Chat-box Icebreaker:

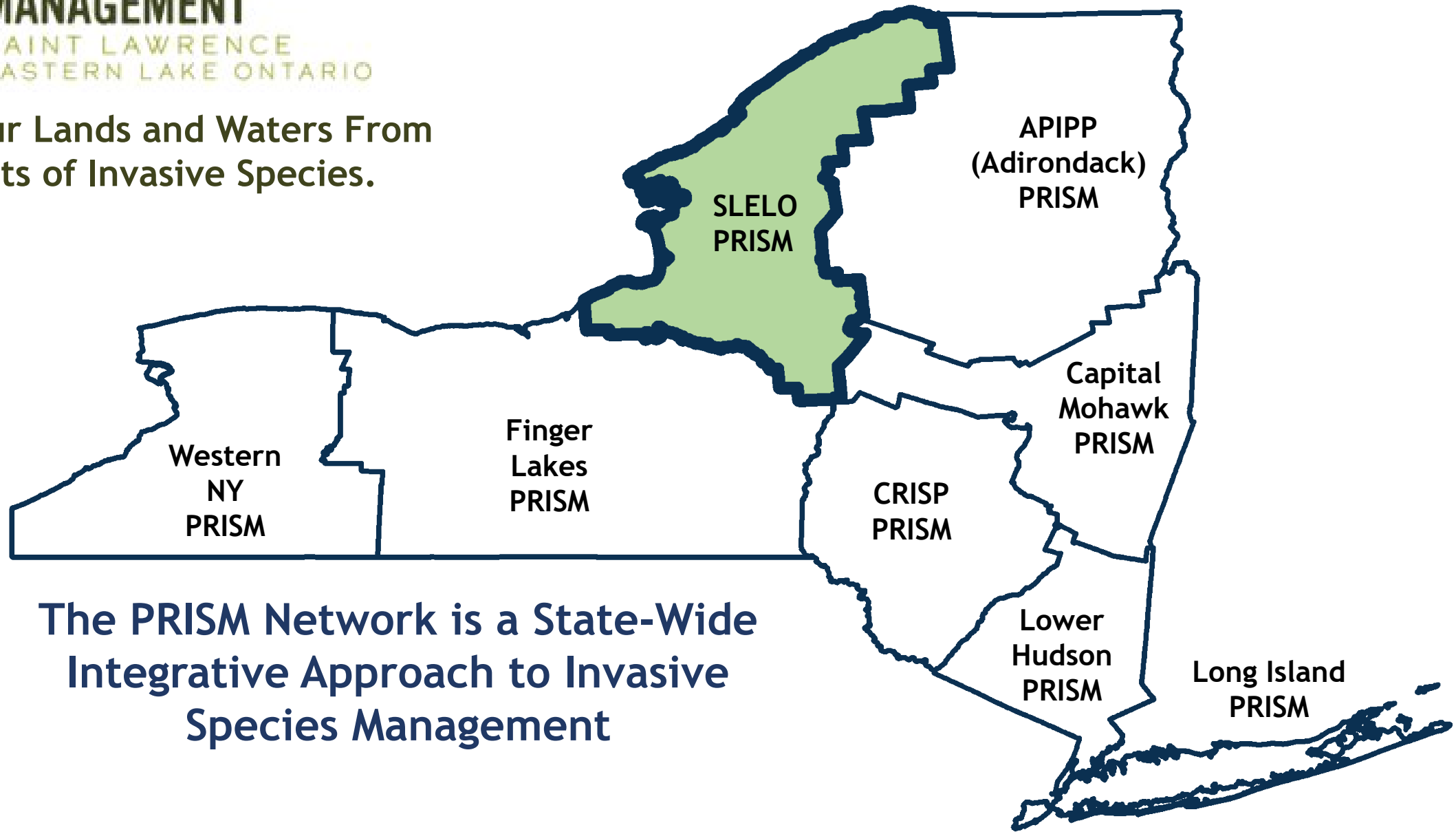
- **Name.**
- **Geographic location of the land you own/manage.**
- **Have you found HWA on the land you own/manage?**

Society of American Foresters: 1.5 Category 1 CFEs

- **You must stay for the entire webinar and participate in the poll at the end to receive credits.**

INVASIVE SPECIES MANAGEMENT
SAINT LAWRENCE EASTERN LAKE ONTARIO

Protecting our Lands and Waters From the Impacts of Invasive Species.



The PRISM Network is a State-Wide Integrative Approach to Invasive Species Management

Join Our Invasive Species Volunteer Surveillance Network (VSN)

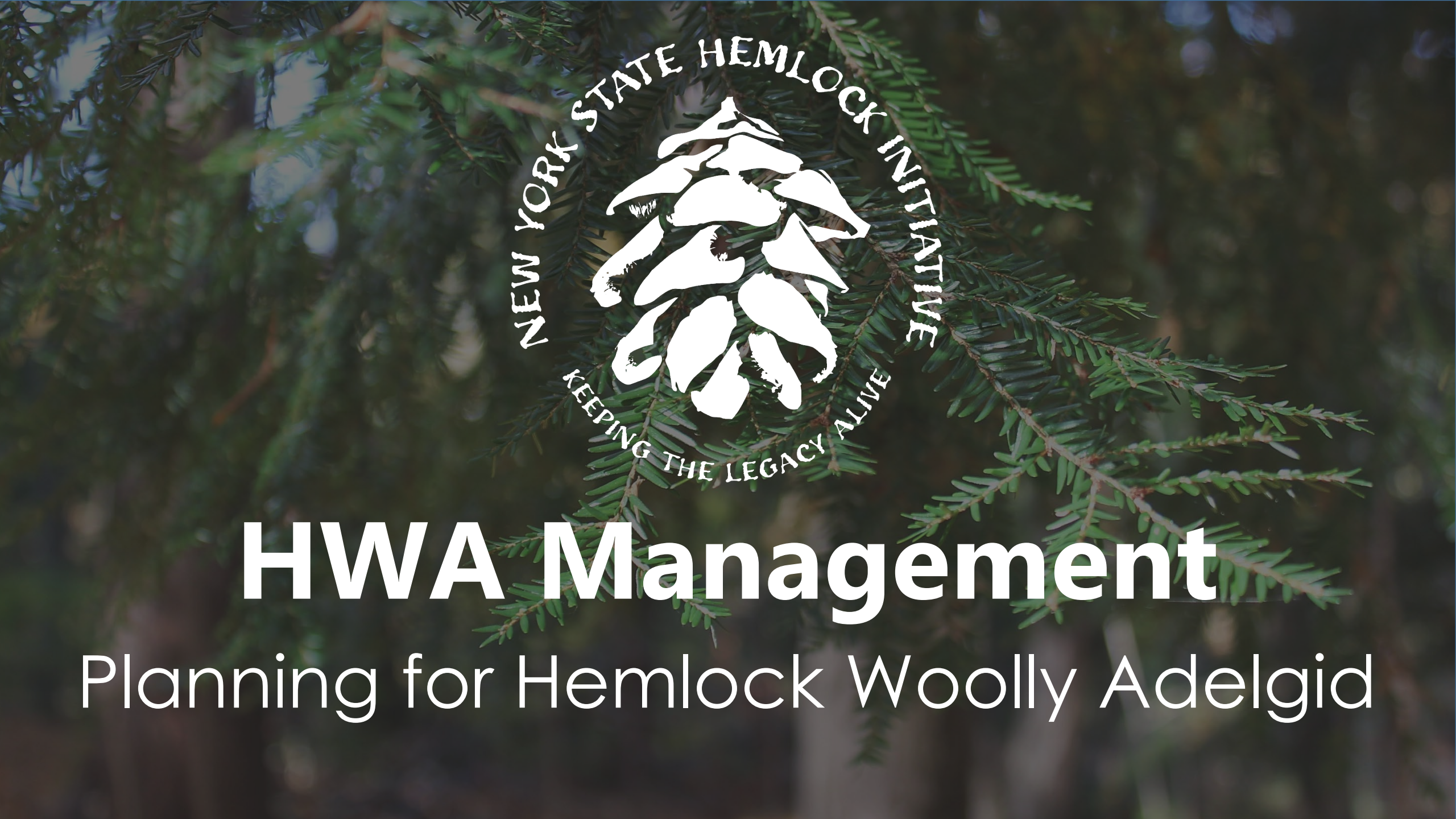
Webinar Purpose

Image © Hemlock Initiative

NEW YORK STATE HEMLOCK INITIATIVE

KEEPING THE LEGACY ALIVE

Caroline Marschner



HWA Management

Planning for Hemlock Woolly Adelgid

In Partnership With:

INVASIVE SPECIES MANAGEMENT
SAINT LAWRENCE EASTERN LAKE ONTARIO

NEW YORK STATE OF OPPORTUNITY
Department of Environmental Conservation

FOREST SERVICE U S DEPARTMENT OF AGRICULTURE

USDA APHIS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Hemlock Trees

Foundation Species

Filling a Niche

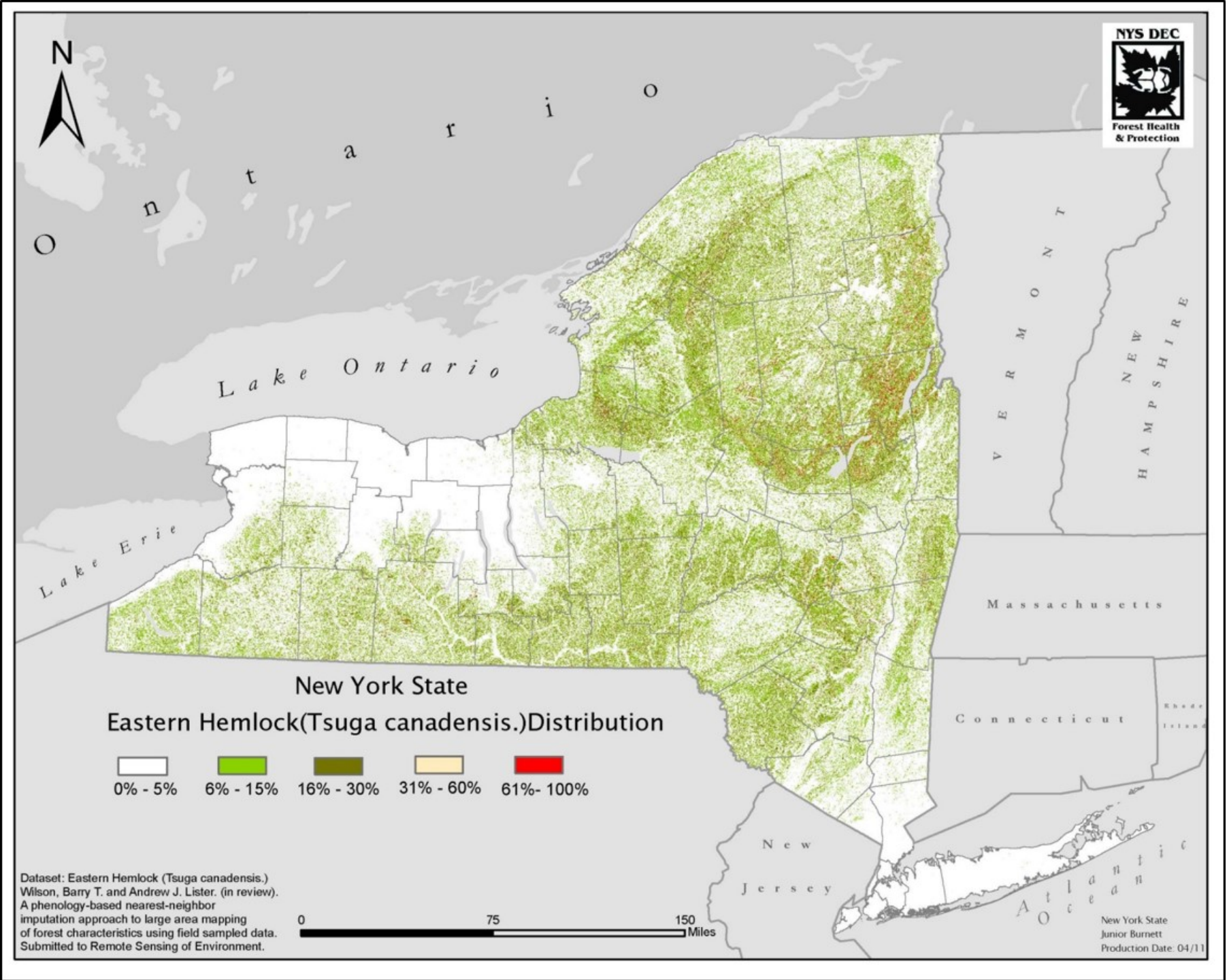
Hemlocks often grow on **steep slopes** and in **shady areas**

Supporting the Food Web

Habitat and food for **over 400 forest species** including birds, mammals, and arthropods


Providing
Ecosystem Services
Hemlocks help keep freshwater streams cold and clean


76%
of New York's
forested land is
privately
owned



Hemlocks are the **third most common** tree species in New York

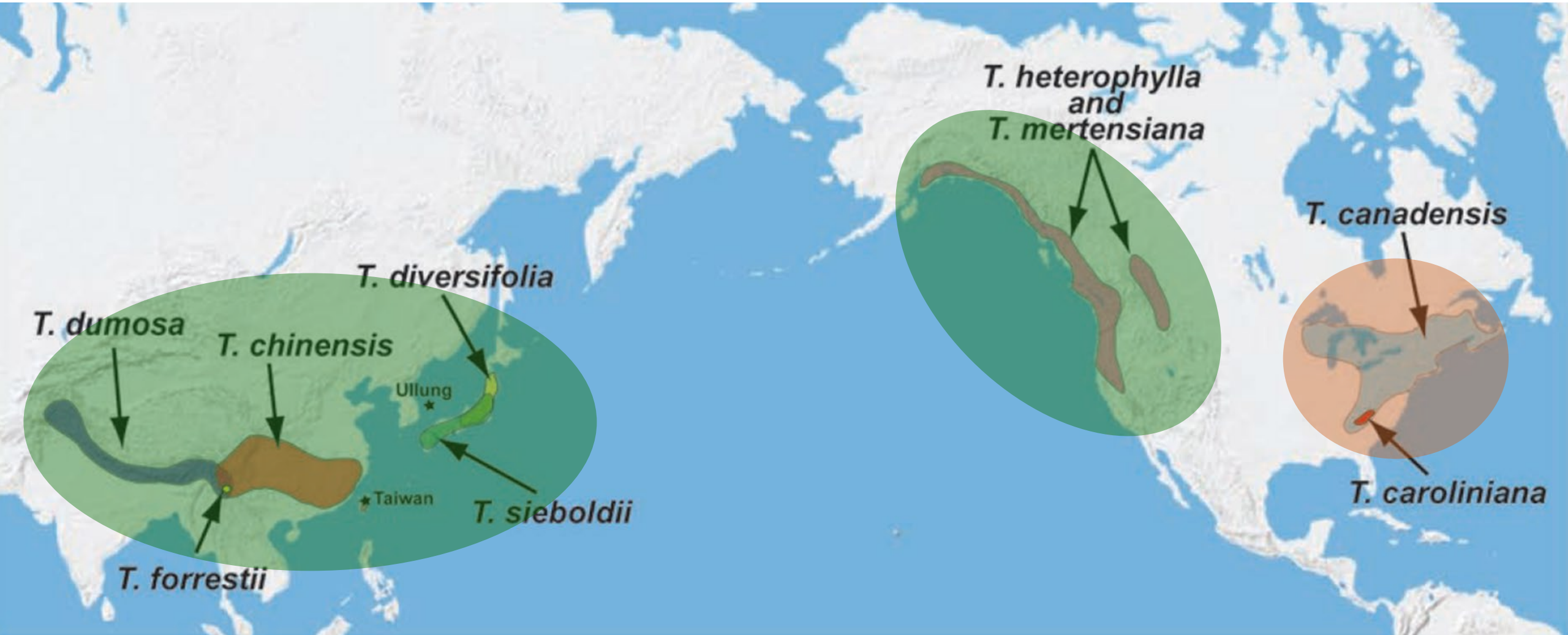

Losing hemlocks
Pisgah National Forest
Photo: Steve Norman

Hemlock Woolly Adelgid

Invasive hemlock pest

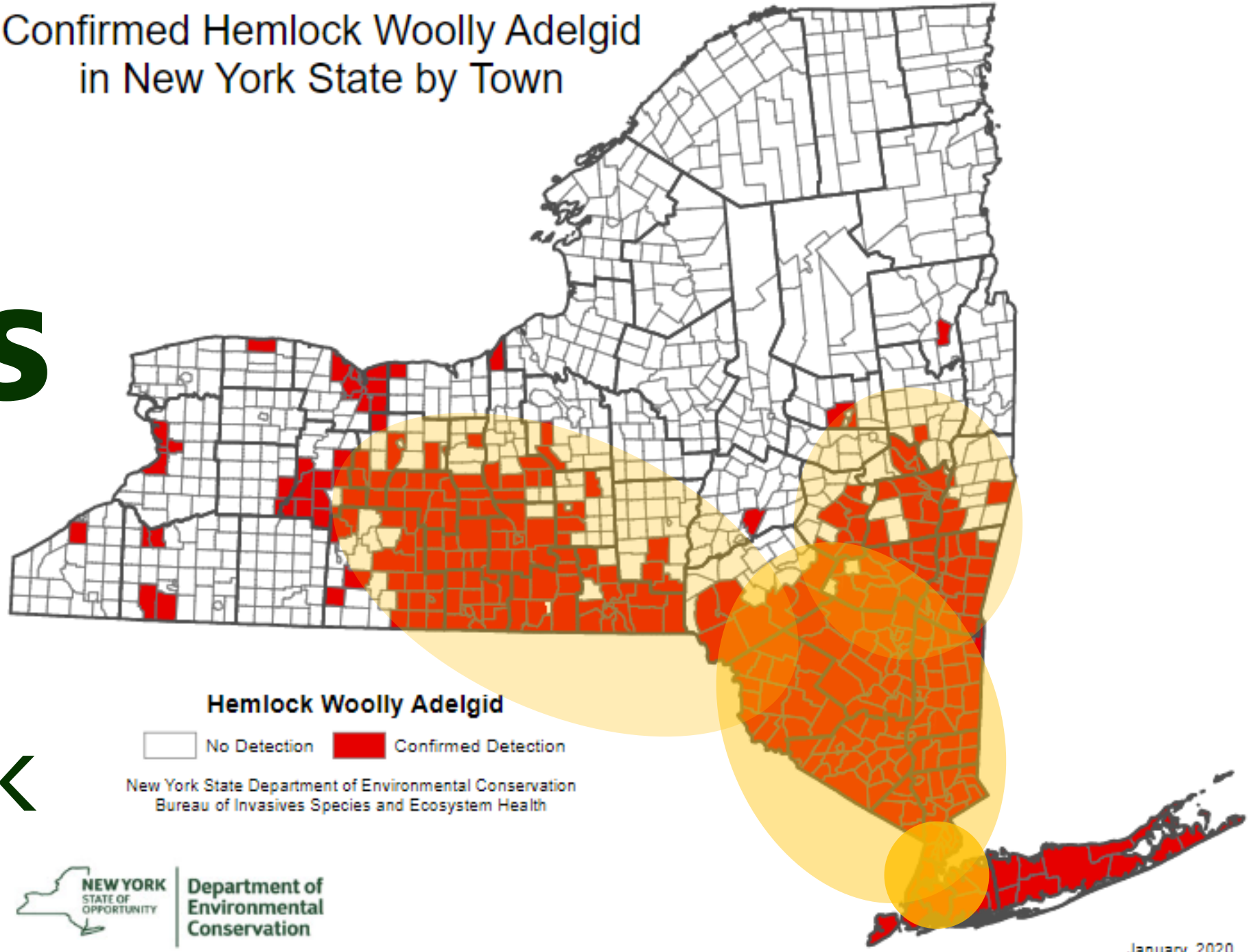
HWA Native Ranges

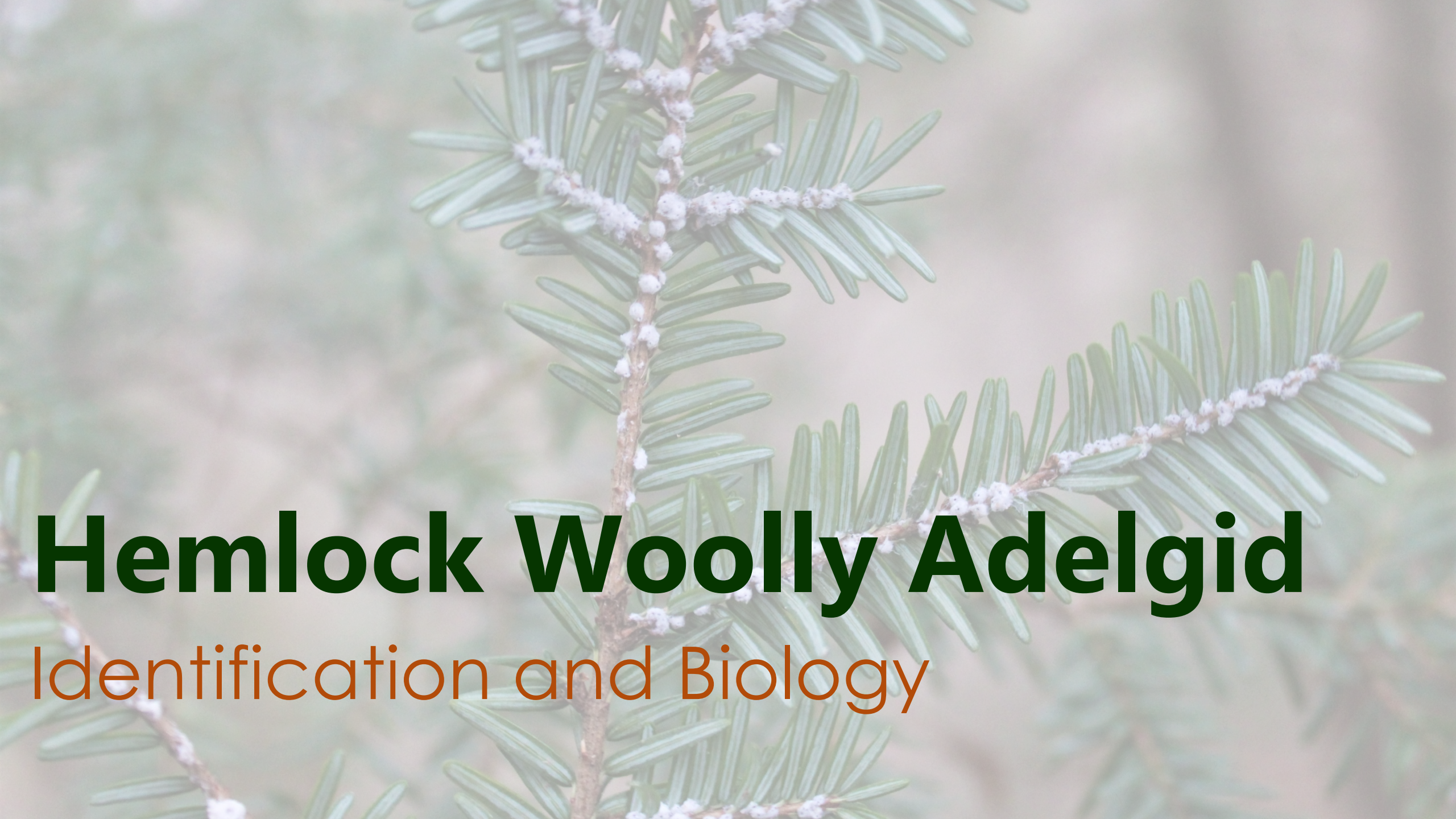
HWA Invasive Range



1980s

HWA enters New York





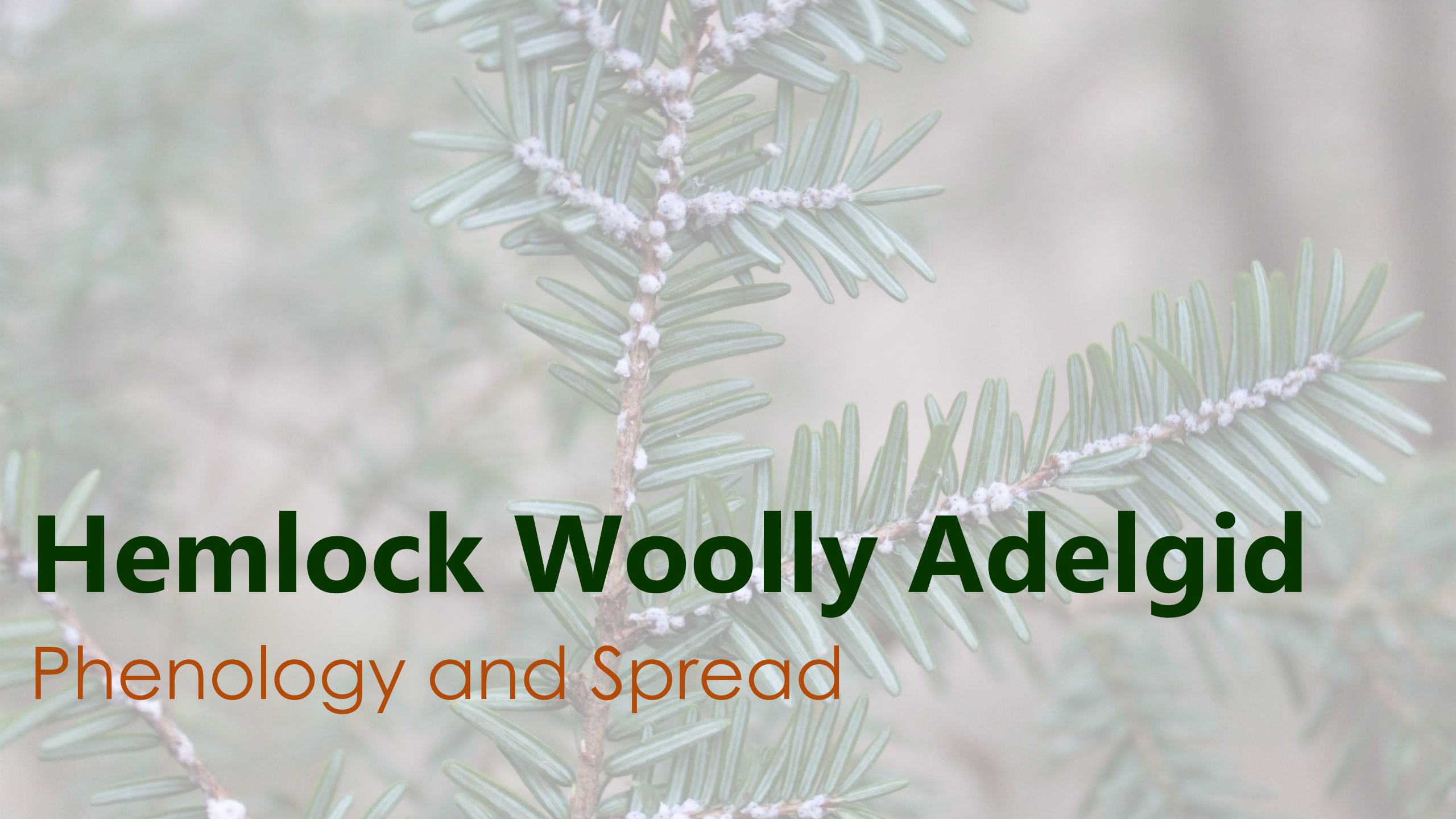
Hemlock Woolly Adelgid

Identification and Biology


Appears as
white, waxy, woolly masses on
hemlock twigs

Feeding
damages
hemlock
twig tissue


4-20
years to kill tree

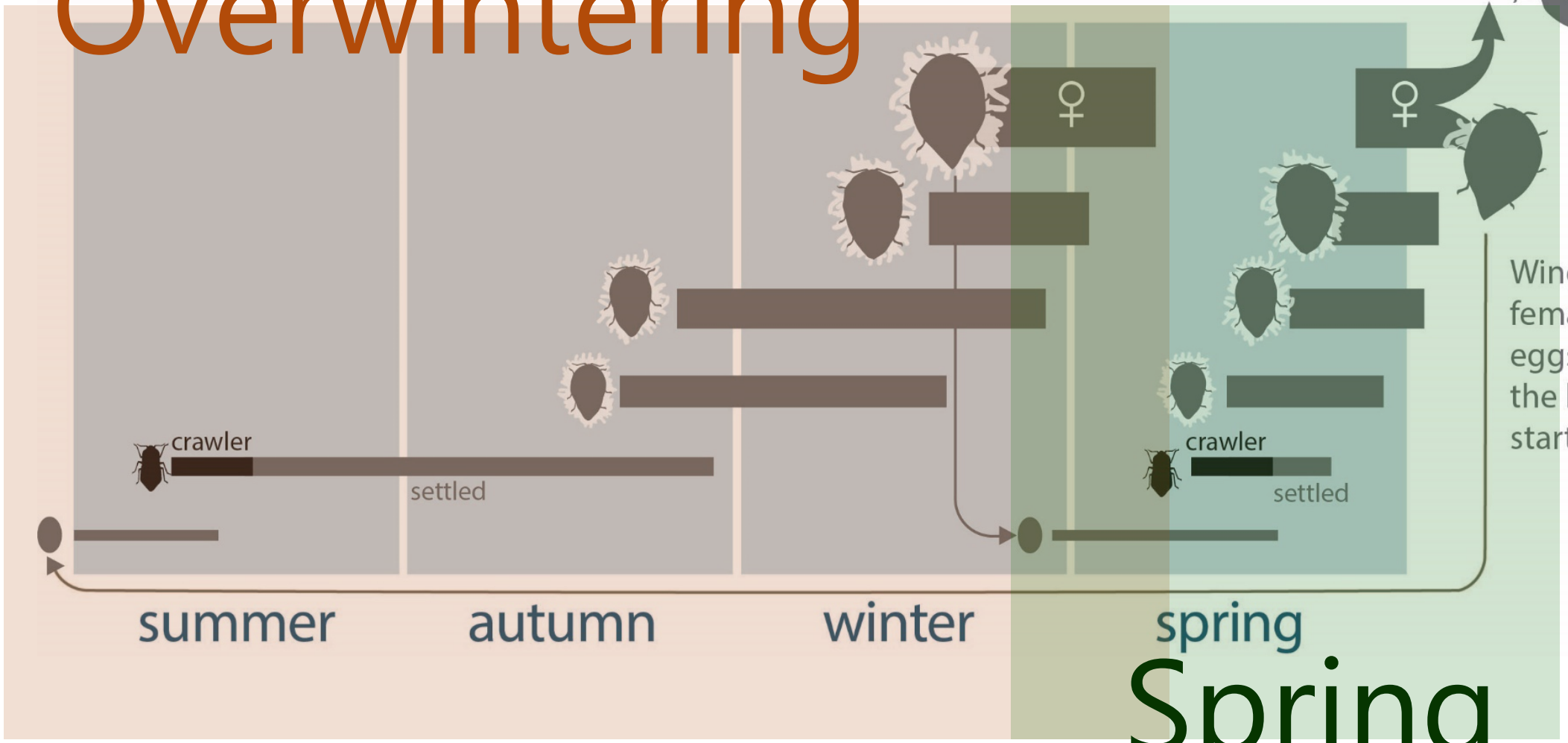


Hemlock Woolly Adelgid

Phenology and Spread

2 generations per year

Overwintering



Spring

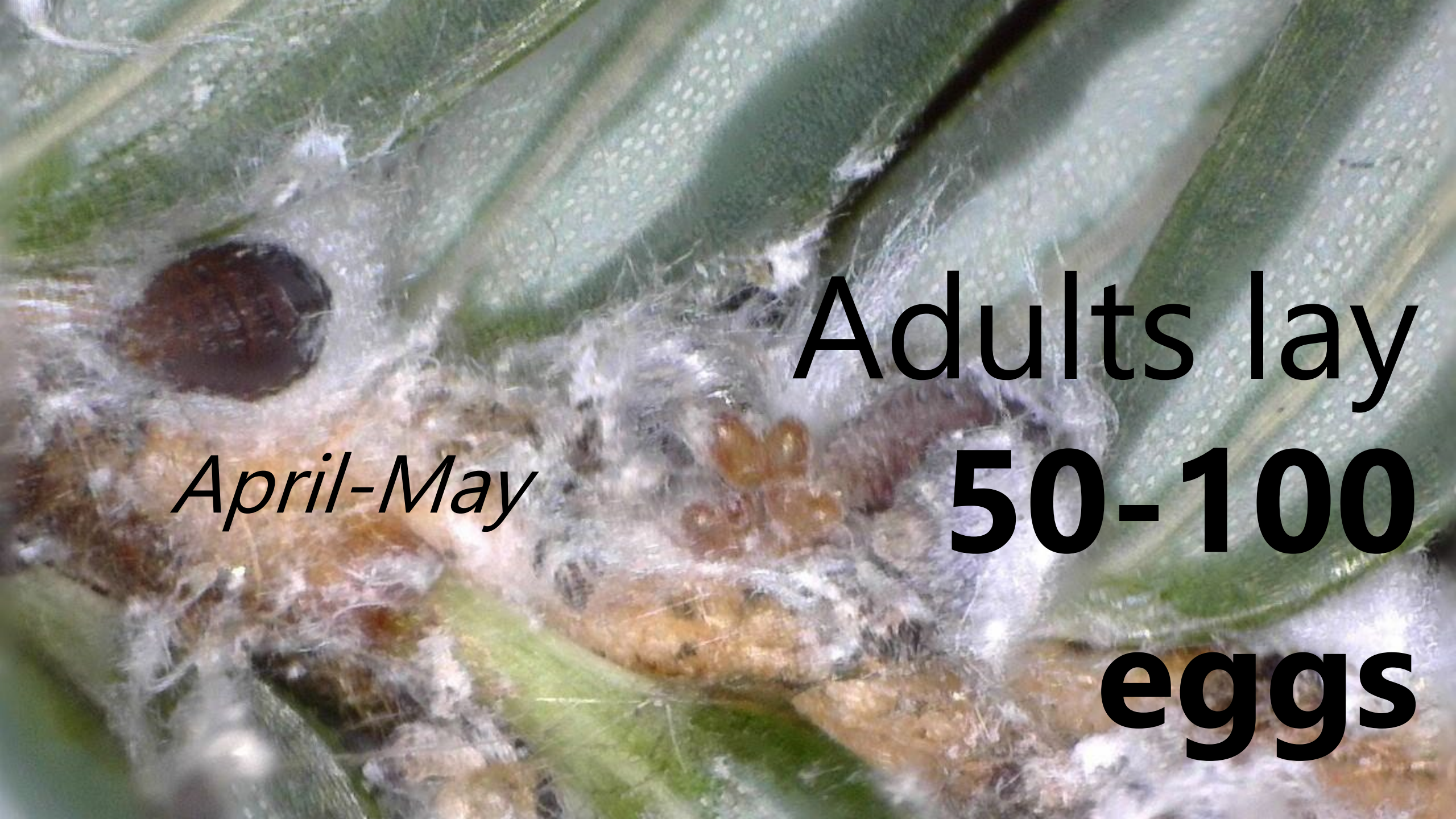

April-June
Only mobile stage!
Hatch from eggs into
crawler stage

Crawlers settle on twigs and become **aestivating nymphs**

July-October

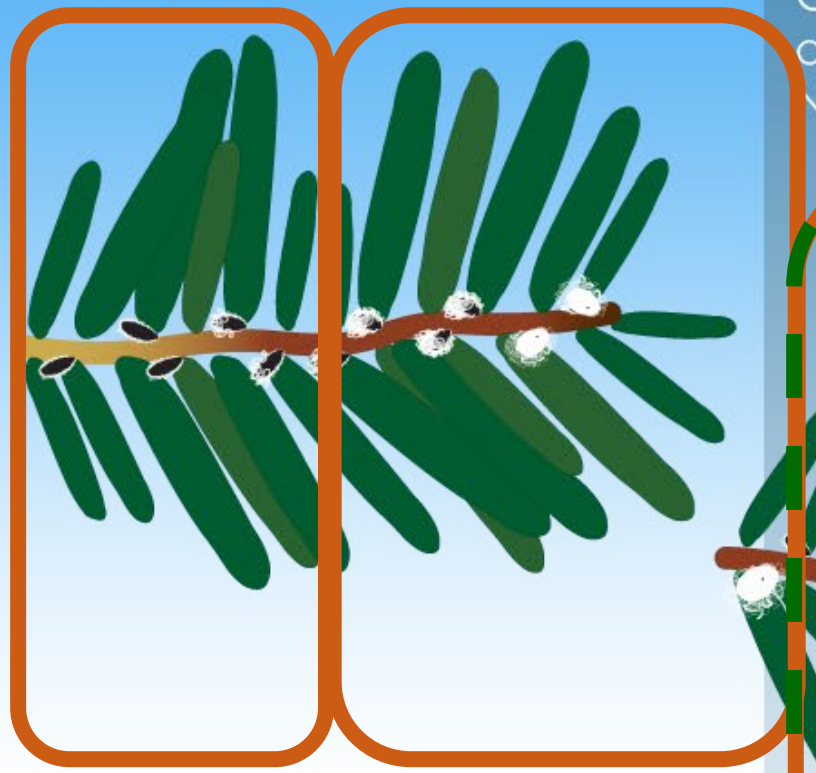
Overwintering only


Nymphs
feed, grow,
and **produce**
wool
November-June


Adults lay
50-100
eggs
April-May

August-February

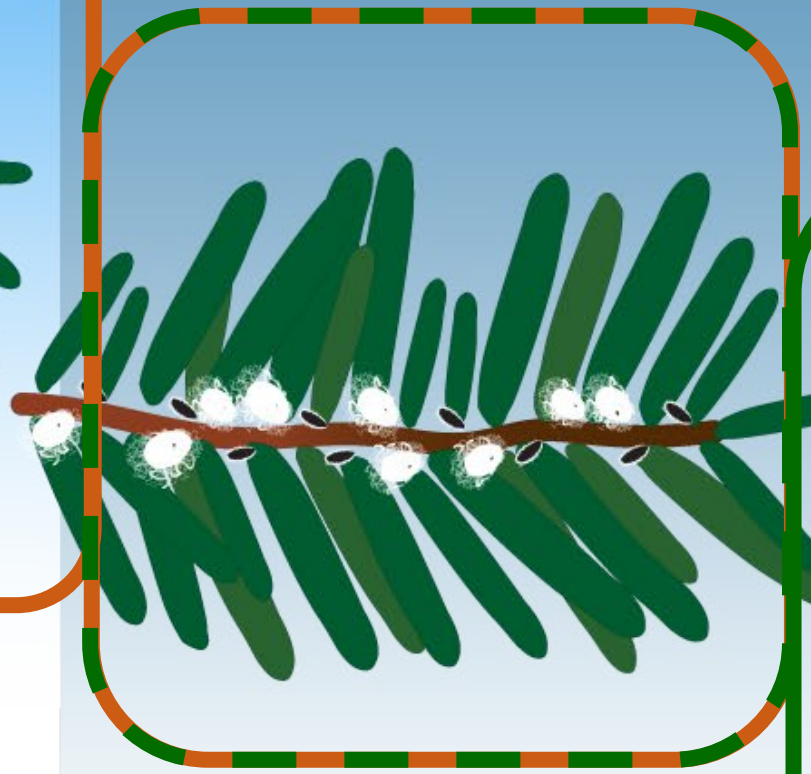
Sistens
Nymphs aestivate during summer, then go through 4 nymphal stages N1-N4



March-May

Sistens
Adults lay eggs

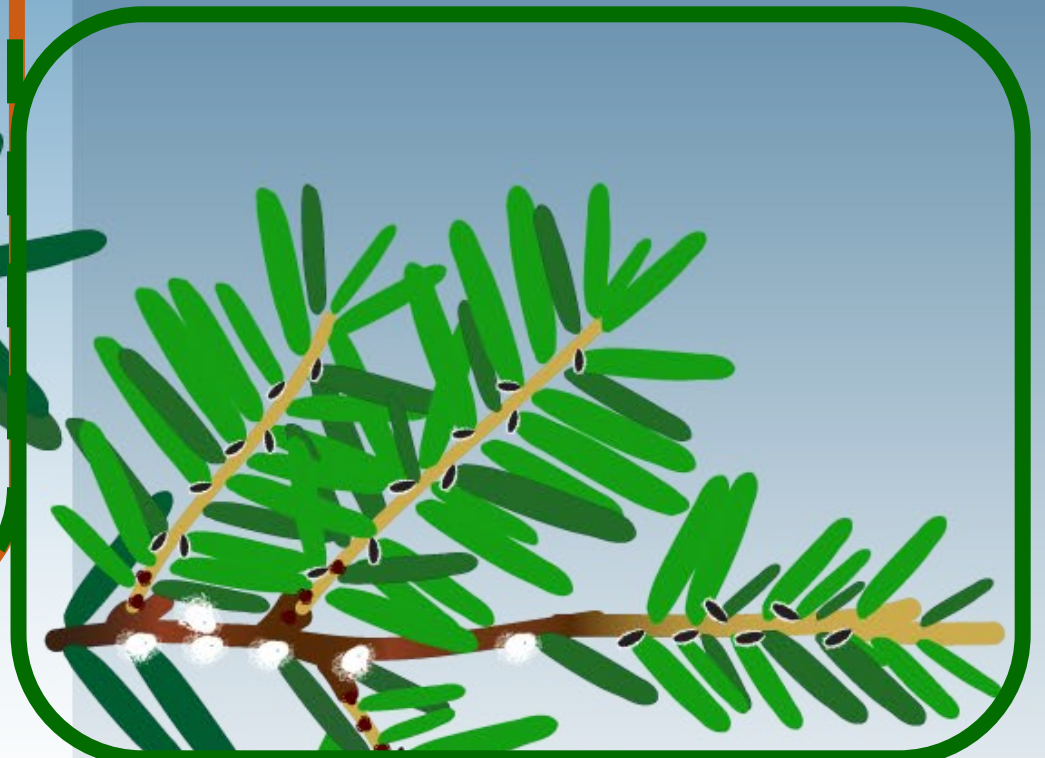
Progrediens
Crawlers settle among sistens adults
N1-N4 to adulthood



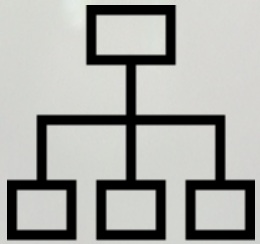
June-July

Progrediens
Adults lay eggs

Sistens (F2 generation)
Crawlers settle on new growth



HWA Invasion



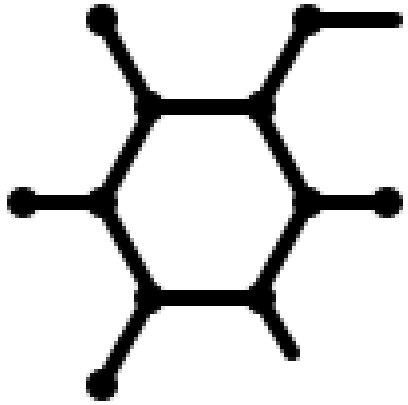
Reproduce **asexually**

2 generations per year

No native **HWA predators**

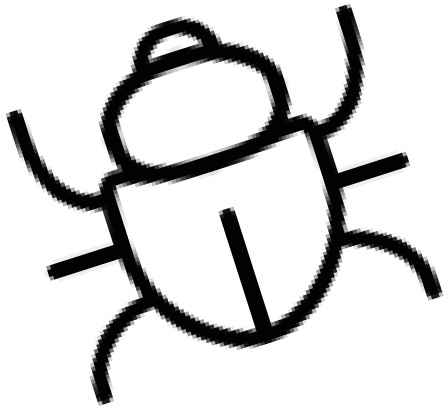

No HWA
population
control

HWA Management



Chemical

Biological




Imidacloprid
Slow-acting
7
Long-lasting
Widely available
Dinotefuran
Fast-acting
1
Short lifetime
Applicators only

Best Management Practice

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

17K released

Beetles established
at **7 sites**

Leucopis silver flies

Pacific Northwest
spring feeder

Eats **HWA eggs**

16K released

Biocontrol Research Timeline

Research potential pest predators

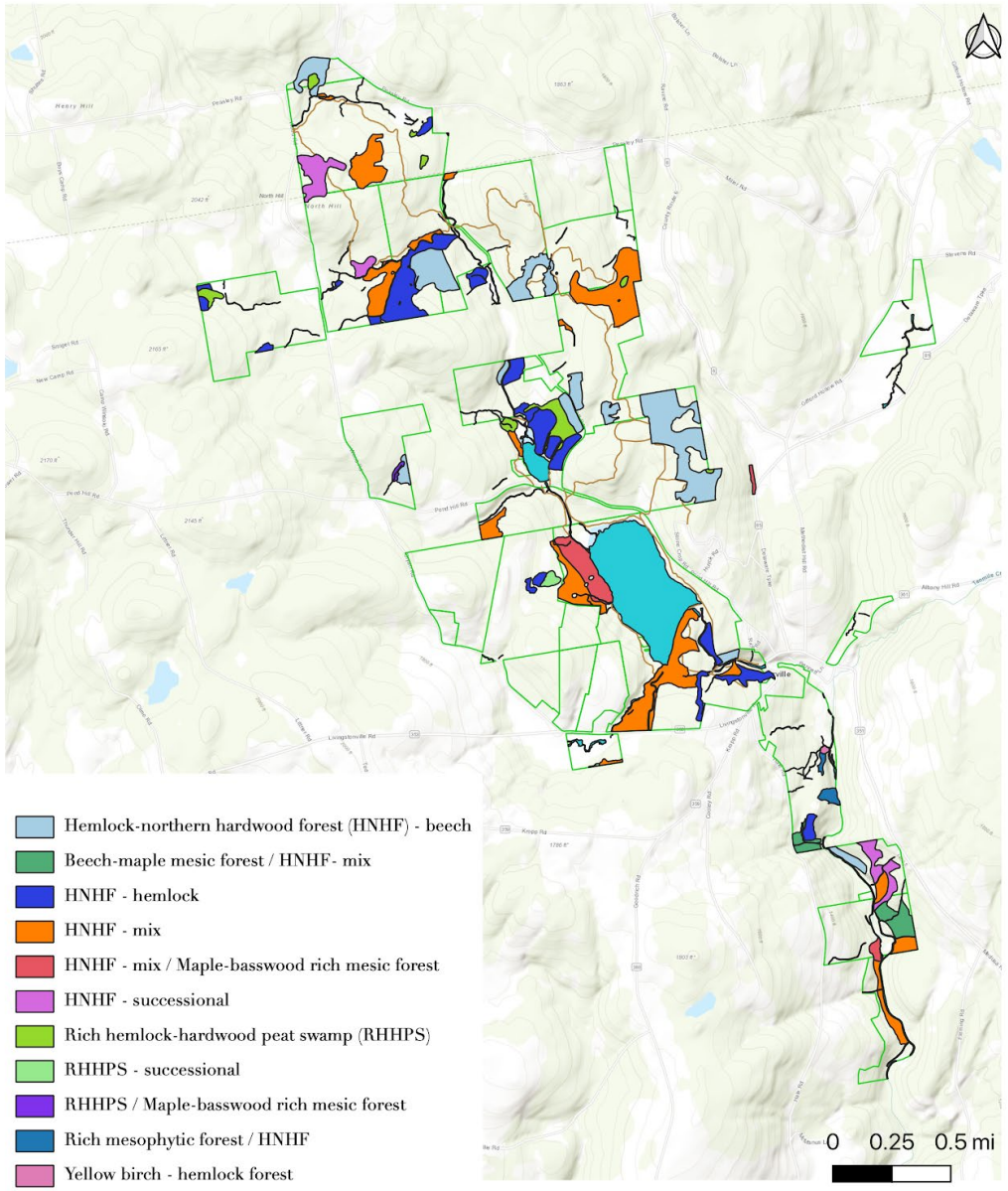
Obtain permits for predator release

Releases and continued research

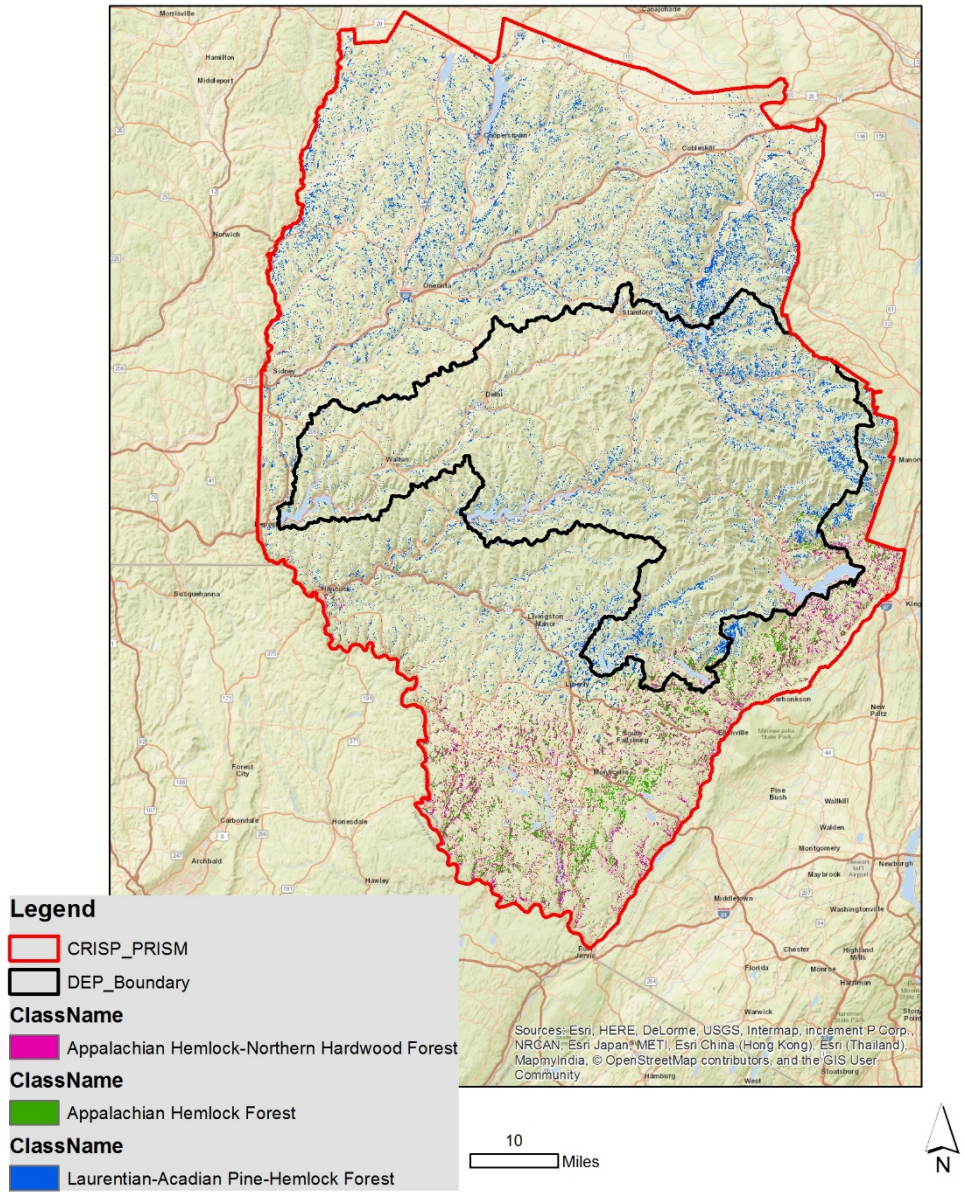
Management Planning:

Which trees to save?

Hemlock Habitats on the Huyck Preserve



Landfire data in Catskills PRISM



Prioritization Tool

Regional Prioritization of Hemlocks

Conservation of hemlocks is critical to the long-term health of New York's forests. New York has more hemlock trees than any other state in the US; it will be impossible to conserve all of our hemlocks. As hemlock woolly adelgid (HWA) moves through the state, landowners, managers, and regional planners need to prioritize which hemlocks to focus on for survey, conservation and management. This regional prioritization tool is a decision tree and weighting tool to help landowners and land managers decide which hemlock stands are the most important to conserve across multiple properties. If you have only one property or a couple properties that are close to each other, you might consider using our landowner tool, which is more streamlined for use on one or just a few properties.

Depending on the scale at which you are work, different qualities of hemlock stands

	A	B	C	D	E	F	G	H	I	J	K	L	M
		Stand Traits								Aquatic terrestrial value			
	Attributes	Current Stand Health	Environmental Stressors	Stand Size	Hemlock Density	Proximity to HWA	Proximity to Water	Genetic diversity	Stand Isolation	Upland Snow in headwater cachement of coolwater fish habitat	Provide direct shade to water	At-risk water quality	Stream flashiness
	Attribute Weight	3	2	2	2	1	1	1	1	2	2	2	1
	Site 1 Name												
	Site 2 Name												
	Site 3 Name												
	Site 4 Name												
	Site 5 Name												
	Site 6 Name												
	Site 7 Name												
	Site 8 Name												
	Site 9 Name												
	Site 10 Name												

Initial Decision Tree

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

What To Consider

(* = complex variable)

Stand Traits

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

Aquatic Ecosystem Value

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

Terrestrial Ecosystem Value

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

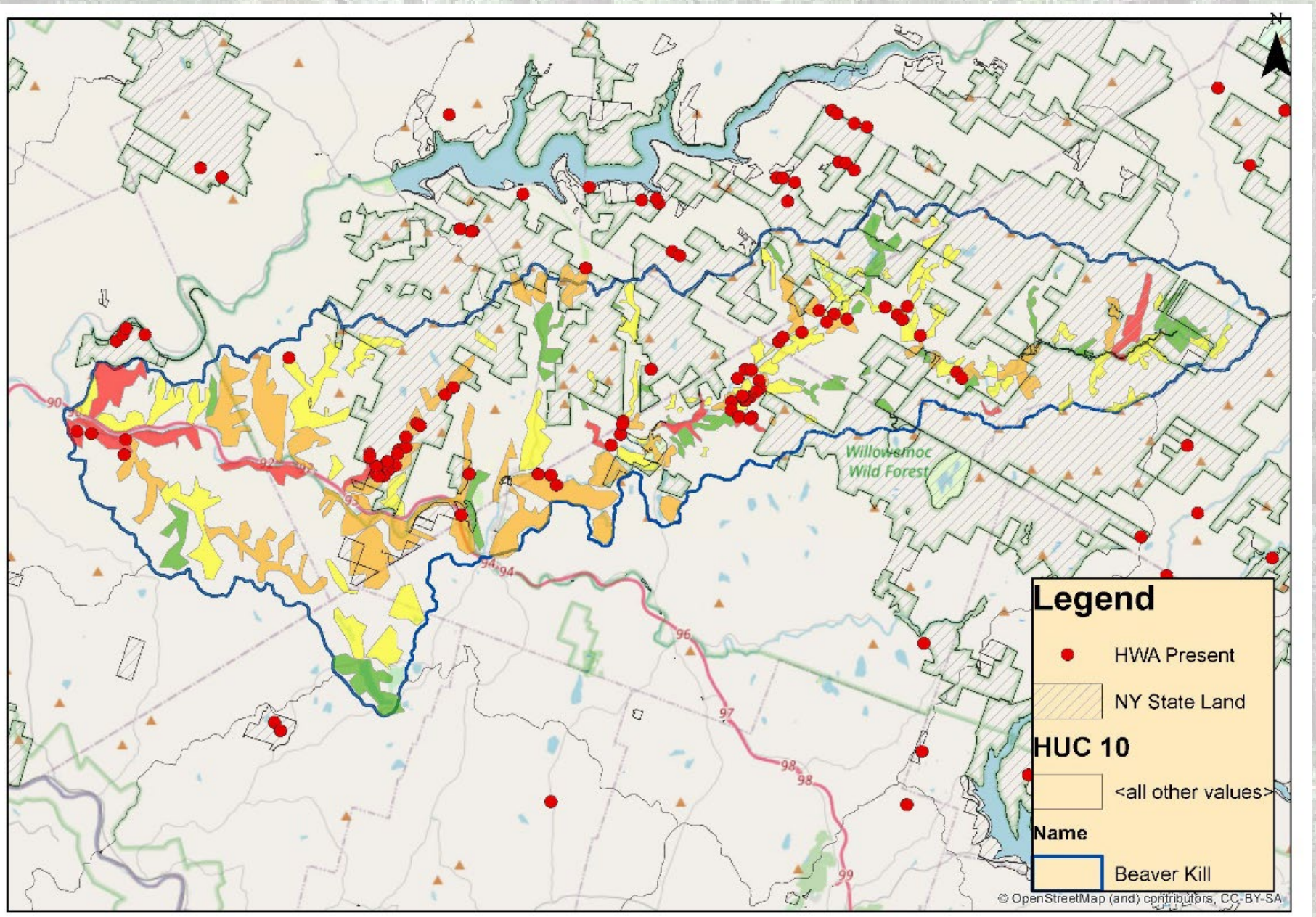
Cultural Value

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

Sustainability

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

Example: Beaverkill Watershed



Reporting HWA Infestations

NYiMapInvasives

www.nyimapinvasives.org

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

NYSHI's **Hemlock Hunters project**

Nathan Hayes

Director of the Rochester Museum & Science Center's Cumming Nature Center

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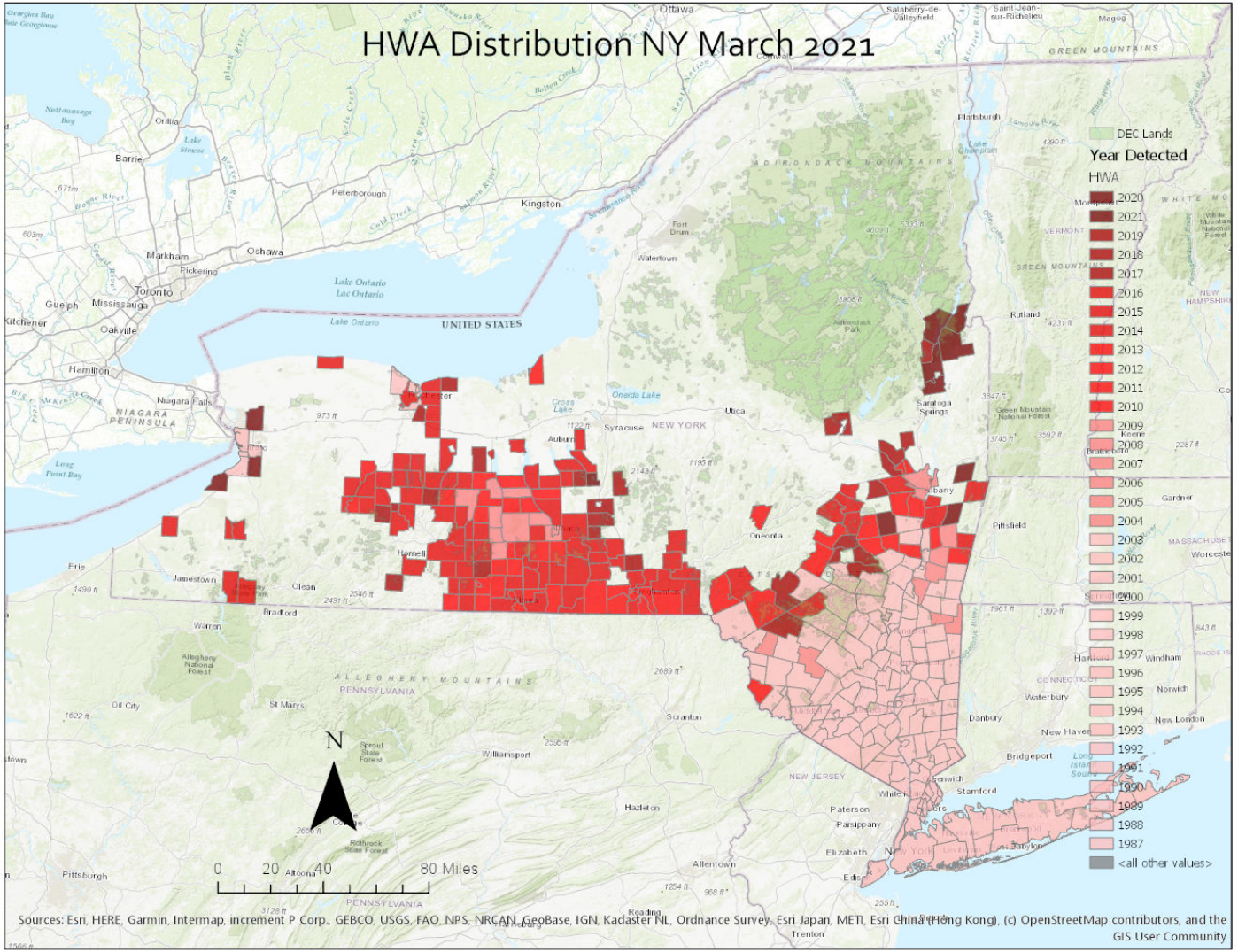
Oswego HWA Meeting

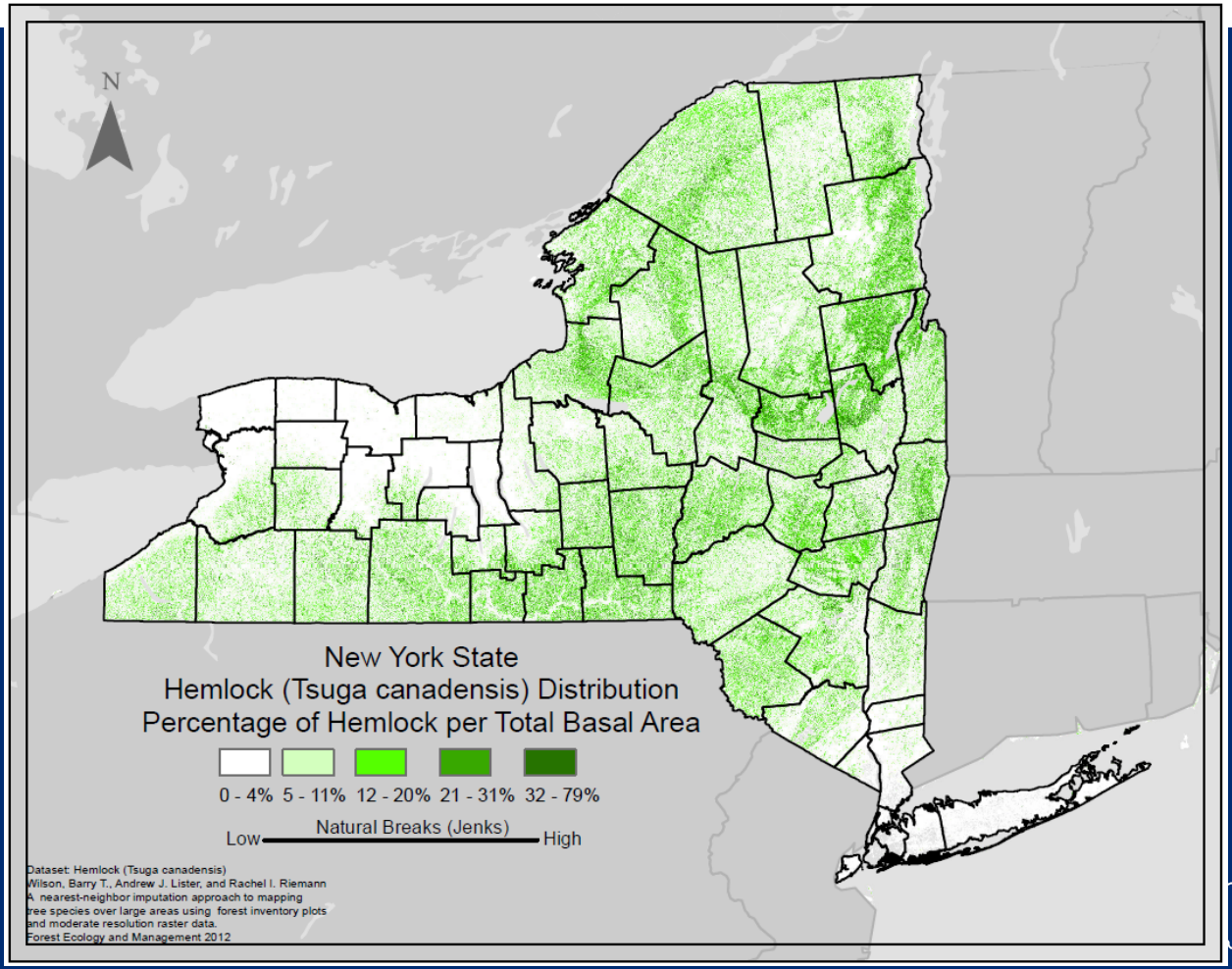
Bryan Ellis

March, 2021

HWA Distribution NY March 2021



Department of Environmental Conservation



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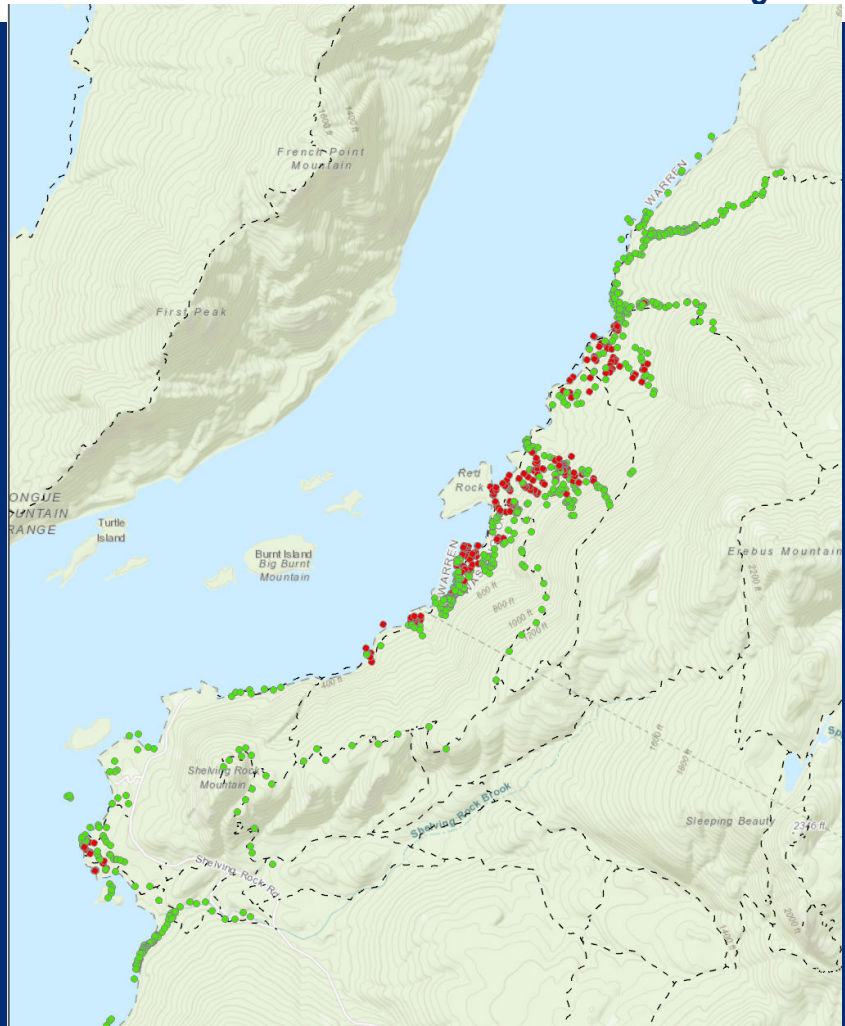
State Approach

- Detect and monitor
- Control the spread
- Manage HWA in priority infested areas
- Work with land managers to restore impacted ecosystems
- Support biological control
- Conduct outreach and education

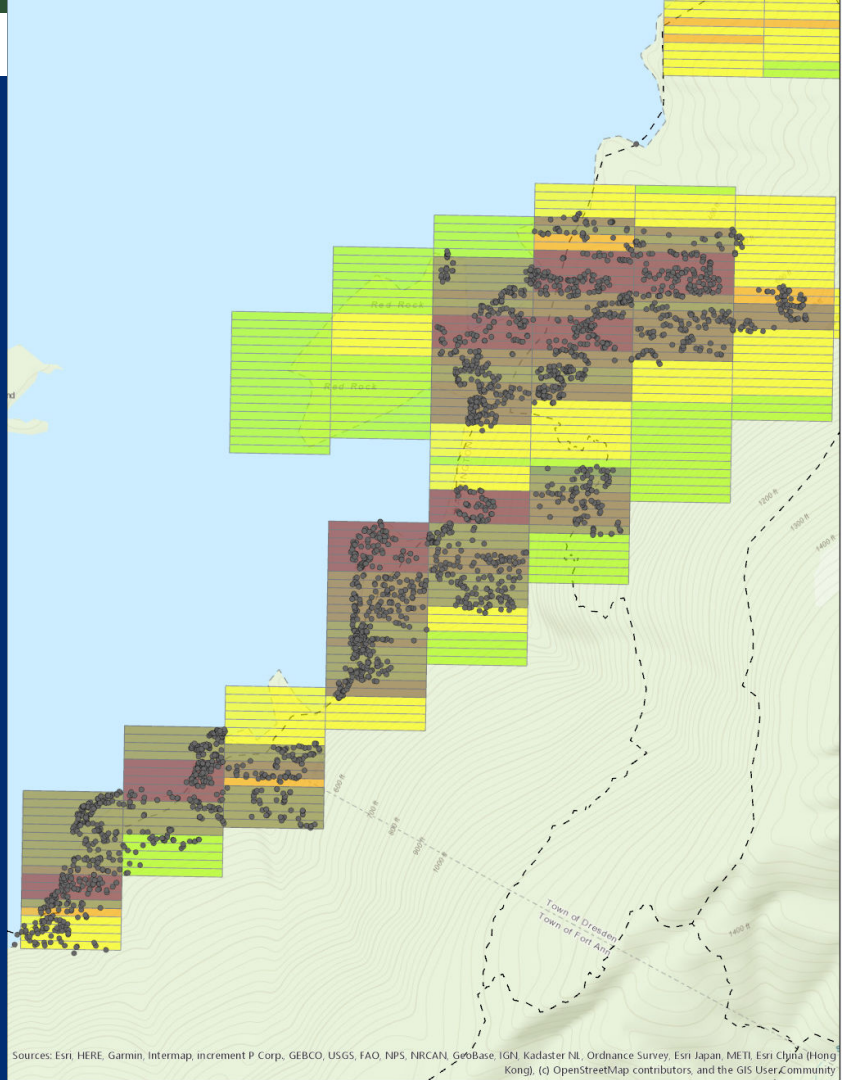
Initial Detection and Delimitation Survey

- Initial report confirmed 8/6
- Delimitation began 8/24
- Mapped over 250 acres of infested trees
  - Surveyed over 37,000ft of shoreline and trails
  - Over 100 person days



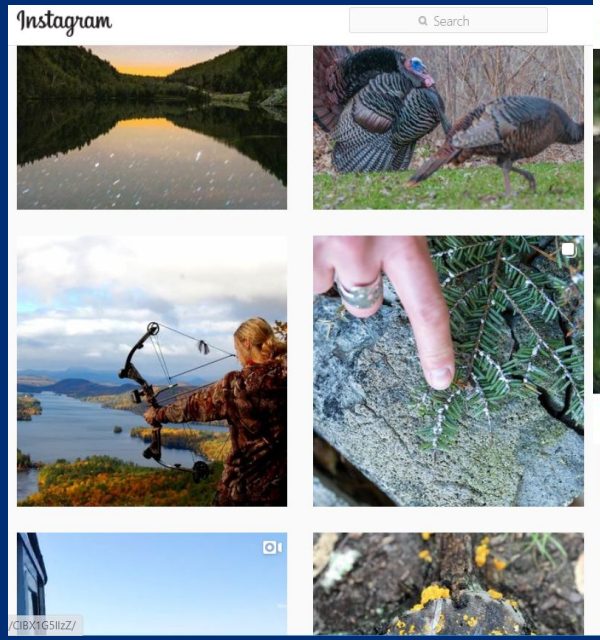
Lake George Treatment

- Treatment from 10/6 – 10/28
- Tagged 3,204 trees over 174 acres
- Treated 2,374 trees over 138 acres and injected 80 trees
- 620 Laricobius released by NYSHI



Outreach and Education

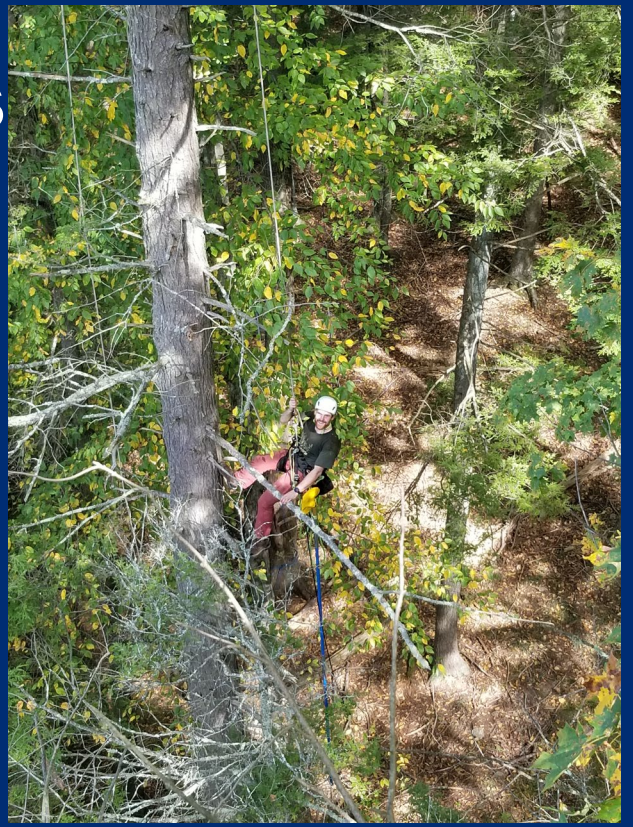
- Importance of reaching both wide and targeted audience
- Utilize both social media and traditional media
- Example in Lake George
  - 3 press releases on 8/11, 9/09, and 11/16
  - Several articles created by local news stations
  - 6 social media and Facebook posts that reached 46,366 people
  - The Capital Region PRISM's HWA mobile sign set up
  - Informational brochures at trailheads



NEW YORK STATE Department of Environmental Conservation

Restoration of Impacted Sites

- Hemlock seed collection and long term storage
- Use of silviculture to improve hemlock resiliency
- Controlling competing vegetation and invasive species
- Alternative species



Thank You

- Bryan Ellis
- Forester
- 625 Broadway, Albany, NY 12233-4253
- Bryan.Ellis@dec.ny.gov

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Twitter: twitter.com/NYSDEC
Flickr: www.flickr.com/photos/nysdec

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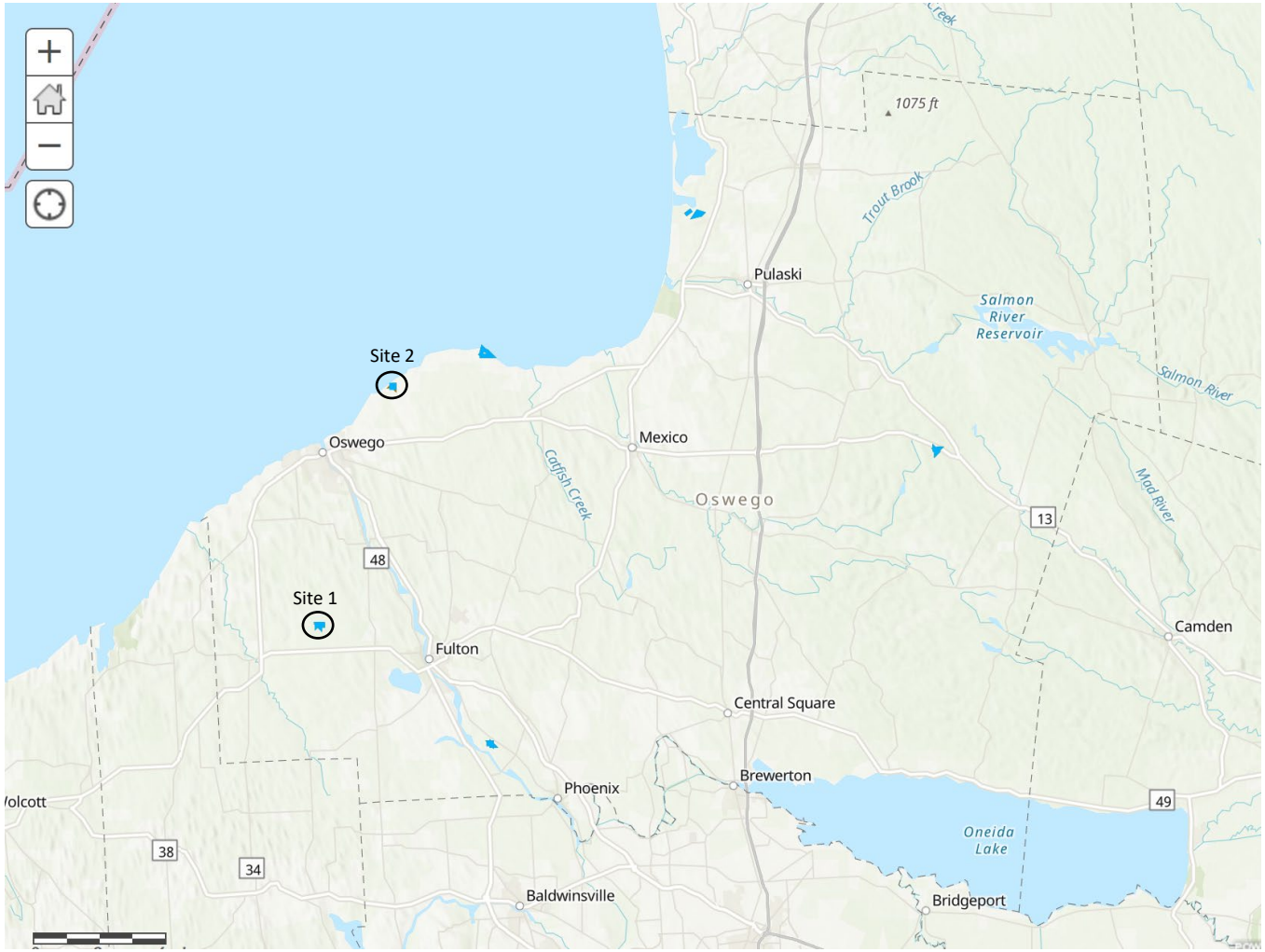
HWA found in SW Oswego County

Oswego County Survey Sites



- HWA found at 2 Sites
- Response in accordance with SLELO PRISM ED/RR Process

HWA found in SW Oswego County

- Site 1
  - Found only 2 woolly masses
  - Sample examined with microscope
  - Closer examination revealed adelgid without woolly masses also present on branch
  - Confirmed with Cornell entomologist Mark Whitmore
  - Alerted NYS DEC
  - Notified Landowner (Public)
  - Meeting held with Strategic Response Team (discussed next steps, etc.)
  - Additional survey planned to determine extent of infestation




HWA found in SW Oswego County (continued)

- Site 2
  - Found woolly masses on most lower branches in one area of site
  - No woolly masses observed in lower branches in other areas of site
  - Informed NYS DEC about additional find
  - Notified Landowner (Public)
  - Meeting held with Strategic Response Team (discussed next steps, etc.)
  - Additional survey planned to determine extent of infestation
  - SLELO PRISM encourages treatment of HWA for two reasons:
    - To protect the landowner's investment by supporting tree stand health, integrity and resiliency to other forest pests and pathogens
    - To reduce the rate of spread of this invasive forest pest into other parts of our region