



Hemlock Woolly Adelgid: An Invasive
Treatment Success?

MI Dept. of Agriculture & Rural
Development

John Hill, Regional Manager

A close-up photograph of a branch from a coniferous tree, likely a hemlock, showing dense, vibrant green needles. Several white, scale-like insects are visible on the brown bark of the branch, which is the subject of the text overlay.

Is this HWA?

Yes...



Is this HWA?

Hemlock Scale



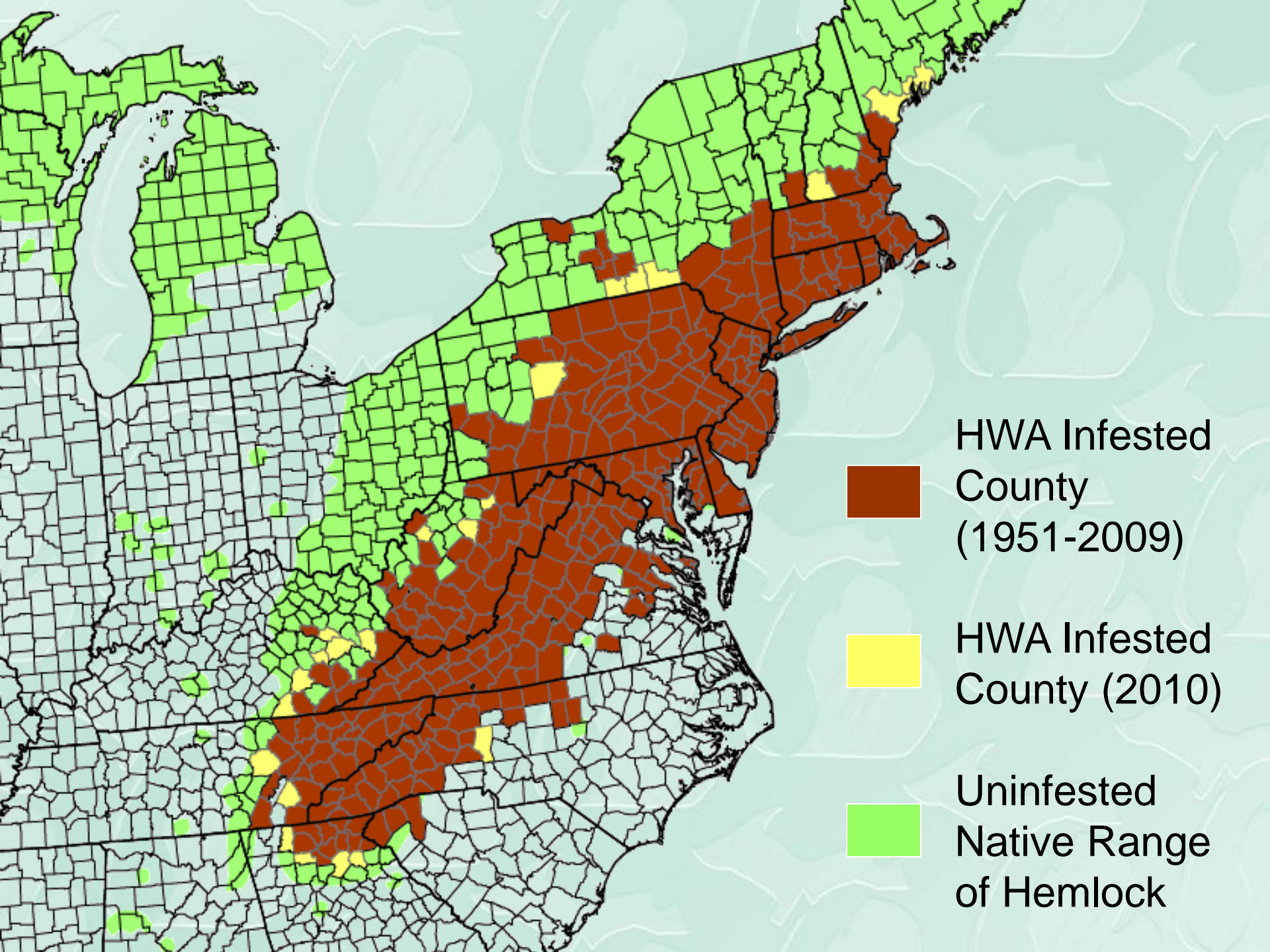
Is this HWA?

Spider Egg
Case

TREE INJURY AND SYMPTOMS

- ⊕ consumes sap from twigs, not needles
- ⊕ needles turn grayish green, lack of bud set or new growth
- ⊕ premature needle drop,
loss of tree vigor,
secondary attack by
scale and mites
- ⊕ death in 1 - 10 years





HWA Infested
County
(1951-2009)



HWA Infested
County (2010)



Uninfested
Native Range
of Hemlock



Close up of HWA cottony masses



Close up of live HWA crawler



Close up of live HWA eggs





Photo by Kathleen Shields, USFS

Michigan Hemlock Woolly Adelgid Quarantine



HISTORY

HWA ORIGINATED FROM JAPAN AND CHINA



First discovered in 1920's in western states

...no serious effects to western Hemlock



Found in eastern states in 1950's



Maine, Vermont, New Hampshire, Ohio, Wisconsin & Michigan have state quarantines

Areas Under Quarantine: “The List”

USDA Publication - List of Counties and States with Known Hemlock Woolly
Adelgid Infestations

Entire STATES of:

- Alaska, California, Connecticut, Delaware, Georgia, Kentucky, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, N. Carolina, Oregon, Pennsylvania, Rhode Island, S. Carolina, Tennessee, Virginia, W. Virginia, Washington & British Columbia, Canada

Regulated Articles:

- Seedlings, nursery stock
- Logs
- Lumber with bark
- Landscape bark, mulch

Restrictions:

Quarantined areas:

No shipments permitted

“...unless treated using a method approved by
the Director.”

...NONE AT THIS TIME

QUARANTINE SUPPORT!!!

Restrictions:

Non-Quarantined Areas

MUST HAVE a state phytosanitary certificate or Certificate of Quarantine Compliance (CQC) less than 7 days old sent to MDARD Lansing office.

May not be sold in MI until released by MDARD

- A. Originated from a non-quarantined area.
- B. Have not been held in an area under quarantine.
- C. Have not been exposed to regulated Articles from quarantined areas.
- D. Must maintain records of shipments for 36 months

Harbor Springs, MI many high value properties



Hemlock is a very popular landscape tree in NW MI



Communicate!!!
Unhealthy tree that
alerted Landscaper
to call MDA on
August 16, 2006





INSPECT!!!

Trees were determined to be infested with hemlock woolly adelgid. Originated from West Virginia.

Rapid Response!!!

Surveys conducted 7 days after initial contact found 4 sites positive for HWA



Investigate!!!

Shipping invoices
showed over 2000
hemlocks arriving
from West Virginia,
Maryland, Illinois,
North Carolina



Landscaper agreed to remove
infested trees
Communicate



Build your
Team!!!

HWA
Response
Group Site
Visit



HWA Response Team

MI Dept. of Agriculture & Rural Development

MI Dept. of Natural Resources

USFS

MSU

Local MSU Extension

Community leaders

Industry- Nursery, Logging



RAPID RESPONSE!!!

31 infested landscape and native hemlocks were removed on September 11, 2006





Trunk and branches cut up for disposal





Hemlock stump removal



Destroy!!! Hemlock Woolly Adelgid





Significant
native
hemlock
population up
to 30" dbh



TREATMENTS!!!

- **Chemical treatments of surrounding hemlocks**



Pesticides:

1. Soaps and oils

- work well when nymphs are active; one year of control

2. Contacts

- bifenthrin gives 2+ years control; can cause elongate hemlock scale flare-ups

3. Systemics

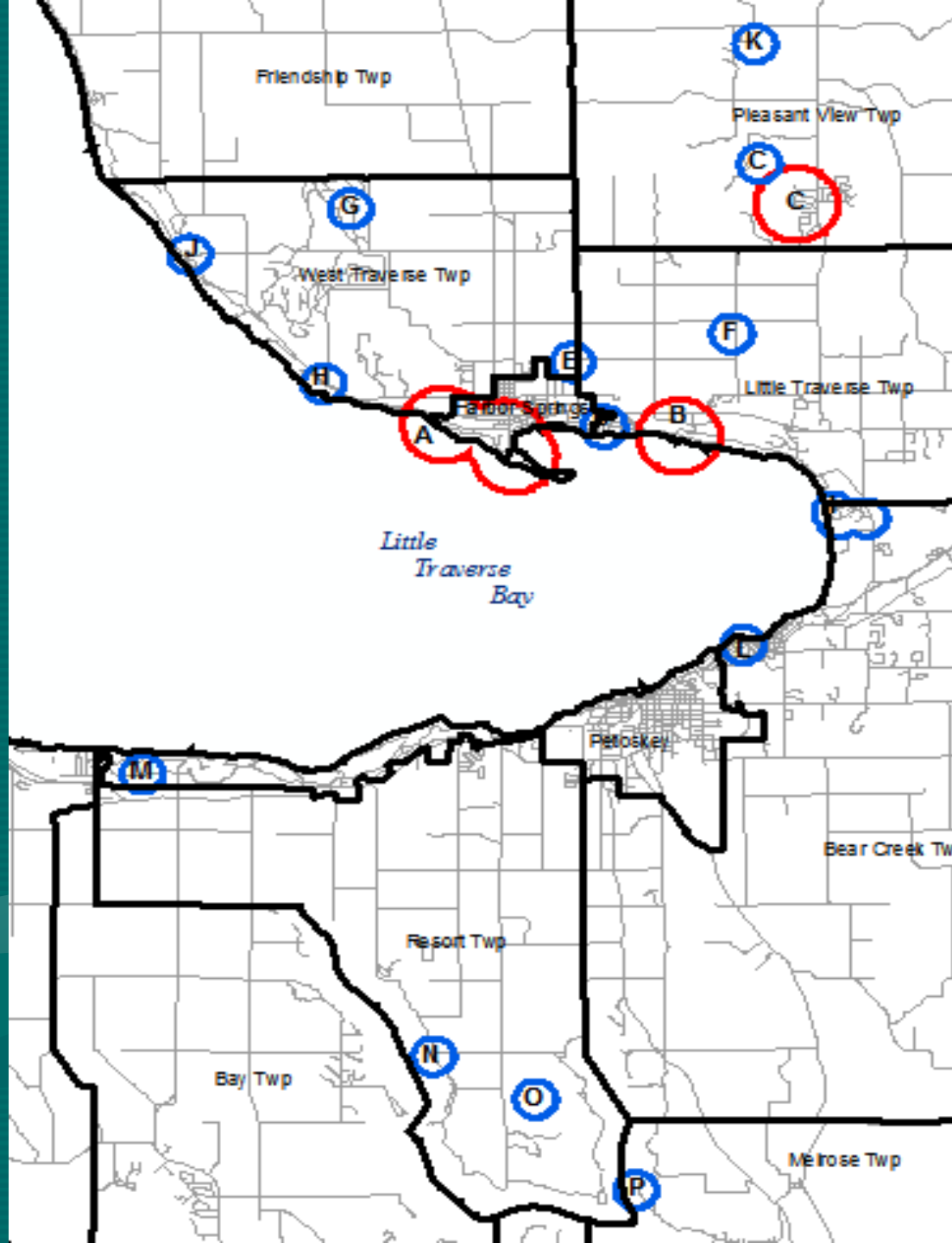
- imidacloprid, dinotefuran
- soil drenches, soil injections, foliar sprays, trunk injections, trunk sprays
- up to five years of control



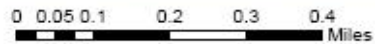
Survey!!!

An area wide survey was designed with guidance from HWA Response Team.





Site C



● Positive Site ● Invoice Site



SURVEY

300 trees/plot for positive invoice sites

Survey 4 sides of tree for ovisacs

100 trees for negative invoice sites

May 2007- 21050 trees on 440 10 acre grids

May 2008- 20150 trees on 440 10 acre grids

May 2009- 18650 trees on 436 10 acre grids



SUCCESS!

NO HWA found for three years by survey and treatments made to native trees adjacent to positive tree sites that were removed!

Or was it?



Invoice Tree Monitoring

- Hemlock trees initially inspected and found free of HWA not destroyed were monitored by local inspector annually.



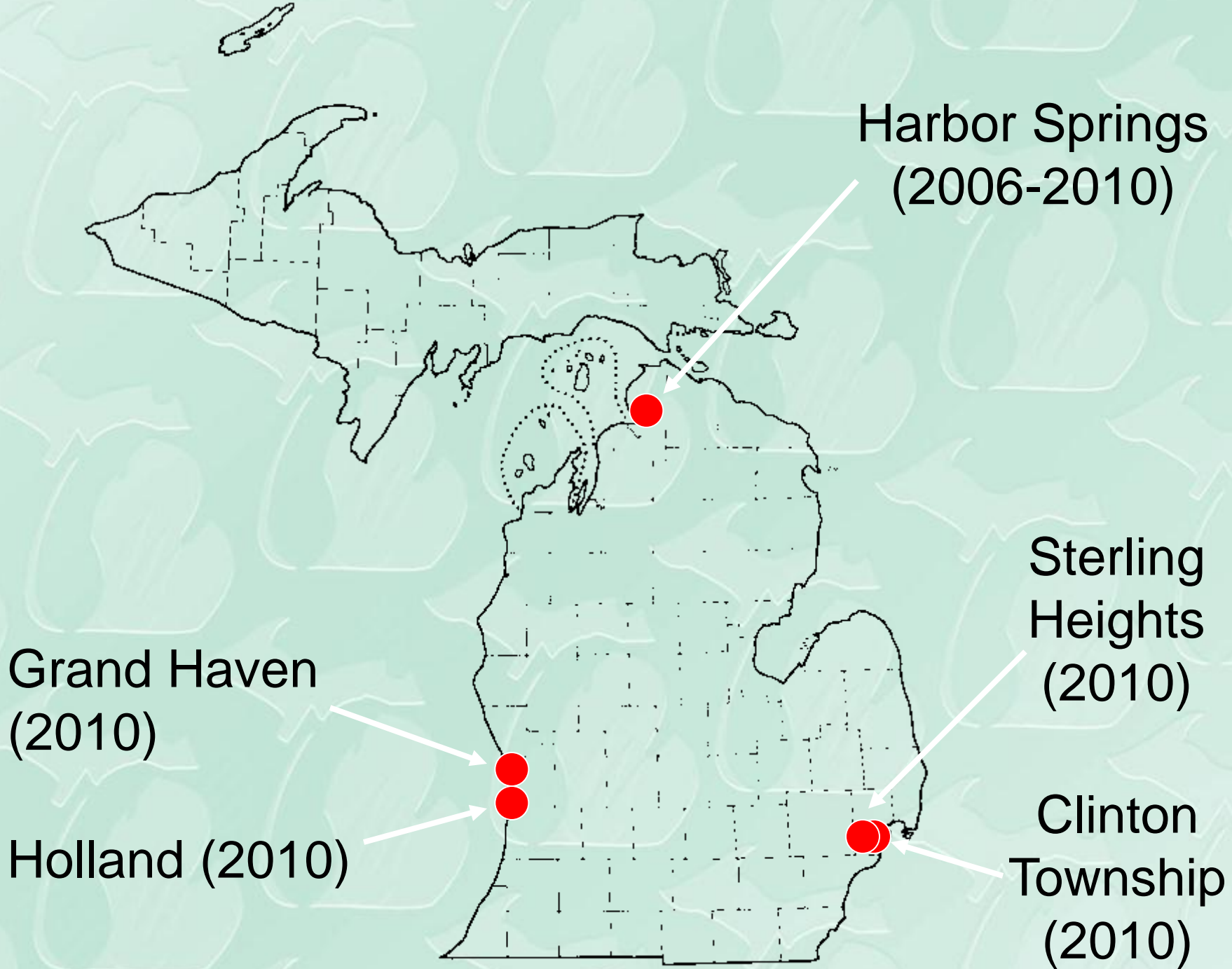
Sleeper cell HWA

- Routine follow up and monitoring discovered HWA on invoice tree previously thought to be free of HWA.



Back to Treat/Survey/Treat/Survey





TAKE ACTION

- *Build your Team-
assemble expert, locals, industry
- *Quarantine Support- strengthened after 2nd
introduction.
- *Communicate- State & local agencies,
mailings to nursery & pesticides firms (get
more trained eyes and ears in the field)

TAKE ACTION

*Educate- hold local informational meetings, keep the public/local authorities in the know

*Survey- Develop survey plan, implement and look long term for success

*Treatments-Plant pest destruction and chemical treatments must be considered

* Repeat the above steps for at least three years

Questions?

John Hill

Michigan Dept of Agriculture & Rural Dev.

231-922-5233

hillj1@michigan.gov