

## **Biological Evaluation of *Lymantria dispar* Outbreaks - 2024**

### **Central Area – Division of Forest Health**

#### **Introduction:**

Like the past several years, the 2023 *Lymantria dispar* (LD) population continued to be high. Populations throughout many locations in the Central Area have reached one thousand or more egg masses per acre. We went from no spray program for spring 2020 to a very large program for spring 2021, which continued in 2022 and 2023. That trend has continued into the fall of 2023. It will be interesting to see if the impact area stays in the central part of the state or continues to shift to the east for 2025.

#### **Methods:**

Bureau of Forestry, and Forest Health (FH) personnel conduct LD population surveys annually. These include ground surveys and aerial surveillance flights, all at the appropriate times. The 1/40<sup>th</sup> acre fixed radius plot survey method is used to estimate egg mass densities. Visible defoliation (>30%) is mapped using GIS technology during aerial survey operations. When appropriate, causal agents, extent and population trends are verified via ground checks afterward. FH personnel also collect samples of various LD life stages for laboratory evaluation of viability and mortality sources. This information is distributed to land managers and other cooperators who can then determine if there is a need to submit a suppression program proposal.

Treatment proposals on public lands are based on a combination of LD egg mass densities, host susceptibility and land management criteria. FH personnel perform field checks to confirm qualifying conditions. Once proposals are received, they are accepted or rejected based on a field evaluation conducted by FH staff.

#### **Results and Discussion:**

In the 2022/2023 season, hundreds of susceptible sites were examined by Central Area personnel. High populations of egg masses were found throughout many parts of the Central Area. Because of this continuation of high populations, many requests for treatment were received from public cooperators.

#### **Recommendations/Proposed Action**

##### **State Park Land**

Centre County – Poe Valley, Poe Paddy, Bald Eagle, and Penn Roosevelt State Parks -- Moderate value oak timber and recreational sites. Egg mass counts are moderate to high and

increasing. There are high numbers in the State Forest Land surrounding the parks. Protect valuable timber and recreational sites.

Huntingdon County – Whipple Dam State Park– Moderate value oak timber and recreational sites. Egg mass counts are moderate to high and increasing. There are high numbers in the State Forest Land surrounding the parks. Protect valuable timber and recreational sites.

Union County – RB Winter and Sand Bridge State Parks– Moderate value oak timber and recreational sites. Egg mass counts are moderate to high and increasing. There are high numbers in the State Forest Land surrounding the parks. Protect valuable timber and recreational sites.

Clinton County – Hyner View and Ravensburg State Parks- Moderate value oak timber and recreational site. Egg mass counts are moderate but increasing. There are high numbers in the State Forest Land surrounding the park. Protect valuable timber and recreational sites.

Perry County – Big Spring State Park– Other desired species and recreational site. Egg mass counts are low, but the surrounding state forest has moderate to high egg mass counts. Protect canopy cover over the recreational site and preserve quality of recreation.

Cumberland County – Colonel Denning State Park– Other desired species and recreational site. Egg mass counts are low, but the surrounding state forest has moderate to high egg mass counts. Protect canopy cover over the recreational site and preserve quality of recreation.

Mifflin County – Reeds Gap State Park– Other desired species and recreational site. Egg mass counts are low, but the surrounding state forest has moderate to high egg mass counts. Protect canopy cover over the recreational site and preserve quality of recreation.

## **State Forest Land**

Forest District 3 – Perry, Juniata, Huntingdon, Franklin, Cumberland, and Mifflin Counties – Moderate to high value timber stands, future timber sales and recreation areas. Egg mass counts are moderate to high and increasing. Protect moderate to high value timber stands and recreation areas.

Forest District 5 – Mifflin, Centre, and Huntingdon Counties - Moderate to high value timber stands, recent timber sales and recreation areas. Egg mass counts are moderate to high and increasing. Protect moderate to high value timber stands and recreation areas.

Forest District 7 – Centre, Mifflin, Snyder, and Union Counties - Moderate to high value timber stands, recent timber sales and recreation areas. Egg mass counts are moderate to high and increasing. Protect moderate to high value timber stands and recreation areas.

Forest District 10 – Clinton and Cameron Counties - Moderate value timber stands and recent timber sales. Egg mass counts mixed, but in many areas high and are increasing. Protect moderate value timber stands.

Table 1. A Summary of Approved Acreage

Cooperator	Type	# of Blocks	Acres
BOF	State Forest Land	85	100,828
BOSP	State Park Land	13	1,529
	<b>TOTAL CENTRAL</b>	<b>98</b>	<b>102,357</b>

It is recommended that the proposed areas in the Central Area be treated with a single application of *Bacillus thuringiensis* (Bt) at the rate of 38 BIU per acre or a single application of Mimic 2LV at 0.09 lb. ai/acre, depending on the population size, block size and location of spray block.

Gina Berger – Forest Health Program Specialist

February 7, 2024

# **Biological Evaluation of *Lymantria dispar dispar* Outbreaks in Pennsylvania - 2024**

## **Southern Area - Division of Forest Health**

### **INTRODUCTION**

The Southern Area (SA) of the PA Bureau of Forestry Division of Forest Health (BOF-DFH) is comprised of 15 counties from south-central to southwestern Pennsylvania. These 15 counties are divided into 4 Forest Districts (FD): FD1, covering York, Adams, Cumberland, and Franklin counties; FD2, covering Fulton and Bedford counties; FD4, covering Blair, Cambria, and Indiana counties; and FD6, covering Somerset, Westmoreland, Fayette, Allegheny, Washington and Greene counties.

In recent history, a Spongy moth (SM) outbreak started in the Pocono region with heavy defoliation recorded in 2004. By 2005, heavy defoliation had reached the Southern Area in Blair, Somerset, Bedford, and Fulton counties. Widespread and regional droughts in 2006 and 2007, coupled with widespread defoliation, resulted in thousands of acres of oak mortality in FD1 and FD2. Some limited spongy moth oak mortality also occurred in FD4 and FD6.

BOF- DFH began suppression on the outbreak starting in 2006 and sprayed annually through 2009. A cool wet spring in 2008 gave the bacterium, *Entomophaga maimaiga* (*Em*), a strong start as an epizootic. The spring of 2009 was also cool and wet, and *Em* became a full blown panzootic event. By the end of June of 2009 SM populations had collapsed across the entire state. In 2012, spotty populations began to appear in the northeast, building momentum through 2016 southward along the ridge and valley region. The Southern Area was on the leading edge; however, a population decline in 2017 halted spread through 2019. Egg mass surveys for 2020 indicated an area-wide gradual increase, which turned out to be a significant increase in many areas for 2021 hatch – a pattern which has continued into 2024.

### **METHODS**

Bureau of Forestry, and Forest Health (FH) personnel conduct Spongy moth population surveys annually. These include ground surveys and aerial surveillance flights, all at the appropriate times. The 1/40<sup>th</sup> acre fixed radius plot survey method is used to estimate egg mass densities. Visible defoliation (>30%) is mapped using GIS technology during aerial survey operations. When appropriate, causal agents, extent and population trends are verified via ground checks afterward. This information is distributed to land managers and other cooperators who can then determine if there is a need to submit a suppression program proposal.

Treatment proposals on state lands are based on a combination of Spongy moth egg mass densities, host susceptibility and forest management criteria. FH personnel perform field checks to confirm qualifying conditions.

## **RESULTS AND DISCUSSION**

In 2023, hundreds of susceptible sites were examined by Southern Area personnel. In most of the Southern Area, SM populations have decreased, but have shifted toward the eastern counties. Populations there have increased some and populations within Forest District 1 are over 1,000 egg masses/acre at many survey points. It will be interesting to see if this lasting trend continues into another year.

## **RECOMMENDATIONS/PROPOSED ACTION**

A 2024 suppression program of over 227,000 acres is planned for state forest lands and state park lands throughout the central third of Pennsylvania and several eastern counties in the state. For the Southern Area, this includes portions of FD1 and two State Parks (Prince Gallitzin, Cambria Co, and Kings Gap, Cumberland Co) totaling 10,071 acres (not including Game Commission lands, which are treated under their contract).

Since many portions of the Area contain high egg mass counts and are not part of the suppression program, continued and diligent monitoring of the 2024 hatch/dispersal is vital.

Scott Stitzer – in place of the  
Southern Area Forest Health Specialist  
Division of Forest Health, Southern Area  
January 30, 2024

# Biological Evaluation of *Lymantria dispar* Outbreaks in Pennsylvania

## 2024

### Western Area – Division of Forest Health

#### INTRODUCTION

Most *Lymantria dispar* populations in the Western Forest Health (FH) Area crashed during the spring/early summer of 2023. In 2024, only a few areas still have a lingering population. This conclusion is supported by data gathered by Bureau of Forestry (BOF) egg mass density surveys. These are conducted annually to determine the need for a *L. dispar* suppression program the following year. Some defoliation from *L. dispar* was recorded for the Western FH Area following the 2023 surveys.

During the summer of 2023, the adult moth flight period was closely observed as well as the size and density of new egg masses laid by the female *L. dispar* during July and August 2023. New egg mass surveys were initiated in August 2023 and survey work is ongoing as of February 2024. Analysis of the new egg mass densities will provide an accurate projection of forested areas at risk for significant defoliation in 2024. This data has been utilized in proposing that a spray program be planned in the Western FH Area for the 2024 *L. dispar* suppression program.

#### METHODS

County, Bureau of Forestry, and Forest Health (FH) personnel conduct spongy moth population surveys annually. These include ground surveys and aerial surveillance flights, all at the appropriate times. The 1/40<sup>th</sup> acre fixed radius plot survey method is used to estimate egg mass densities. Visible defoliation (>30%) is mapped using GIS technology during aerial survey operations. When appropriate, causal agents, extent and population trends are verified via ground checks afterward. Survey site data is recorded utilizing Apple iPad/iPhone devices and the ESRI Field Maps app. Data is uploaded to the Bureau of Forestry's FIMS system.

Treatment proposals on state lands are based on a combination of spongy moth egg mass densities, host susceptibility and forest management criteria. FH personnel perform field checks to confirm qualifying conditions. Once proposals are received and reviewed, they are accepted or rejected based on a field evaluation and data review by FH staff.

## RESULTS AND DISCUSSION

### 2023-2024

Some defoliation took place in the Western Area in 2023, due to moderate populations of *L. dispar*. Frost damage was a major contributor to foliage damage in 2023. Oak shothole leafminer continued to be easy to find through the Western Area but are at far lower densities than in 2021, 2020 or 2019.

New egg mass survey plot sampling began following the adult male moth flight, mating, and the laying of new egg masses by female moths in July 2023. To date, seven hundred and thirty-one (731) 1/40<sup>th</sup> acre egg mass survey plots were established from mid-July 2023 thru January 2024 in the Western FH Area.

An effort was made to conduct sampling in areas where problems had occurred in previous years, areas that had defoliation in 2023, as well as a few relatively new purchases with unknown history.

### SUMMARY

Analysis of the data from the 2023-2024 egg mass counts, to date, indicate that *Lymantria dispar* populations are above treatment threshold levels in portions of Clearfield and Centre Counties of the Western FH area.

### RECOMMENDATIONS/PROPOSED ACTION

It is recommended that FH carry out suppression treatments to protect valuable forest resources in the 2024 growing season for the following Western Area locations:

- Moshannon State Forest in Clearfield and Centre Counties

FH staff should continue to monitor *Lymantria dispar* populations to allow the prediction of future outbreaks paying particular attention to the following:

- Areas historically defoliated, including areas with increased numbers of egg masses (as described above).

- Areas with increases in egg masses relative to 2022-2023, that did not qualify for the 2024 suppression program.

Suppression activities have been proposed for 2024. The amount of qualifying acreage across state forest does not exceed what we are able to be spray during the 2024 suppression program.

<b>Cooperator</b>	<b>Type</b>	<b># of Blocks</b>	<b>Acres</b>
Bureau of Forestry	State Forest	6	13,323
<b>Total</b>		<b>6</b>	<b>13,323</b>

James Altemus

Western Area Forest Health Program Specialist

25 January 2024



**Biological Evaluation of *Lymantria dispar dispar*  
Outbreaks in Pennsylvania – 2024 PA DCNR Bureau of  
Forestry**

**Division of Forest Health, Eastern Area**

## INTRODUCTION

The Eastern Area (EA) of the PA Bureau of Forestry Division of Forest Health (BOF-DFH) is comprised of 23 counties in the eastern portion of the state. These 23 counties are divided into 4 Forest Districts (FD): FD11, covering Lackawanna, Luzerne, Susquehanna, Wayne, and Wyoming Counties; FD17, covering Berks, Bucks, Chester, Delaware, Lancaster, Lehigh, Montgomery, Northampton, and Philadelphia Counties; FD18, covering Carbon, Columbia, Dauphin, Lebanon, Northumberland, Montour, and Schuylkill Counties; and FD19, covering Monroe and Pike Counties.

The EA has been experiencing a *Lymantria dispar* (LDD) outbreak cycle over the last several years. Signs of a building infestation were observed as early as 2014, and suppression programs have been warranted every year from 2015 through 2019. In 2019, a very small LDD Suppression Program was proposed and implemented. The entire 2019 program fell within a single County (Lackawanna) and consisted of 21 treatment blocks and totaling 1,490 acres. Post treatment spray block evaluations indicated that all blocks met or exceeded success criteria.

After several years of high fungus and virus activity and LDD population decline, it was known that we would not need a suppression program for 2020 and 2021. We had a small suppression program in 2022 with 5 spray blocks, 1,247 acres. For 2023, we had a growing suppression program compared to 2022 with 48 spray blocks, 14,981 acres. In 2024, Unfortunately, as the egg mass data came in, we see that there was an increase within common “Hot Spots” in the eastern area of Pennsylvania. We do need a suppression program in 2024 within the EA of Pennsylvania.

## METHODS

County, Bureau of Forestry, and Forest Health (FH) personnel conduct spongy moth population surveys annually. These include ground surveys and aerial surveillance flights, all at the appropriate times. The 1/40<sup>th</sup> acre fixed radius plot survey method is used to estimate egg mass densities. Visible defoliation (>30%) is mapped using GIS technology during aerial survey operations. When appropriate, causal agents, extent and population trends are verified via ground checks afterward. Survey site data is recorded utilizing Apple iPad/iPhone devices and the ESRI Field Maps app. Data is uploaded to the Bureau of Forestry's FIMS system.

Treatment proposals on state lands are based on a combination of spongy moth egg mass densities, host susceptibility and forest management criteria. FH personnel perform field checks to confirm qualifying conditions. Once proposals are received and reviewed, they are accepted or rejected based on a field evaluation and data review by FH staff.

## RESULTS AND DISCUSSION

Up until now, one thousand forty-six (1,046) 1/40<sup>th</sup> acre egg mass survey plots were established from mid-September 2022 thru January 2024 in the Eastern Area. Surveys have been done in historical *LDD* areas, and the results show that, in some areas, suppression is recommended. Egg mass surveys were conducted on various types of State Lands and revealed that spots of high *LDD* populations have occurred in the most eastern part of Pennsylvania, which includes Pike, Monroe, and Dauphin Counties. Egg mass size was predominately medium (nickel-sized) at most survey locations.

Beneficially, a near total collapse of the population occurred as a wet, cool spring favored the *LDD* fungus, *Entomophaga maimaiga* in 2022 and 2023. The collapse of *LDD* populations appeared to be consistent across the eastern region, but not for parts of Pike, Monroe, and Dauphin Counties. Based on our Aerial Defoliation survey data in 2023, surveys within Pike, Monroe, and Dauphin County identified a total of 171,757 acres of Chestnut Oak, White Oak, and Northern Red Oak with 50 – 75% of leaves defoliated, which is up from last year. When comparing our last largest spray program in 2015, Pike County defoliation was 15,689 acres and Monroe County was 103,076 acres with 50 – 75% of leaves defoliated. Initially, it looks as though the Eastern Area could see an increase in defoliation for 2024.

Frequent communication occurred with the Eastern Area's County Coordinators, District Staff, and Private Citizens. Much of the communication resulted in calls or other forms of reported sightings of *LDD* activity within the EA, specifically Pike and Monroe Counties. In fact, most of the calls were from Pike County's Conservation District and Private Citizens concerned about *LDD* and looking for guidance on how to conduct a private *LDD* Suppression Program. The result of the calls was reports of *LDD* sighting of higher adult females' populations versus adult males. At the time of this report, we are told that Pike County's Commissioner's Office will not be organizing a County Level *LDD* suppression program. However, we know other larger communicates are working on a spray program for the spring 2024.

State Lands submitting treatment proposals included the Bureau of Forestry. State Game Commission has their own program with a separate contractor. Several other counties and State Forest Lands in the central parts of eastern Pennsylvania had high numbers that warranted inclusion in the state program, but they decided not to participate.

State Forest District Office 19 did submit a treatment proposal for spraying lands within Pike and Monroe County, which includes 10,336 acres within twenty (20) blocks and approved for treatment in 2024. In addition, State Forest District Office 18 did submit a treatment proposal for spraying lands within Dauphin County, which includes 5,443 acres within two (2) blocks and approved for treatment in 2024. At the time of this report, the United States Department of Agriculture Forest Service (USDA FS), did submit a proposal for spraying Grey Towers National Historic Site, which includes 79 acres within one (1) block and approval is pending. Table 1 summarizes approved acreage for the Eastern Area for 2024 suppression program.

## RECOMMENDATIONS/PROPOSED ACTION

### State Forest Lands

Pike, Monroe, and Dauphin County - High value managed timber stands and managed recreation areas. Egg mass counts are moderate to high and are increasing. Protect high value managed timber stands.

### Federal Lands

Grey Towers National Historic Site – High value historical site with managed recreation areas. Egg mass counts are high and are increasing. Protect high value historical site.

## Egg Mass Surveys

Egg mass surveys conducted by Eastern Area Forest Health, District 19, and District 18 staff through the fall and winter of 2023-2024. Hundreds of susceptible sites were examined, and new egg masses were found. Of interest is a slight increase in egg mass densities in portions of Pike, Monroe, and Dauphin Counties. Therefore, a suppression program is necessary in the Eastern Area in 2023 because *LDD* population levels are increasing within these Counties.

It is recommended that proposed areas in Pike and Monroe Counties be treated with *Bacillus thuringiensis* (Bt) and in Dauphin County be treated with *Tebufenozide* (Mimic 2LV).

Table 1 Summary of proposed treatments:

<b>Cooperator</b>	<b>Type</b>	<b>Number of Blocks</b>	<b>Acres</b>
State Forest Lands	BoF	22	15,779
United States Forest Service	Federal Land	1	79
	<b>Total</b>	<b>23</b>	<b>15,858</b>

Kendra McMillin  
Forest Health  
Program Specialist  
January 31, 2024

# **Biological Evaluation of *Lymantria dispar* Outbreaks in Pennsylvania – 2024**

## **PA DCNR Bureau of Forestry**

### **Division of Forest Health, Northern Area**

## **INTRODUCTION**

The Northern Forest Health Area encompasses 4 State Forest Districts and 6 counties. Forest Districts in the Northern Area are Tiadaghton (D12), Susquehannock (D15), Tioga (D16), and Loyalsock (D20). Counties in the Northern Area are McKean, Potter, Tioga, Bradford, Sullivan and Lycoming. Part of the Allegheny National Forest is encompassed by the Northern Area, in western McKean County. This area is dominated by northern hardwoods, with oak stands in small pockets, except for central-southern D12 which is mostly mixed oak. Historically, districts 15, 16 and 20 have not had severe LD moth impacts, although district 12 has, especially in the southern part of the district.

The most recent outbreak of significant LD moth activity in northern Pennsylvania began to build in 2020, and is ongoing although nearing complete collapse. Prior to 2020, the 2011 – 2013 outbreak was the most recent Suppression Program conducted in the Northern Area. LD moth populations had remained low throughout most of the northern part of the state until 2020 (aside from small higher-population locations in southern Lycoming and SE Bradford Counties that had both collapsed completely by the time of surveys in 2019-2020). The current outbreak was facilitated by dry conditions throughout 2020, spring of 2021, and periodically during the growing season of 2022. However as of now, egg mass surveys conducted in the 2023-2024 survey period show that populations have collapsed across most the Northern Area except for small pockets in districts 15, 16 and 20, and most of district 12.

## **METHODS**

County, Bureau of Forestry, and Forest Health (FH) personnel conduct spongy moth population surveys annually. These include ground surveys and aerial surveillance flights, all at the appropriate times. The 1/40<sup>th</sup> acre fixed radius plot survey method is used to estimate egg mass densities. Visible defoliation (>30%) is mapped using GIS technology during aerial survey operations. When appropriate, causal agents, extent and population trends are verified via ground checks afterward. Survey site data is recorded utilizing Apple iPad/iPhone devices and the ESRI Field Maps app. Data is uploaded to the Bureau of Forestry's FIMS system.

Treatment proposals on state lands are based on a combination of spongy moth egg mass densities, host susceptibility and forest management criteria. FH personnel perform field checks to confirm qualifying conditions. Once proposals are received and reviewed, they are accepted or rejected based on a field evaluation and data review by FH staff.

## RESULTS AND DISCUSSION

Population trends in some areas remain high, but in the vast majority of these areas egg masses are generally medium sized or smaller. Most of the high egg mass counts occur in the Tiadaghton, although there is a small area of the Susquehannock with populations in excess of 2,000 egg masses per acre.

In 2023, NPV virus impacts were notable to the north and west, especially in the Susquehannock and Tioga State Forests. In many areas of the Tiadaghton, virus impacts were noted, however egg mass counts remain high (although populations are stable or decreasing). *Entomophaga maimaiga* fungus impacts were generally less noticeable than in 2022, due to dry conditions in early summer. However, moisture levels increased mid to late summer and were generally normal, so there is hope that *Entomophaga maimaiga* continued to impact LD moth populations during pupation and egg laying.

Defoliation in 2023 was patchy, and mostly confined to the Tiadaghton as far as state forests impacted. Portions of northern Tioga and Bradford experienced heavy defoliation, although this was all on private lands. Based on the results of the field surveys conducted to date, the Northern Area is expected to experience light to no defoliation during the 2024 growing season.

We are still getting many calls from homeowners with inquiries about LD moth spraying for 2024. Most of these are from the Williamsport region, although a few have been received from northern Tioga County. Many landowners had concerns over frost impacts and therefore would like to ensure that no LD defoliation occurs in 2024 to further stress their trees.

## RECOMMENDATIONS/PROPOSED ACTION

In state forests in Potter and Tioga Counties (Susquehannock & Tioga, respectively) the outbreak is collapsing, but concern over stand health and lingering populations warrants treatment. Financial constraints justify the use of Mimic in both cases, although not all blocks qualify by LD population, particularly in the Tioga. In the Loyalsock State Forest, blow-in and stand health concerns warrant treatment of 2 blocks. Bt will be used due to district concerns about vernal pools on Jacoby Mountain, while financial constraints justify the use of Mimic in their Bradford County block. In the Tiadaghton, collapse is nearing, although populations

remain high enough almost district-wide (excluding northern Tiadaghton) to warrant the use of Mimic throughout the district. In a couple blocks, they do not technically qualify by egg mass counts for Mimic, but in those location stand health is very poor and mortality is already occurring.

Several state parks desire treatment with Bt in 2024, although all of them have been treated at least 1 year previously, and most for the previous 2 years, and populations within the parks are low.

LD egg mass surveys show overall small egg mass average sizes, which indicates that full collapse across the Northern Area is nearing and may occur in 2024.

Summary of proposed treatments:

<b>Cooperator</b>	<b>Type</b>	<b># Blocks</b>	<b>Acres</b>
State Parks	Rotary Bt	6	1,060
District 12	FW Mimic	22	60,626
District 15	FW Mimic	3	5,192
District 16	FW Mimic	2	9,170
District 20	FW Mimic, Rotary Bt	2	4,966
	<b>Total</b>	<b>35</b>	<b>81,014</b>

Sarah Johnson

Forest Health Program Specialist

1-3-2024