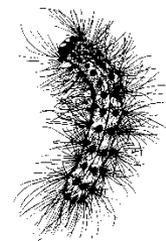


GYPSY MOTH (*LYMANTRIA DISPAR*) TRAPPING & TREATMENTS IN MINNESOTA – 2014 UPDATE

**Natasha M. Northrop, Gypsy Moth Trapping Coordinator
Minnesota Department of Agriculture
Plant Protection Division, Pest Mitigation & Biocontrol Unit**

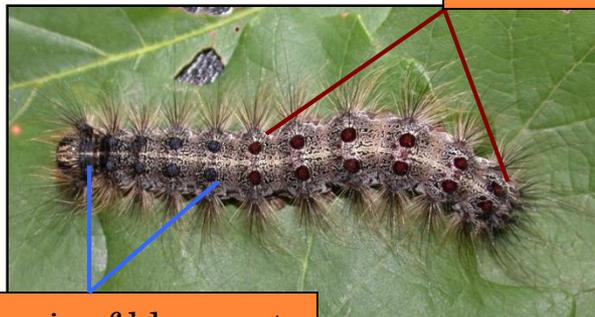


European Gypsy Moth Life Cycle (univoltine)



Larva
(5-6 Instars)

6 pair of red spots

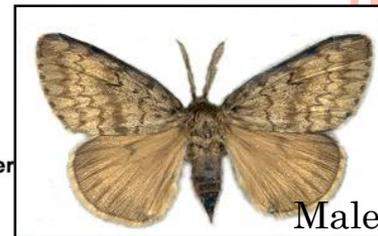


5 pair of blue spots

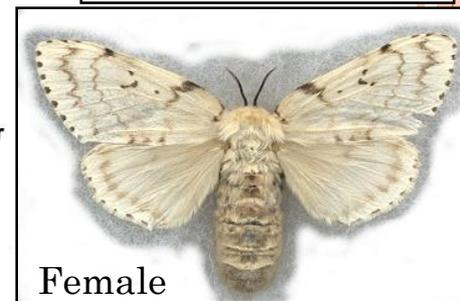
Pupa



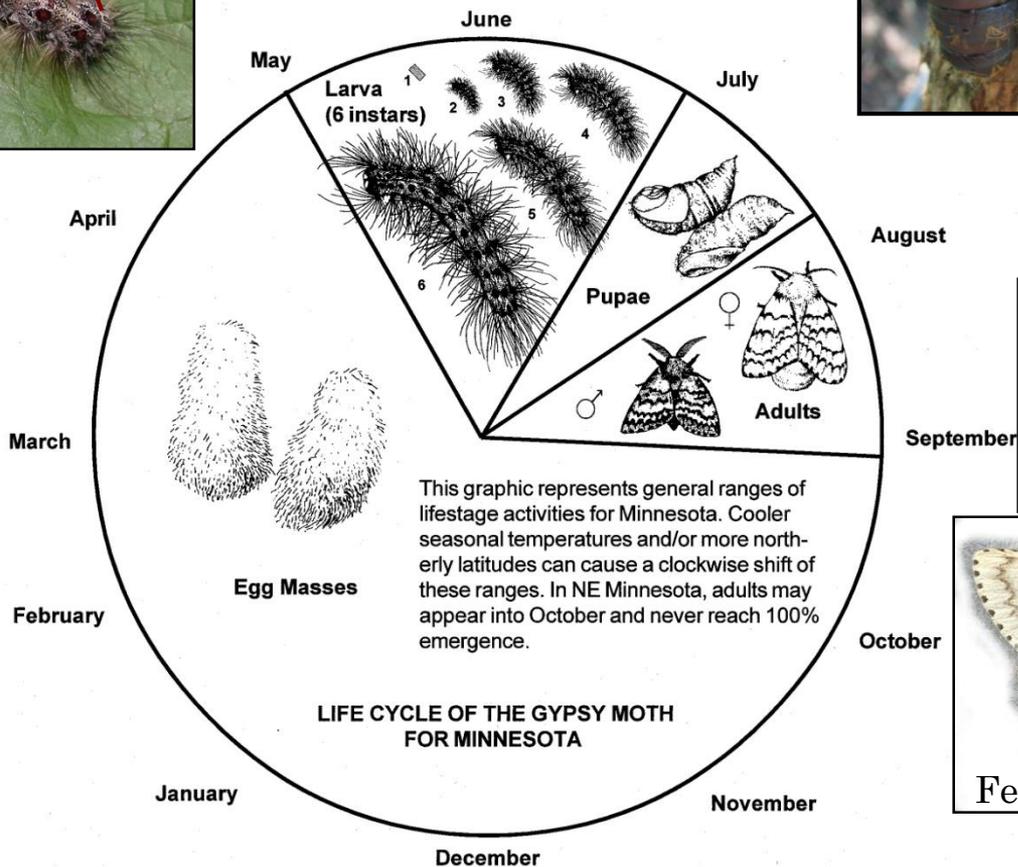
Adult



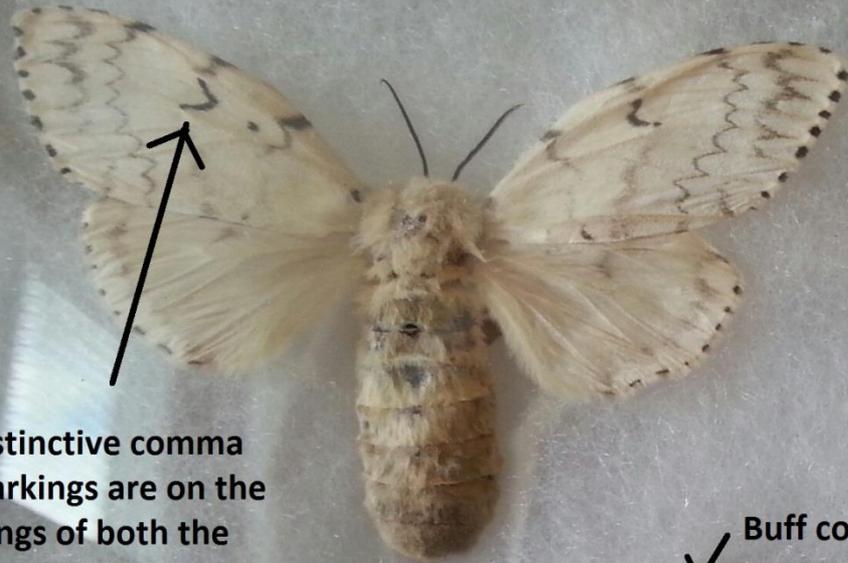
Male



Female



Gypsy Moth *Lymantria dispar*



Distinctive comma markings are on the wings of both the female and male adult moths.



Feathered Antennae



Buff colored egg mass can vary in size and shape.



Difficult to see here, but the pupae have golden hairs coming out of various places on the surface of the casing. Casing can be light to dark brown, sometimes with a purple hue. Males are smaller.

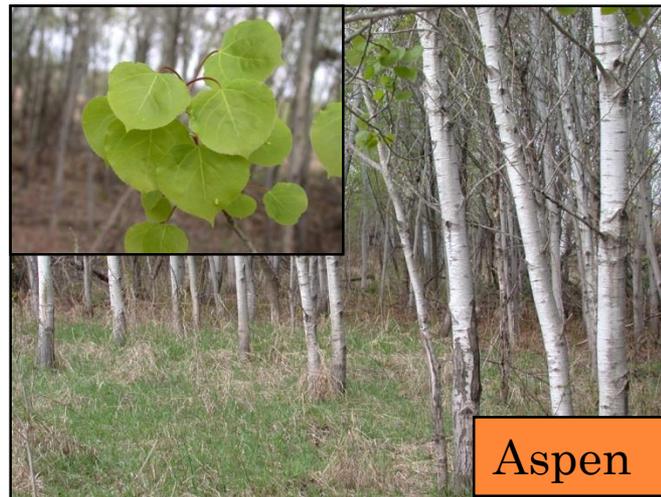
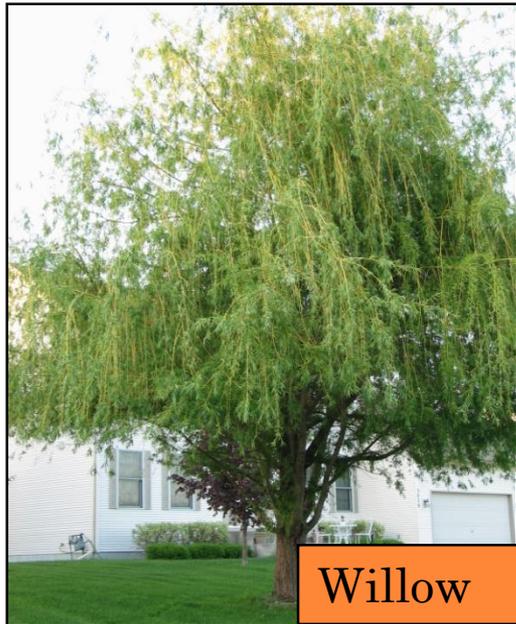


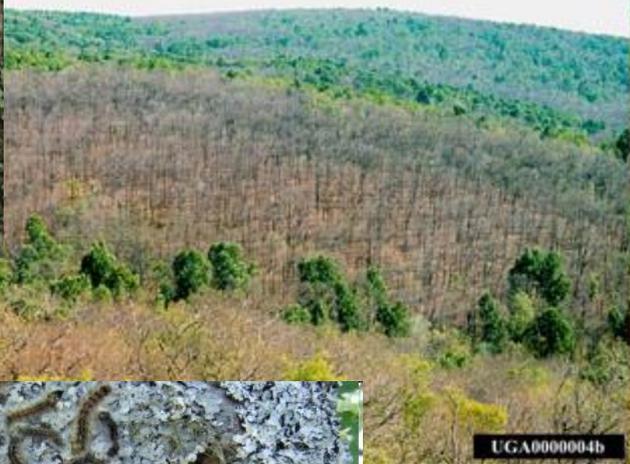
Adult ♀
Pupa ♀

Egg Mass

Adult ♂
Pupa ♂

PREFERRED HOSTS OF THE GYPSY MOTH





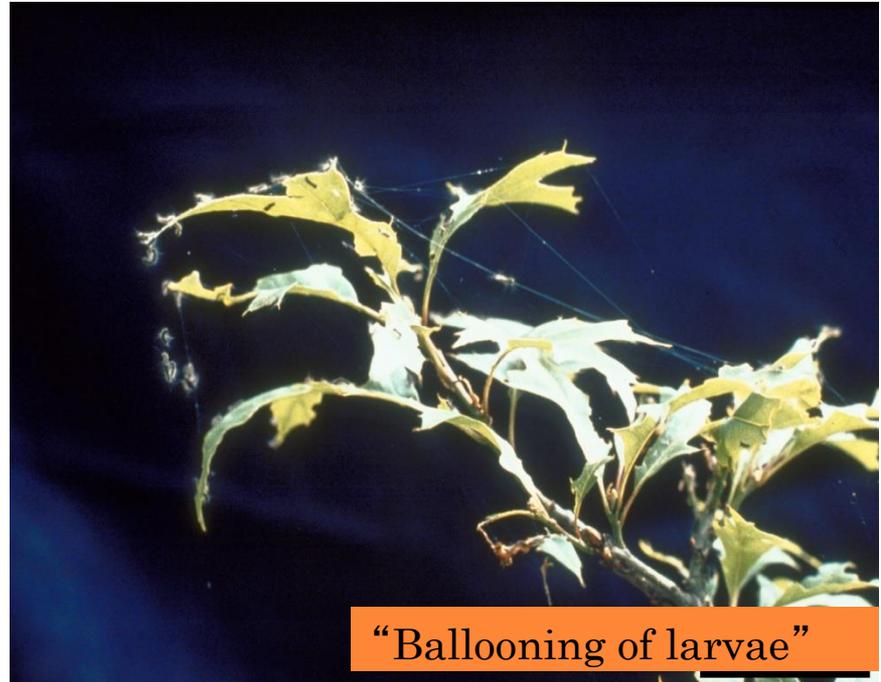
UGA0796082

LIMITED NATURAL SPREAD RATE

- 1 ¼ miles per year due to larval dispersal.
- Female moths do not fly.



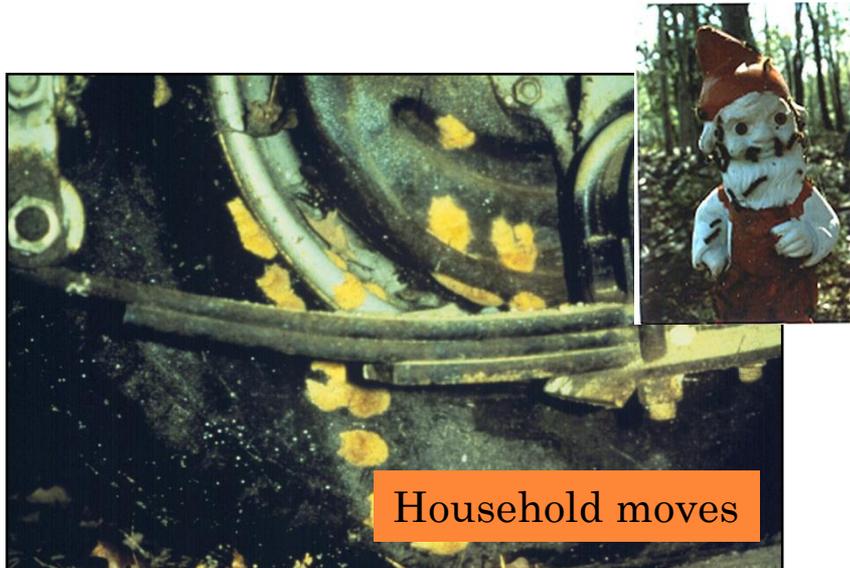
Female gypsy moth laying egg mass.



ARTIFICIAL SPREAD OF GYPSY MOTH



- Egg masses or other life stages are transported
- 13-16 miles per year (1960-1990)

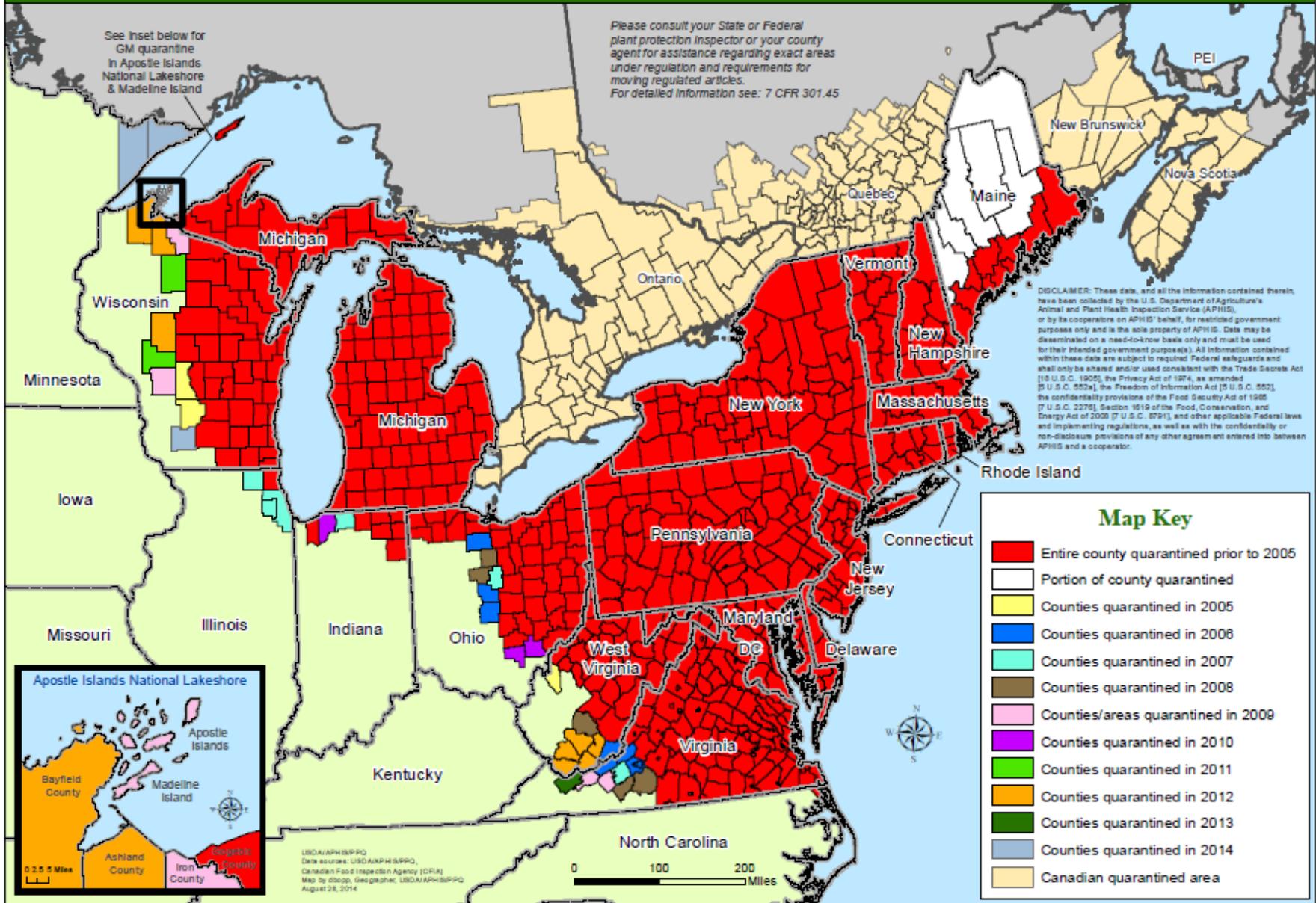


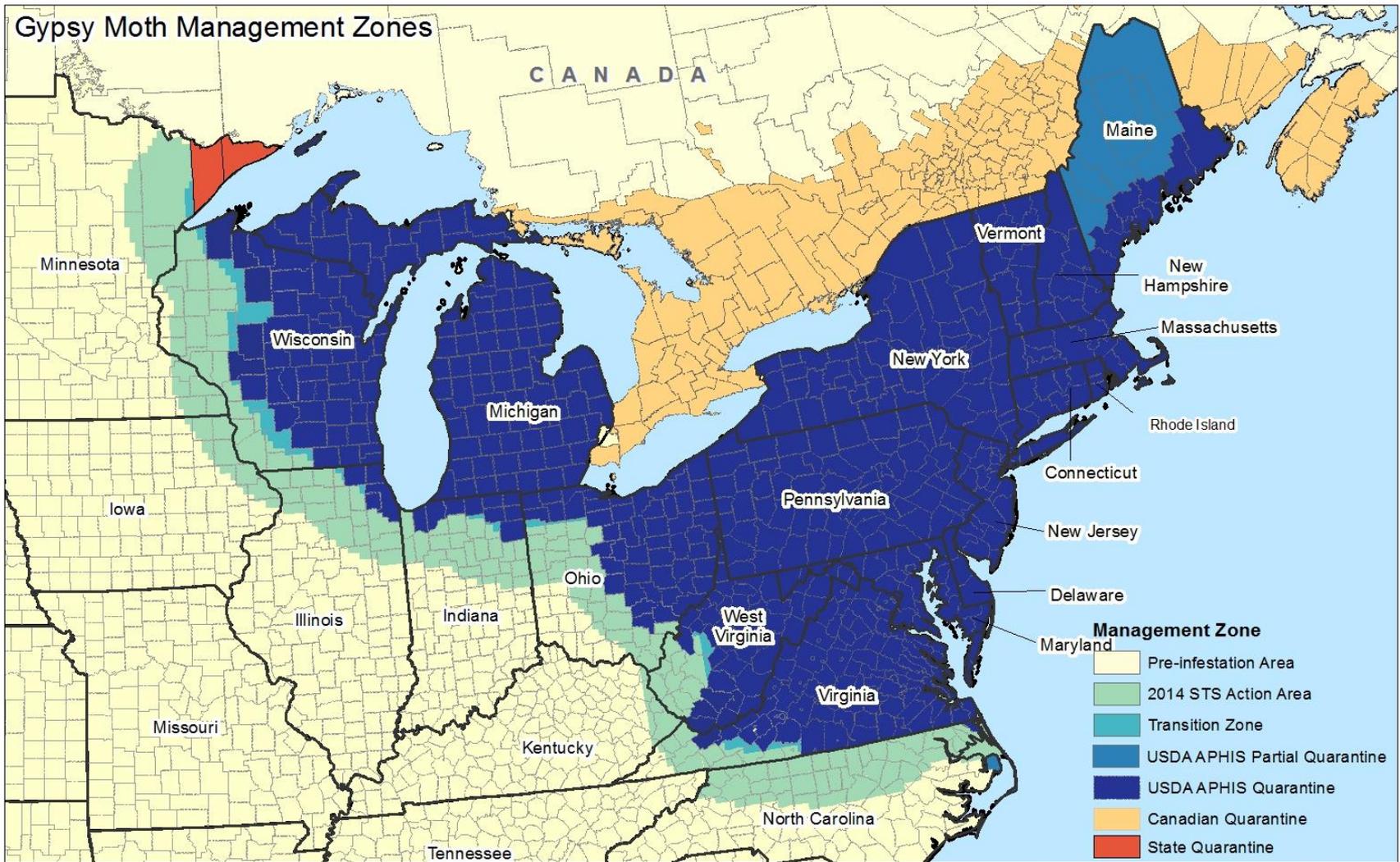


European Gypsy Moth (*Lymantria dispar*) North America quarantine

See inset below for GM quarantine in Apostle Islands National Lakeshore & Madeline Island

Please consult your State or Federal plant protection inspector or your county agent for assistance regarding exact areas under regulation and requirements for moving regulated articles. For detailed information see: 7 CFR 301.45

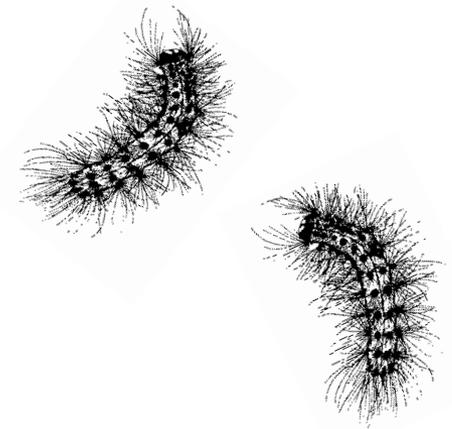




Quarantine Information Source: http://www.aphis.usda.gov/plant_health/plant_pest_info/gypsy_moth/downloads/gypmoth.pdf

Minnesota Department of Agriculture - Plant Protection Division (Updated: 7/20/14)

MANAGEMENT NATIONALLY



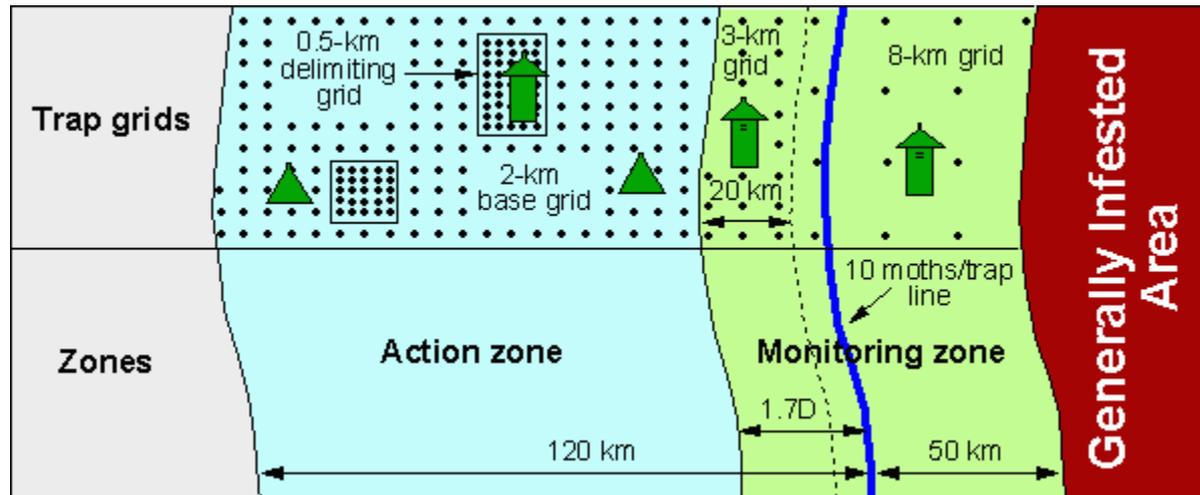
- Three strategies of gypsy moth management
 - Suppression: Gypsy moth population is established/reproducing
 - Treatments conducted to suppress population/decrease defoliation
 - Slow the Spread
 - Treat localized populations to decrease the general population spread to < 6 km per year
 - Eradication
 - Eliminate start up populations



SLOW THE SPREAD (STS)



- Federal Program through US Forest Service



- Barrier Zone Concept
- Goal is to limit spread to >5 miles per year
- www.gmsts.org – DA (Decisions Algorithm)



MINNESOTA'S COOPERATIVE GYPSY MOTH PROGRAM

○ *State Partners*

- MN Department of Agriculture
- MN Department of Natural Resources
 - University of Minnesota

○ *Federal Partners*

- USDA APHIS Plant Protection & Quarantine
 - USDA Forest Service
- Gypsy Moth Slow the Spread Foundation



MOTH PROGRAM AREAS

• SURVEY



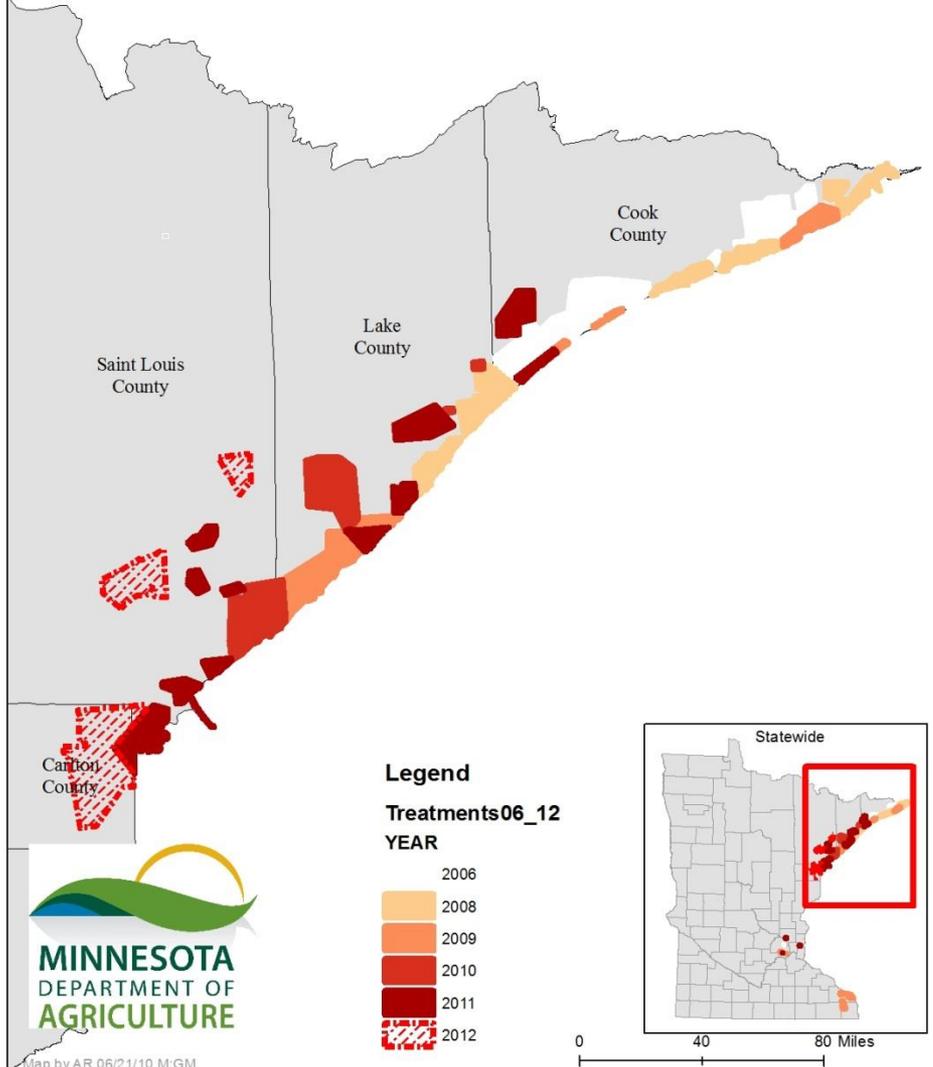
• TREATMENT



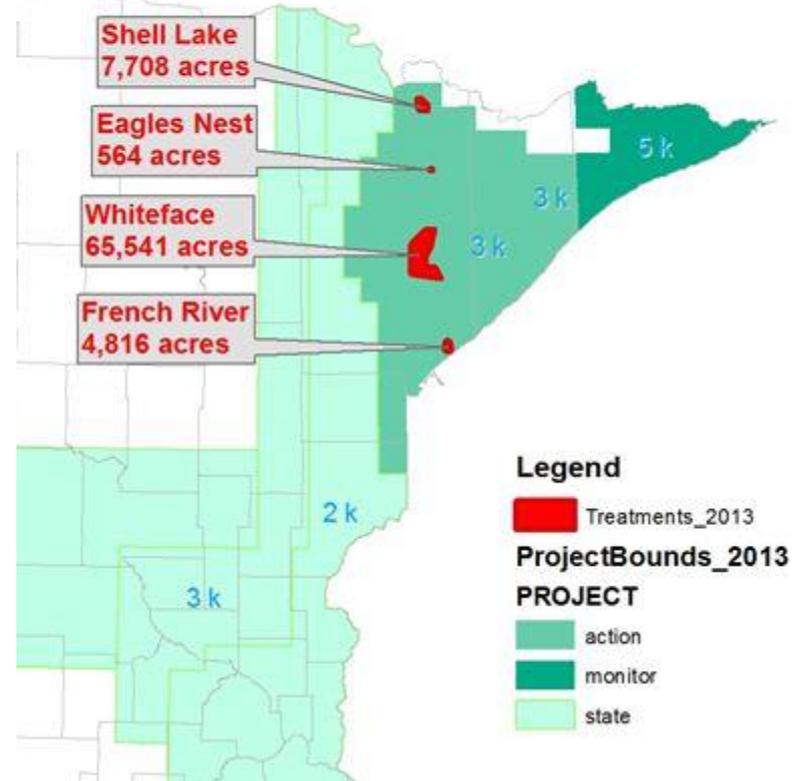
• REGULATORY



Gypsy Moth Treatment History Along the North Shore 2006-2012



2013 Gypsy Moth Treatments



FALL EGG MASS SURVEYS



- Conducted at the end of the trapping season.
- Used to determine if reproducing population exists.



PARK

*CASTLE DANGER (N. OF TWO HARBORS),
MN*



Photo Credit: Jonathan Osthus, MDA





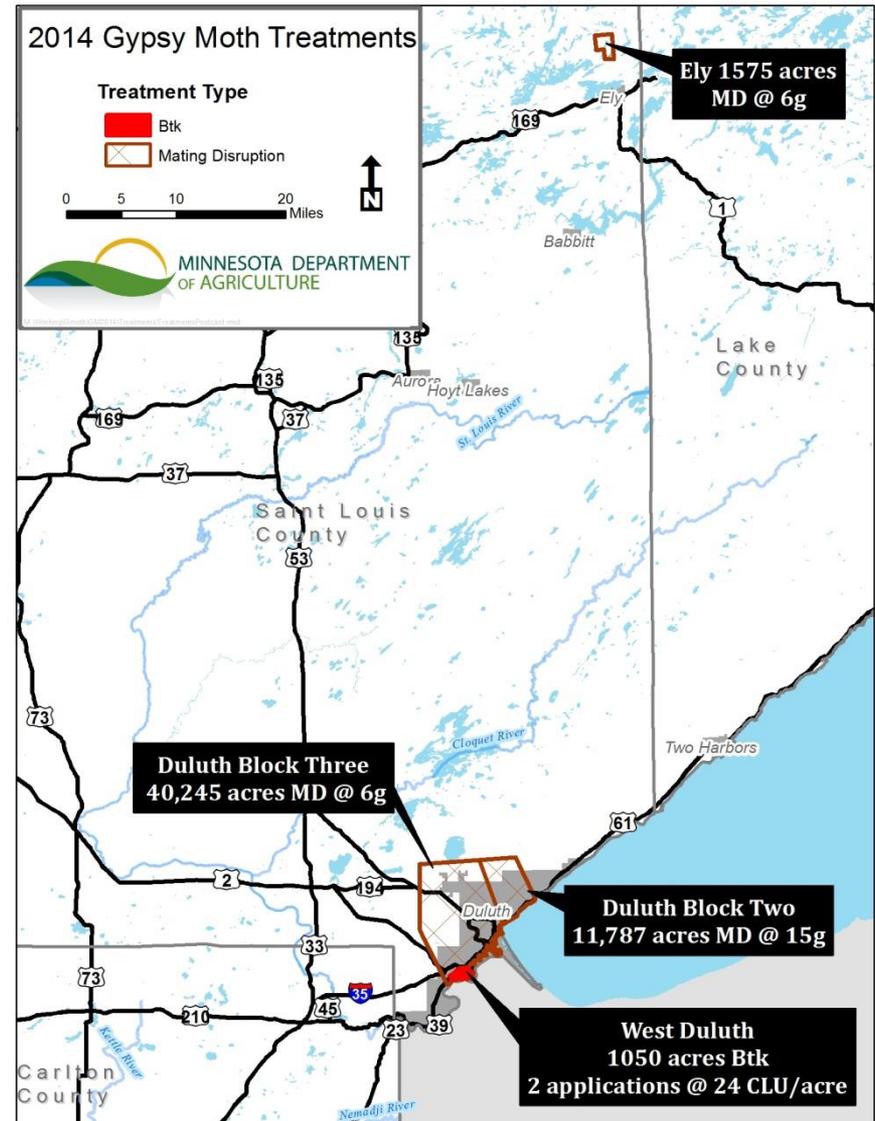
Look at the pretty...EGG MASS!

*PHOTO CREDIT: COOK COUNTY INVASIVES TEAM,
2013*



2014 GYPSY MOTH TREATMENTS

- Four blocks identified in St. Louis County
- All within the STS Action Area
- Total acres= 54,657
- Two products were utilized—targeting different life stages of development
 - Biological Insecticide— larval stage
 - Mating Disruption- moth stage
- Environmental Assessments conducted to select the least environmentally impacting product available.



BIOLOGICAL INSECTICIDE TREATMENT



○ *Bacillus thuringiensis var. kurstaki* (Btk)

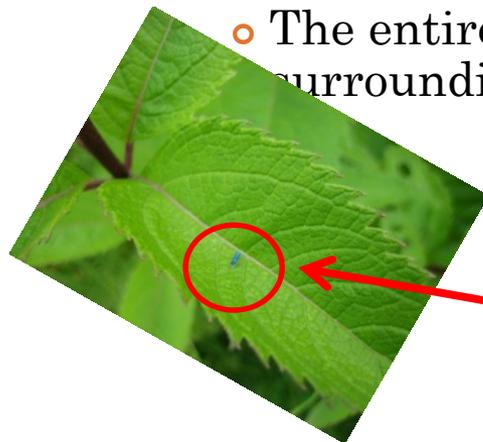
- Applied when caterpillars are in the first or second instar of development
- Sensitive to sunlight/heat will only persist of foliage for 3-7 days
- Crystalline proteins formed by naturally occurring bacteria
- Commonly used in organic gardening
- Applied aerially with a low flying fixed-wing aircraft
- One block in West Duluth- 1050 acres
- 2 application were conducted
 - First application -Fri. June 13 perfect weather!
 - Second application- Mon June 23 & Thurs June 26; delayed due to weather (fog).
- Treatment success is currently being evaluated by our survey program



MATING DISRUPTION

○ Disrupt II

- Applied before moths begin to fly and look for mates
- Interrupts mating, moths die before mating occurs
- Specific to gypsy moth-dispersed by small plastic flakes
- Two –three flakes per square foot
- Applied aerially by fixed wing aircraft
- 2014 application conducted on July 28 & 29
- 1 large block surrounding the city of Duluth and a smaller block north of Ely-53,607 acres
 - Perfect weather, completed over 40,000 acres in one day.
 - The entire city of Duluth and surrounding townships

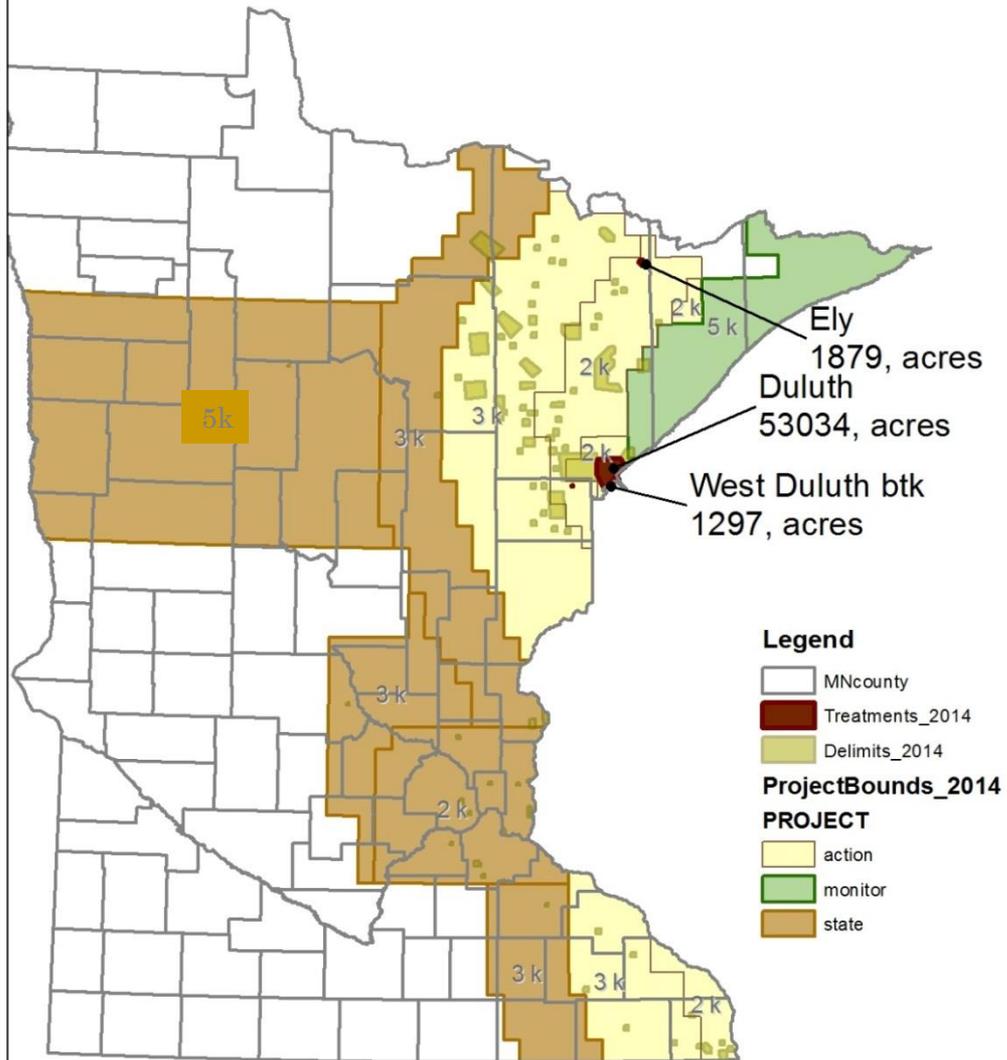


Flake



2014 Proposed Gypsy Moth Program Plans

As of 11/27/2013 ar



2014 GM Trapping Survey

- 15,154 traps planned; ~14,000 set
- 25 trapping routes; 3 LW areas
- AGM route (Farm Bill; North Shore)
- Asian Defoliator Trapping (Farm Bill)
 - Twin Cities Metro (20 sites)
 - Port of Duluth (10 sites)
 - International Falls (2 sites)
- Western Rotation was funded
- ~500 moths = preliminary, estimated statewide trapping total
- Most catches were in the STS area.

Egg Mass Hunts

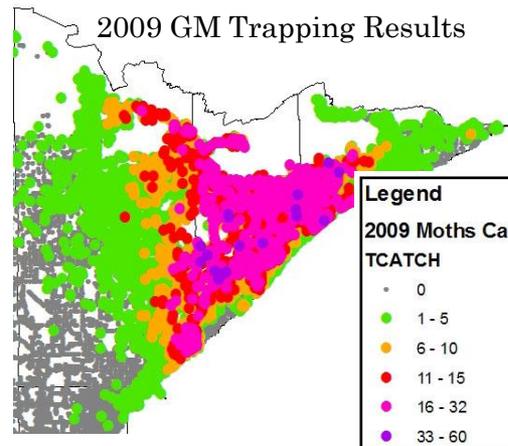
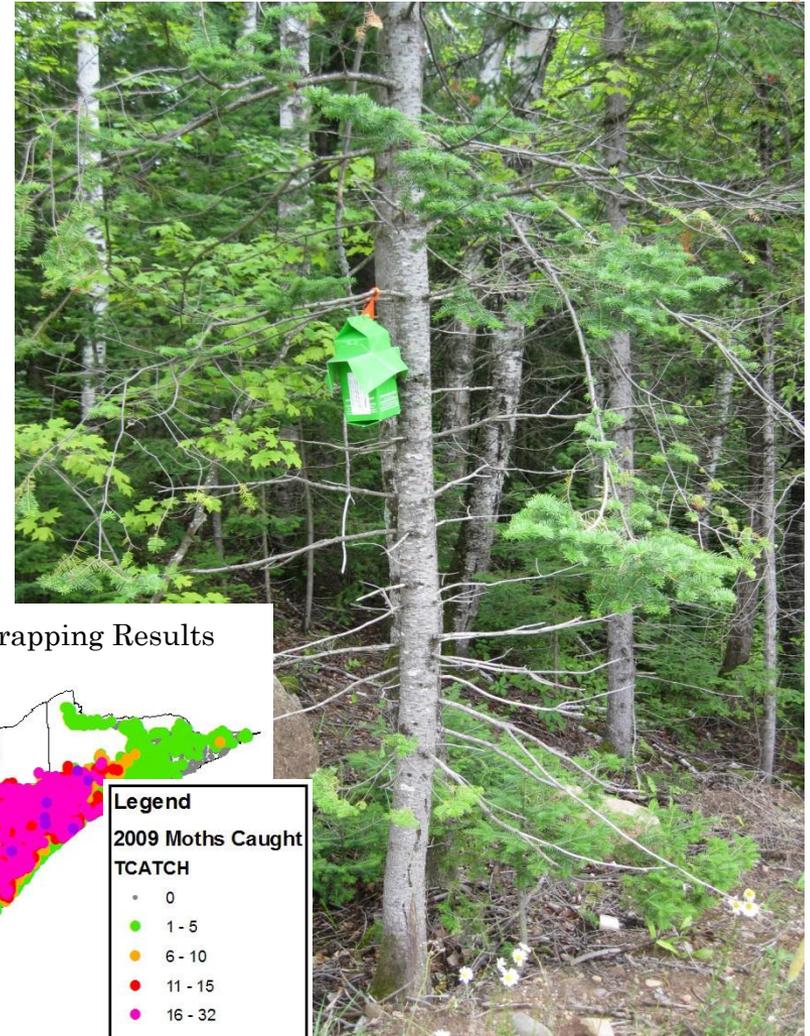
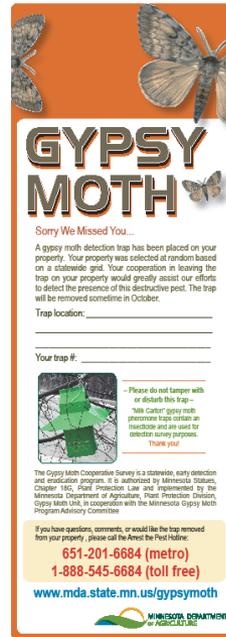
- Low trap catches = not many places to hunt!
- Northern egg hunts are happening right after this conference!
- Egg masses found in Anoka County
 - Residential
 - A likely 2015 Btk treatment (eradication)



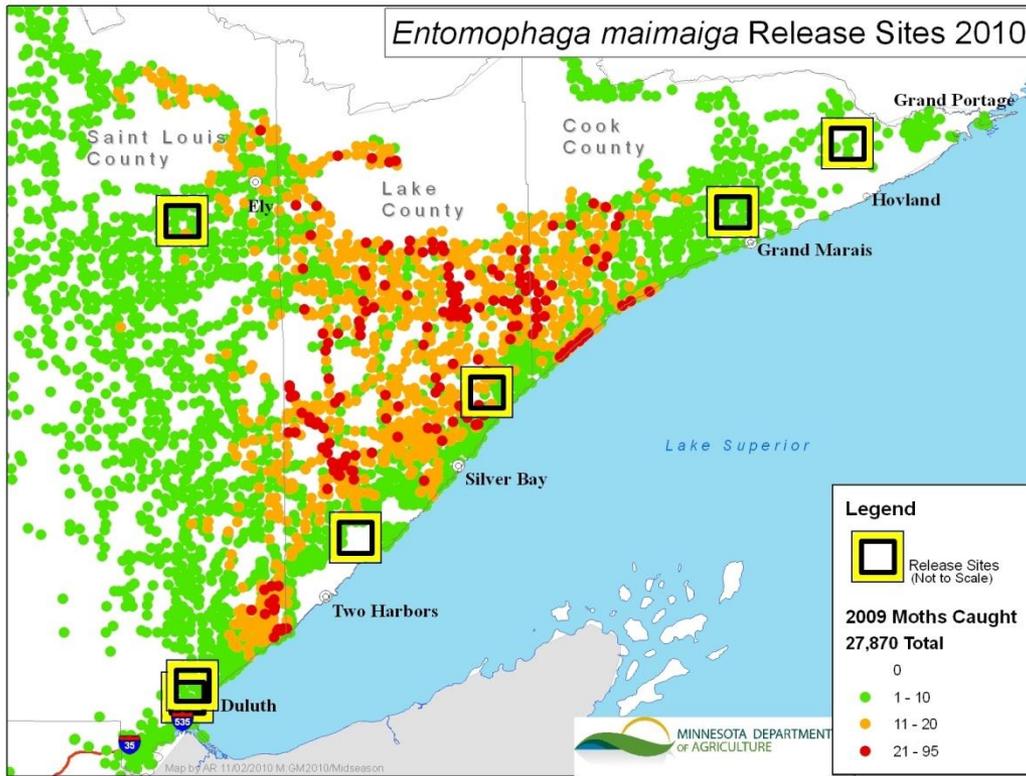
ARROWHEAD REGION OF NE MINNESOTA

Milk Carton Trap

- There has been a persistent influx of moths inland from the north shore of northeastern MN since the “wave” that came through in 2009. This has since implemented some changes.
- Milk Carton Trapping – bigger traps accommodate for more moths in Cook County and select areas of Lake County.
- 2012 Trapping: The STS Action Area trapping density was changed due to budget cuts – 2K to 3K base grid (traps spaced further apart).
- Post 2012 Trapping: STS will not be treating in Cook County anymore since the STS Action Area has passed through the area, leaving it in the STS Monitoring Area with a 5K trapping grid for 2013. The next phase would be “Generally Infested Area”.
- Post 2012 Trapping: **Quarantines are likely in the near future for Cook & Lake Counties.** We have criteria to determine where and when quarantines will occur.

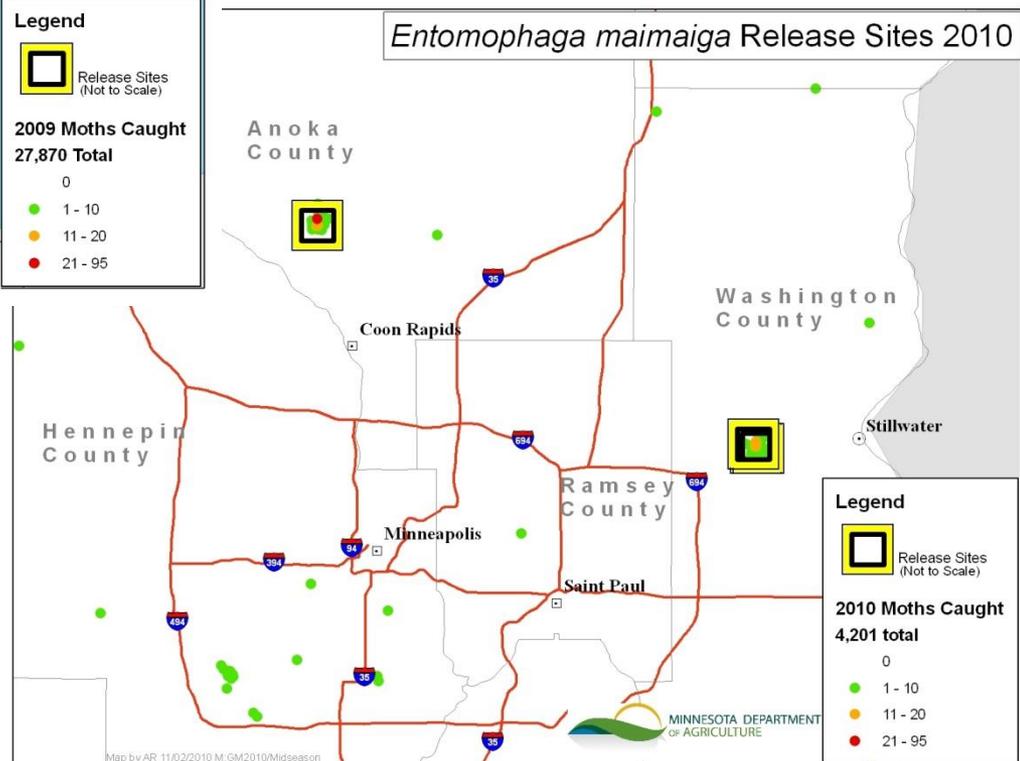


Entomophaga maimaiga Release Sites 2010



Biocontrol Releases Monika Chandler, MDA

Entomophaga maimaiga Release Sites 2010



Natasha Northrop

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651-201-6692 (office)
natasha.northrop@state.mn.us

Website: www.mda.state.mn.us/gypsymoth

Arrest the Pest (*report gypsy moth in MN*)

Toll Free: (888) 545-6684

gypsy.moth@state.mn.us



MINNESOTA DEPARTMENT
OF AGRICULTURE

