

National Gypsy Moth Slow the Spread Program



State and Federal agencies and a non-profit foundation collaborate in a national integrated pest management (IPM) program, Slow the Spread (STS), to slow the rate of spread of the exotic gypsy moth and limit its impacts. The program was developed in 2000 and now spans eleven states (Illinois, Indiana, Iowa, Kentucky, Minnesota, North Carolina, Ohio, Tennessee, Virginia, West Virginia, Wisconsin).

GYPSY MOTH BIOLOGY



Female gypsy moths lay buff-colored egg masses on any vertical surface, which contributes to their spread.

Caterpillar egg hatch (inset) is synchronized with bud break in the spring. Mature caterpillars have red and blue-colored spots along their back.



Adult female moths (white) are flightless. Males (brown) find and fly to females using a sex pheromone.

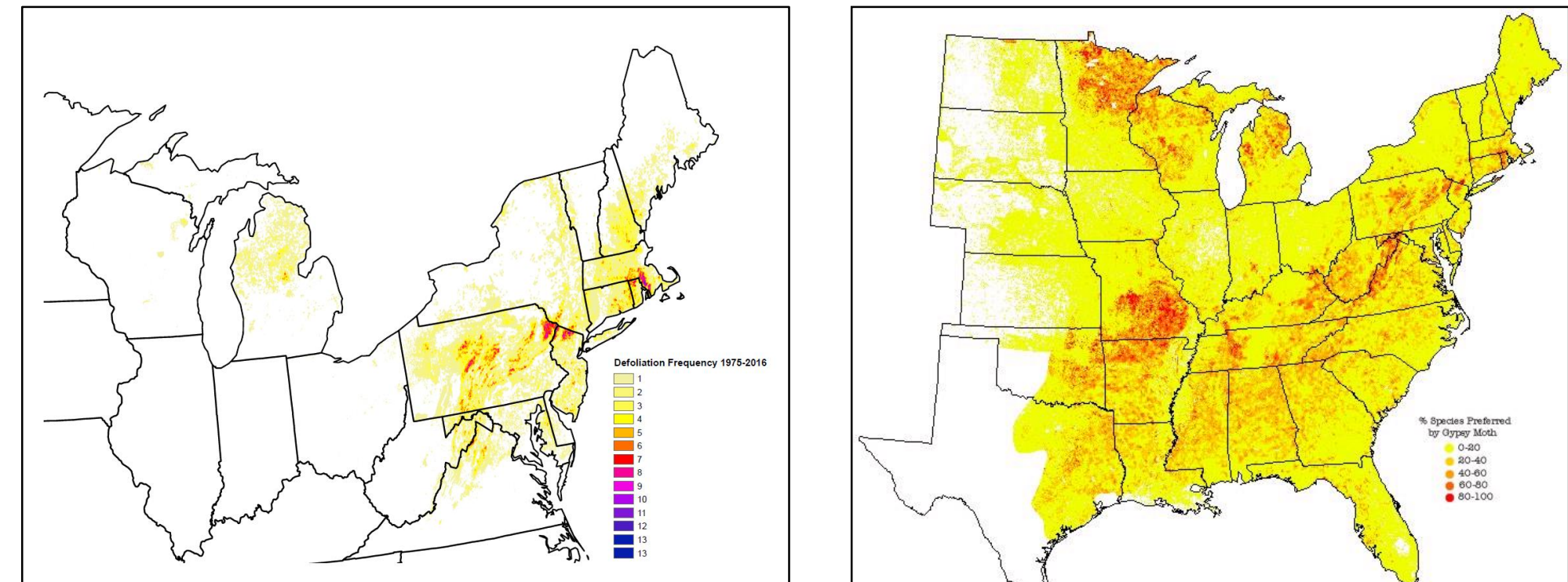
Pupae can be found mid-summer affixed to trees in bark cracks and crevices.

IMPACTS



Caterpillars can defoliate an entire tree during outbreaks. Tree mortality often occurs following several consecutive years of severe defoliation.

Oaks stripped bare of leaves during a gypsy moth outbreak in Ohio. Notice the uninjured trees (species not palatable to gypsy moth) in the background.



Historical gypsy moth defoliation events in the Northeastern U.S. Oak-dominated forests are affected most by this exotic pest.

Distribution and abundance of preferred host species in the eastern U.S. Red-colored areas note higher percentage of host species.

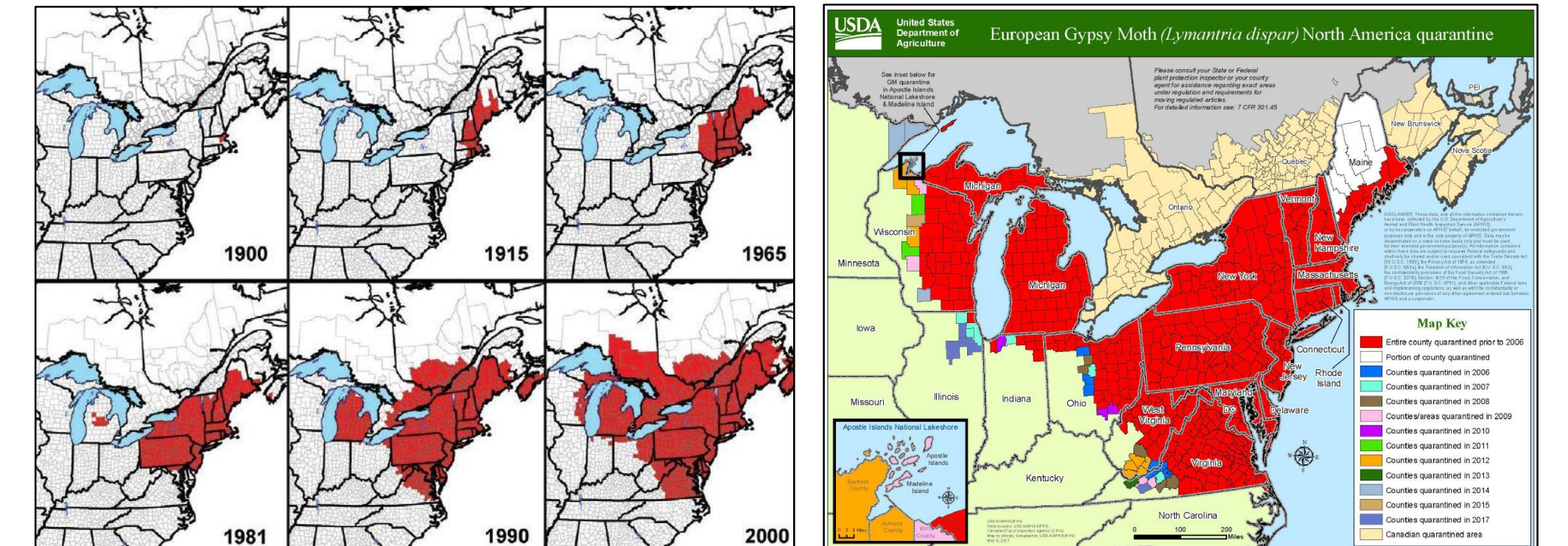
Gypsy moth outbreaks can kill trees, affect aesthetics for high-value trees, and hairs from caterpillars can cause allergic and respiratory reactions. Since the 1920's, gypsy moth has defoliated >95,000,000 acres. The greatest economic impacts are the cost of suppression treatments, loss of forest resources, and quarantine costs.

INTRODUCTION AND SPREAD



Young caterpillars disperse by spinning silken strands that are caught by the wind, called "ballooning."

Egg masses can be laid on any substrate. During outbreaks, egg masses are easily moved on vehicles and lawn furniture and tools.



Over the last century, gypsy moth has spread from its point of introduction in Massachusetts to several Midwestern and Southern States.

The number of new quarantined counties (various colored counties on the map) has declined with the continued monitoring and treatments from STS.

Gypsy moth populations can spread naturally over short distances, or be transported long distances by people. Egg masses and other life stages are commonly moved out of quarantined areas unknowingly to uninfested areas. Inspect vehicles, trailers, and household goods when leaving quarantined areas.

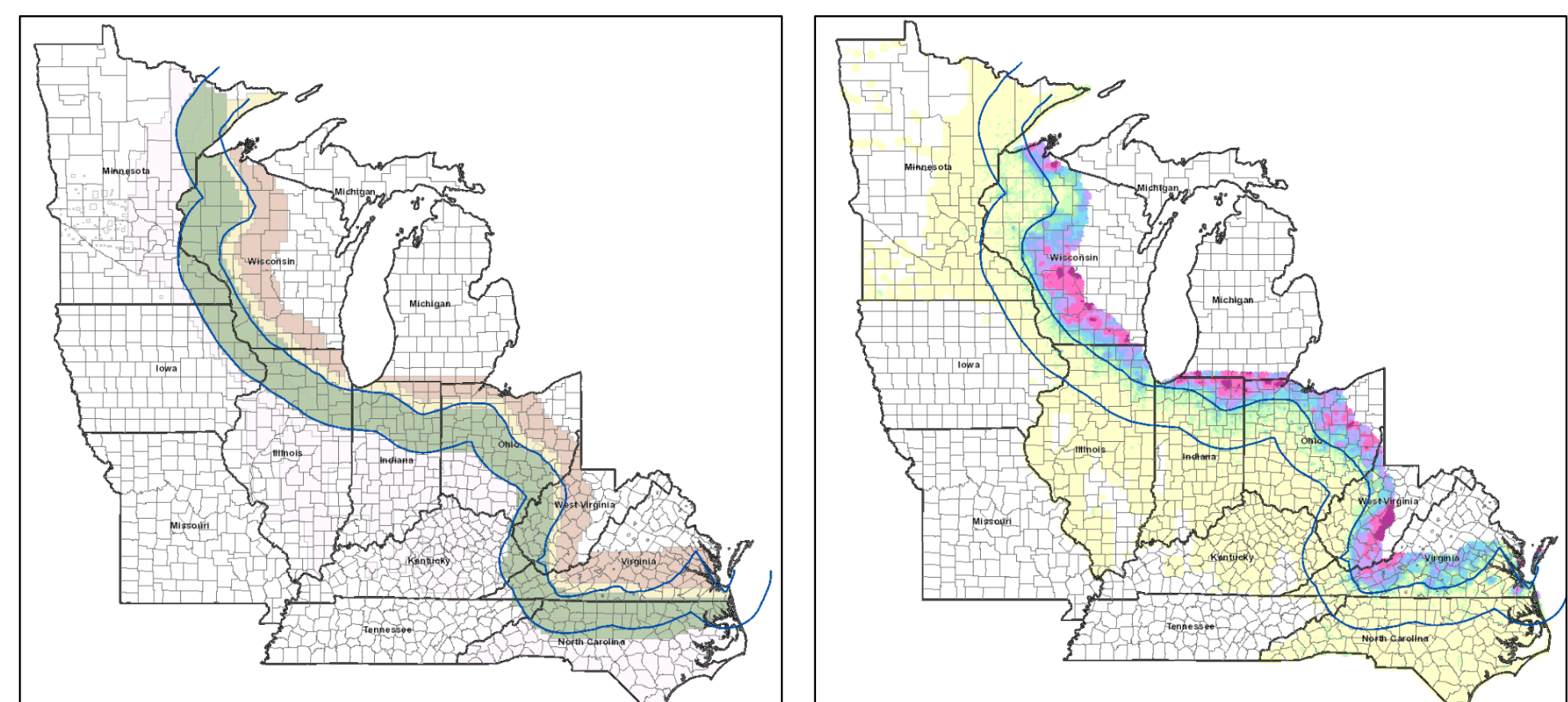
Gypsy moth, *Lymantria dispar*, was introduced in the late 1800's to the U.S. from Europe. The moth has one generation a year and progresses through four life stages (egg, caterpillar, pupa, and adult). Gypsy moth caterpillars are the damaging life stage and can feed on >300 trees and shrubs. The caterpillars prefer to feed on oak trees.

MONITORING



Delta traps are used to monitor low density (<5 moths per trap during a season) gypsy moth populations. Annually, ~60,000 traps are monitored in the STS program area.

High density (>5 moths per trap during a season) populations are monitored with milk carton traps. Traps are placed for approximately two months during the moth flight period in mid-summer.

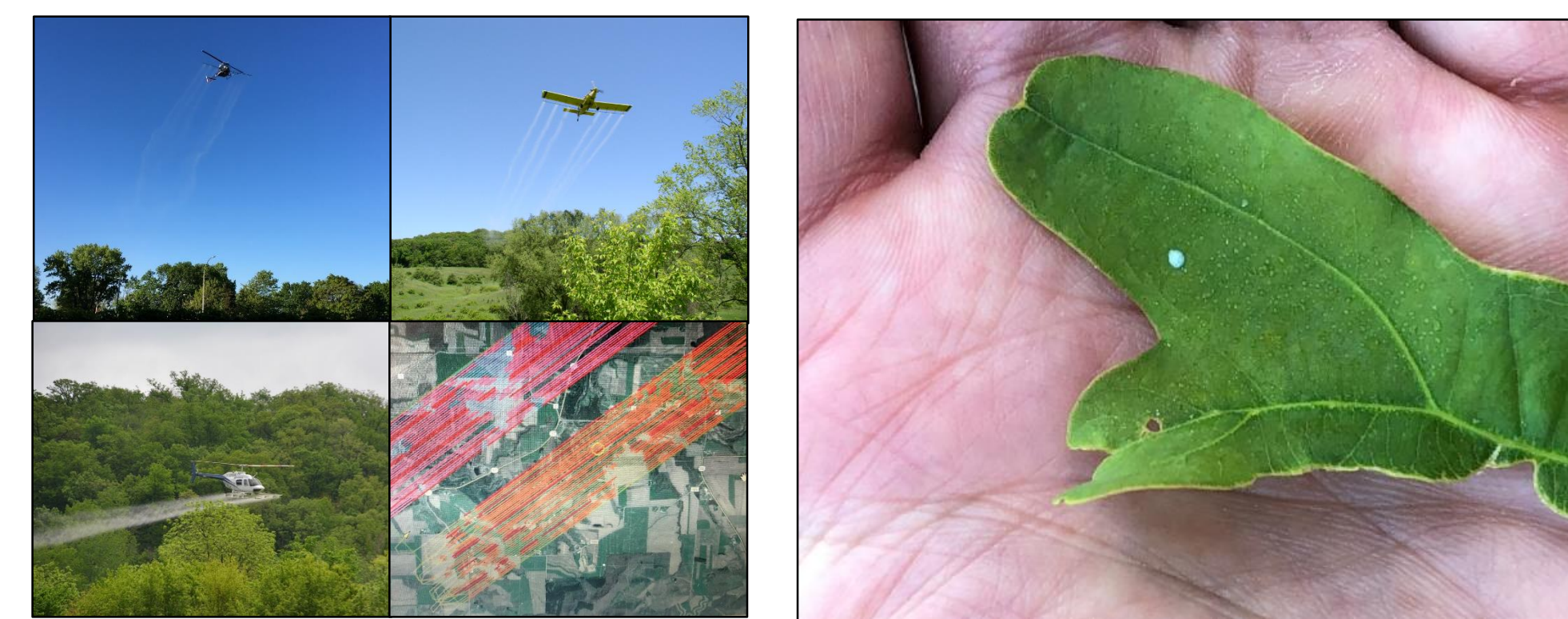


The STS program is composed of three monitoring zones. Two zones are placed in the quarantined area (pink and yellow) and one in the transition area, called the action area (green).

Milk carton traps in the monitoring I and II zones help model population growth (blue and purple) and direct treatments the following year.

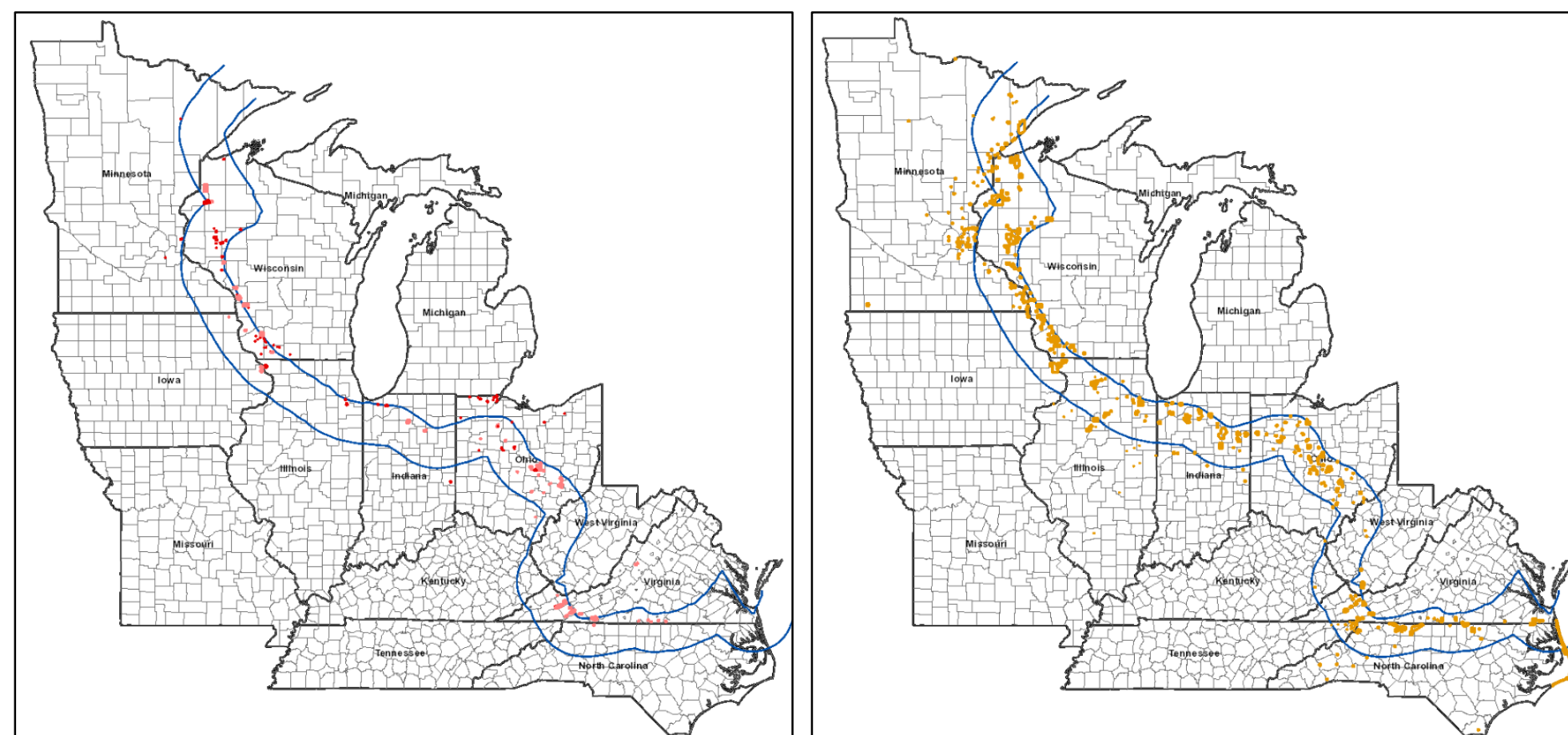
Trap captures of male moths are the foundation for the program. Highly effective pheromone-baited traps allow us to detect new low-density populations, monitor population growth in quarantined areas, and model the rate of spread of gypsy moth.

TREATMENTS



Fixed-wing and rotary-wing aircraft are used to apply treatments to suppress gypsy moth populations. Aircraft apply treatments at low elevation, 100-200 ft above the ground. Aircraft are tracked during applications to monitor treatment progress (bottom right).

Approximate size of a SPLAT-Gypsy Moth Organic droplet on a leaf. SPLAT-Gypsy Moth Organic is the consistency of a thick lotion. The treatment uses a synthetic version of the female's sex pheromone, similar to the compound used in the traps, to prevent males from locating females and mating.

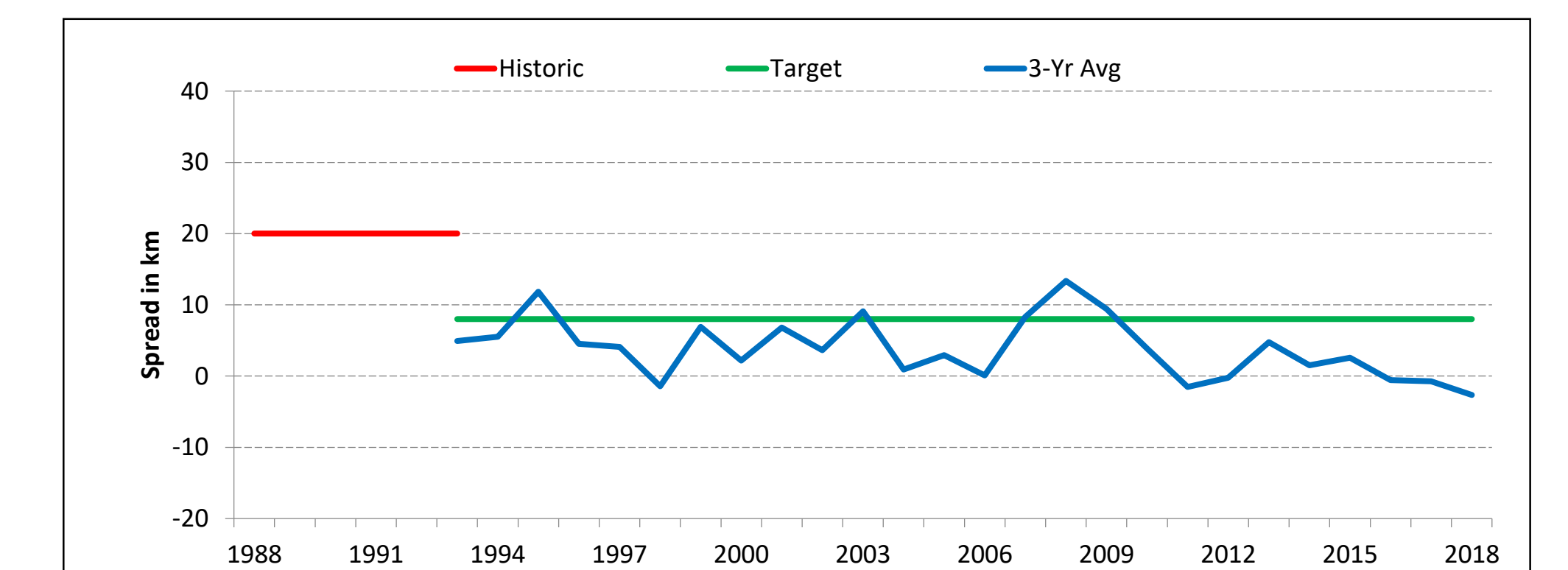


Treatments are mostly directed at populations within the action area (blue lines) of STS. Mating disruption (pink areas) and *Btk* treatments (red areas) are the two predominant treatments utilized in STS.

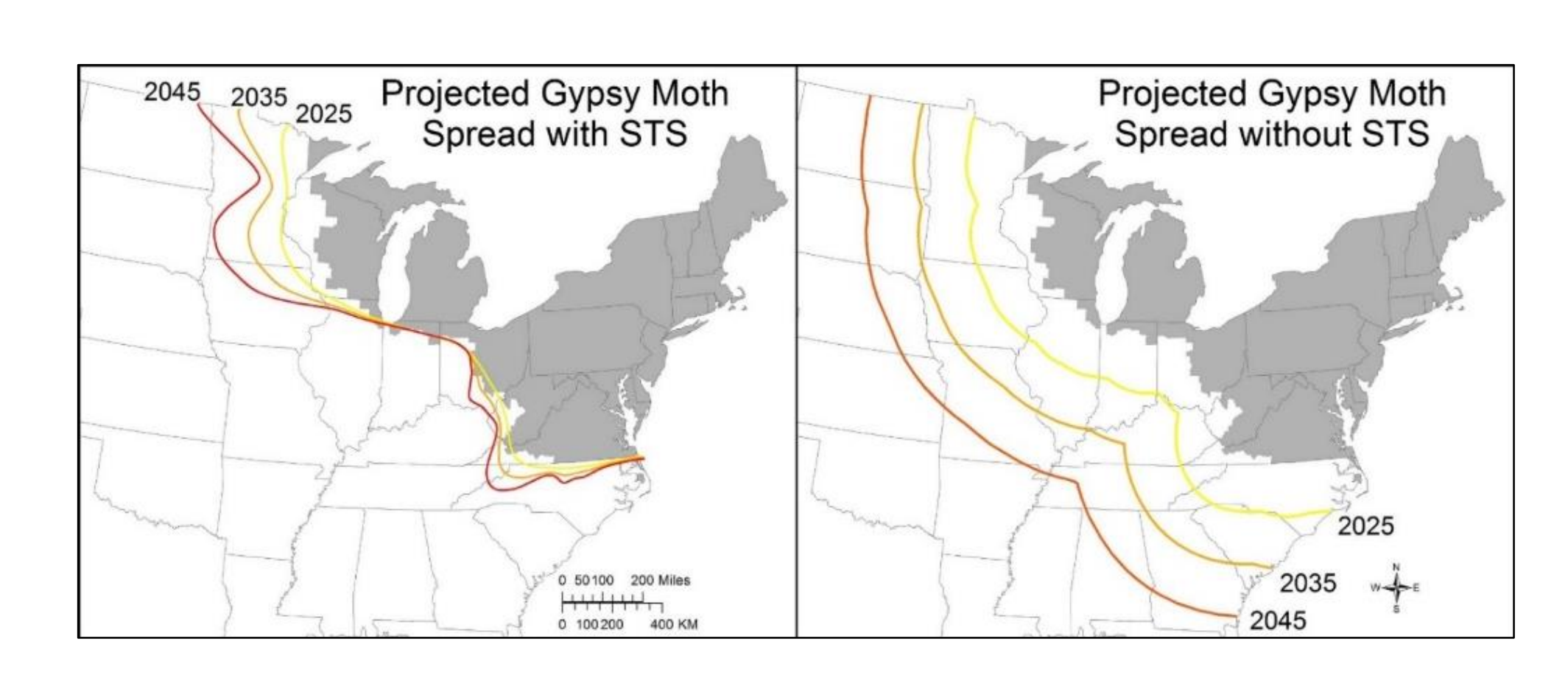
Delimit grids of delta traps (gold areas) are used to delineate new populations in the action area and evaluate treatment success. Average treatment success is between 80 and 90%.

Two treatments, mating disruption and *Btk*, are commonly used to suppress gypsy moth populations. Both are organically certified, and mating disruption is specific to gypsy moth with no non-target effects. Mating disruption accounts for >90% of all treatments. Treatments fluctuate around 300,000 acres annually.

SUCCESS OF THE PROGRAM



STS has successfully met its goal of reducing the rate of spread of gypsy moth by >60% (<8 km/yr) from its historical rate of spread (20 km/yr) throughout the pilot program (1992 to 2000) and the national program (2000 to present).



Over the next 25 years, the projected spread of gypsy moth without STS (right) will impact more Midwestern and Southern States, whereas the projected spread with STS (left) will vary little from the current distribution, except in Minnesota and the Appalachian Mountains.

STS is one of the world's most successful IPM programs. Collaboration between state and federal agencies has successfully reduced the spread of gypsy moth and offered a benefit-to-cost ratio of 4:1 by delaying the onset of outbreaks and reducing management and quarantine costs, as well as losses in recreation and tourism.