Btk) for gypsy moth control. The use of Btk was previously evaluated in an Environmental Impact Statement as one of six alternatives for treating gypsy moth and was found to be most effective at treating gypsy moth outbreaks similar to the one described in Henepin County, Minnesota. The EA was made available to the public for a 30-day public comment period beginning on March 30, 2017, on the APHIS website at https://www.aphis.usda.gov/planthealth/ea/. Notice of the availability was published in the Star Tribune on March 30, 2017. APHIS received no comments on the EA. The analysis in the EA suggests that the treatment of gypsy moth in the 329-acre block in Henepin County, Minnesota, with Btk will not result in significant impacts to human health and the environment. Two aerial applications of Btk will be applied with an interval of approximately five to 10 days between each application. These applications are estimated to occur sometime in early to mid-May 2017. The exact date of application will be timed so that the applications occur during the early larval stages when gypsy moth caterpillars hatch from their eggs and are most susceptible to treatments.

APHIS has consulted with the U.S. Fish and Wildlife Service and has determined that the preferred treatment alternative may affect, but is unlikely to adversely affect the threatened Northern long-eared bat (*Myotis septentrionalis*). APHIS received a concurrence letter from the U.S. Fish and Wildlife Service on this determination on December 28, 2016.

There are no disproportionate adverse effects to minorities, low-income populations, or children, in accordance with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," and Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks." Available risk assessment and toxicity data that are summarized in this EA show low risk to the human population, including children, from the proposed use of Btk. The potential for impacts to historic properties, including sites of tribal importance, were evaluated pursuant to Section 106 of the National Historic Preservation Act. A letter from the State Historic Preservation Office of the Minnesota Historical Society received on March 7, 2017, confirmed that no historic properties occur within the proposed treatment block.

Figure E-2 Example of a Completed FONSI (page 1 of 2)

I have determined that there would be no significant impact on the quality of the human environment from implementation of the preferred alternative. APHIS' finding of no significant impact from the preferred alternative is based on the results of the analysis in this EA. Lastly, because I have not found evidence of significant environmental impact associated with the proposed program, I further find that no additional environmental documentation needs to be prepared and that the program may proceed.

_____ _____

Jane Doe Date

State Plant Health Director

USA

Figure E-2 Example of a Completed FONSI (page 2 of 2)

Appendix

F

Appendix F

Procedures for Composting Bark

Contents

Procedure for Composting Bark in a Trench

Step 1: Start a Compost Pile

Start a compost pile of at least 200 cubic yards in one end of a trench.

NOTICE

1. The material on the outer side of the compost pile must be free of both eggs that could hatch and larvae.
2. The compost pile must be as far away from host material as possible.

Step 2: Leave Compost Pile Undisturbed

Allow the compost pile to remain undisturbed until the temperature reaches 120 °F (49 °C) for at least 4 continuous days. In situations where 120 °F (49 °C) cannot be maintained for at least 4 continuous days, the compost pile shall remain undisturbed until the temperature reaches 100 °F (37.8 °C) for at least 6 continuous days.

Step 3: Remove Compost Pile's Outer Layer

Using a front-end loader or a bulldozer, remove the outer layer of the compost pile to a depth of 3 feet.

Step 4: Start a Second Compost Pile

Down the trench, start a second compost pile using the recently removed cover material as a core.

Step 5: Move the Core Material

Move the core material from the first compost pile and place on the second compost pile as a cover at least 3 feet deep. (Leave some composted material to serve as "inoculum" for subsequent piles.)

Step 6: Leave Second Compost Pile Undisturbed

Allow the second compost pile to remain undisturbed until the temperature reaches 120 °F (49 °C) for at least 4 continuous days. In situations where 120 °F (49 °C) cannot be maintained for at least 4 continuous days, the second compost pile shall remain undisturbed until the temperature reaches 100 °F (37.8 °C) for at least 6 continuous days.

Step 7: Remove Second Compost Pile

Remove the second compost pile and use as fully composted material.

Step 8: Repeat Procedure

This procedure will allow continuous operation. After the first compost pile is "turned" to become the second compost pile, a new "first" compost pile can be started.

Procedure for Composting Bark in a Pile

Step 1: Start a Compost Pile

Start a compost pile of at least 200 cubic yards.

NOTICE

1. The material on the outer side of the compost pile must be free of both eggs that could hatch and larvae.
2. The compost pile must be as far away from host material as possible.

Step 2: Leave Compost Pile Undisturbed

Allow the compost pile to remain undisturbed until the temperature reaches 120 °F (49 °C) for at least 4 continuous days. In situations where 120 °F (49 °C) cannot be maintained for at least 4 continuous days, the compost pile shall remain undisturbed until the temperature reaches 100 °F (37.8 °C) for at least 6 continuous days.

Step 3: Remove Compost Pile's Outer Layer

Using a front-end loader or a bulldozer, remove the outer layer of the compost pile to a depth of 3 feet.

Step 4: Start a Second Compost Pile

Start a second compost pile using the recently removed cover material as a core.

Step 5: Move the Core Material

Move the core material from the first compost pile and place on the second compost pile as a cover at least 3 feet deep. (Leave some composted material to serve as "inoculum" for subsequent piles.)

Step 6: Leave Second Compost Pile Undisturbed

Allow the second compost pile to remain undisturbed until the temperature reaches 120 °F (49 °C) for at least 4 continuous days. In situations where 120 °F (49 °C) cannot be maintained for at least 4 continuous days, the second compost pile shall remain undisturbed until the temperature reaches 100 °F (37.8 °C) for at least 6 continuous days.

Step 7: Remove the Second Compost Pile

Remove the second compost pile and use as fully composted material.

Step 8: Repeat Procedure

NOTICE

This procedure will allow continuous operation. After the first compost pile is “turned” to become the second compost pile, a new “first” compost pile can be started.

Appendix

G

Appendix G

Protocols for Regulated Logs Originating in the Gypsy Moth Quarantine Area

Contents

Executive Summary

The Gypsy Moth Program has adopted a standard-based approach to processing requirements for regulated logs moving to receiving mills or other facilities outside the quarantine area. The standard requires that the number of moths caught in traps at each receiving mill or facility be statistically similar to trap catch numbers in the surrounding area. Gypsy moth population levels at and around each regulated facility will be monitored on annual basis through a statistical analysis of each year's trapping data. Should this analysis indicate that elevated trap catch numbers have occurred at a particular mill, a series of recommended remedial actions designed to bring the facility back into conformance with the standard has been developed.

Background

APHIS's Gypsy Moth Program has adopted a standard based approach for the way logs moving interstate from quarantine areas to processing facilities outside the quarantine area are regulated. Historically, this movement of logs was subject to a series of federal requirements, including movement under an Accurate Statement or Limited Permit and certain processing conditions at the processing facility. Movement requirements are found in the Code of Federal Regulations (7 CFR 301. 45-4), while processing requirements were housed in the APHIS Gypsy Moth Program Manual. However, State to State variances in the processing conditions had arisen over time and industry practices have changed. An analysis of numbers of gypsy moths caught in traps near regulated mills outside the quarantine area indicates that movement of logs from the quarantine area to primary processing facilities does not typically result in elevated gypsy moth population levels in the vicinity of those facilities. The adoption of a this standard based approach accommodates these changes and is in keeping with Executive Orders to minimize regulatory burdens on the public while still maintaining high levels of protection to America's agricultural and natural resources.

Under this standard-based approach, gypsy moth population levels will be monitored at receiving mills and other facilities and compared to population levels in the surrounding environment. Each year, population levels in the immediate vicinity of the facilities receiving regulated logs will be compared to population levels in the surrounding environment. The standard that APHIS has adopted requires that population levels in the immediate vicinity of each mill not be statistically elevated when compared to population levels in the surrounding environment. APHIS continues to require that movement of logs occur under a properly issued Limited Permit or Accurate Statement. Receiving mills and other facilities and their suppliers must enter into Federal compliance agreements for the movement of the logs. Each state determines appropriate requirements for the processing of the regulated logs once they are at the processing facility and enters into State compliance agreements with receiving facilities detailing those requirements and any other applicable conditions deemed necessary.

Beginning in June, 2014, an interagency working group was convened to develop specific recommendations on the steps and actions necessary to implement the standard based approach to regulating logs moving from the quarantine area to mills and other receiving facilities for processing.

This document details the working group's findings. Working group members included representatives from the major stakeholder groups that would be

affected, including the National Plant Board, the U.S. Forest Service, the Gypsy Moth Slow the Spread Foundation, and APHIS.

Specific Policies and Protocols

Federal Regulatory Actions

APHIS's gypsy moth regulations serve as the foundational policy guidance for program activities. These regulations can be found in Title 7 of the Code of Federal Regulations, 301. 45. Of particular relevance to this document are the regulations governing "Conditions of Movement of Regulated Articles" (7 CFR 301.45-4). This section of the Federal gypsy moth regulations contains only one requirement for movement of logs out of the quarantine area - that they move under a properly issued certificate or Limited Permit. Alternatively, the logs can move under an Accurate Statement after being inspected by trained personnel operating under a compliance agreement and found to be free of gypsy moth life stages. This requirement is retained in the standard based approach.

Survey Protocols

The standard based approach to regulating logs is rooted in the fact that gypsy moth traps are calibrated to pest population levels in the vicinity of a trap. In order for the standard based approach to work, traps must be placed at and in the area surrounding primary processing facilities that receive regulated logs. In areas where significant levels of trapping already occur, set two traps at the facility itself – standard trapping densities are sufficient to monitor moth population levels in the surrounding area. In areas where trapping densities are low, set two traps at the regulated facility, along with a small number of additional traps in the surrounding area to serve as a basis for comparison of population levels at the mill and in the surrounding environment.

- Identification of all mills receiving regulated logs
- Placement of two (or more) traps in host material at the perimeter of each regulated mill
- Placement of 4 to 10 traps around mills in areas with no known background population of GM
  - Traps should not be placed closer than 2 kilometers of each mill
  - Trap array should extend out 10 kilometers from each mill
- For mills in areas covered by STS or State survey (areas with a background GM population) current trapping protocols and densities should be followed

Data Capture and Management

Properly capturing the outcomes from the survey effort is instrumental to being able to perform an analysis of trap catch numbers at regulated primary processing facilities.

- Appropriate existing notations within National GM survey and STS Survey data capture protocols should be used to designate traps placed at regulated mill sites
- All trap placement data will be entered into either IPHIS or the STS database
- All trap catch data will be entered into either IPHIS or the STS database

Analysis of Data

An annual, transparent, and robust analysis of trap catch numbers is the basis on which the determination that receiving primary processors are in conformance with the standard of not exhibiting elevated population levels at the mill site will be made. A Space-time Cluster Analysis developed for this purpose makes maximum use of existing trapping protocols while allowing each mill's performance to be examined individually.

- Trap catch data will be analyzed annually (each winter) by APHIS
- Each regulated mill site will be analyzed separately using the space-time cluster technique developed by CPHST
  - If two or more mills are in very close proximity to one another, they will be combined into a single "mill feature" for the analysis
- A description of the analytic technique is provided in each year's report and in Description of Space-time Cluster Analysis on page G-6

Compliance Agreements

As noted in the Background section of this document, state-to-state variation exists in processing requirements for regulated logs. This variety of requirements is reflected in the current inventory of compliance agreements held by the Gypsy Moth Program. Under the standard based approach, Federal compliance agreements contain standard language relating to the movement of logs out of the quarantine area. Individual states remain free to establish or maintain processing requirements for those logs once they arrive at the mills site. State requirements for processing are detailed in a state-issued compliance agreement or in a clearly delineated section of a joint State-Federal compliance agreement.

- Federal compliance agreements are limited to the continued need for a Limited Permit or Accurate Statement for interstate movement out of the quarantine area along with associated site and paperwork access requirements

- State compliance agreements stipulate what processing requirements are necessary at receiving mills (e.g. processing times, duration of high risk period, distance from surrounding host vegetation), along with associated site and paperwork access requirements
- Joint compliance agreements may be issued but activities governed under Federal authority (bullet one in this section) should be clearly delineated from those regulated under State authority (bullet two in this section)

Costs

Mills found to be out of conformance with the standard would bear the costs associated with any remedial actions deemed necessary

Recommended Remedial Actions

In anticipation of the occasional instance where a given primary processor is found to be out of conformance with the standard by exhibiting statistically significant higher trap catch numbers at the mill when compared to trap catch numbers from the surrounding area, a list of remedial actions that can be taken to bring the mill back into conformance with the standard is provided. There may be instances where non-conformant trap catch numbers are not the result of the mill's activities. For this reason, it is strongly recommend that any follow up actions begin with a visit to the non-conformant mill to identify any contributing factors. Additional remedial actions would be predicated on the findings from that initial mill visit. Specific remedial actions taken would be determined by the State in which that mill is located, in consultation with APHIS and mill management.

- Initial visit and inspection of non-conforming facility should be conducted
  - Review practices and protocols at facility to identify any potential contributing factors
  - Assess background GM population levels in the area
- Based on findings of initial visit, potential actions might include (but are not limited to):
  - Conducting a delimiting survey around the facility the following year
  - Shortening the processing time frame during the high risk egg hatch period
  - Modifying log storage protocols
  - Increasing the frequency of compliance monitoring visits
  - Requiring the mill to pay for eradication, treatment, or increased trapping costs (in States where authorities exist to do so)
  - Offering (or requiring) recertification or other appropriate training to mill personnel and the mill's loggers

- ❖ Installing a barrier to GM movement between the mill premises and surrounding host vegetation
- ❖ Extending the length of the high risk period

Description of Space-time Cluster Analysis

Basis for Statistical Analysis

Anselin's Local Indicator of Spatial Association (LISA), a measure of spatial autocorrelation, is used to identify "hot spot" clusters of trap counts compared to the background population, or average trap count. It also detects spatial outliers which is useful in identifying a single trap with catch surrounded by traps with zero catches (which may be indicative of a new introduction).

Procedure

Sawmills are buffered by 2km, which represents their immediate environs affected by a pathways introduction of gypsy moth via transport and processing of regulated lumber. The background population is evaluated over a 24km buffer around the mill, which also defines the extent of the LISA analysis. Trap counts that intersect treatment areas are removed from the analysis. A moving window analysis of 10 years of trap catch data within the environs area for each mill utilizes a 4-km, 2-year space-time window. Multiple testing over x trap locations inflates significance testing, therefore a false discovery rate is applied. Clusters are further analyzed to ensure that they are "spatially distinct" and separated by a sufficient distance from other clusters of matching years outside the mill's immediate environs. This ensures that the population cluster detected is not likely to be influenced by nearby dynamics outside the mill environs.

Automation

The tool is written in Python code and is built into an ArcGIS toolbox for workflow automation. The tool is easy to use, and can be applied to other programs looking for evaluation of pest population levels near potential introduction sites.

Deliverable

A formatted output table which records individual mill sites with significant cluster results. For records that return a significant result in the most recent year, the cluster results are displayed graphically within a geographic information system (GIS) environment to better visualize and interpret the results.

Appendix

H

Appendix H

Accurate Statement

Contents

Introduction

This appendix contains information on the signed Accurate Statement described in the gypsy moth regulations. There are actually two Accurate Statements, one for logs and one for pulpwood or wood chips. Refer to Figure H-1 on page H-2 for an example of an Accurate Statement for logs and poles and Figure H-2 on page H-3 for an example of an Accurate Statement for pulpwood (or wood chips). The Accurate Statement **must** be attached to the waybill or other shipping documents accompanying logs, pulpwood, and wood chips inspected under a compliance agreement.

Required Information for the Accurate Statement

The signed Accurate Statement must contain the following information:

- Applicable Federal quarantine (7 CFR 301.45)
- Certification statement (refer to below)
- Date of inspection
- Destination of Regulated Articles
- Location of inspection site
- Mailing address of inspector
- Name of inspector
- Signature of inspector
- Type and quantity of Regulated Article(s)

Accurate Statement for Logs and Poles

Name of Inspector: _____

Mailing Address of Inspector: _____
(including company name)
_____
_____

Location of Inspection Site: _____

Applicable Federal Quarantine: ____7CFR 301.45_____

Regulated Article(s): _____
_____
_____

Destination of Regulated Article(s): _____

Certification Statement:

I certify that all of the exterior surfaces (100 percent inspection) of the following logs were inspected in accordance with the gypsy moth regulations (7 CFR 301.45) and the *Gypsy Moth Program Manual*.

Number of Logs: _____ Species: _____

As a result of the inspection, I certify that:

No life stages of the gypsy moth were found

All life stages found were treated

This inspection occurred no more than five days prior to the date of movement. After the inspection, the logs were safeguarded to prevent infestation or reinfestation by gypsy moth. The above information is true to the best of my knowledge.

Signature of Inspector: _____

Date of Inspection: _____

Figure H-1 Example of Accurate Statement for Logs and Poles

Accurate Statement for Pulpwood (or Wood Chips)

Name of Inspector: _____

Mailing Address of Inspector: _____
(including company name)
_____
_____

Location of Inspection Site: _____

Applicable Federal Quarantine: 7CFR 301.45 _____

Regulated Article(s): _____
_____
_____

Destination of Regulated Article(s): _____

Certification Statement:
I certify the pulpwood (or wood chips) were handled and inspected in accordance with the gypsy moth regulations (7 CFR 301.45) and the *Gypsy Moth Program Manual*.

Quantity: _____ Regulated Article: _____

The above information is true to the best of my knowledge.

Signature of Inspector: _____

Date of Inspection: _____

Figure H-2 Example of Accurate Statement for Pulpwood (or Wood Chips)

Appendix

I

Appendix I

Qualified Certified Applicator (QCA) Document

Contents

QCA Document

Refer to Figure I-1 for an example of a QCA document.

QCA DOCUMENT

The household move below involves a mobile home and/or OHAs that could have come in contact with some life stage of the gypsy moth. The mobile home and/or OHAs were examined for all life stages; as a result, were ____ found to be free or ____ treated to be free.

1. **NAME OF PERSON MOVING:**

2. **MOVING TO (DESTINATION):**

Street address:

City: State: ZIP:

3. **MOVING FROM (PRESENT ADDRESS):**

Street address:

City: State: ZIP:

4. **DATES:**

Date of inspection:

Date of move:

5. **TELEPHONE NUMBERS:**

Old home:

Work:

New home:

Work:

6. **MOVING FIRM DATA:**

Name of firm:

Street address:

City: State: ZIP:

Telephone number (with area code):

7. **INSPECTION DATA:**

A. **Notice:**

This certificate is valid only if issued not more than five days before the move. See block 4.

B. **Mobile Home Inspection:**

Yes No See list on back.

OHAs Inspection:

Yes No See attached list.

Name of QCA (printed) **Certificate No.** **Signature of QCA**

Figure I-1 QCA Document

Mobile Home and Associated Items

- Air conditioners (remove covers)

- Awnings (open if necessary)
- Blocks on which the mobile home rests
- Chimney flashing and rain guard
- Compressors
- Drainpipes
- Expansion unit (open if necessary)
- Fuse box, circuit breaker box, and/or electrical connections
- Hitch, including undersides of the I-beams and junctions
- License plate
- Moldings (probe if necessary)
- Mud flaps
- Patio room
- Propane gas tanks (remove covers)
- Roof and eaves
- Shutters
- Skirting
- Steps
- Taillights
- Underside of the mobile home, including floor boards, frame, and tubing
- Vents
- Wheels, including the inside of the rim and brake drums (if accessible)
- Window sills (top and bottom)

Comments

(Describe any problems or difficulties encountered)

Appendix

J

Appendix J

Emergency Action Notification (EAN) PPQ Form 523

Refer to Figure J-1 for an example of an EAN.

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information is 0579-0102. The time required to complete this information collection is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

FORM APPROVED - OMB NO. 0579-0102

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

EMERGENCY ACTION NOTIFICATION

SERIAL NO.

1. PPQ LOCATION | 2. DATE ISSUED

3. NAME AND QUANTITY OF ARTICLE(S)

4. LOCATION OF ARTICLES

5. DESTINATION OF ARTICLES

6. SHIPPER

7. NAME OF CARRIER

8. SHIPMENT ID NO.(S)

9. OWNER/CONSIGNEE OF ARTICLES

Name:

Address:

PHONE NO. | FAX NO.

SS NO. | TAX ID NO.

10. PORT OF LADING | 11. DATE OF ARRIVAL

12. ID OF PEST(S), NOXIOUS WEEDS, OR ARTICLE(S)

12a. PEST ID NO. | 12b. DATE INTERCEPTED

13. COUNTRY OF ORIGIN | 14. GROWER NO.

15. FOREIGN CERTIFICATE NO.

15a. PLACE ISSUED | 15b. DATE

Under Sections 411, 412, and 414 of the Plant Protection Act (7 USC 7711, 7712, and 7714) and Sections 10404 through 10407 of the Animal Health Protection Act (7 USC 8303 through 8306), you are hereby notified, as owner or agent of the owner of said carrier, premises, and/or articles, to apply remedial measures for the pest(s), noxious weeds, and or article(s) specified in Item 12, in a manner satisfactory to and under the supervision of an Agriculture Officer. Remedial measures shall be in accordance with the action specified in Item 16 and shall be completed within the time specified in Item 17.

AFTER RECEIPT OF THIS NOTIFICATION, ARTICLES AND/OR CARRIERS HEREIN DESIGNATED MUST NOT BE MOVED EXCEPT AS DIRECTED BY AN AGRICULTURE OFFICER. THE LOCAL OFFICER MAY BE CONTACTED AT:

16. ACTION REQUIRED

☐ TREATMENT:

☐ RE-EXPORTATION:

☐ DESTRUCTION:

☐ OTHER:

Should the owner or owner's agent fail to comply with this order within the time specified below, USDA is authorized to recover from the owner or agent cost of any care, handling, application of remedial measures, disposal, or other action incurred in connection with the remedial action, destruction, or removal.

17. AFTER RECEIPT OF THIS NOTIFICATION COMPLETE SPECIFIED ACTION WITHIN (Specify No. Hours or No. Days):

18. SIGNATURE OF OFFICER:

ACKNOWLEDGMENT OF RECEIPT OF EMERGENCY ACTION NOTIFICATION

I hereby acknowledge receipt of the foregoing notification.

SIGNATURE AND TITLE: | DATE AND TIME:

19. REVOCATION OF NOTIFICATION

ACTION TAKEN:

SIGNATURE OF OFFICER: | DATE:

PPQ FORM 523 (JULY 2002) Previous editions are obsolete.

Figure J-1 Emergency Action Notification (EAN), PPQ Form 523

Appendix

K

Appendix K

After Action Review

After Action Reviews (AAR) is a process for collecting valuable information about actions APHIS has taken in addressing pest mitigation activities. AARs can be collected electronically, with APHIS approved tools (QuestionPro) or in the traditional paper format.

AAR regularly begin with a brief description of the actions taken or response being reviewed. It should include the intent of the review and what benefits it can provide for future actions in improving the processes and outcomes. The AAR is then followed up with a few basic questions.

Example;

Thank you for helping improve our response to incidents by providing feedback on our recent "Gypsy Moth Treatment – WA 2018". Your feedback is valuable and will contribute greatly to managing our future activities and operations--so thanks! Please begin completing the survey at your earliest convenience: upon your arrival, during your TDY or upon your return home, then submit after you return home. Note that you can submit more than one response to the survey if you have additional feedback.

After the introductory questions, you may answer any or none of the remaining questions, please provide as much detail as you like, and you will have the option of repeating the core questions to provide as many responses as you like. We encourage you to provide suggestions to improve anything you comment on, including those things that worked well. However, it is especially important to provide ideas and suggestions for things that need improvement or did not work well. All responses are anonymous unless you choose to provide your contact information. Just click Continue to begin this brief survey--and thanks!

How did you participate?

- ☐ State Cooperator
- ☐ VERRC Member
- ☐ Dispatch
- ☐ Off-site Support Staff
- ☐ NIMT Member
- ☐ Domestic TDY Responder
- ☐ TDY Support Staff
- ☐ Other (if selected, please specify: AEOC, FO's Support, etc.)

If you would like to be contacted by someone to discuss your responses or ideas, please provide your contact information below.

Remember, unless you provide your contact information here, your responses are anonymous and confidential.

First Name : _____

Last Name : _____

Address 1 : _____

Address 2 :

City : State : Washington Zip :

Phone :

Email Address :

Indicate the type of feedback or comment you would like to provide (core questions).

- Things that worked well
- Things that worked, but need improvement
- Things that did NOT work well
- None

Select the subject or category of your comment or feedback.

-- Select --

Please elaborate on your selection.

How can this item be improved?

Do you have additional comments or feedback?

- Yes
- No

Gypsy Moth Manual

Glossary

Use this glossary to find the meaning of specialized words, abbreviations, acronyms, and terms used by USDA–APHIS–PPQ–PHP–IRM-Information Services and Manuals Unit. To locate where in the manual a given definition, term or abbreviation is mentioned, refer to the index.

Definitions, Terms, and Abbreviations

Accurate Statement. A document, prepared by an employee of an establishment operating under a compliance agreement, which will allow the establishment to ship logs, pulpwood, and/or wood chips; along with other items, the Accurate Statement includes a certifying statement, information on the type of regulated article, the amount and/or number of regulated articles, and the signature of the inspecting employee.

active ingredient. The chemical in a product which produces the desired effect.

artificial dispersal. Dispersal by other than natural means; that is, artificial dispersal occurs through human activities such as the movement of commercial products (nursery stock), vehicles (RVs, campers, cars), and forest products (logs, pulpwood with bark, bark mulch) outdoor household articles.

associated equipment. Articles used in conjunction with mobile homes and recreational vehicles, such as, but not limited to awnings, tents, outdoor furniture, trailer blocks, and trailer skirts.

***Bacillus thuringiensis kurstaki* (Btk).** The scientific name of the bacterium that is pathogenic to the larval stage of many lepidopterous insects. Btk is the active ingredient in several biological insecticides sold under various trade names.

bark. The tough outside covering of the trunk, branches, and roots of trees and certain other plants; the bark includes all tissues outside the vascular cambium (Barnhart, *Dictionary of Science*).

bark products. Products containing pieces of bark; these products include bark chips, bark nuggets, bark mulch, and bark compost; bark that has been composted according to the procedures in Appendix F may move out of the quarantine area.

Btk. The acronym for the bacterium *Bacillus thuringiensis kurstaki* and for its biological insecticide.

CA. The abbreviation for compliance agreement.

certificate. A document, PPQ Form 540, issued by PPQ officers, State personnel, or compliance agreement holders to allow the movement of regulated articles into or through a non-infested area.

Christmas tree. In this manual Christmas trees are trees cut from their roots. If the "Christmas trees" have their roots attached (e.g., balled and burlapped plants), the trees are considered nursery stock, even if intended for display during Christmas.

compliance agreement (CA). An official document which specifies the conditions to be followed for growing, handling or moving regulated articles. An example would be a written agreement between Plant Protection and Quarantine and/or the State and a shipper (a person or company) engaged in handling, or moving regulated articles. In the CA, the shipper of the regulated articles agrees to comply with certain requirements to allow shipment of the regulated articles.

debarking. The removal of bark from round wood, wood carrying its natural rounded surface (debarking does not necessarily make the wood bark free).

defoliation. The loss or shedding of leaves; significant defoliation occurs when gypsy moths strip at least 30 percent of the leaves from the trees in a given area.

delimiting survey. A survey that establishes the boundaries of an area considered to be infested or free from a pest; the typical delimiting survey for a gypsy moth infestation uses pheromone traps, such as the delta trap.

delta trap. A triangular shaped trap made of plastic coated cardboard that uses Disparlure to attract male gypsy moths.

detection survey. A survey that determines if a pest is present; detection surveys for the gypsy moth focus on finding infestations, particularly isolated infestations; the typical detection survey uses pheromone traps (when suspected infestations or obvious infestations are detected, further surveying using a delimiting survey usually follows).

Disparlure. A commercially synthesized analogue of the sex pheromone emitted by the female gypsy moth to attract the male.

EA. The abbreviation for environmental assessment (refer to *Environmental Assessment (EA)* on page E-1).

egg mass survey. A survey to find egg masses that will establish: 1) whether reproduction of gypsy moth has occurred (if an infestation is present); and/or 2) the population density by determining the amount of reproduction.

eradication project. Action taken to eliminate an infestation (with gypsy moth, usually an isolated infestation)

established. An introduced pest, present in an area, reproducing, and expected to continue to reproduce.

FEIS. The abbreviation for Final Environmental Impact Statement.

FONSI. The abbreviation for Finding of No Significant Impact (refer to *Finding of No Significant Impact (FONSI)* on page E-8).

Forest Service. The Forest Service, a USDA agency, works in combination with PPQ to eradicate certain pests.

free from. Of a consignment, field, or place of production: without pests or a specific pest (in this case, gypsy moth).

FS. The abbreviation for the Forest Service.

geographic information system (GIS). A system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.

GIS. Acronym for geographic information system.

Global Positioning System (GPS). A U.S.-owned utility that provides users with positioning, navigation, and timing (PNT) services. This system consists of three segments: the space segment, the control segment, and the user segment. In gypsy moth survey GPS is used to feed data into GIS.

Golden Pest Spray Oil. An emulsified soybean oil used to treat gypsy moth egg masses to prevent their hatch.

gypsy moth. L*ymantria dispar,* Linnaeus, (Lepidoptera: Lymantriidae) a moth native to the Old World, having hairy caterpillars that feed on foliage and are very destructive to hardwood trees.

infestation. A reproducing population in a given area.

IPHIS. A web-based application that provides a single, standardized, and comprehensive data management system capable of supporting activities associated with APHIS PPQ's domestic or emergency pest programs.

isolated infestation. A reproducing population of gypsy moth, typically occupying no more than a few hundred acres, located outside the quarantine area; isolated infestations are determined as a result of a positive detection survey followed by a positive delimiting survey or egg mass survey.

Limited Permit. An official authorization (usually PPQ Form 530, issued by PPQ Officers, State personnel, or compliance agreement holders) for the movement of regulated articles to a specified destination for treatment or processing.

***Lymantria dispar* (L.).** The scientific name for gypsy moth.

MB. The abbreviation used for methyl bromide.

methyl bromide. A fumigation chemical used to treat gypsy moth egg-masses.

mobile home. Any vehicle other than a recreational vehicle, designed to serve, when parked, as a dwelling or place of business.

monitoring. Assessing compliance with the gypsy moth regulation by reviewing activities required by compliance agreements.

natural dispersal. Dispersal that occurs through natural means; for gypsy moth, natural dispersal involves the short-distance movement of adult moths and the longer distance spread by windblown first-instar larvae.

NEPA. The acronym used for the National Environmental Policy Act of 1976 (refer to *Guidelines for Environmental Documents* on page E-1).

non-infested area. An area where a pest (in this case, the gypsy moth) is *not* established.

NPV. The abbreviation used for nucleopolyhedrosis virus of gypsy moth.

OHA. The abbreviation used for an outdoor household article.

outdoor household article. An item associated with a household that has been kept outside the home; some examples of OHAs are outdoor furniture, barbecue grills, dog houses, boats, hauling trailers, garden tools, tents, awnings, and firewood.

QCA. The abbreviation for qualified certified applicator.

QCA document. The document used by a pest control operator who is certified by the State or the USDA for the interstate movement of outdoor household articles (OHAs).

qualified certified applicator. An individual who is: 1) a certified pesticide applicator under FIFRA (the Federal Insecticide, Fungicide, and Rodenticide Act) who can use the restricted pesticides recommended in this manual; and 2) a successful completor of a workshop approved by PPQ on the identification and treatment of gypsy moth life stages.

quarantine area. An area within which a quarantine pest is present and is being officially controlled [FAO, 1990; revised FAO, 1995].

- **quarantine area. IPPC definition:** An area into which, within which, and/or from which plants, plant products, and other regulated articles are subjected to phytosanitary measures to prevent the introduction and/or spread of quarantine pests (in this case, gypsy moth).
- **GM Program Manual Definition:** An infested area from which plants, plant products, and other regulated articles are subjected to phytosanitary measures to prevent the introduction and/or spread of the gypsy moth.
- **quarantine area.** The area where gypsy moth is established, that is, maintaining a reproducing population.

recreational vehicles. Highway vehicles, including pickup truck campers, one-piece motor homes, and travel trailers, designed to serve as a temporary place of dwelling.

regulated articles. include the following:

- Christmas trees (including holiday greenery)
- Logs (including firewood), pulpwood, bark, and bark products
- Mobile homes and associated items

- Nursery stock (trees with roots, shrubs with roots and persistent woody stems, unless they are greenhouse grown throughout the year)
- Outdoor household articles (OHAs)
- Any other products, articles, or means of conveyance that pose a high risk of artificial spread of gypsy moth as determined by an APHIS employee or a State official

RV. The abbreviation for recreational vehicle.

Slow the Spread (STS). A regional integrated pest management strategy that aims to minimize the rate of gypsy moth spread into uninfested areas through comprehensive detection/delimit survey data and a decision algorithm targeting treatment/trapping areas.

transition area. An area between the quarantine area and the uninfested area; because of natural dispersal, the area is in transition from uninfested to generally infested.

- Populations are variable and discontinuous; mostly male moths will be detected, occasionally other life stages
- Population outbreaks do not occur and defoliation is uncommon

transition area survey. A survey designed and conducted to monitor the transition area and provide data to support regulatory decisions.

trap array. The pattern of trap placement within an area.

trap density. The number of traps per unit of area.

trapping frequency. How often an area is trapped.

vapona. An insecticide impregnated strip used to kill adult gypsy moths caught in milk carton traps.

Gypsy Moth Manual

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