**What is the Gypsy Moth Treatment Monitoring Program?**

**The Gypsy Moth Treatment Monitoring Program establishes the procedures and standards necessary for evaluating all USDA Forest Service Cooperative suppression projects. The purpose of the Program is to provide the information necessary for the Forest Service to assess how well treatment objectives were met and to help the Forest Service focus technical assistance in areas that monitoring indicates need improving. The Treatment Monitoring Database provides the capability to track monitoring efforts and the platform to conduct the required post-suppression project evaluations. The Treatment Monitoring Database is the only mechanism by which the states and the Forest Service can cooperatively and constructively evaluate the success of projects in meeting treatment objectives.**

All State and Federal agencies that receive Federal funding for gypsy moth suppression programs are required to participate in the Treatment Monitoring Program. **At a minimum**, each agency is asked to include 30% of the total number of blocks treated representing at least 50% of the project area (hectares).

Treatment Monitoring procedures require four stages of data collection:

- pre-treatment
- aircraft calibration
- on-site monitoring (during treatment)
- post-treatment

Data collected during all four stages is necessary for a spray block to be entered into the Treatment Monitoring Program.

**Deadlines and Project Evaluation**

Following the collection of post-treatment data, all information must be sent to the Morgantown Office by December 15. Once all data is entered into the Treatment Monitoring Database, a printout of the data will be sent to each state cooperator for corrections by January 15.
Once the data is verified as being correct and complete, a draft report of Treatment Monitoring results will be sent to each state for review by February 1. The draft report will include the evaluation of the success or failure of treatment blocks based on each state's treatment thresholds and project objectives as documented in each states Environmental Assessment and/or Biological Evaluation. After a two week review period, a Review Team will meet with each state to discuss the project and make recommendations for program improvement. The results and recommendations will be the basis for a final report (i.e. "Evaluation of the 1996 Maryland Gypsy Moth Suppression Project") by March 1.

## GENERAL INSTRUCTIONS

### BLOCK SELECTION FOR INCLUSION INTO THE TREATMENT MONITORING PROGRAM

- Blocks should be geographically representative of the project area.

- Block size should also be representative of average block size for the project.

- If more than one insecticide formulation or application rate is used, a proportionate number of blocks and number of hectares should be included.

### DATA COLLECTION

Collection of data takes time (most of the data collection requires on site visits) and patience (retrieving data from various sources and locations).

Two sources of data are required to be collected which includes the **Treatment Block Data** and the **Aircraft Calibration Data** .

**Treatment Block Data** is information used to describe the treatment area and is divided into the following four sections.

1. Block Information (page 3) describes the treatment block itself.

2. Pre-Treatment Survey (pages 3-4) refers to information relevant to insect populations collected prior to treatment of the spray block.

3. On-Site Monitoring (pages 4-6) refers to existing conditions in the block at the time of treatment and observations of the application.

4. Post-Treatment Survey (pages 6-7) refers to information regarding defoliation and residual insect populations.

**Aircraft Calibration Data** includes all information about the aircraft (i.e. type, tail number, etc.) and its calibration (i.e. spray material, nozzle type, etc.). An **Aircraft Calibration Data Form** (Appendix A) should be completed for each aircraft and insecticide used.

**TREATMENT BLOCK DATA**

## BLOCK INFORMATION

**State/County/Municipal** - FIPS codes (standardized number codes that identify geographic locations) will be used when recording state and county for each treatment block. A list of state, county, and municipal FIPS codes can be found in Appendix B.

**Block Number** - This number should be a unique block reference number. It will be used to track the block throughout the project.

**Block Hectares** - This number refers to the total hectares to be treated in the block.

**Canopy Cover** - Choices include:
- <50%
- 51-75%
- >75%

**Tree Composition** - Choices include:
- >50% preferred species
- <50% preferred species

**Ownership** - This variable will be tracked for record keeping purposes only. If block is multiple ownership, report hectares separately. Choices include:
- Private
- State
- County
- Municipal
- National Forest
- Other Federal

## PRE-TREATMENT SURVEY

**Percent of Block Defoliated in Previous Year** - Choices include:
- none
- <30%
- >30%
- Unknown

**Population Trend** - Choices include
- Building
- Static
- Declining
- Unknown

**Treatment Threshold** - Egg mass density used to determine the required density to qualify for treatment (egg masses per hectare)

**Egg Mass Counts** - Average pre-treatment egg masses densities must be estimated using 1/40th hectare plots distributed within the treatment block. (See Gypsy Moth Egg Mass Sampling for Decision Making: A User's Guide in Appendix C)

**Egg Mass Length** - The size of egg masses is a good indicator of the overall health of the population. Record the average length in mm.

Indicate the average size of only NEW egg masses for a block. Measure at least ten egg masses and average the egg mass lengths for the entire treatment block.

**Number of Plots** - Indicate number of sample plots used for estimating egg mass densities for each treatment block. Plots should be evenly spaced across the entire treatment block. The following guidelines should be used with the fixed-radius plots method. If sequential plan is used, see "Sequential Sampling Plans for Estimating Gypsy Moth Egg Mass Density" in Appendix D.

| Block size (Hectares) | Number of Plots |
|---|---|
| .5-10 | 4 |
| 11-20 | 5 |
| 21-30 | 6 |
| 31-40 | 7 |
| Add one plot for each 10 hectare increase | |

**Potential for Blow-In (within 1 Kilometer)** - Indicate likelihood of larval blow-in from surrounding terrain or high populations. Choices include:
- High
- Low
- Unknown

## ON-SITE MONITORING

**Material Being Applied** - A choice of either
- *Btk*
- Dimilin
- Gypchek
- Mimic
- Other

If "other" is marked, please specify which insecticide was used in the comments section.

**Code** - Use the following codes to differentiate between formulations.

1 = Dimilin 4L
2 = Foray 48B
3 = Dipel 6AF
4 = Thuricide 48LV
5 = Gypchek
6 = Other

If "other" is marked, please specify which insecticide was used in the comments section.

**BIU/HA** - List the actual BIU/hectare rate applied to the block.

**AI/HA** - When using spray material other than Bt, list the amount of active ingredient in mililiters per hectare (e.g. Dimilin .5 ml/ha)

**Application Rate (ML/HA)** - List total application rate in mililiters per hectare.

**Multiple Applications** - Choices include:
- N = single application
- 1 = 1st of multiple applications
- 2 = 2nd of multiple applications
- 3 = 3rd of multiple applications

If multiple application, record treatment block data for each application.

**Application Start Date** - Month, Day, and Year

**Most of Application Occurred During** - Choices include:
- Dawn - 9:00 am
- 9:01 am - 12:00 noon

- 12:01 pm - 3:00 pm
- 3:01 pm - 6:00 pm
- 6:01 pm - Dusk
- All Day
- All am
- All pm

If treatment took place morning and evening, check all day. If treatment occurs on more than one day, record treatment block data for subsequent days' treatment.

**Aircraft Tail Number** - FAA tail number of aircraft(s) conducting the application. This tail number will be cross-referenced with the aircraft calibration form that provides the specific information about the type and configuration of the aircraft. If two aircraft are treating the same block add any other tail numbers in the comments section.

An aircraft calibration data form must be completed for each aircraft tail number for each insecticide used.

**Percent Foliage Expansion** - Timing of application is generally dictated by insect and foliage development. Since the insecticides used must be ingested to be effective, target foliage should be sprayed when the average leaf expansion is at least 45 percent. A foliage expansion guide can be found in Appendix E). Use an average that reflects the majority of the tree species being treated (If a majority of species is white oak, take an average foliage expansion from white oak). Observe foliage from the top of trees as well as the lower crown.

**Predominant Larval Instar** - The application should be timed when a majority of larvae have developed to late first and early second instar. Early first instar larvae feed very little. Visually inspect a minimum of 25 larvae. Larval development will vary if extreme differences in elevation or aspect occurs within a block,. It is important to check larvae at each extreme (higher elevations vs. lower elevation, northeast facing slopes vs. southwest facing slopes) throughout the block. It may be necessary to split blocks due to the differences in larval and leaf development. If blocks are split, assign a different block number and record separately. Two treatment blocks cannot have the same block number. Use the guide found in Appendix F for estimating predominant larval instar.

**Wind Speed** - Average wind speed can be estimated using the Beaufort wind scale. This can be found in the Appendix G. Also review the publication, "A Guide to Weather and Gypsy Moth Spray Operations in the East" located in Appendix G. Note: Wind speed should be estimated for tree tops. If wind speed is measured at 2-3 meters above ground level, multiply speed recorded by 1.5 to estimate wind speed at tree top level. Since many times the environmental conditions at the beginning of treatment is entirely different then when treatment is completed, record the wind speed that represents the average during treatment. Average wind speed should be recorded at or near the block.

**Temperature in Degrees C** - Average temperature readings should be taken at or near the block. Refer to publication "A Guide to Weather and Gypsy Moth Spray Operations in the East". found in the Appendix G. Since many times the environmental conditions at the beginning of treatment is entirely different then when treatment is completed, record the temperature that represents the average during treatment.

**Percent Relative Humidity** - Average relative humidity readings should be taken at or near the block. Refer to publication "A Guide to Weather and Gypsy Moth Spray Operations in the East". found in the Appendix G. Since many times the environmental conditions at the beginning of treatment is entirely different then when treatment is completed, record the relative humidity that represents the average during treatment.

**Spray Deposit** - Choices include: •present
•none
•unknown

The amount of spray deposit on cards can be quite variable depending on card placement (open areas such as roads vs. under canopy). If time permits, cards should be placed at least 20 feet apart and preferably dispersed across the block. If deposit is found on spray cards or other surfaces (i.e. leaves and windshields of vehicles), record "present". If no deposit was found, record "none". If personnel was not present during treatment, record "unknown".

**More Than 1.5 cm of Rain Within 24 Hours** - Choices include: •yes
•no
•unknown

**Was GPS Used in Spray Aircraft** - A choice of either •yes
•no

**Code** - If GPS was used, use the following codes to differentiate which system.
1 = SATLOC
2 = AGNAV
3 = Trimble
4 = Other
If "other" is marked, please specify which system was used in the comments section.

## POST-TREATMENT SURVEY

**Defoliation** - Choices include: •none
•light (1-30 percent of foliage missing)
•moderate (31-59 percent of foliage missing)
•heavy (>60 percent of foliage missing.

**Survey Type (optional)** - Choices include: •Aerial
•Ground
•Photo

**Block Boundaries (optional)** - Choices include: • Distinct
• Indistinct

If one or all sides of the block can be distinguished from adjacent non-treated areas, mark Distinct. If sides of the treated block cannot be distinguished from adjacent non-treated areas, mark Indistinct. Though subjective, this provides some measure of the effectiveness of the treatment in comparison to surrounding areas.

**Egg Mass Counts** - Post -treatment egg mass densities must be estimated using 1/40th hectare plots distributed within the treatment block and the same sampling methodology used for the pre-treatment survey (See Gypsy Moth Egg Mass Sampling for Decision Making: A Users' Guide in Appendix C).

**Egg Mass Length** - The size of egg masses is a good indicator of the overall health of the population. Record the average length in mm.

**Number of Plots** - Indicate number of sample plots used for estimating egg mass densities for each treatment block. Use same guidelines listed for pre-treatment surveys. The number of plots should be comparable to the number of pre-treatment plots.

**Presence of Fungus or Virus** - Choices include:
- None
- Limited
- Widespread
- Unknown

**Comments** - Explain “other” if marked in any of the previous sections.

## AIRCRAFT CALIBRATION DATA FORM

Each aircraft associated with Treatment Monitoring blocks must have a record of calibration. An example of the **Aircraft Calibration Form** can be found in Appendix A.

**Contractor**

Name of the company that has the contract

**Aircraft Type**

Use the list of aircraft types (see Appendix H) to specify aircraft

**Tail Number**

This FAA registration number allows the aircraft to be matched with a treatment block.

**Material to spray**

List the material and formulation

**Desired Application Rate**

List the application rate as specified within the contract.

**Nozzle Type**

List type of nozzle being used

**Calibrated Flow Rate**

Not a calculated flow rate but the actual flow rate measured during calibration.

**Swath Width**

As assigned during calibration