



Federation of Ontario Cottagers' Associations

# Members' Webinar

Thursday, July 30, 2020

## Understanding the Gypsy Moth

**Welcome** ~ The webinar will start @ 2:00pm

### NOTES:

- Turn on your computer audio
- All attendees are muted
- Find "CHAT" to send notes about technical problems or questions for the presenters



# About FOCA



**Terry Rees**

**FOCA Executive Director**



# FOCA: the Federation of Ontario Cottagers' Associations

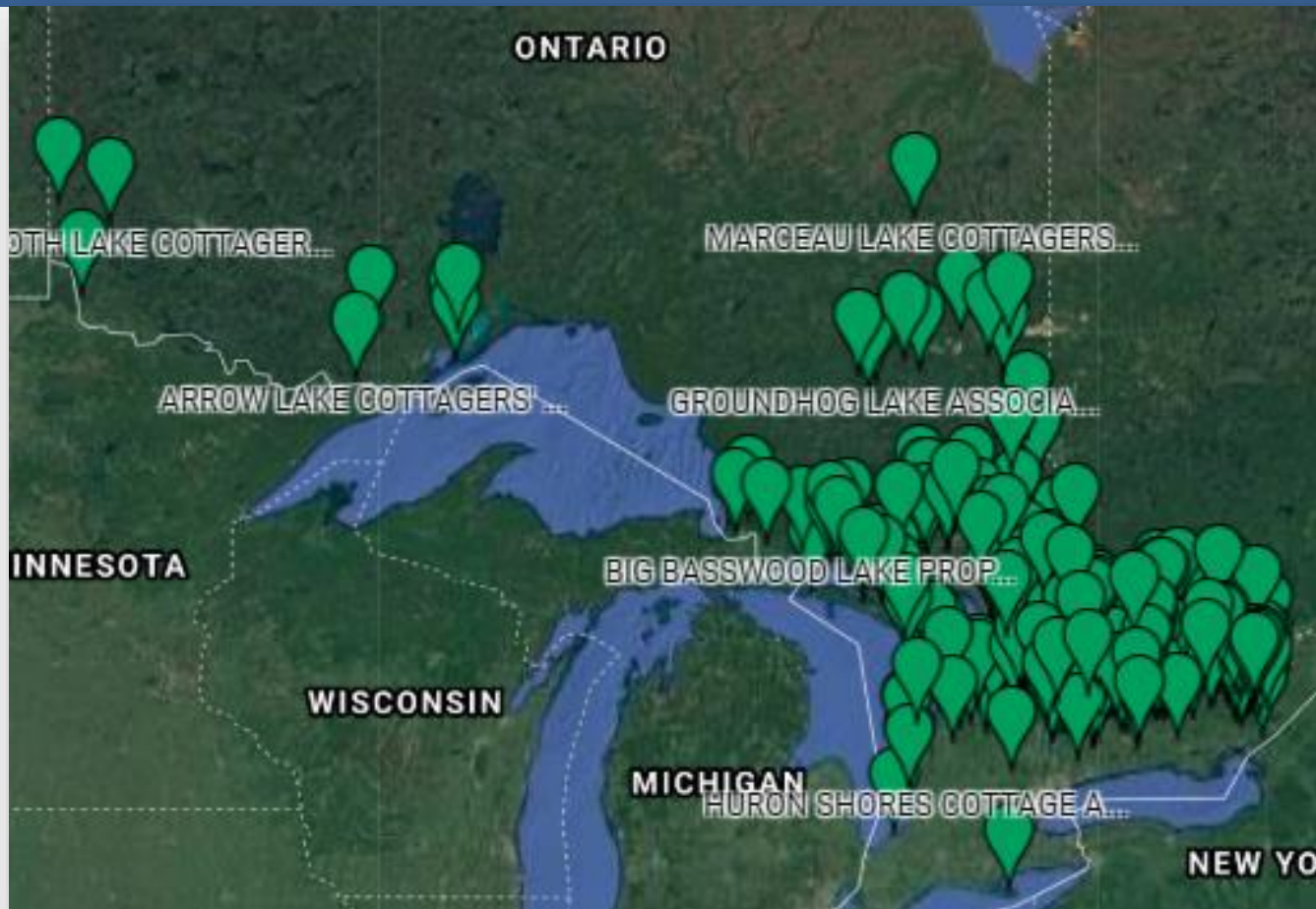


**55+** years of volunteers  
**520+** lake associations  
**50,000** member families

If you are in a Member Association,  
*YOU* are a FOCA member!



# FOCA's members are all across Ontario



# Delivering on strategic priorities & serving the members' needs



Strengthening Lake Associations



Effective Government Relations



Science into Action



Bridging Gaps in our Rural Communities


# Hot topic: Gypsy moths



Gypsy moth caterpillars and tree defoliation  
Lake Kasshabog, June 2020

**NATURE NOTES**  
**GYPSY MOTHS — MOVING ON THE WIND**

All around Kennebec Lake, this summer of 2020, we are seeing caterpillars in large numbers defoliate our trees. What is this non-native, destructive, invasive species? The following is in the spirit of "know your enemy."



**Gypsy moth, *Lymantria dispar dispar***, is an invasive forest pest from Europe. Deliberately brought into the USA in the 1870s to try to start a silkworm industry, it escaped from captivity. It slowly spread out from Massachusetts, reaching eastern Canada around 1924. It was first detected in Ontario in 1969.


**Life Cycle**  
Photo: Norcen Dortziger

In late summer, the white female moths lay a mass of tiny grey eggs close to where they themselves emerged from their pupal cases. The mass of eggs can be laid from the base to quite high in a tree. They are also laid in many other sites around your property, including on cars and other vehicles. Thus people may move egg masses and cocoons to distant new sites.

An egg mass can contain as many as 1000 eggs. Roughly oval, and 2-5 cm long by 0.5-2 cm wide, the mass is covered by the female with a coating of tan-coloured hairs.

Egg masses overwinter where laid, and miniature 3 mm long, grey-black, hairy larvae hatch just as the trees start to put out new leaves. This first larval stage, called an instar, may remain on the egg mass for a few days, and then climb the tree to the tips of branches where they may start to feed on buds and leaves. As it moves up the tree, the young larva spins a silk thread, suspending itself from it, and is easily picked up by the wind and carried to other host trees.

**Adapted for arboreal travel, the first instars are the main natural dispersal stage of the gypsy moth.**



Older larvae are hairy, black or brownish, with two rows of large spots down the back—five blue pairs, followed by six pairs of red. To become bigger, larvae must periodically discard their exoskeleton and grow a new, larger one. After about eight weeks, males reach maturity in their fifth instar, and are 4-5 cm long. Females mature in their sixth instar, when they are 6-7 cm long. Mature larvae find a resting place, usually on a tree trunk or in the leaf litter, where they rest and surround themselves with a silken nest in which to pupate. The pupa is dark brown with reddish hairs.

The moth emerges as an adult after developing inside the pupal case for about 2 weeks. European gypsy moth females cannot fly. They crawl around close to where they emerge and emit pheromones to attract the brown, flying males. Almost immediately after mating, the female deposits her eggs.

**What do they eat?**

- Gypsy moth larvae cause the destruction; adults do not eat.
- Although larvae are said to prefer leaves of oaks and other deciduous trees, they also feed heavily on white pine and hemlock, many shrubs and hundreds of other plants such as ferns.

**Who eats them?**

- Many birds may feed on gypsy moth larvae; some sources say crows, chickadees, blue jays, grackles, nuthatches, phoebe and robins.
- Small mammals such as white-footed mice, shrews, squirrels, chipmunks and raccoons will prey on pupal cocoons.

**So what can we do?**

The short answer is very little. Some suggestions were discussed in the December 2019 newsletter. In the early 1990s, for a number of years, the area surrounding Kennebec Lake had one of the worst outbreaks of gypsy moths in Ontario. Wide areas were defoliated, many trees were killed. Fortunately, after the last outbreak, nature took over the job of repairing the damage to the forest. Dead trees fell and decomposed and other trees and shrubs took their place.

As devastating as the current outbreak is, we can take comfort in how relatively quickly, and thoroughly, the forest recovered after the last outbreak. By 2019, no one would have believed the extent of defoliation in the 1990s.

— Aileen Merriam

an excerpt from the  
Kennebec Lake Association Summer 2020 Newsletter

# Our experts:

## **Taylor Scarr**

Director Integrated Pest Management, Natural Resources Canada

## **Paul Zimmer**

Zimmer Air Services Inc.

## **Allison Craig**

BioForest Southern Ontario Office (Etobicoke)



# Our first presentation:

## Taylor Scarr

Director Integrated Pest Management,  
Natural Resources Canada

*Gypsy moth life cycle, biology, impacts  
and management options*







# Gypsy moth biology, history and management



Taylor Scarr, Ph.D.

Natural Resources Canada, Canadian Forest Service

Sault Ste. Marie, Ontario, Canada

[taylor.scarr@canada.ca](mailto:taylor.scarr@canada.ca)

FOCA Webinar, 30 July 2020



Natural Resources  
Canada

Ressources naturelles  
Canada

Canada

# Know your insects



Bob



Linda



Don



Randy



Carl



Dele



# Gypsy Moth Life Cycle

## Gypsy moth (*Lymantria dispar* (L.))

### Pest Information

Pest Origins: **Invasive** - Native to Europe Defoliator  
Pest Type: Host Oak, birch, aspen and various hardwoods  
Species: 47,000+ ha (2019)  
Infestation Area:




## Gypsy moth (*Lymantria dispar* (L.))

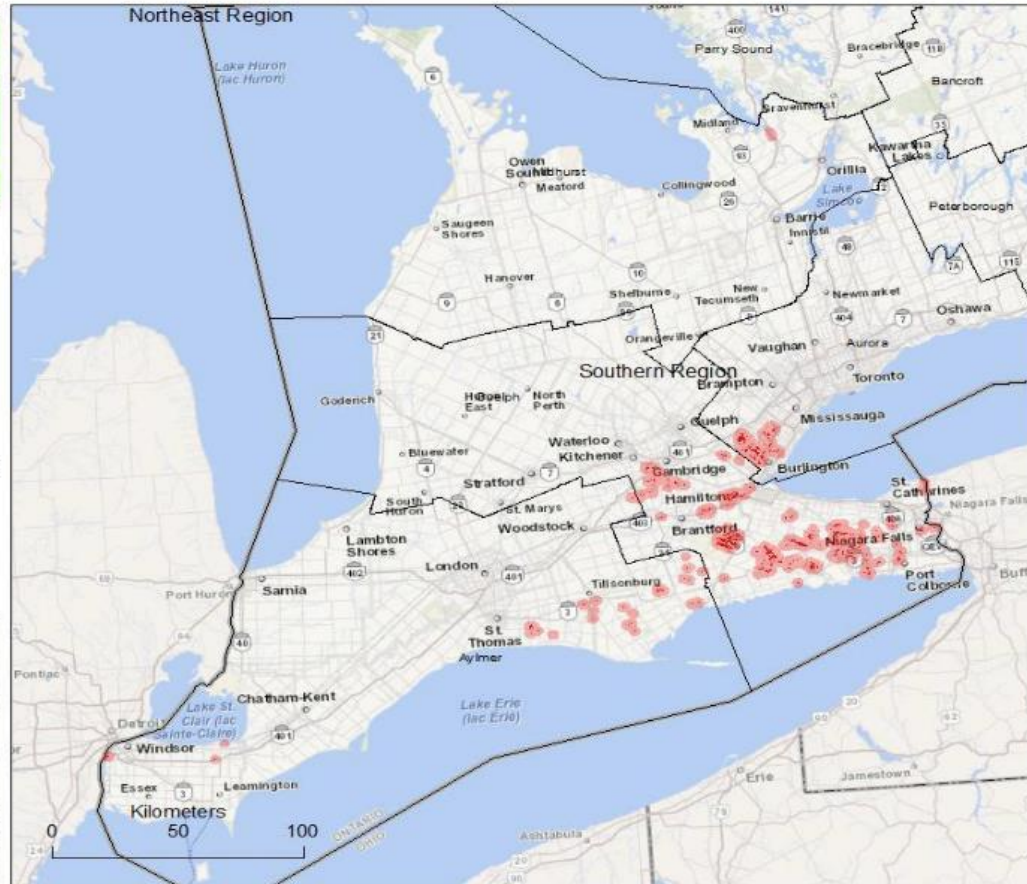


### Gypsy moth 2018

Southern Region  
Areas within which gypsy  
moth caused defoliation

Moderate-to-severe = 14,937 ha

 Area of moderate-to-severe  
defoliation



# Gypsy moth (*Lymantria dispar* (L.))

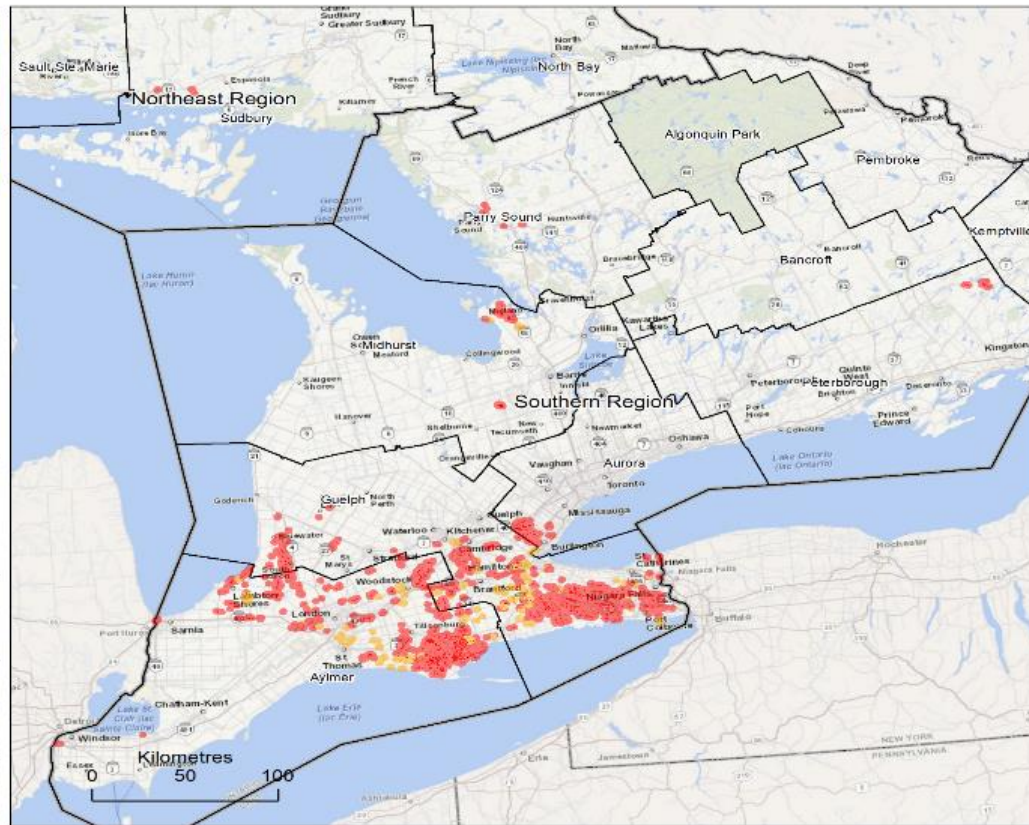


## Gypsy moth 2019

Areas in the Ontario where gypsy moth caused defoliation

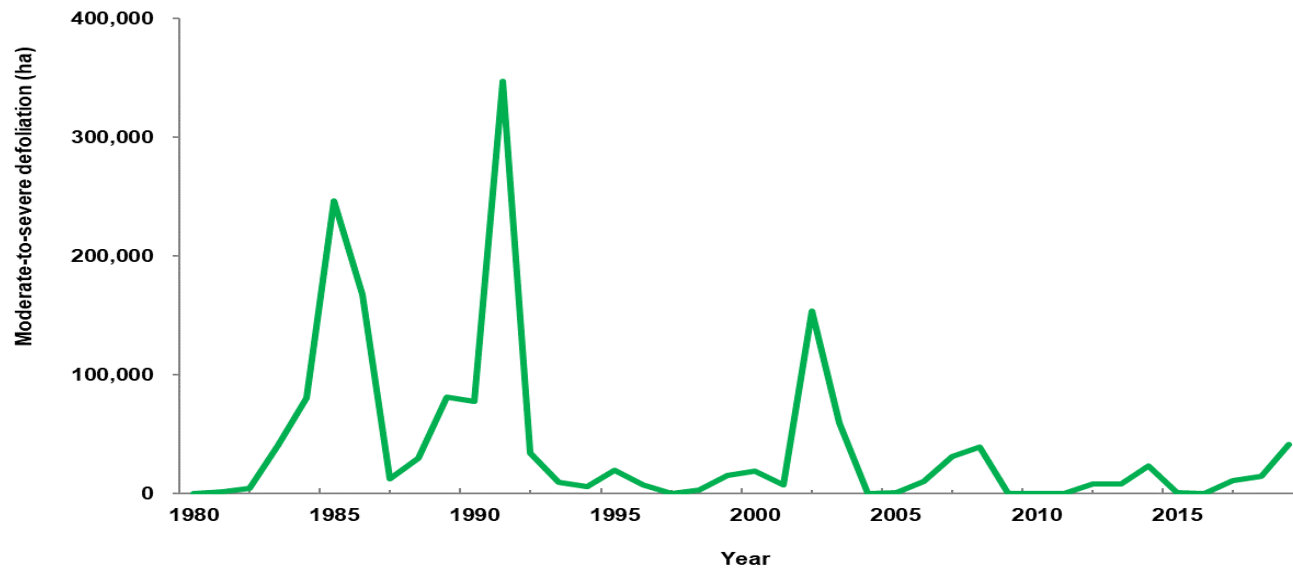
Light = 4,007 ha  
Moderate to severe = 41,617 ha

- Area of light defoliation
- Area of moderate to severe defoliation



Gypsy moth (*Lymantria dispar* (L.))

### Gypsy moth Moderate-to-severe defoliation in Ontario 1980 - 2019



## Gypsy moth (*Lymantria dispar*)



### Gypsy moth


### 2015


#### Overview

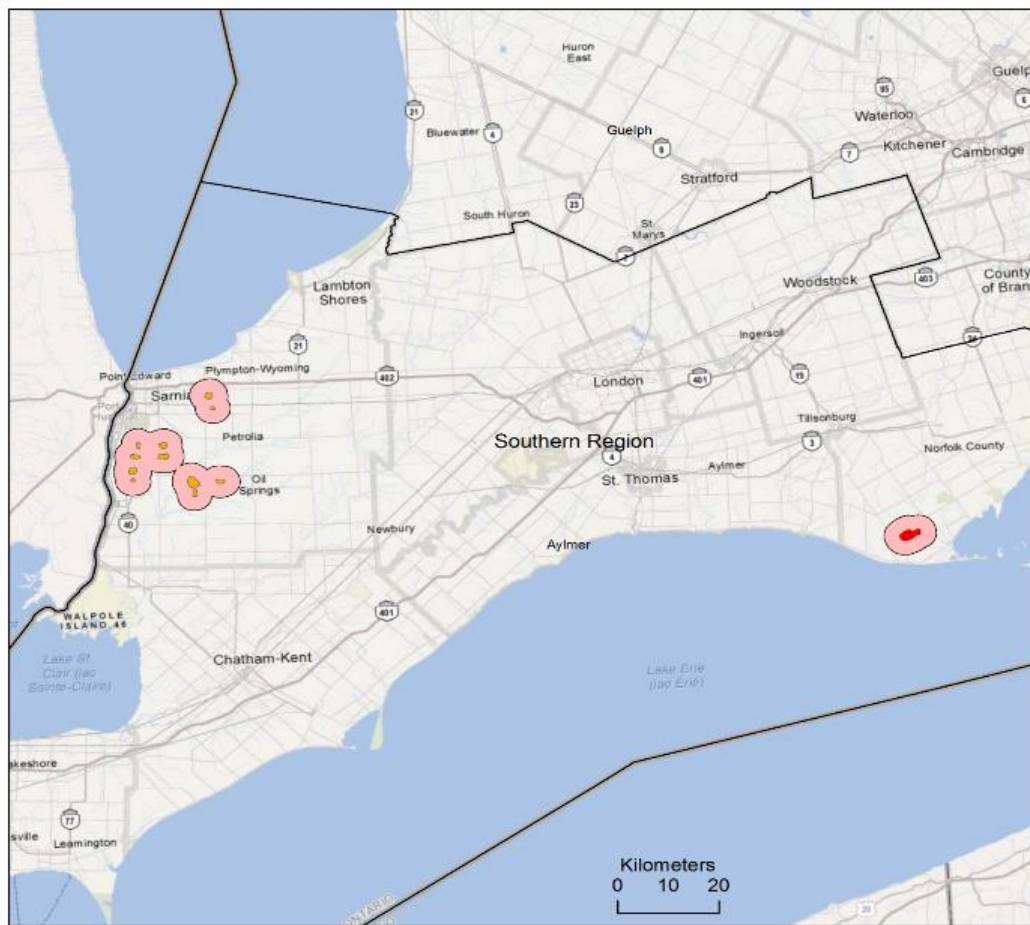
Areas-within-which gypsy moth caused defoliation.

**Moderate-to-severe = 757 ha**

**Light = 1,772 ha**

 Area of Moderate-to-Severe Defoliation

 Area of Light Defoliation






## Gypsy moth (*Lymantria dispar* (L.))

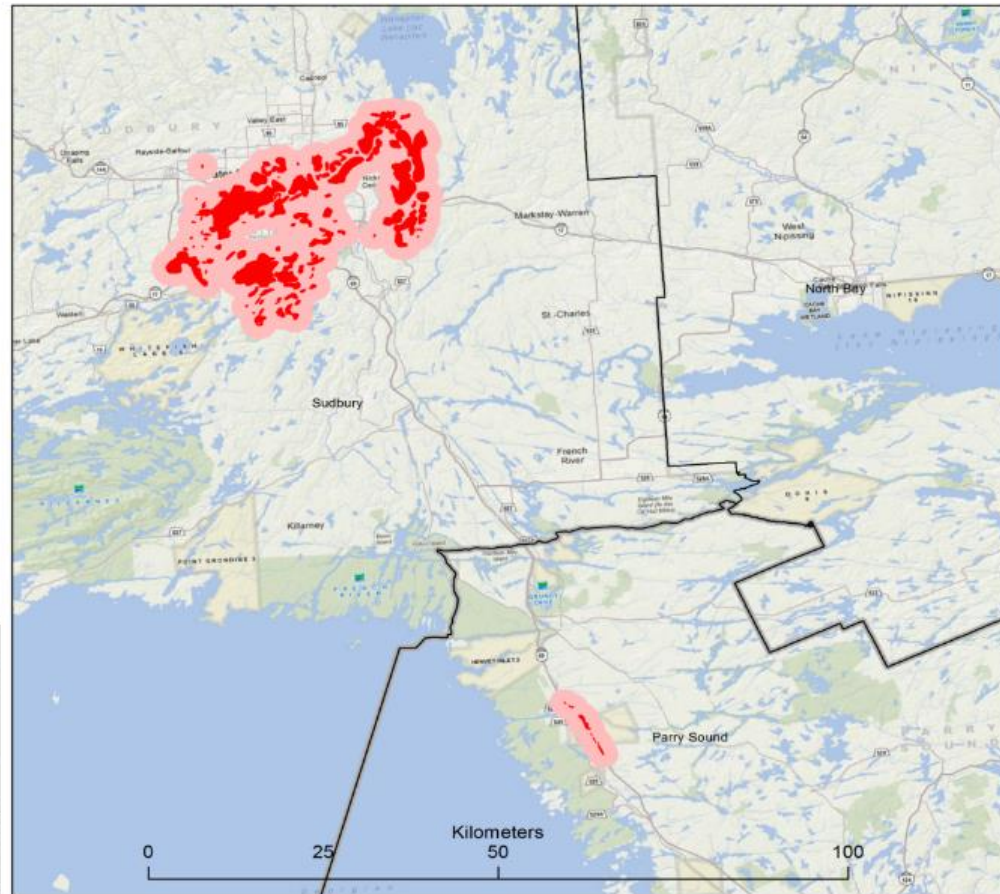


### Gypsy moth 2014

Northeastern Region and part  
of Southern Region (Parry  
Sound District)  
Areas-within-which gypsy moth  
caused defoliation.

**22,258 ha**

 Area of Moderate-to-  
Severe Defoliation



Canada

Regulated Area | Région réglementée

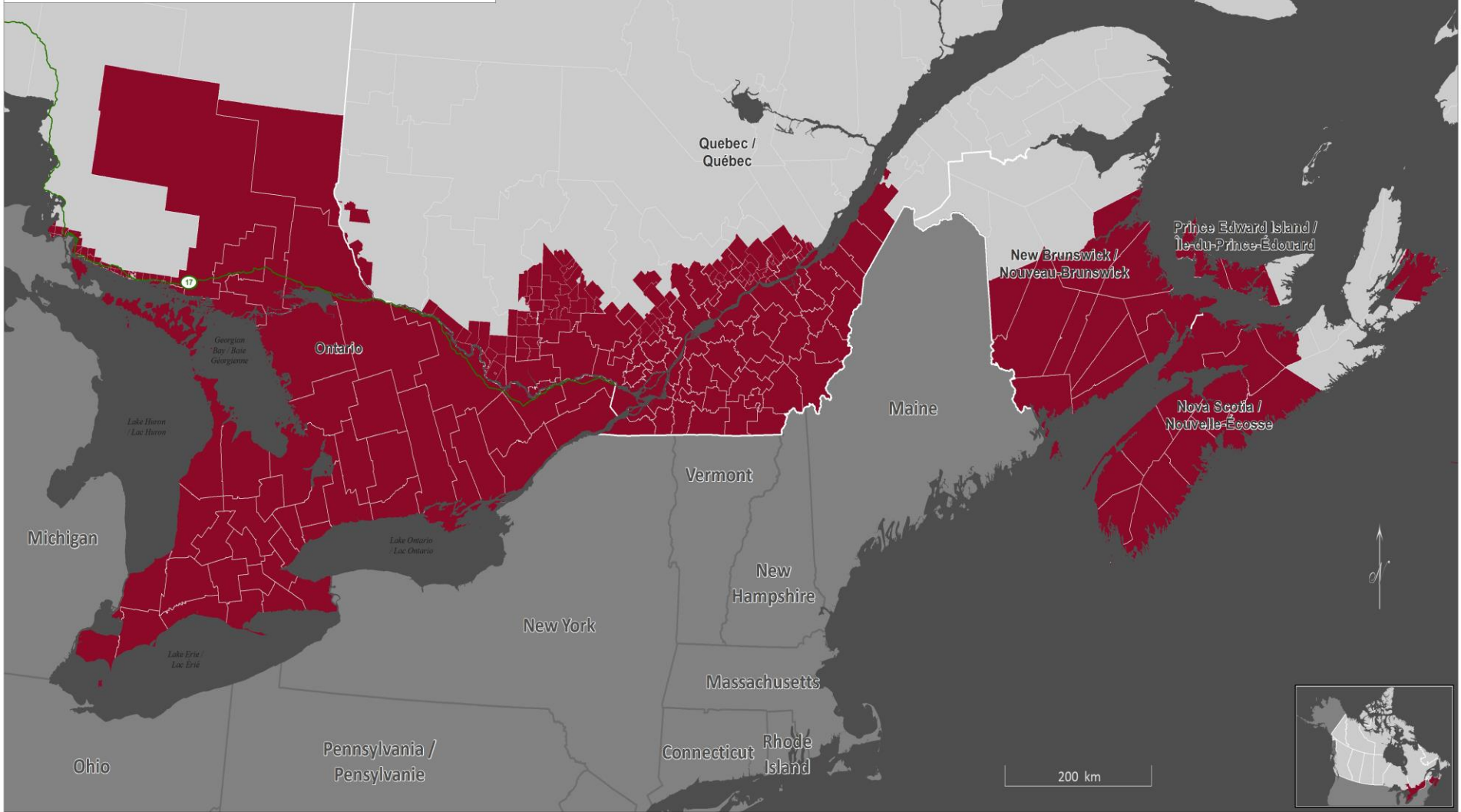
North American Gypsy Moth,  
*Lymantria dispar*  
La spongieuse nord-américaine,  
*Lymantria dispar*

Legend | Légende  
Regulated Area | Région réglementée

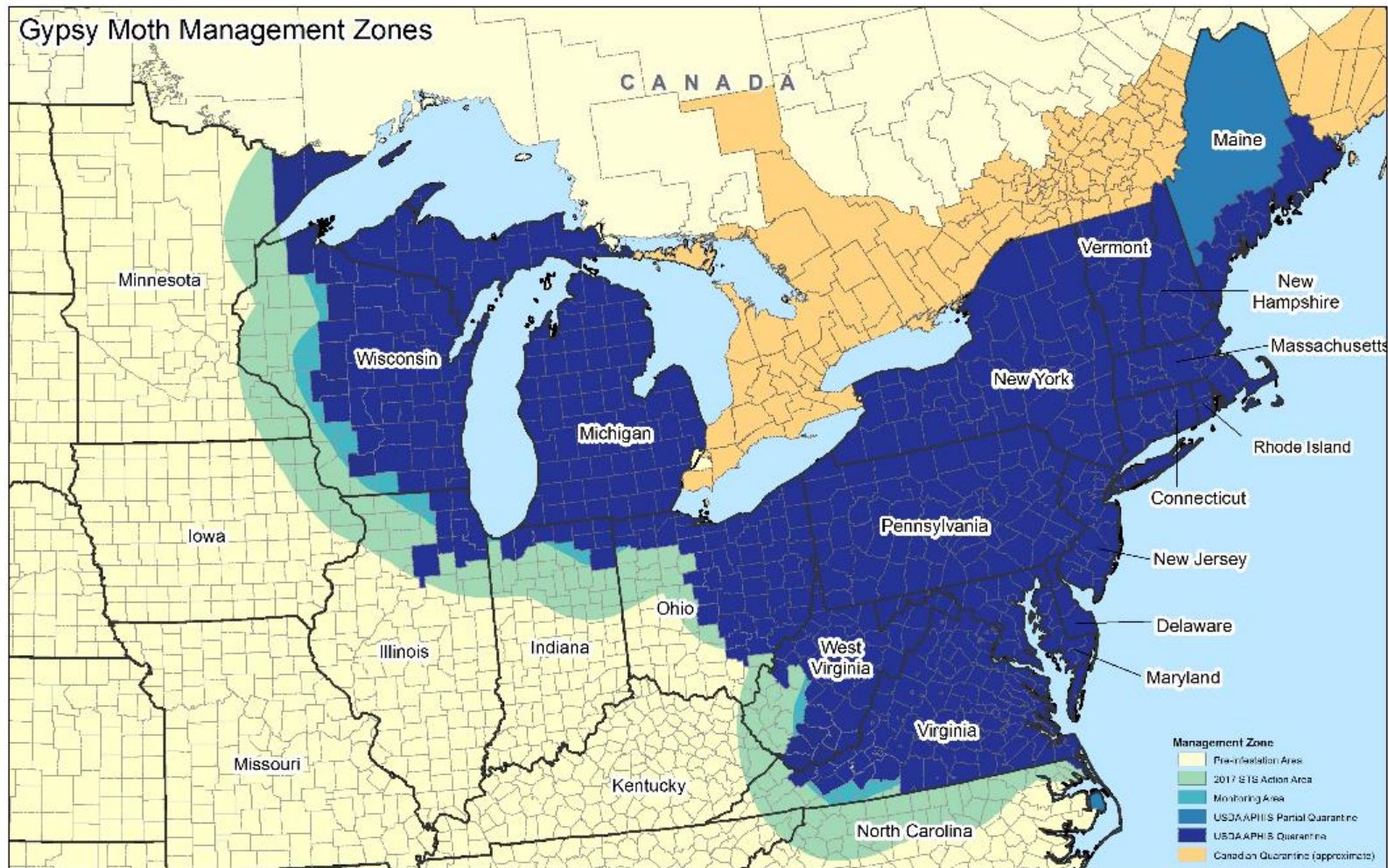
While this map may not be free from error or omission, care has been taken to ensure the best possible quality. CMA makes no representations or warranties, either expressed or implied, as to the accuracy of the information presented and the client assumes the entire risk as to the use of any or all information.

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By: J. Paré, S. Legay and M. Seward  
Contact: M. Marcotte (Plant Health Survey Unit) / Unité de surveillance phytosanitaire  
Date: 04 / 2017



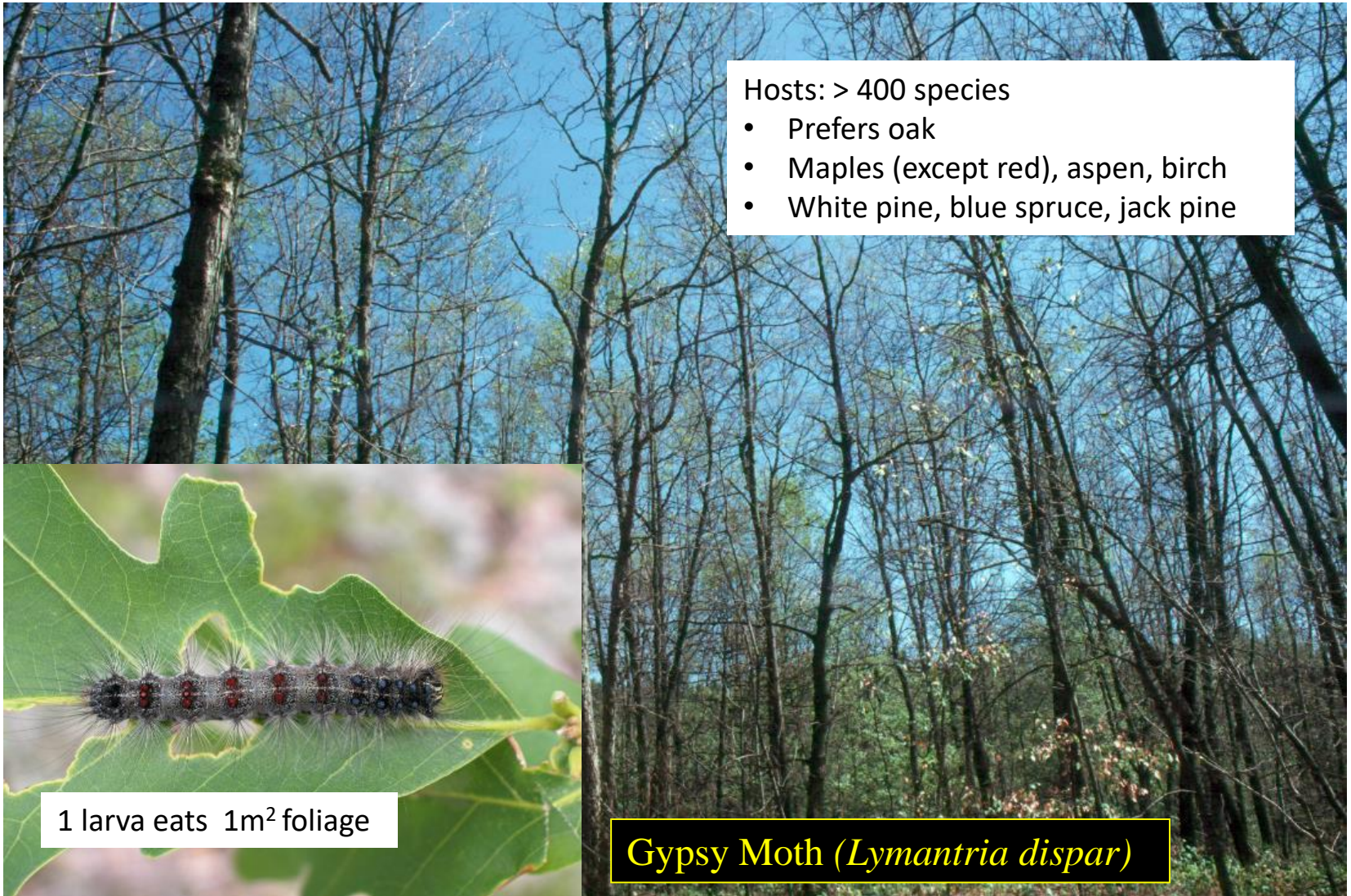
# Gypsy Moth Management Zones



- Management Zone**
- Pre-Installation Area
  - 2017 SIS Action Area
  - Monitoring Area
  - USDA/APHIS Partial Quarantine
  - USDA/APHIS Quarantine
  - Canadian Quarantine (approximate)

Quarantine information source: [http://www.aphis.usda.gov/plant\\_health/zam/pest\\_mit/gypsy\\_moth/downloads/gymarch.pdf](http://www.aphis.usda.gov/plant_health/zam/pest_mit/gypsy_moth/downloads/gymarch.pdf)

Minnesota Department of Agriculture - Plant Protection Division (Updated: 12/06/2017)



Hosts: > 400 species

- Prefers oak
- Maples (except red), aspen, birch
- White pine, blue spruce, jack pine

1 larva eats 1m<sup>2</sup> foliage

**Gypsy Moth (*Lymantria dispar*)**



*Entomophaga maimaiga* and  
gypsy moth

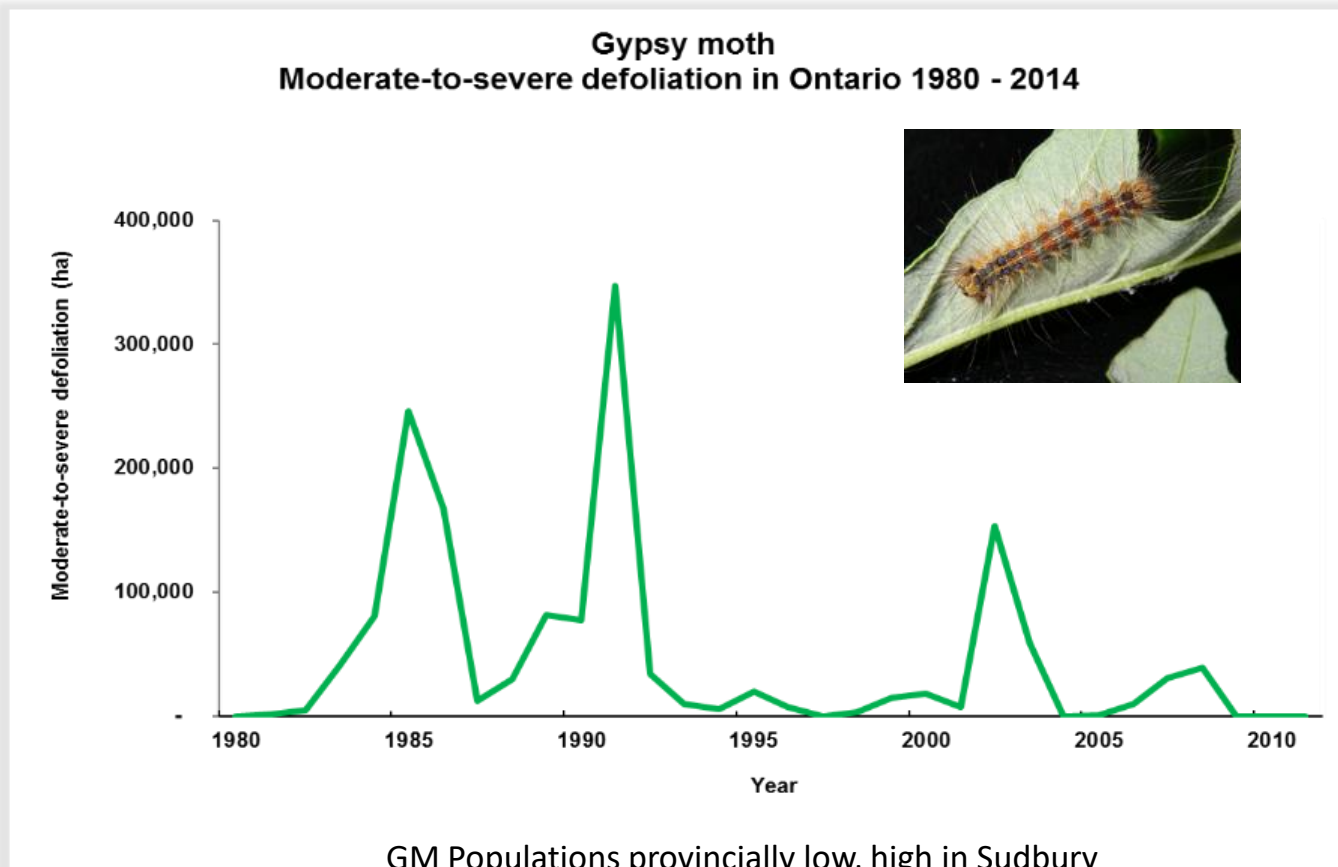
Larvae killed by fungus



Entomophaga  
maimaiga



## Gypsy moth (*Lymantria dispar*)



# Gypsy moth virus

## NPV



5566380



5383249



## Outbreaks collapse from:

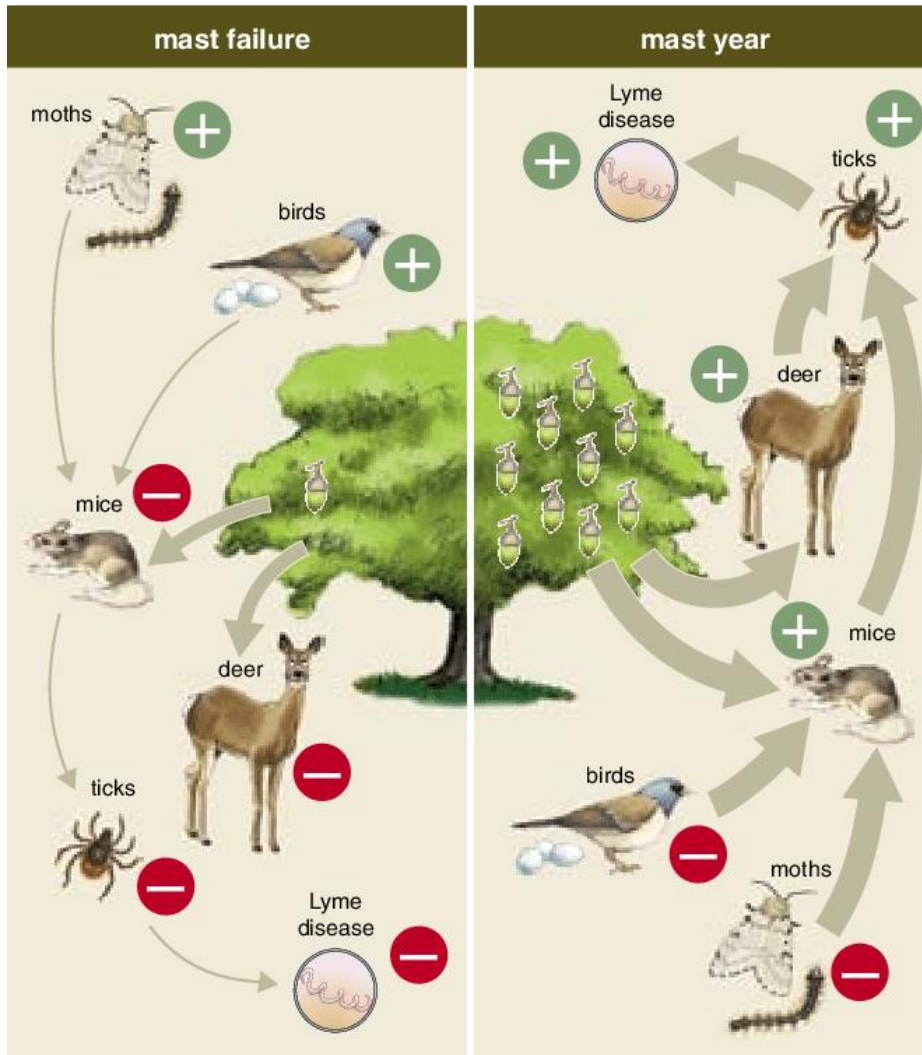
- Cold temps < -20C
- Starvation
- Host tree induced defenses
  - Tougher, less nutritious leaves
- Predation and parasitism
- NPV (nucleopolyhedrosis virus)
  - Density dependent mortality
  - Greater effect at higher populations
- Fungus *Entomophaga maimaiga*
  - Density independent mortality
  - Greater effect in wet cool spring weather



## Impacts

- Outbreaks typically < 3 yrs
- Most hardwoods can tolerate < 3 yrs defoliation
- Hardwoods re-flush if defoliation > 50%
- Pine trees can die after 100% defoliation
- Drought, other insects can increase tree mortality
- Longterm change in forest tree species





Gypsy moth is part of the food web, including interactions with mice, humans, deer, ticks, and Lyme disease

## Gypsy moth 2021 ???

- Cold tolerant to -20C
- Eggs below snow are likely to survive
- Gypsy moth lays ½ its eggs below the snow
- Snow depth 2020-21: unpredictable
- Populations increase in hot dry summers, decrease in wet springs (*Entomophaga maimaiga*)



Egg mass sampling

Modified Kaladar  
Plot (MKP)



0 - 1235 e.m./ha    Light

1236-6175 e.m./ha    Moderate

> 6175 e.m./ha    Severe



## Insect management program

### Objective:

protect a value: aesthetics, recreation, wood supply, habitat, fire risk, human health

### Tactics:

- Individual trees, ornamentals
- Woodlots, cottage lots, contiguous forest
- Physical insecticide, ecological, insecticide, and no action



# Homeowner options

- Licensed applicator, treat with B.t.k.
- Burlap trap, daily collections
- High pressure water spray to dislodge caterpillars
- Trunk tape coated in sticky paste







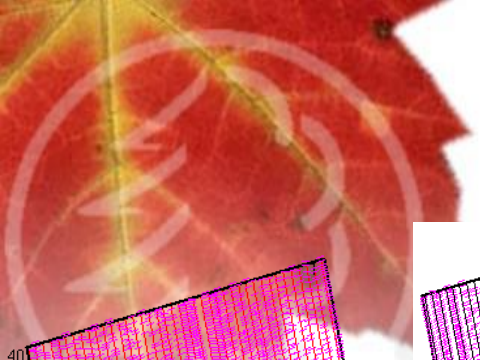
Insecticide spray: to keep trees alive

- Insecticide: B.t.k.
- Biological, bacterium
- Specific to larvae of moths & butterflies
- Must be ingested, alkaline stomach
- No buffer zones required, approved for organic farming
- Applied early spring to young caterpillars
- Bacterium dies after 3-5 days from ultraviolet light
- Operations early morning, low wind, temperature inversion

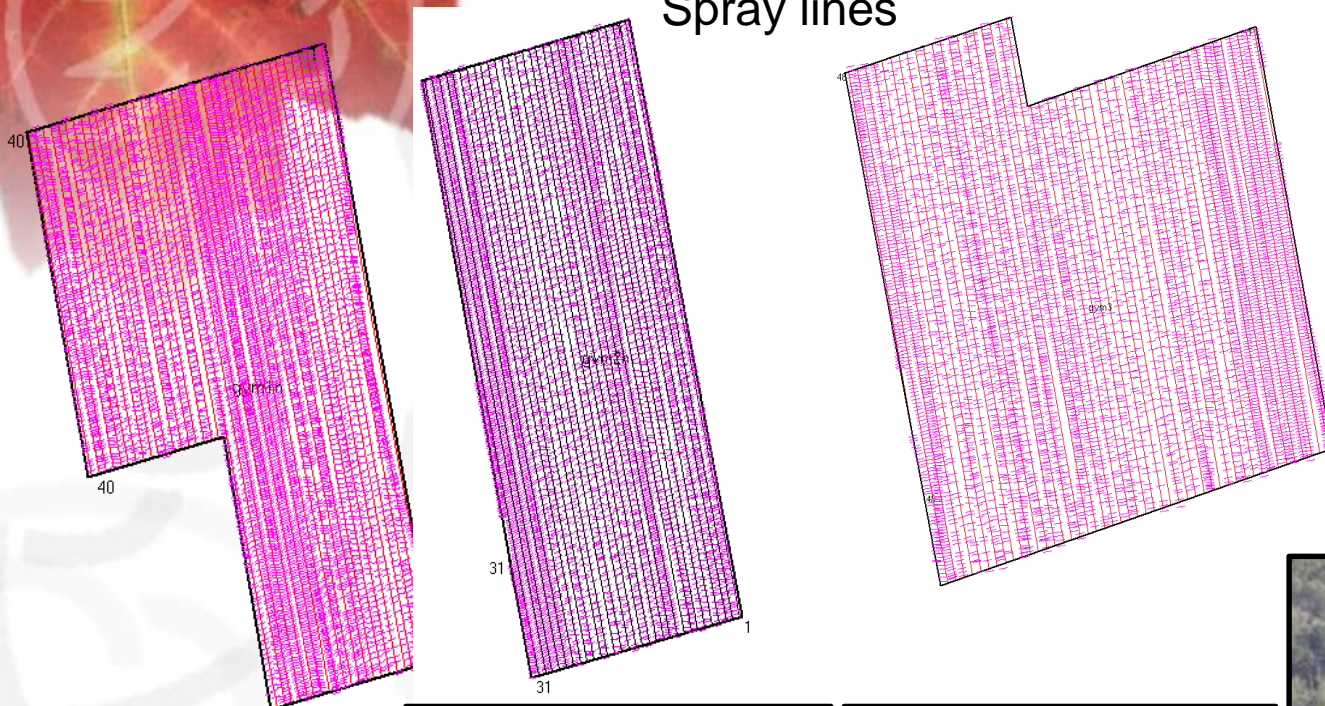
B.t. spray

No B.t. spray

•B.t.k. Foray 48B double application



# Spray lines



Dispar Virus spray



GPS-GIS navigation



Micron-air rotary atomizer





# Organizing an aerial spray

- Economies of scale
- Economies of logistics (e.g. length of spray lines)
- Some groups or associations pool their efforts
- It's not too early to start
- Turn-key consultants can reduce your efforts
- Check references, past performance
- Highly regulated by Ont. Min. Environment, Conservation, & Parks



## Take home messages...

- Though non-native, gypsy moth is now much like our native species
- It can be difficult to predict next year's infestation
- Insect pest management is like an insurance policy, depending on your tolerance for risk
- There is an effective, safe product (B.t.k.) available if you wish to take action



# Our second presentation:

**Paul Zimmer**

Zimmer Air Services Inc.

**Allison Craig**

BioForest Southern Ontario  
Office (Etobicoke)

*Aspects of an active control  
program for Gypsy moths*



# Egg Mass Surveys

- Egg mass surveys focus on collecting data that helps to forecast defoliation for the following growing season
- Conducted in fall/winter after leaf drop
- One stand to entire region
- Focus on mature oaks, poplar, birch



# Egg Mass Size

- Larger egg masses (>25mm) can be indicative of a healthy, building population

24mm

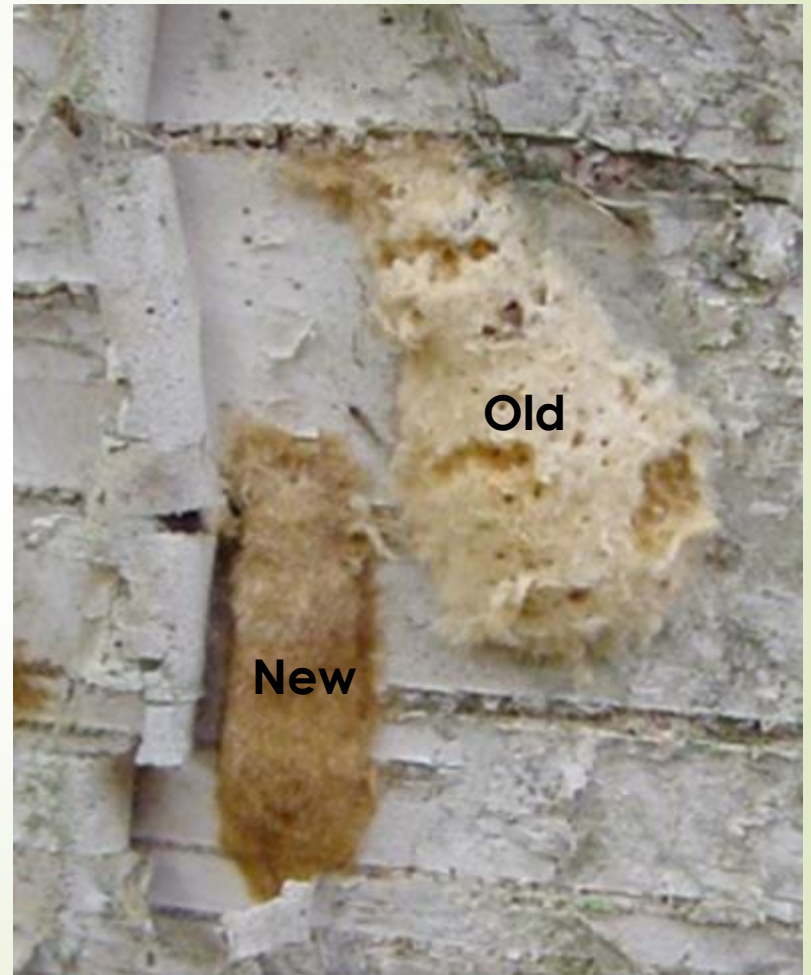


27mm



# Egg Mass Age

- ▶ A high proportion of new egg masses may be indicative of a healthy, building population





# Egg Mass Surveys

<b>Egg Mass Density (Egg Masses per Hectare)</b>	<b>Expected Defoliation</b>	<b>General Impacts</b>
0	Nil (0%)	None
1 – 1,235	Light (1 – 40%)	Nuisance and Aesthetics; Noticeable Defoliation
1,236 – 6,175	Moderate (40 – 75%)	Wildlife and Recreation; Growth Loss
> 6,175	Severe (> 75%)	Tree Mortality

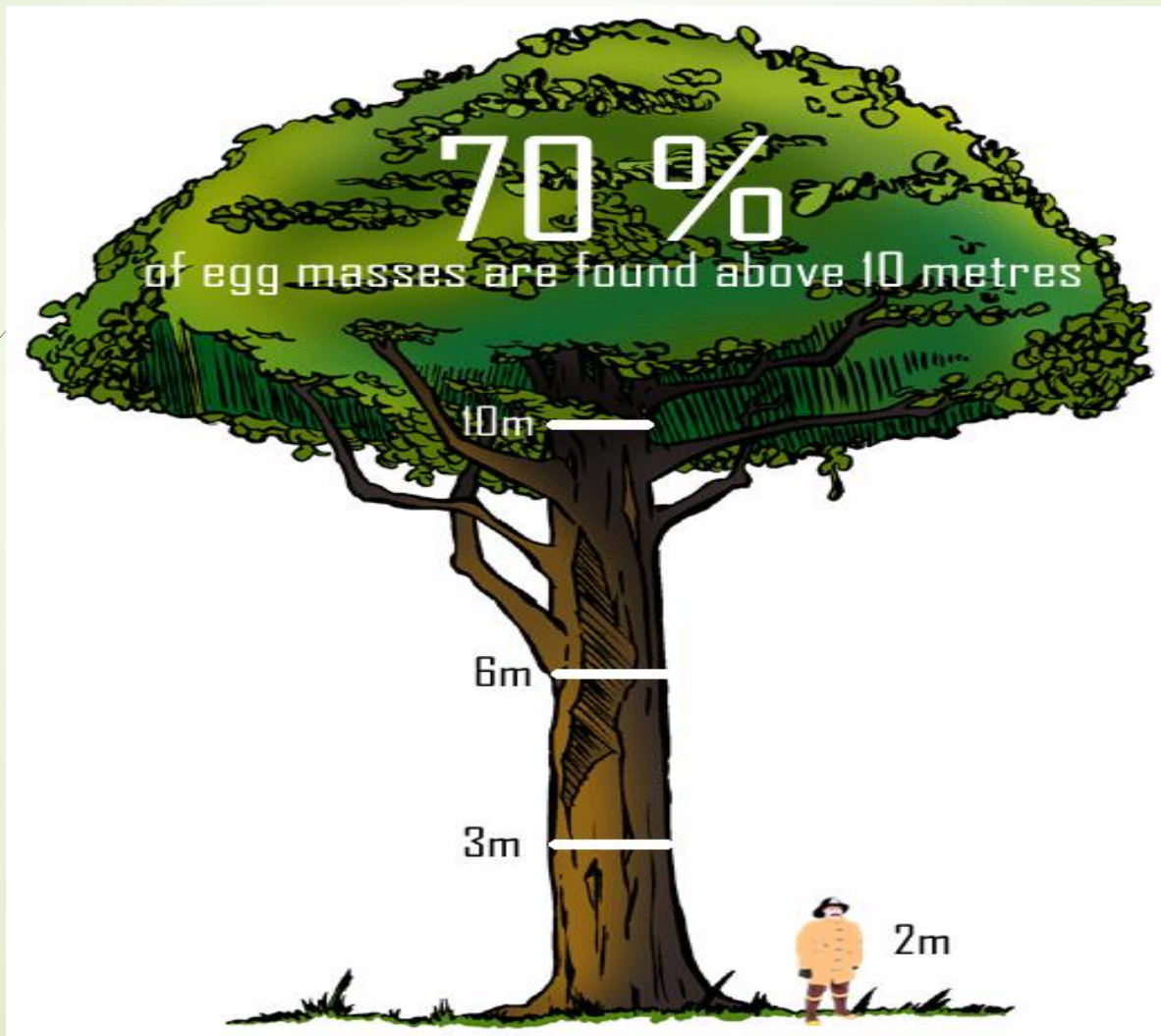
- 1 to 10 egg masses on an individual tree could result in light to moderate defoliation, more than 50 egg masses per tree could result in severe defoliation

# ZIMMER AIR SERVICES INC. SERVING CLIENTS SINCE 1975



# WHY AERIAL APPLICATION?

CATERPILLARS HATCH & MOVE UP IN CANOPY TO FEED



# CALIBRATION

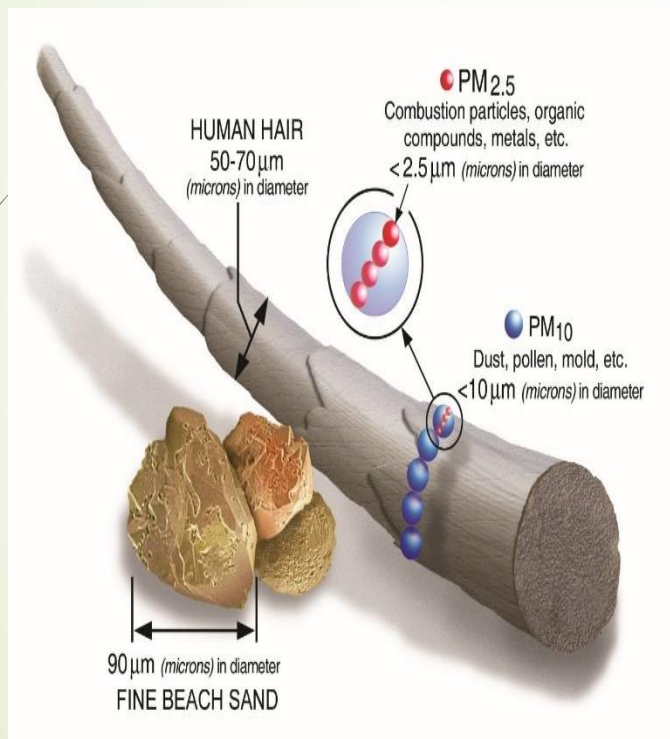
The spray system is calibrated on the ground using btk to ensure correct application rate in the air.

IAW PMRA Label we use the maximum application rate 1.6 L/Acre for best results.

Rotary atomizers are used and blades are set to deliver the 50-150 micron droplet spectrum at the aircraft speed.



# SPRAY DROPLET SIZE OF 50-150 MICRON FOR MAXIMUM COVERAGE





# CAN OUR COTTAGE ASSOCIATION CONTRACT WITH YOU?

➤ **NO.**

A Cottage Association does not have the legal authority to bind it's members relating to their personal property without Power of Attorney documents authorizing the association to make decisions on behalf of the owner.

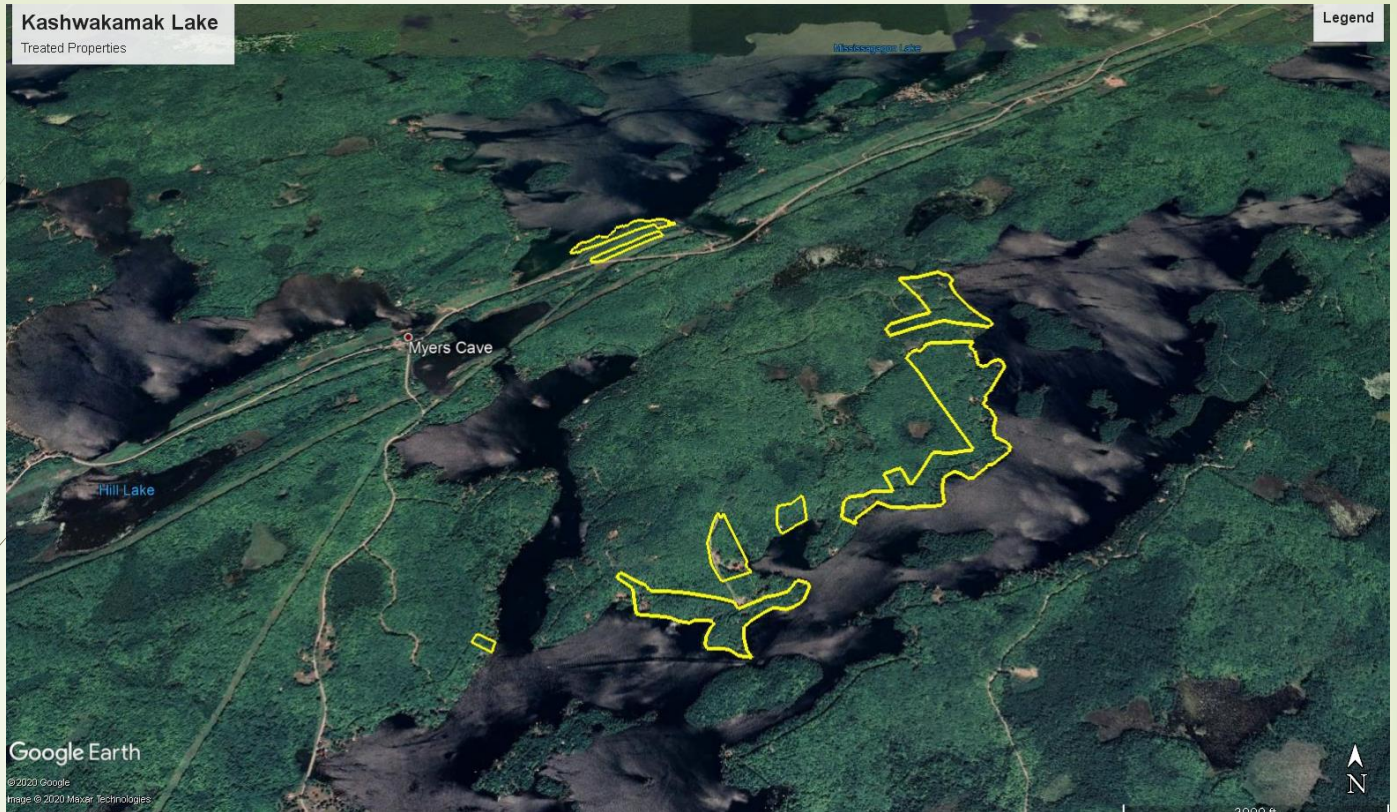
For this reason we require every property owner to sign a contract for service.

Every property owner has legal rights. If the property owner does not want their property sprayed we must respect those wishes. Doing otherwise would be in contravention to the Pesticide Act.



# WHAT HAPPENS IF MY NEIGHBOR DOES NOT PARTICIPATE?

- ▶ We would request that you ask your neighbor sign a waiver to indicate that they either simply don't want to pay for spraying as opposed to not wanting any spray or drift land on their property.
- ▶ No signed waiver and we will have to assume they are objectors.
- ▶ Their opposition will not preclude you from spraying however we will have to leave a buffer between the properties which depending up your lot size may affect the effectiveness of the application.



## ACCURATE MAPPING USING TAX ROLL #S

PROPERTY BOUNDARIES ARE CONFIRMED PRIOR TO COMMENCING AERIAL APPLICATION





## IN FLIGHT & REAL TIME DGPS SPRAY GUIDANCE

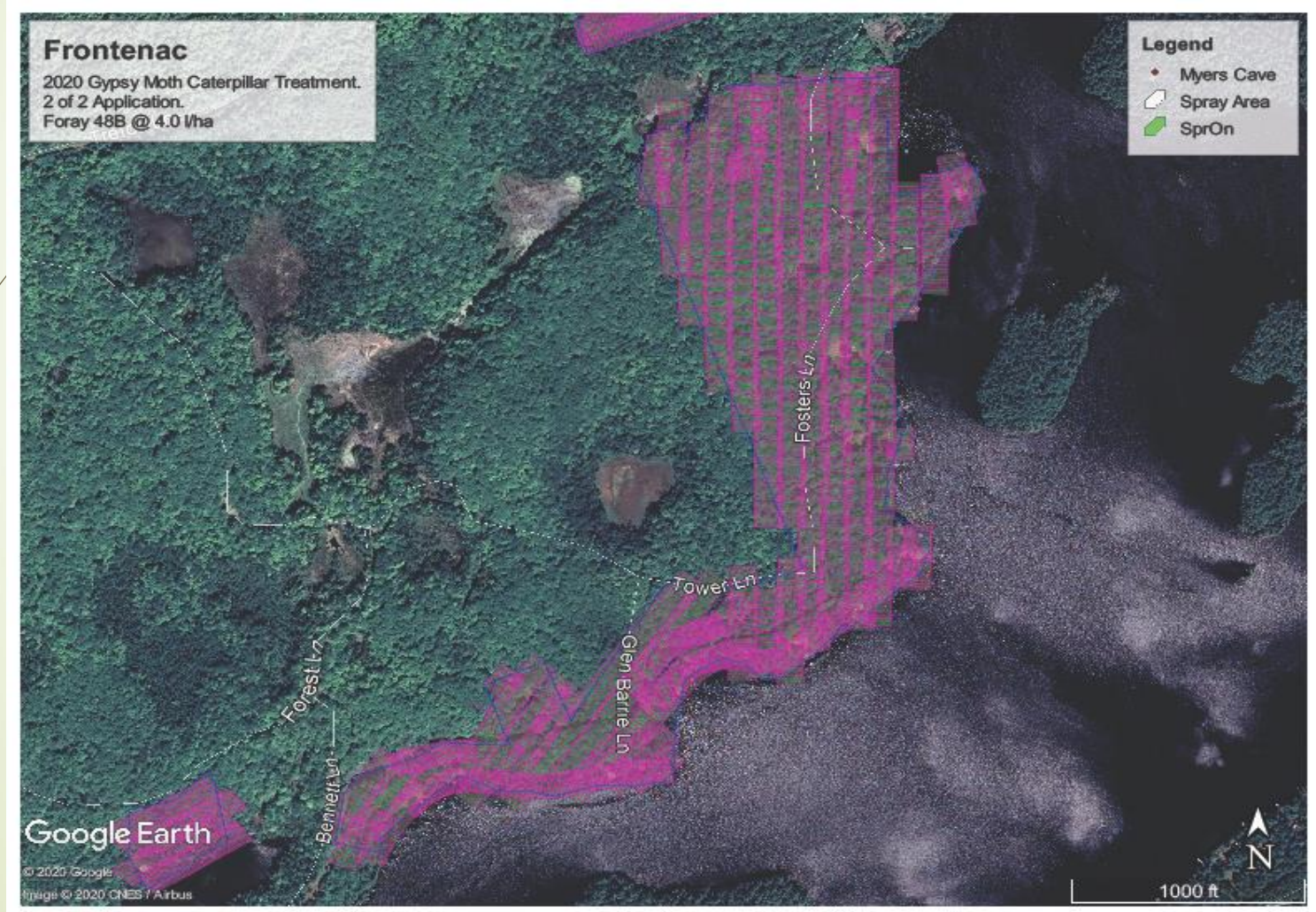
Allows pilot to determine spray block boundaries, no spray zones, accurate track spacing, and maintains a record of what was sprayed.



**Applications occur when Temperature, Wind,  
and Humidity are OPTIMAL.**

**Usually early morning or in the evenings before dark.**

# SWATH LINES GENERATED USING SPRAY GUIDANCE SYSTEM





**RESULTS OF AERIAL APPLICATION  
LIMITING CATERPILLAR FEEDING DAMAGE**

# Questions...

Please use the “Chat”  
feature of Zoom  
to type your question to  
the speakers



# Contacts & Links

## Find out more about Gypsy moths:

- [www.invadingspecies.com/gypsy-moth/](http://www.invadingspecies.com/gypsy-moth/)
- [www.ontario.ca/page/gypsy-moth](http://www.ontario.ca/page/gypsy-moth)

## For surveillance/monitoring info:

Allison Craig, MFC

BioForest Southern Ontario Office (Etobicoke)

905-609-4167 [acraig@bioforest.ca](mailto:acraig@bioforest.ca)

## For aerial spray programs info:

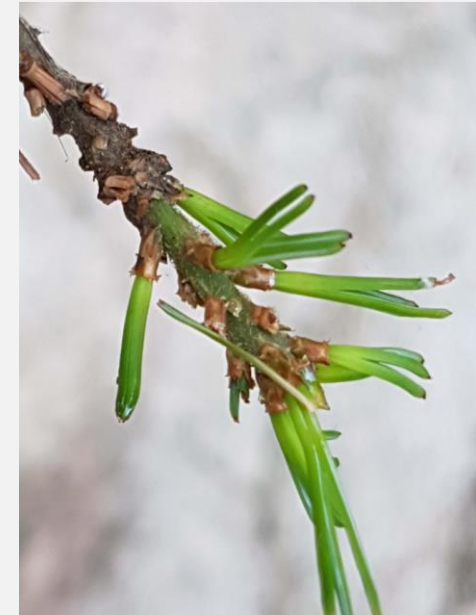
Paul Zimmer

Zimmer Air Services Inc.

<https://zimmerair.com/contact-us/>



Regrowth, Kasshabog, July 2020



Regrowth, Kennebec Lake  
image courtesy Aileen Merriam

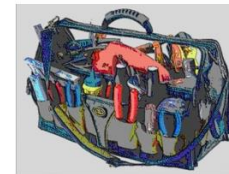


# FOCA Member Benefits

## Key Services provided for your Association:

- FOCA liability insurance program
- Lake Planning Handbook
- Policy updates & government advocacy on rural issues
- Association webpage offer
- Member rate on teleconferencing from Genesis Integration
- Credit card payment processing
- Newsletter articles, fact sheets, videos & brochures (septics, invasives, ...)
- Members' only web login for roads information, governance tips & more!

Also: **Events like this,** plus **Benefits & Offers** for all your Member families!



\$1365.00\*  
Retail Value \$1995.00  
**Philips Home Defibrillator**  
...affordable and easy to use!



**GENESIS**  
INTEGRATION

**Cade Associates**  
Insurance Brokers Limited



The CANADIAN CANOE MUSEUM  
Le MUSÉE CANADIEN du CANOT



THE OFFICIAL MANUFACTURER OF  
**BUNKIE NATION**  
WWW.SAWMILLSTRUCTURES.COM

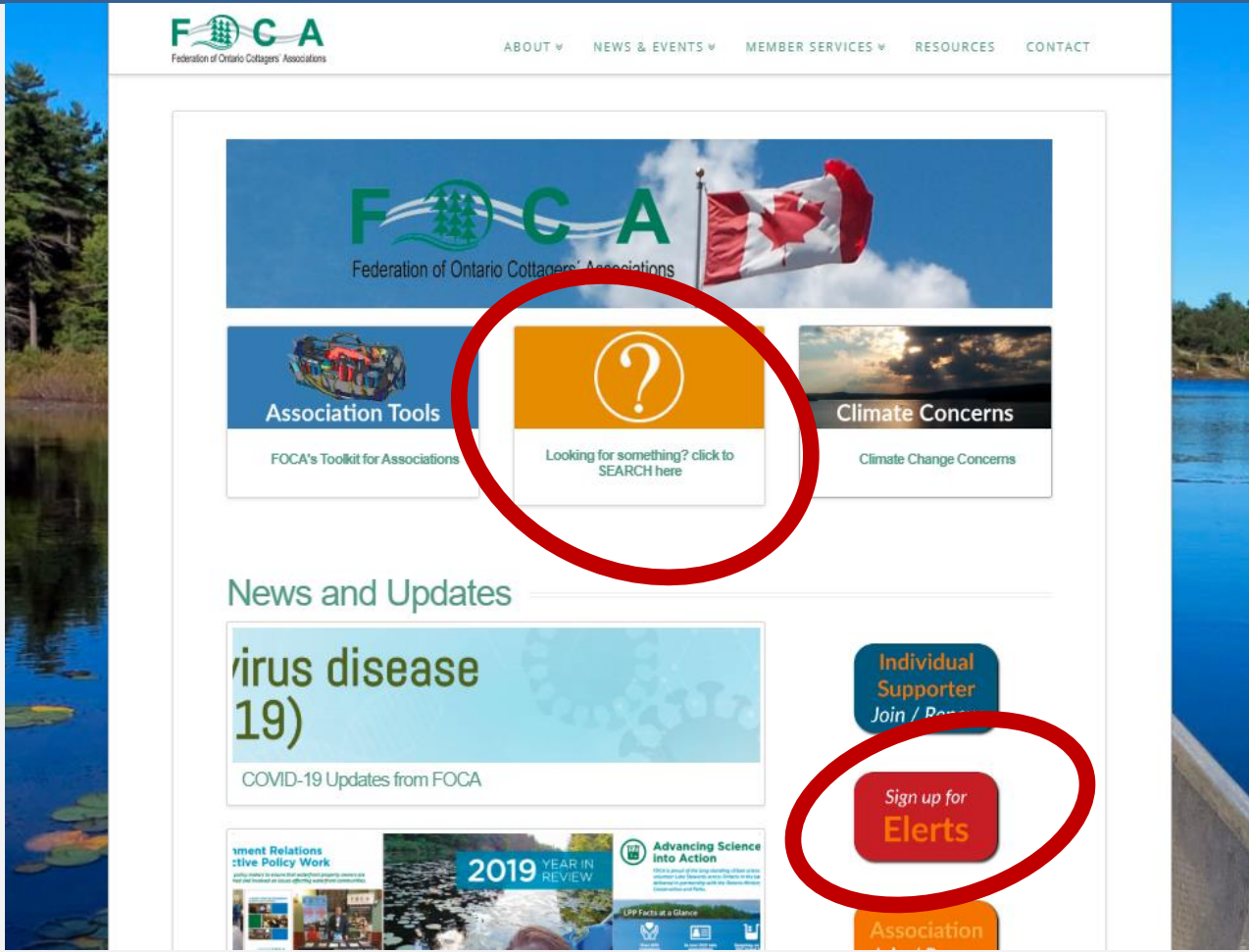
**CottageLife**

**Separett**  
Waterless toilets

<https://foca.on.ca/benefits/>



# Got a question? Search at: **foca.on.ca**



**& join over  
10,000  
FOCA Eert  
subscribers!**





# Waterfront Ontario:

image: Andy Metelka



**We're in this, together**  
**[foca.on.ca](http://foca.on.ca)**

