



INVASIVE SPECIES MANAGEMENT

SAINT LAWRENCE
EASTERN LAKE ONTARIO

SLELO PRISM

Wednesday, March 8th, 2023

1 PM - 2 PM EST

Via Zoom

Hemlock Conservation & Management

IN THE PATH OF HEMLOCK WOOLLY ADELGID



AGENDA

- Overview of Hemlock Woolly Adelgid & Current State
- Importance of Hemlock Trees
- Hemlock Conservation
- HWA Management
- Funding
- HWA in SLELO
- Volunteer Opps.
- Q&A





INVASIVE SPECIES MANAGEMENT

SAINT LAWRENCE
EASTERN LAKE ONTARIO

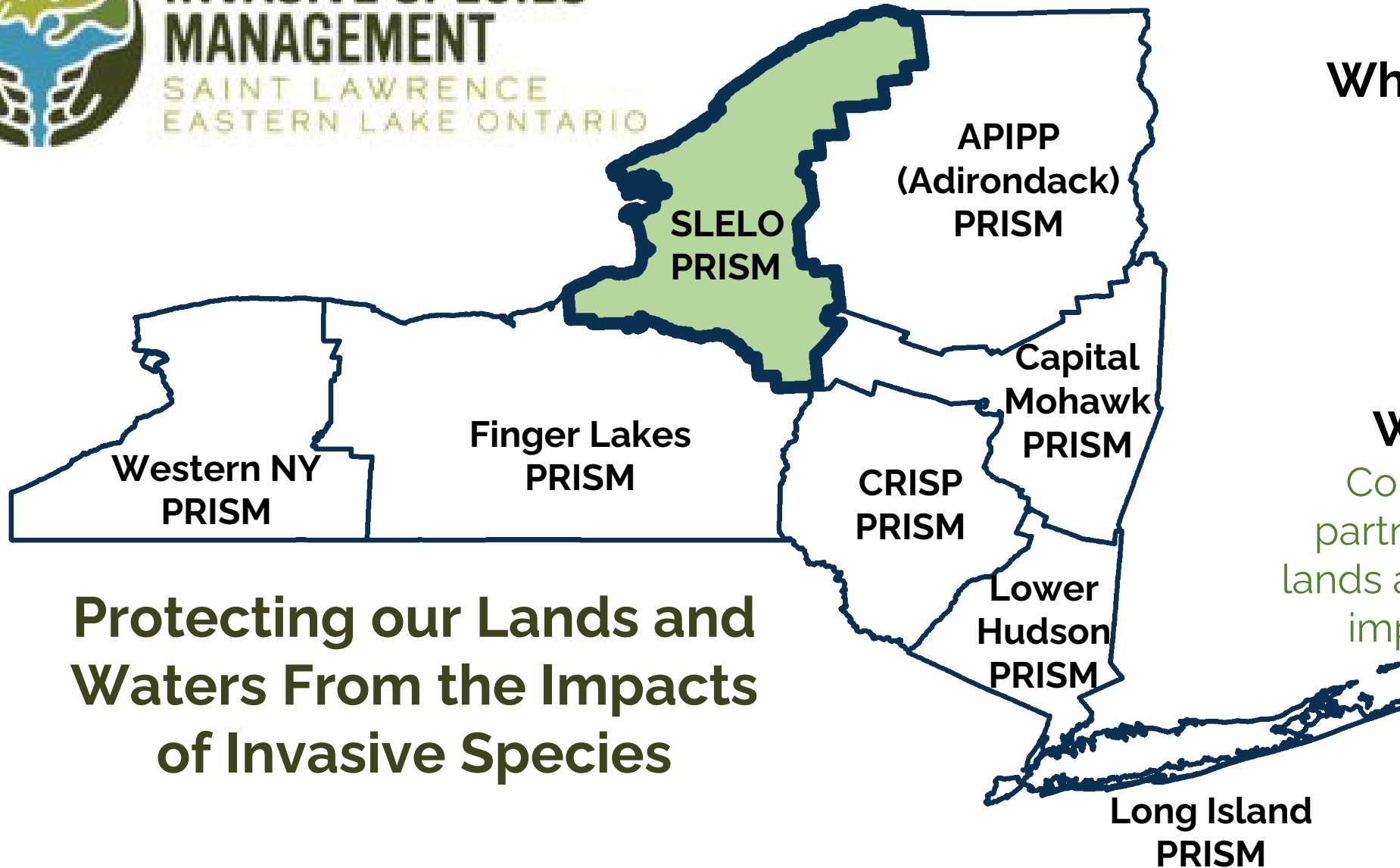
SLELO is Hosted by:
The Nature Conservancy

Where We Work:

Oneida
Oswego
Jefferson
Lewis
St. Lawrence

What We Do:

Collaborate with our partners to protect our lands and waters from the impacts of invasive species.



Protecting our Lands and Waters From the Impacts of Invasive Species

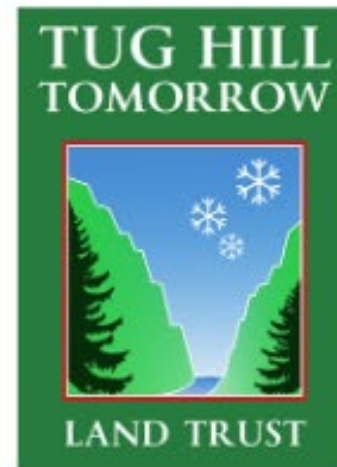
Hike to Protect Hemlocks

Learn to Recognize and Report Hemlock Woolly Adelgid

Thursday, March 16th 10am-12:30pm

Salmon River Falls, Orwell

Registration Required- sleloinvasives.org/events





*Caroline
Marschner*





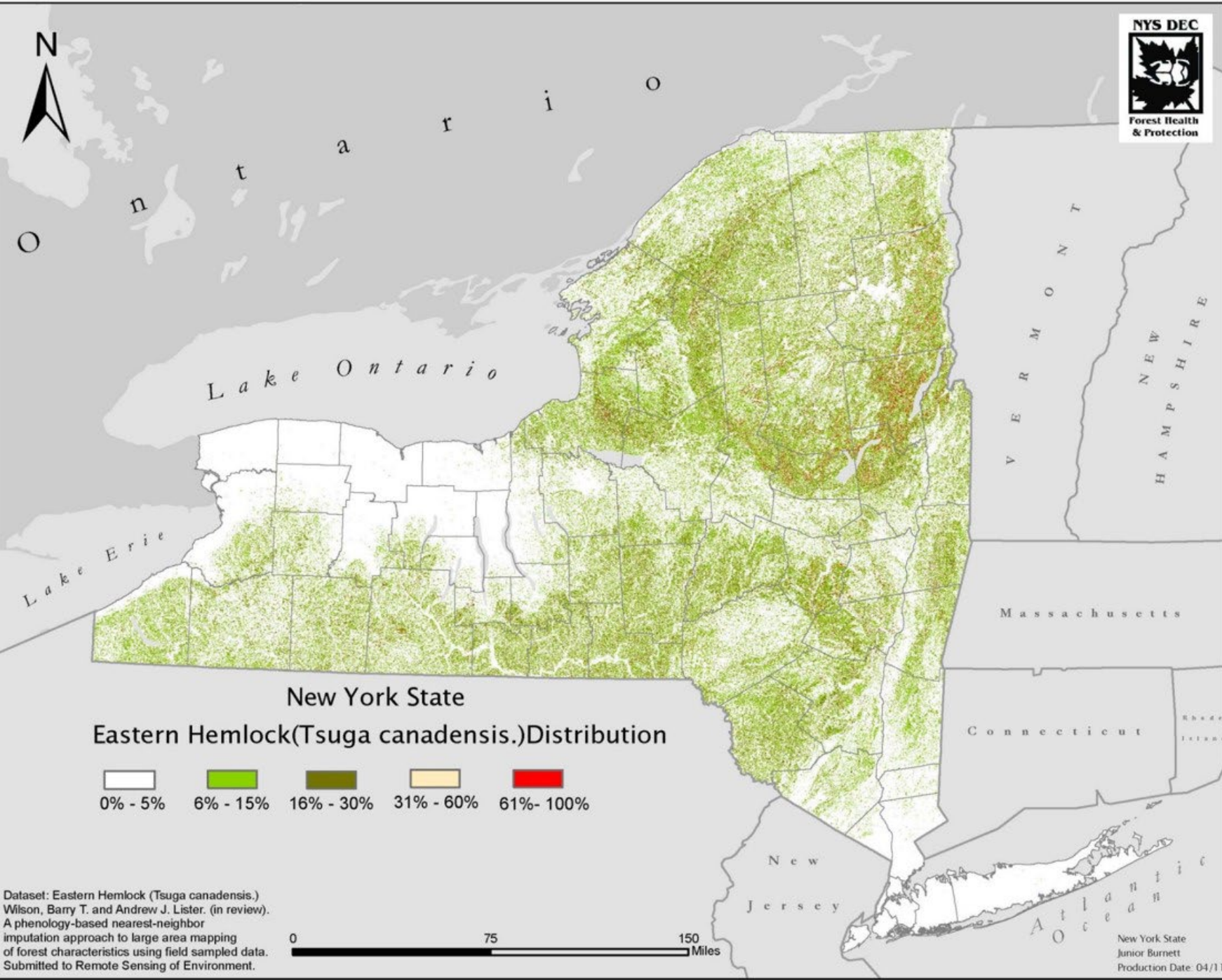
HWA Management

Planning for Hemlock Woolly Adelgid



Hemlock Trees

Foundation Species



Hemlocks
are a
common
tree species
in New York

Dataset: Eastern Hemlock (*Tsuga canadensis*).
Wilson, Barry T. and Andrew J. Lister. (in review).
A phenology-based nearest-neighbor
imputation approach to large area mapping
of forest characteristics using field sampled data.
Submitted to Remote Sensing of Environment.

Filling a Niche

A photograph of a snowy forest path. The path is covered in snow and leads into a dense forest of tall evergreen trees. Sunlight filters through the trees, creating a hazy, golden glow. A person in a red jacket is visible in the distance on the path. The path is bordered by wooden railings on both sides.

**Hemlocks often grow
on steep slopes and
in shady areas**

A close-up photograph of a deer's head and antlers in a snowy forest. The deer is looking to the left. The background is a soft-focus, snow-covered forest. The text is overlaid on the image.

Supporting the Food Web

Habitat and food for
over 400 forest species



Providing Ecosystem Services

**Hemlocks help keep freshwater
streams cold and clean**

An aerial photograph of a forest landscape. A river flows through the center of the image, surrounded by dense green trees. In the foreground and middle ground, there are significant areas of dead, grey trees, indicating a forest die-off. The background shows rolling hills covered in green forest under a clear sky.

Losing hemlocks

Pisgah National Forest

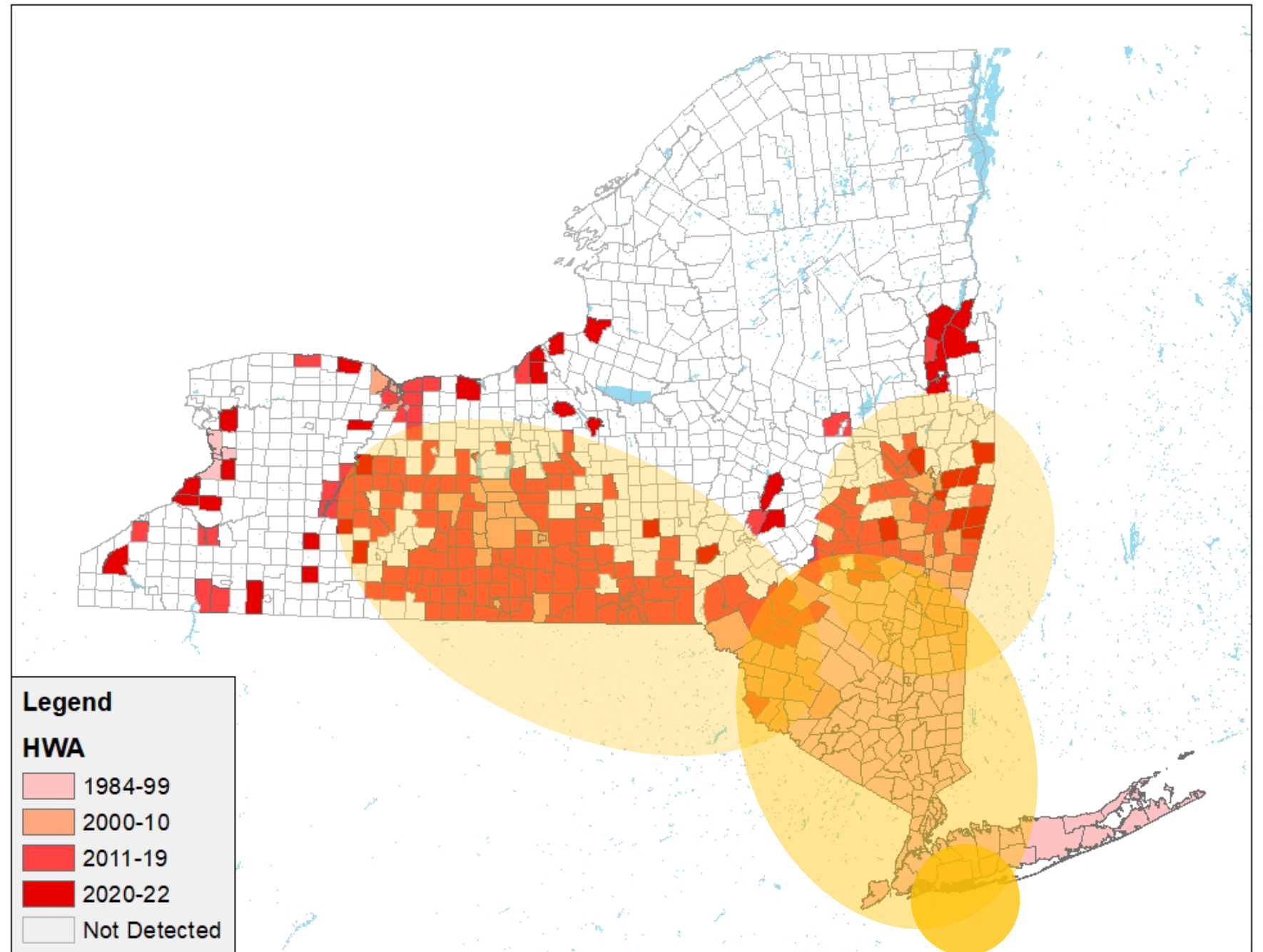
Photo: Steve Norman

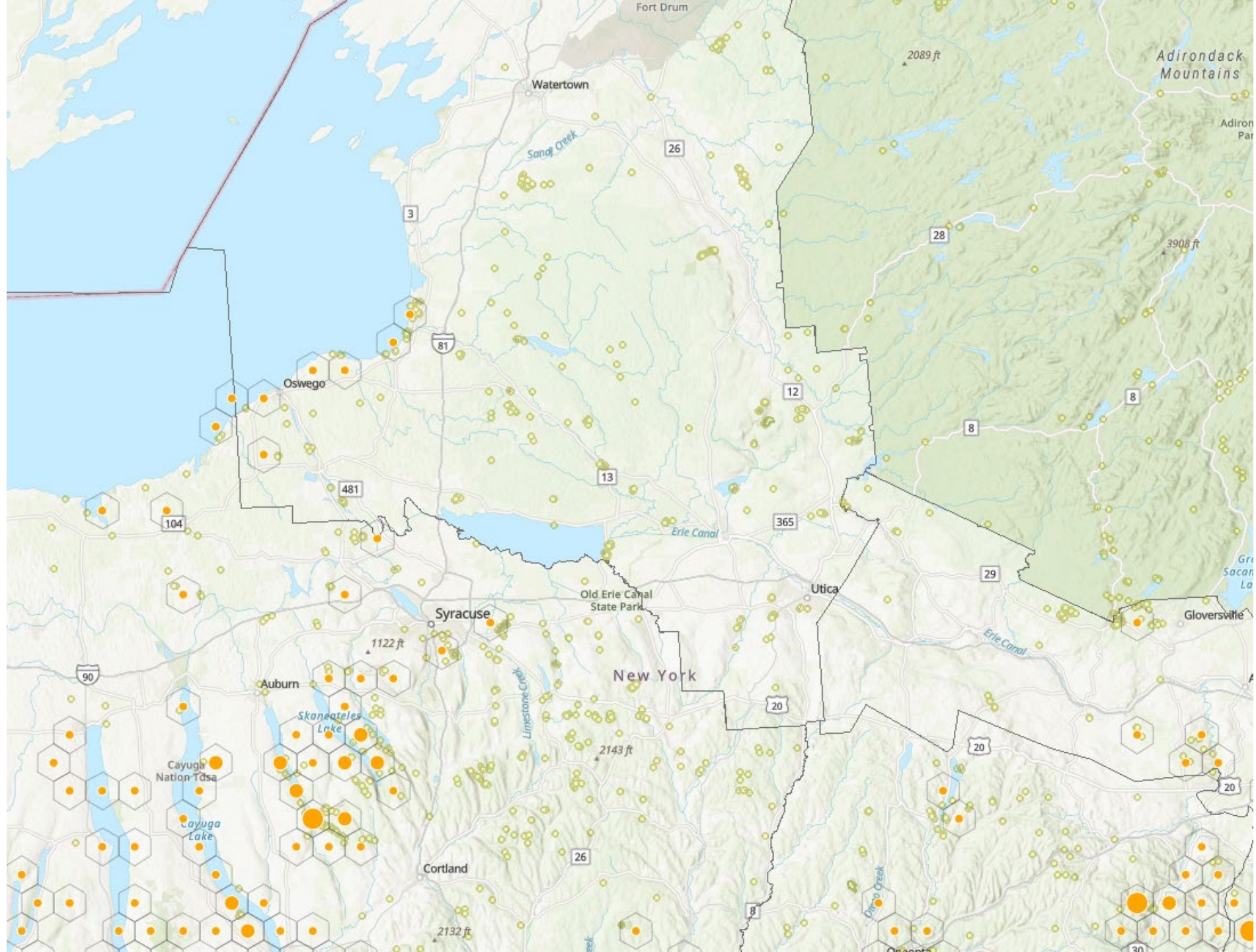


Hemlock Woolly Adelgid

Invasive hemlock pest

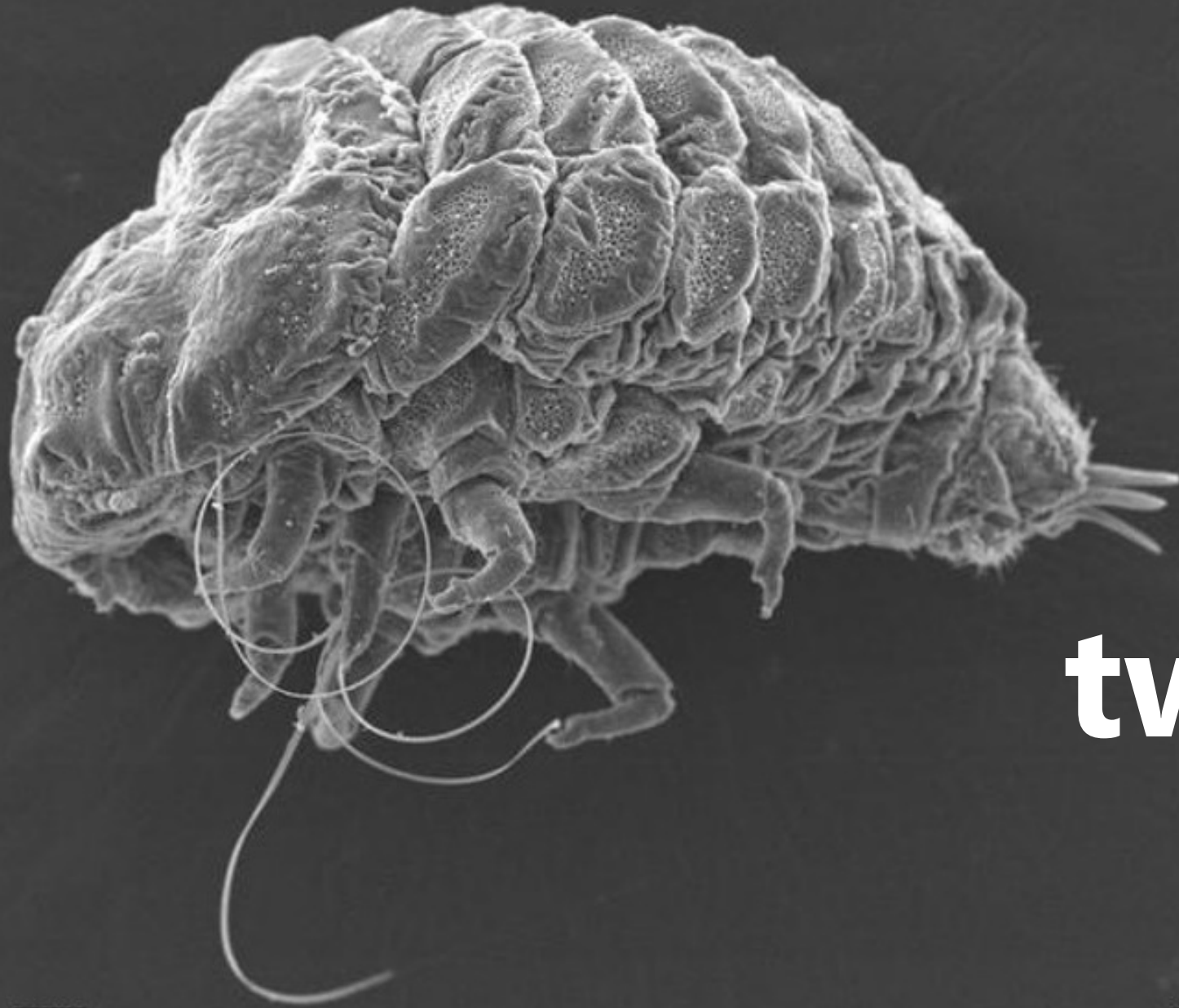
1980s HWA enters New York





Appears as
white, waxy,
woolly
masses on
hemlock twigs





Feeding
damages
hemlock
twig tissue

20 kV

0008

100µm

5449453

An aerial photograph of a dense, lush green forest. A river or stream flows through the center of the forest, surrounded by a rocky bed. The trees are thick and cover the entire landscape, extending to the horizon.

4-20

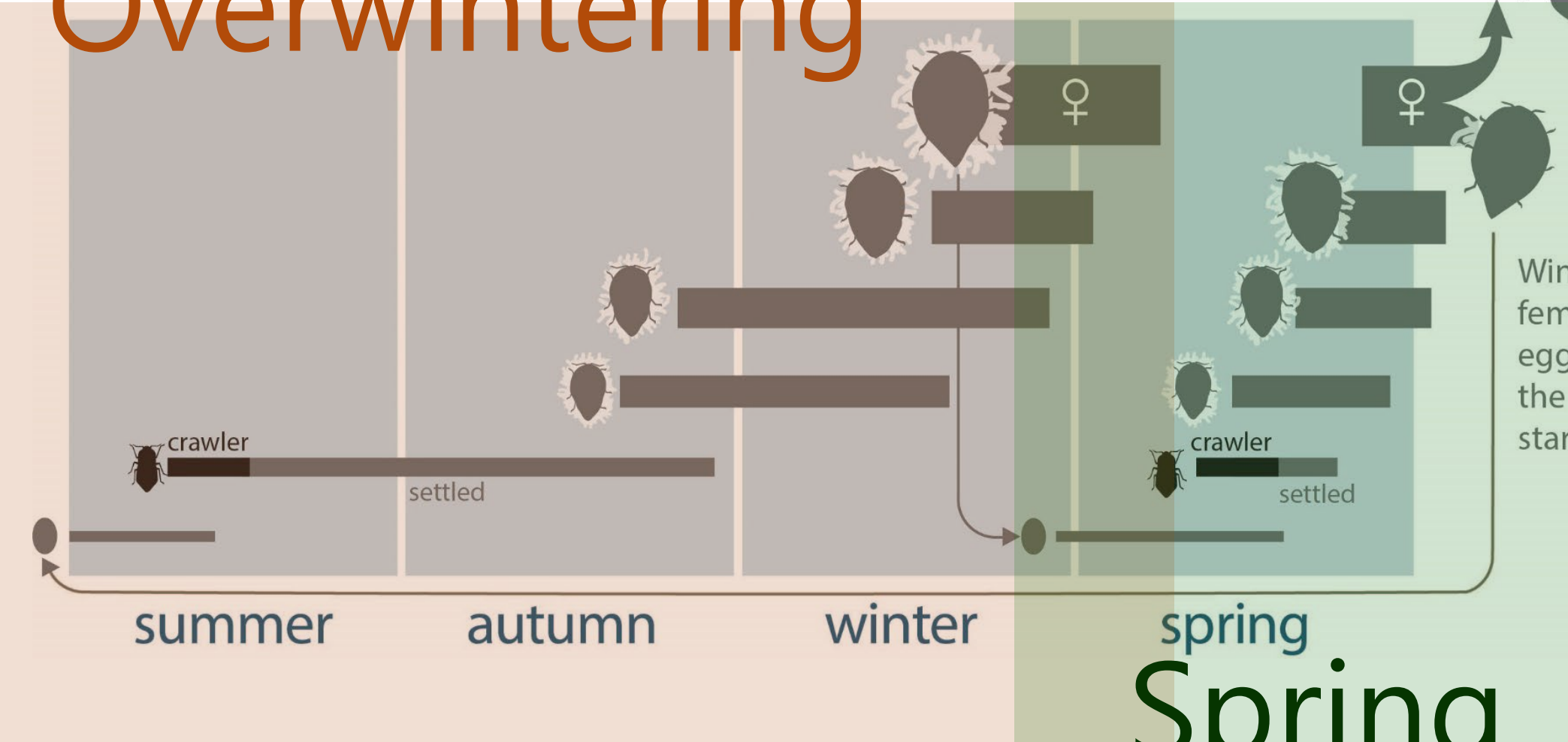
years to kill tree

2 generations per year

Winged females cannot reproduce in North America



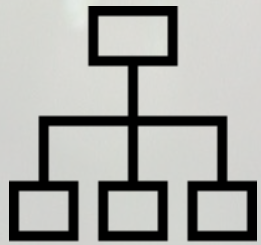
Overwintering



Wingless females lay eggs and the life cycle starts again

Spring

HWA Invasion



Reproduce
asexually



2 generations
per year



No native
HWA
predators



Reporting HWA Infestations

NYiMapInvasives

www.nyimainvasives.org



- **Online interface**
- **Presence/absence**
- **Survey 1-2-3**



NYSHI's Hemlock Hunters project



Hemlock Woolly Adelgid

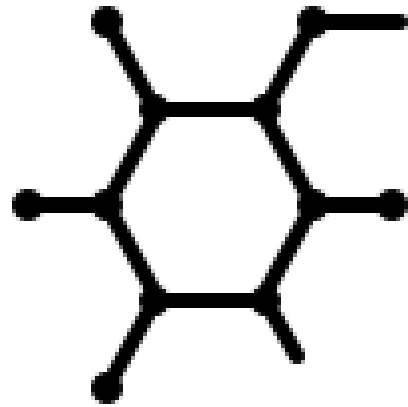
Management



**No HWA
population
control**

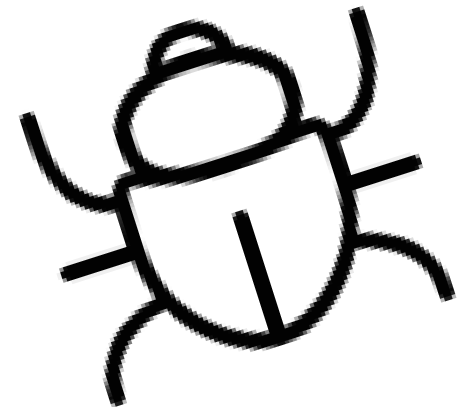


HWA Management



Chemical

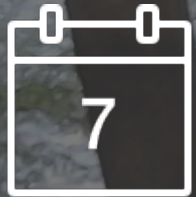
Biological



Imidacloprid



Slow-acting



Long-lasting

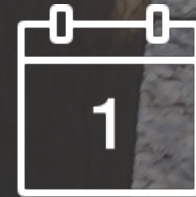


Widely available

Dinotefuran



Fast-acting



Short lifetime



Applicators
only



Application Methods

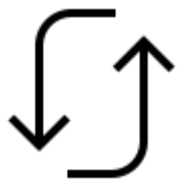
Imidacloprid in Context



Reduced off-target impacts




Low risk to pollinators



Reduced need for reapplication





Treatment prevents
a **cascade of**
ecological effects
from hemlock loss

Biological Control



Long-term



Landscape-scale

Research still in progress

Laricobius beetles



Pacific Northwest
winter feeder



Since 2009



Beetles established
at **11 sites**

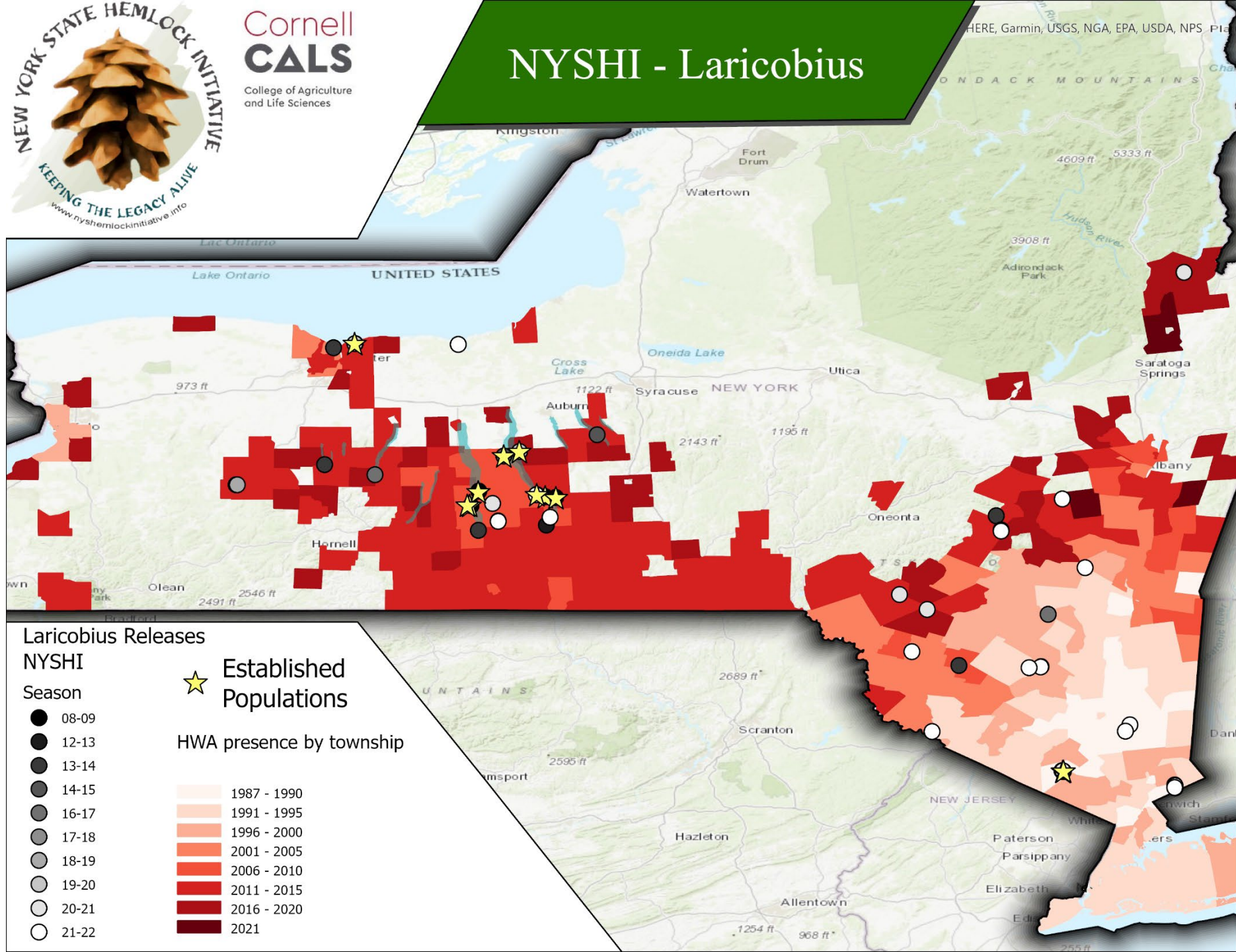






Cornell
CALS
College of Agriculture
and Life Sciences

NYSHI - Laricobius



Laricobius Releases

NYSHI

Season

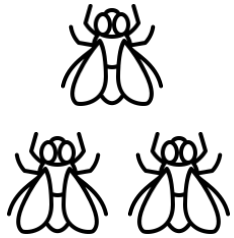
- 08-09
- 12-13
- 13-14
- 14-15
- 16-17
- 17-18
- 18-19
- 19-20
- 20-21
- 21-22

★ Established Populations

HWA presence by township

- 1987 - 1990
- 1991 - 1995
- 1996 - 2000
- 2001 - 2005
- 2006 - 2010
- 2011 - 2015
- 2016 - 2020
- 2021

Leucotaraxis silver flies



Pacific Northwest
spring feeder



Eats **HWA eggs**



Since 2017



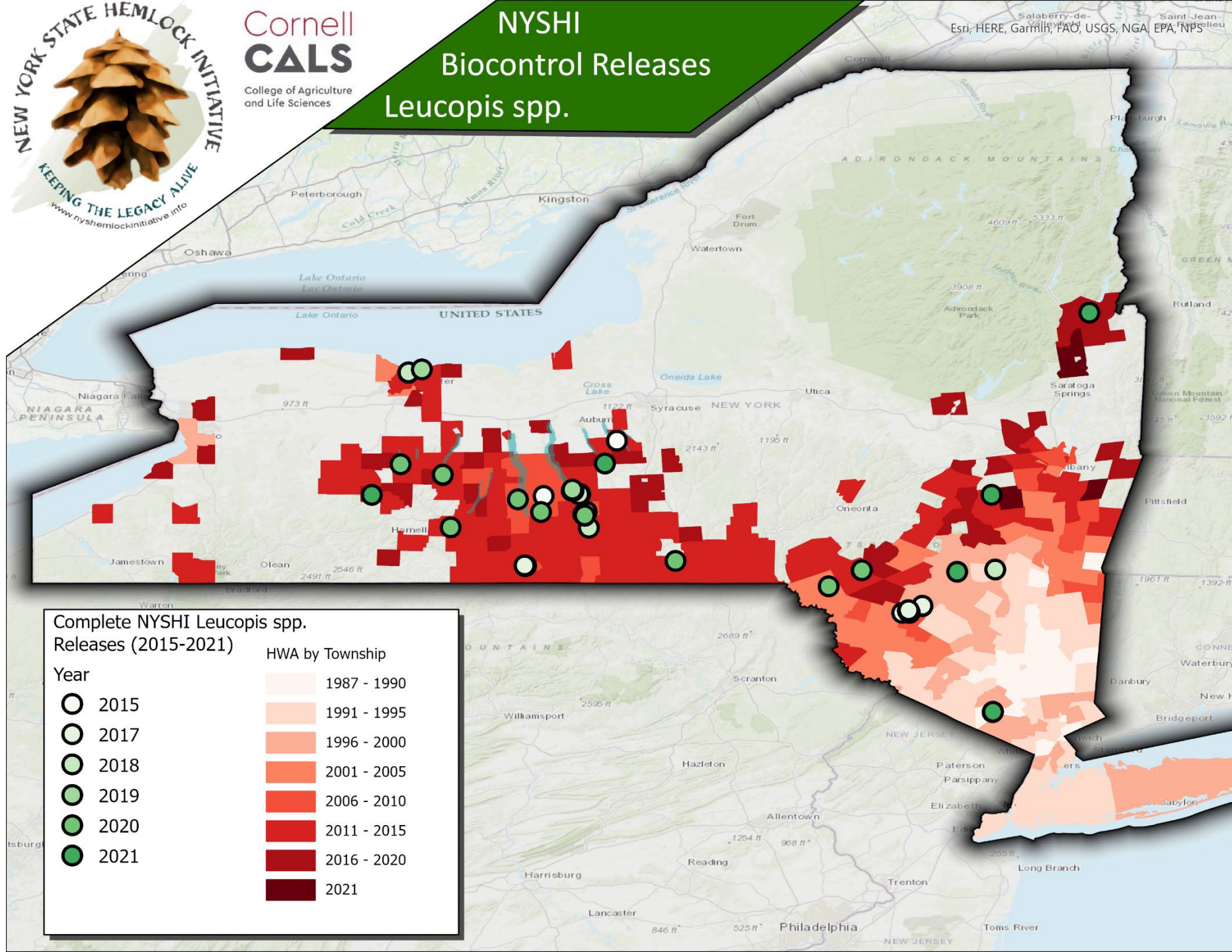




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NYSHI
Biocontrol Releases
Leucopis spp.

Esri, HERE, Garmin, FAO, USGS, NGA, EPA, NPS



Complete NYSHI *Leucopis* spp.
Releases (2015-2021)

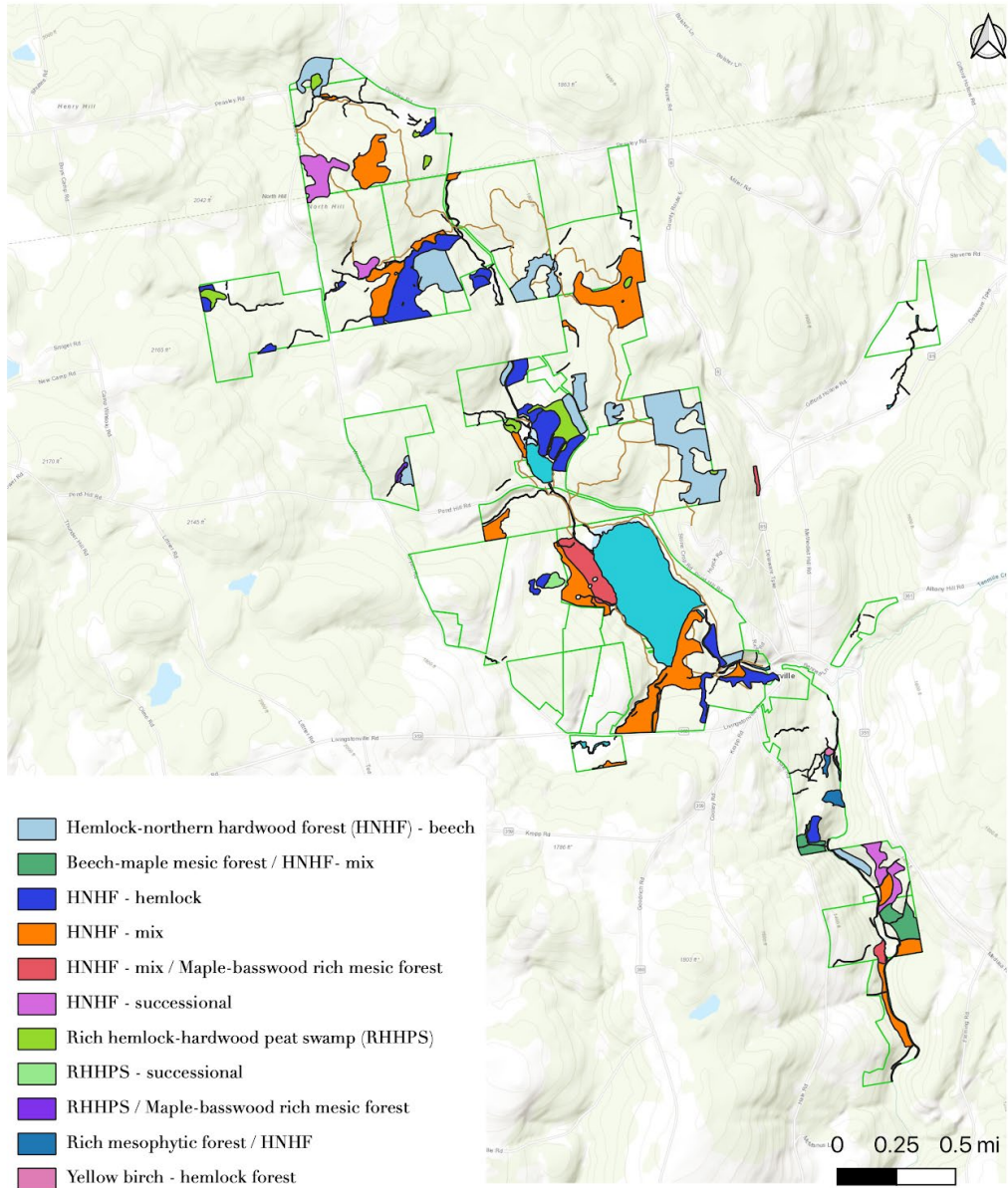
| Year | HWA by Township |
|--------|-----------------|
| ○ 2015 | 1987 - 1990 |
| ○ 2017 | 1991 - 1995 |
| ○ 2018 | 1996 - 2000 |
| ○ 2019 | 2001 - 2005 |
| ○ 2020 | 2006 - 2010 |
| ○ 2021 | 2011 - 2015 |
| ○ 2021 | 2016 - 2020 |
| ○ 2021 | 2021 |



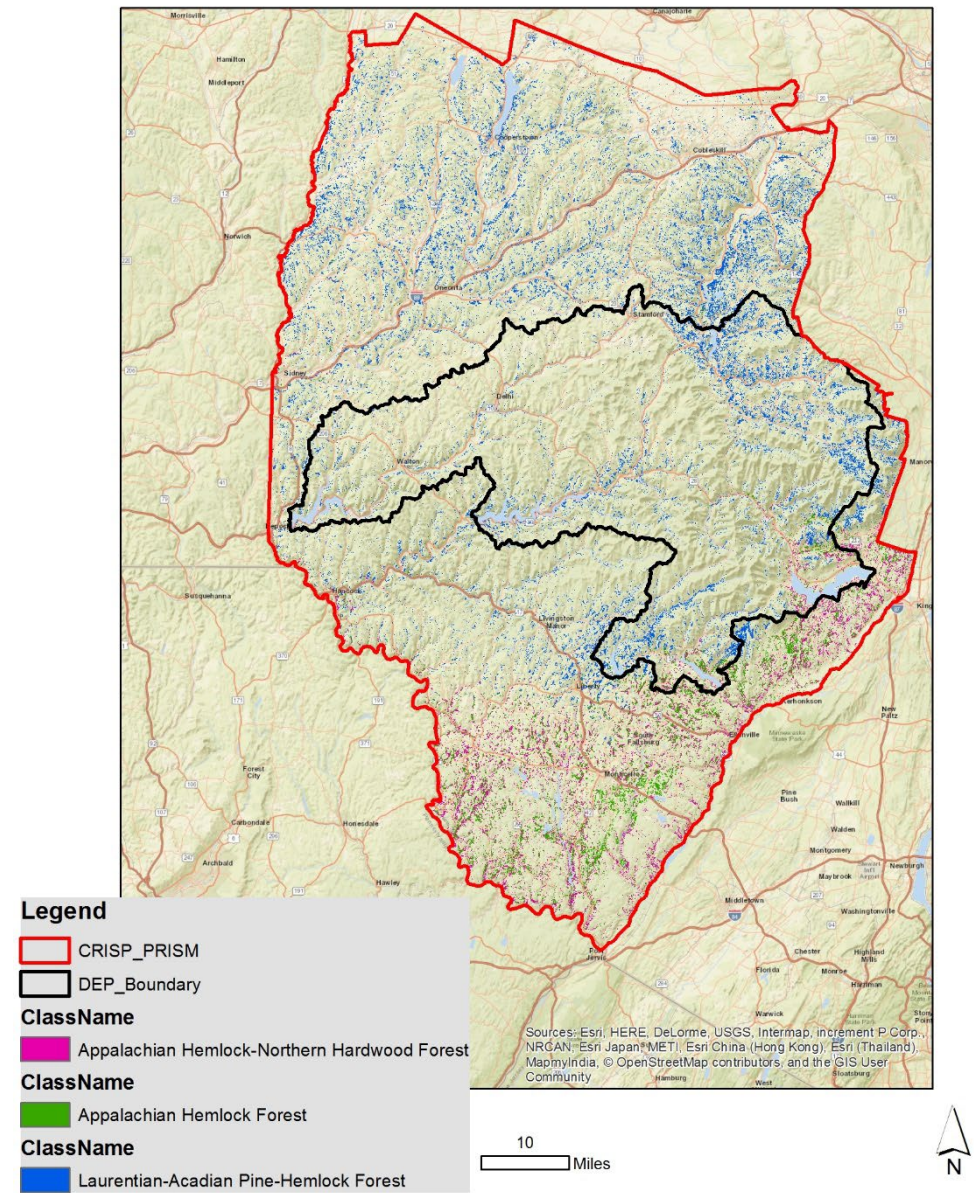
Management Planning:

Which trees to save?

Hemlock Habitats on the Huyck Preserve



Landfire data in Catskills PRISM



Initial Decision Tree

- Leading edge/isolated infestations: **Treat**
- Old growth remnant: **Treat**
- Likely to be removed: **Don't treat**
- All other stands: **Rank**

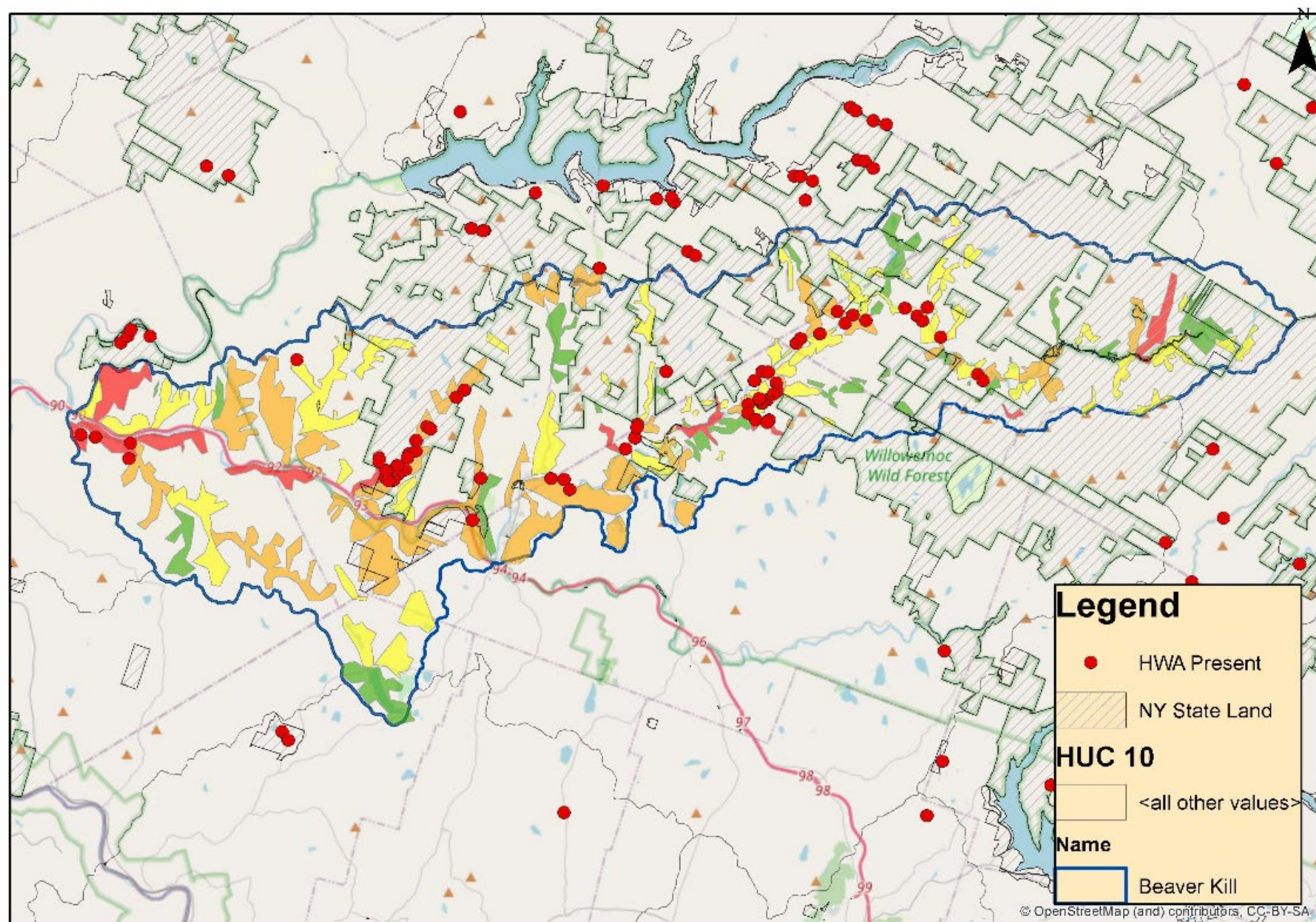


Selection Process

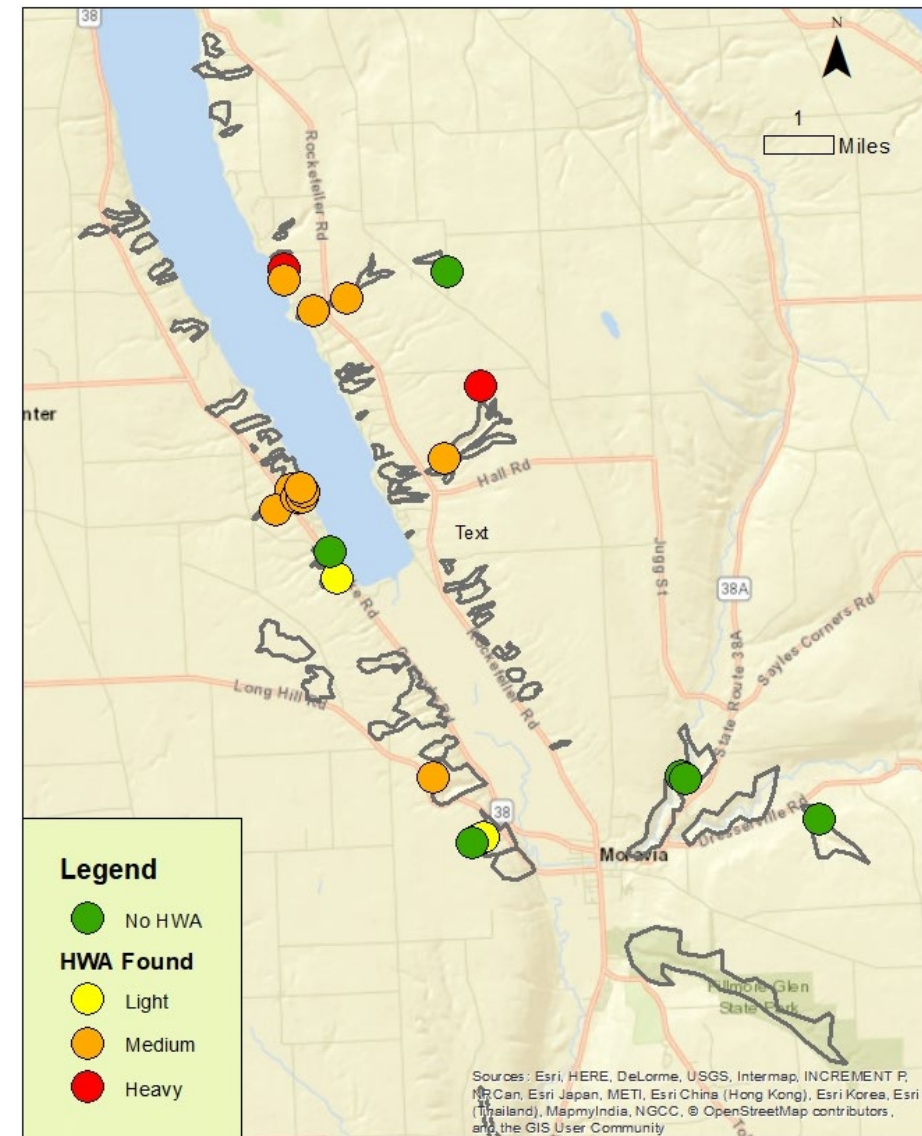
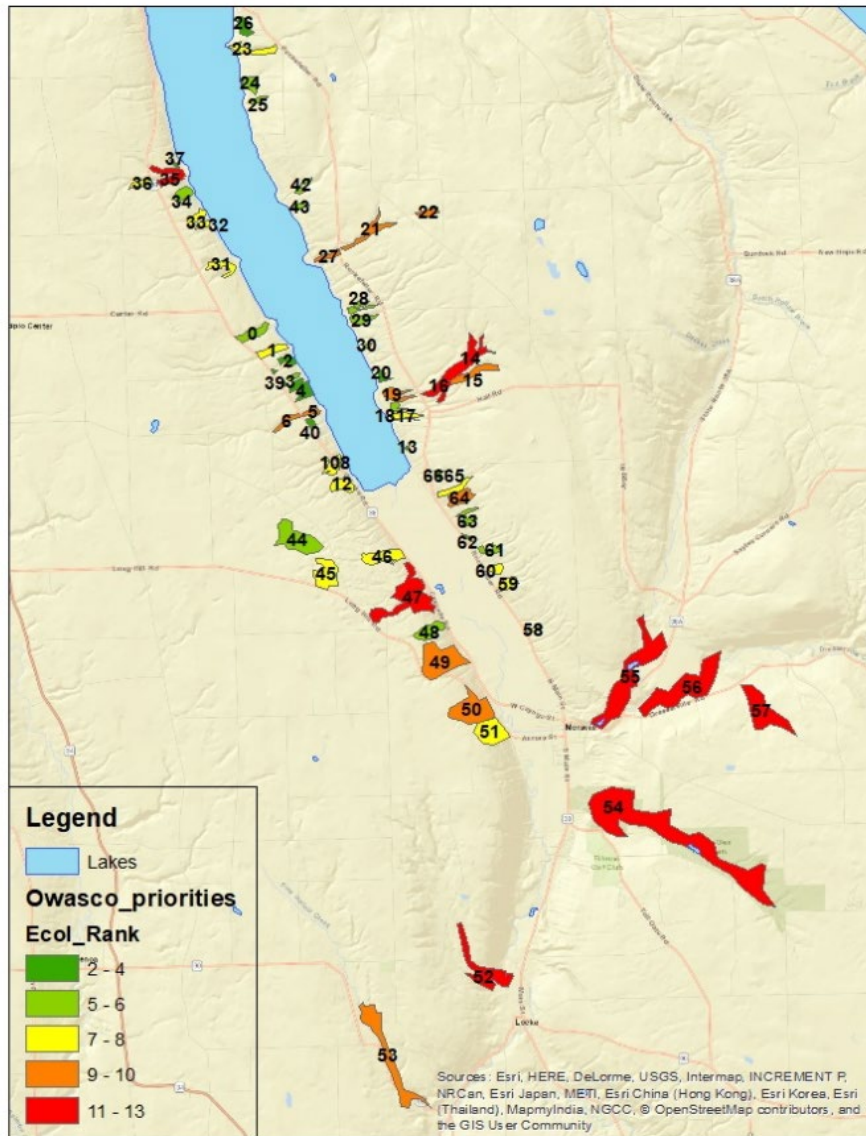
- Locate stands (first-pass ranking)
- Survey
- Score
- Prepare for management



Example: Beaverkill Watershed



Example: Owasco Lake Watershed

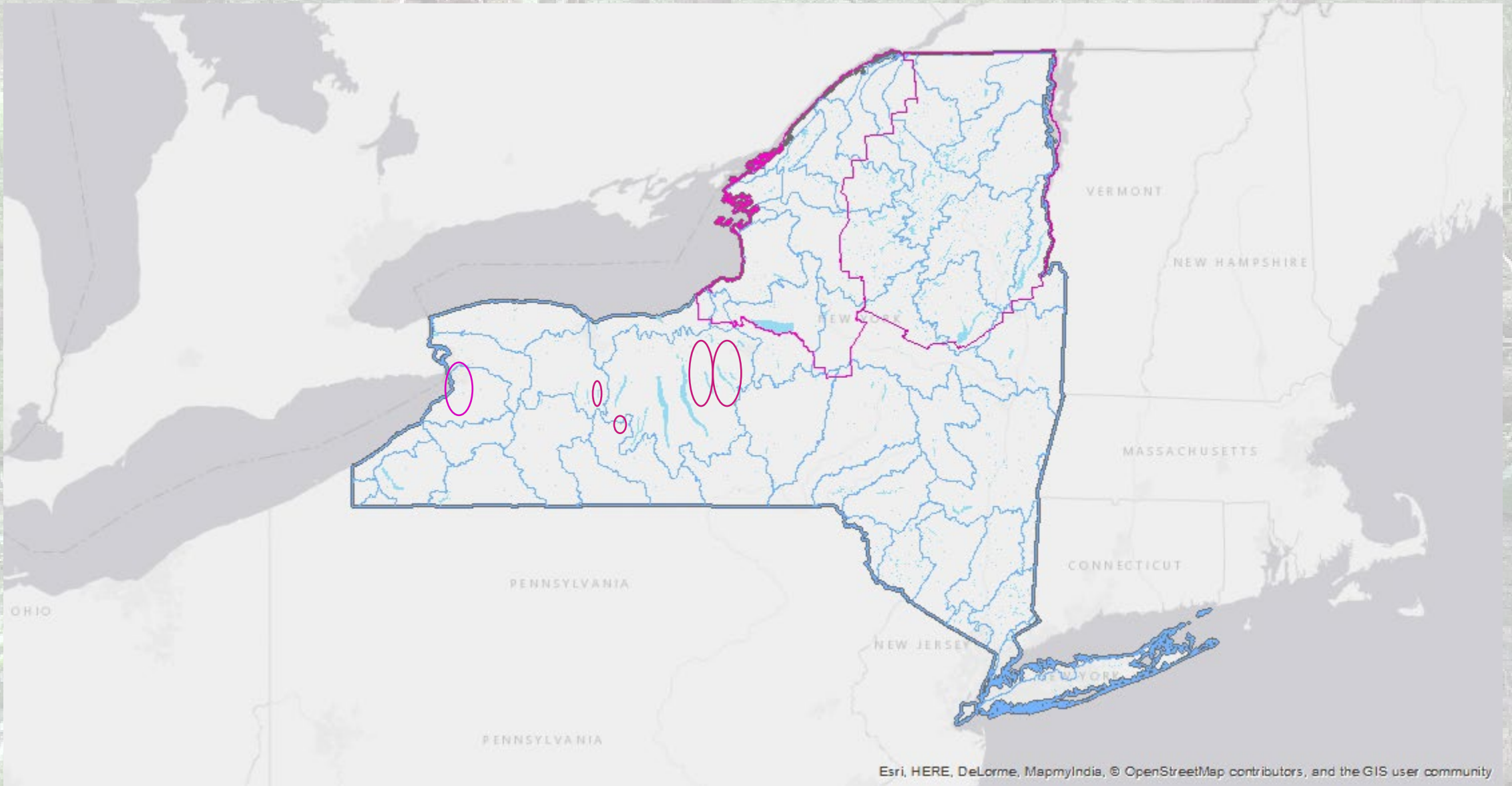


Regional Projects

- Develop a regional group
- Reach out to hemlock property owners
- Build survey team
- Score properties
- Apply for funding
- Treatment plan



Regional Projects



What To Consider

Stand Traits

- Current stand health, size, density, isolation
- Environmental stress
- Proximity to water
- Genetic diversity

Aquatic Ecosystem Value

Terrestrial Ecosystem Value

Cultural Value

Sustainability



Photo: Kate O'Connor

What To Consider

Stand Traits

Aquatic Ecosystem Value

- Coldwater fish - upland snow in headwater catchment
- Provide direct shade to water
- At-risk water quality
- Drinking water
- Stream flashiness

Terrestrial Ecosystem Value

Cultural Value

Sustainability



What To Consider

Stand Traits

Aquatic Ecosystem Value

Terrestrial Ecosystem Value

- Primary forest
- Ecosystem rarity
- Rare species
- High quality habitat
- Hemlock-dependent species
- **Steep slopes**

Cultural Value

Sustainability



Photo: Mashall Lefebvre, NYSHI

What To Consider

Stand Traits

Aquatic Ecosystem Value

Terrestrial Ecosystem Value

Cultural Value

- Political viability
- Hazard trees
- Natural/cultural resource
- Use/outreach potential

Sustainability



What To Consider

Stand Traits

Aquatic Ecosystem Value

Terrestrial Ecosystem Value

Cultural Value

Sustainability

- Protection/investment risk
- Treatment feasibility
- **Climate resilience**
- Deer pressure



Final Thoughts



Now:

**Survey
and
Plan**



Near Term:

**Hemlock
Conservation
is critical**



Long Term:

**Biocontrol
will move us
forward**



Thank You!

Visit us online:

www.nyshemlockinitiative.info



@nyshemlockinitiative

Email Us: nyshemlockinitiative@cornell.edu



Current Status of HWA in SLELO

- Independence Park: Insecticide applied in 2021/2022. *Being considered for Biocontrol Release in 2023.*
- Camp Hollis: Insecticide Applied in 2021.
- Oswego County Reforestation Area- very small infestation found in 2021 *No Management conducted at this time*
- Noyes Bird Sanctuary: *Insecticide being considered for 2023.*
- Mexico Point State Park: *Biocontrol Laricobius beetles released in October 2022.*
- Selkirk Shores State Park: *under park management, insecticides applied in 2022 and will continue.*

Know of any Hemlock Stands?

- Sites with 100 or more healthy trees.
- Assists survey efforts
- *Google form to be sent in follow-up email*



Volunteers searching for HWA at the Trenton Greenbelt trails with Tug Hill Tomorrow Land Trust

Volunteer Opportunities

- In Our Region-
Volunteering with SLELO

Across the State-
Volunteering with *Hemlock Initiative*



iMapInvasives

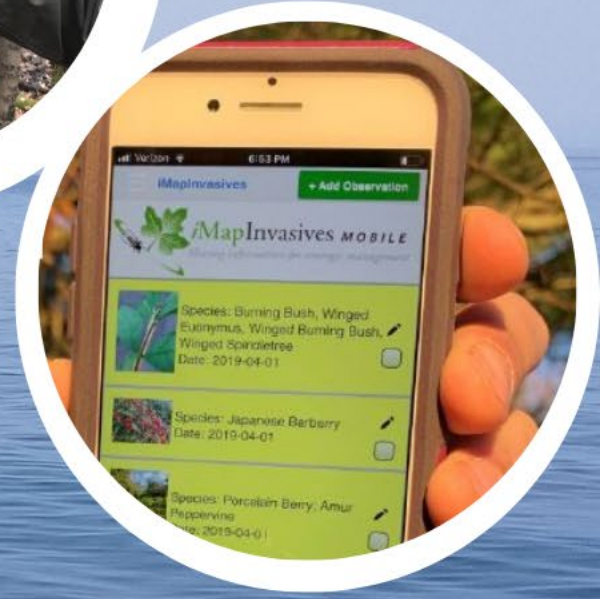
*New York's Invasive Species Database
and Community Science Platform*

- Report positive and negative observations for HWA.
- *Join SLELO/NYSHI special projects.*
- Participate in the HWA Winter Mapping Challenge until March 15th to win a prize!

www.nyimainvasives.org

A screenshot of the iMapInvasives mobile app interface. At the top, there is a small photo of a hand holding a branch with white woolly insects. Below this are two green buttons: "Take Photo Using Camera" and "Select Photo From Library". The "Species:" section has a checked "Custom List" option and a dropdown menu showing "Hemlock Woolly Adelgid". There are two radio buttons: "Species Detected" (selected) and "Species Not Detected". The "Date:" field is set to "Mar 9, 2021". There is a checkbox for "GPS: Uncheck to manually move location" which is currently unchecked. A dropdown menu shows "Road". At the bottom, there is a map with a plus sign for zooming in and a minus sign for zooming out. Text at the bottom reads: "Viewing the map requires an internet connection, if you do not see the map check your connection and restart iMapInvasives Mobile. GPS will work without the map. GPS Accuracy: 0000 m".

Volunteer With Us!



SLELO PRISM

sleloinvasives.org/volunteer

Scan to Volunteer





**TAKE THE PLEDGE.
GET THE TOOLS.
EARN THE BADGE.**

www.iPledgeToProtect.org

BECOME A PROTECTOR

WHAT
YOU'LL
GET

- Simple Actions You Can Take to Protect Your Lands & Waters from Invasive Species
- Bragging Rights.
- Collectable Virtual Badges.
- Access to a Social Media Toolbox.
- Prizes!

www.iPledgeToProtect.org

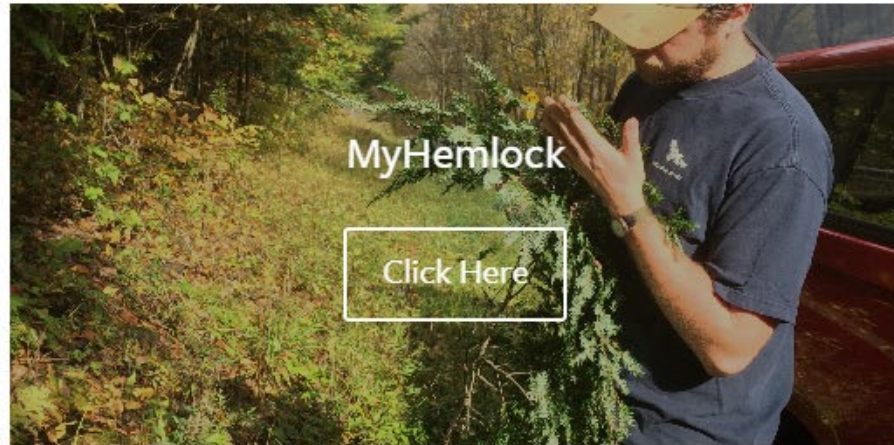


NYSHI Volunteer Opportunities

Find Your Program



HWA Hunters provide data about HWA presence/absence, density, and overall hemlock health in a given area. Help us fill in critical survey gaps, detect emerging HWA infestations, and identify new biocontrol areas.



MyHemlock participants survey the same site two times per year, giving us data on HWA infestations and hemlock tree health over the course of a season and over the long term. Choose your site and get started today.



www.nyshemlockinitiative.info

CONNECT WITH SLELO PRISM and NYS Hemlock Initiative

Sleloinvasives.org

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nyshemlockinitiative.info

@NYSHemlockInitiative

@nyshemlockinitiative

@NYS Hemlock Initiative





Questions

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