

# Invasive Species

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## THREATS AND OPPORTUNITIES FOR ACTION

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**Mission:**

To protect the Adirondacks from the negative impacts of non-native invasive species

**Goals:**

1. Prevent new introductions
2. Rapidly detect and eradicate new infestations
3. Manage existing priority infestations to mitigate impacts

**Activities:**

Coordination, Prevention, Education & Outreach, Survey & Mapping, Control & Management, Monitoring, Research, Planning, Policies, Funding

**Partnerships:**

3 staff, 1 seasonal  
 Rapid Response Team  
 4 principal partners (+4 new ones)  
 30+ cooperating organizations  
 100s of volunteers

**Funding:**

Environmental Protection Fund (5 yrs)  
 2013-2017



# WHAT'S THE DIFFERENCE?

## Native Species



Species indigenous to a region at the time of European settlement

## Non-native Species (*Exotic, Introduced, Alien*)



Accidental or purposeful introduction of a species outside of its historic range

## Invasive Species (*Noxious*)



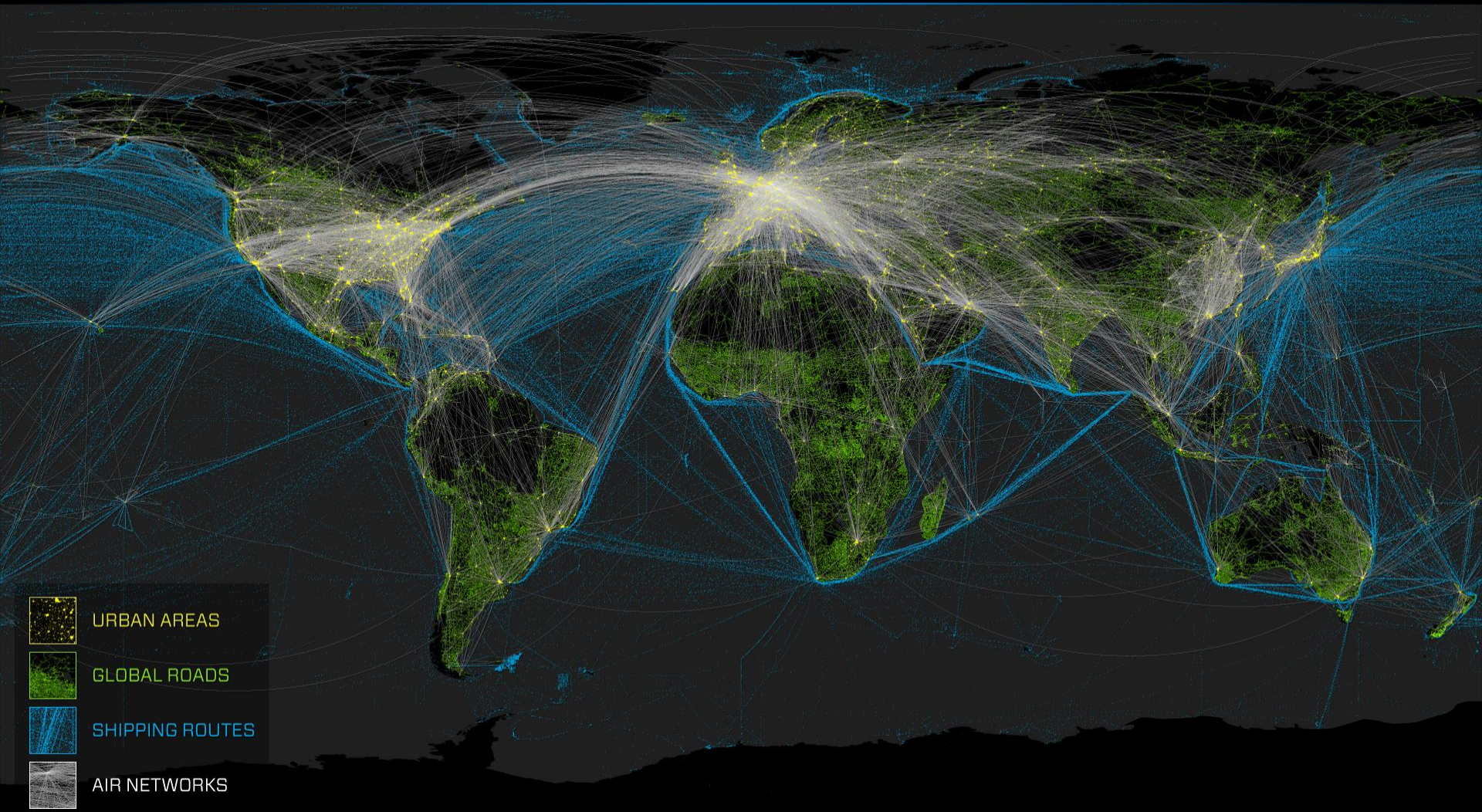
Non-native species that causes measurable harm to the environment, economy, or society

## Nuisance Species (*Weed*)



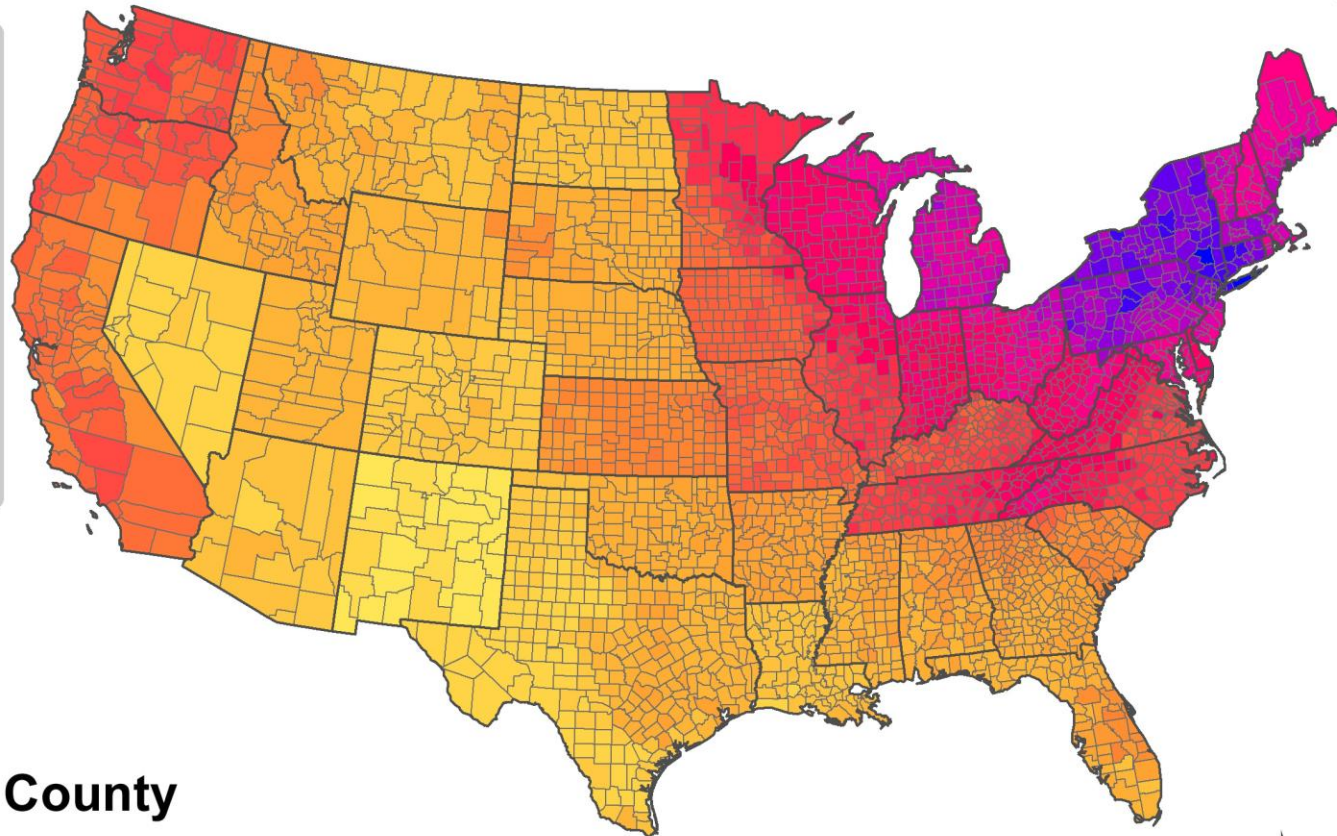
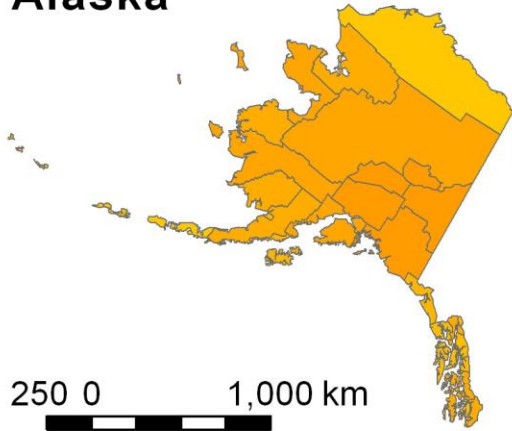
Species that interferes with human activities

# THE GLOBAL TRANSPORTATION SYSTEM

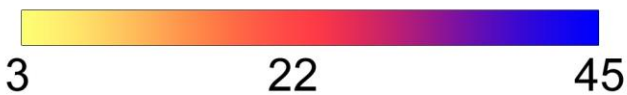


# FOREST PEST ABUNDANCE BY COUNTY

Alaska



Number of Pests per County



# **COSTS & IMPACTS**



**LOSS OF BIODIVERSITY**

# **COSTS & IMPACTS**



**LOSS OF RECREATIONAL OPPORTUNITIES**

# COSTS & IMPACTS



**RISK OF DISEASE OR INJURY**



# COSTS & IMPACTS



**\$137-146  
BILLION**

**COST OF INVASIVE  
SPECIES IN THE UNITED  
STATES EACH YEAR**

Pimentel et al. 2005

**ECONOMIC IMPACT**



**THE ADIRONDACK REGION  
REMAINS RELATIVELY  
*UNINVADED***

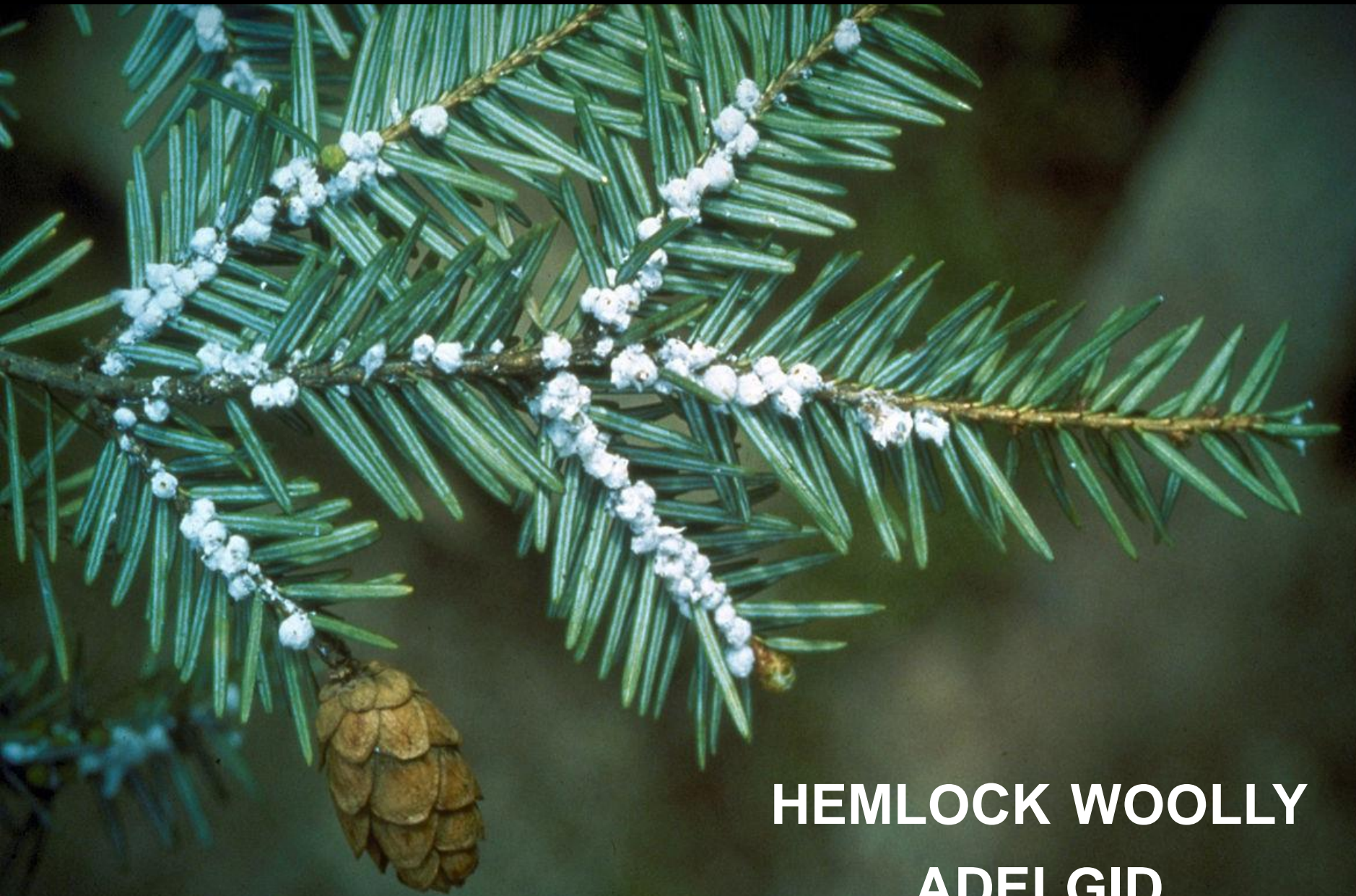
# PRESENT & APPROACHING

PLANTS

# THREATS

ANIMALS



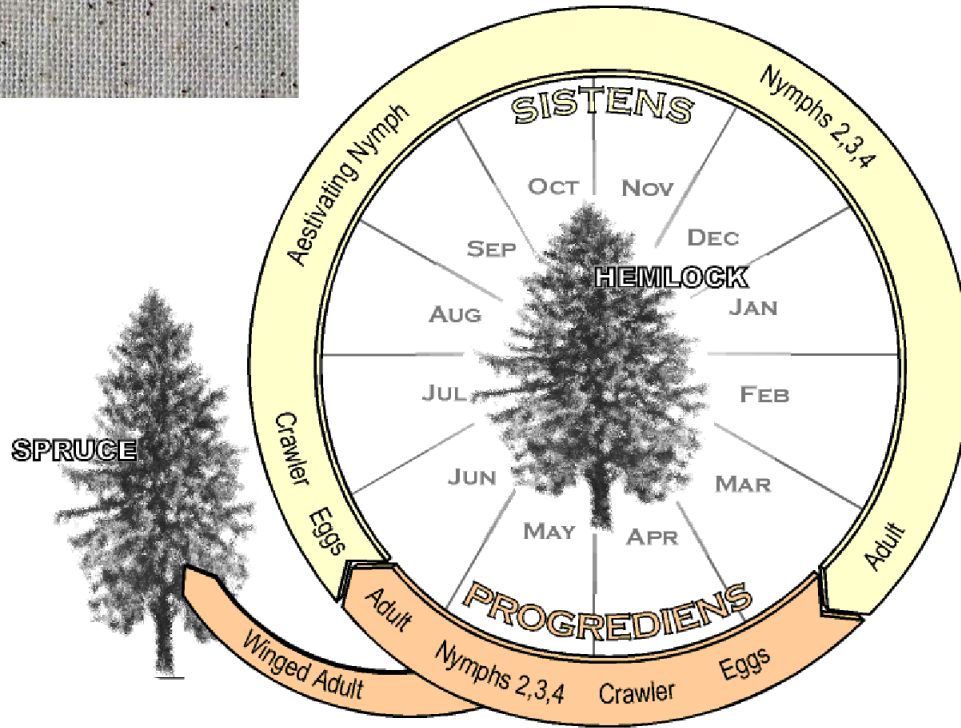


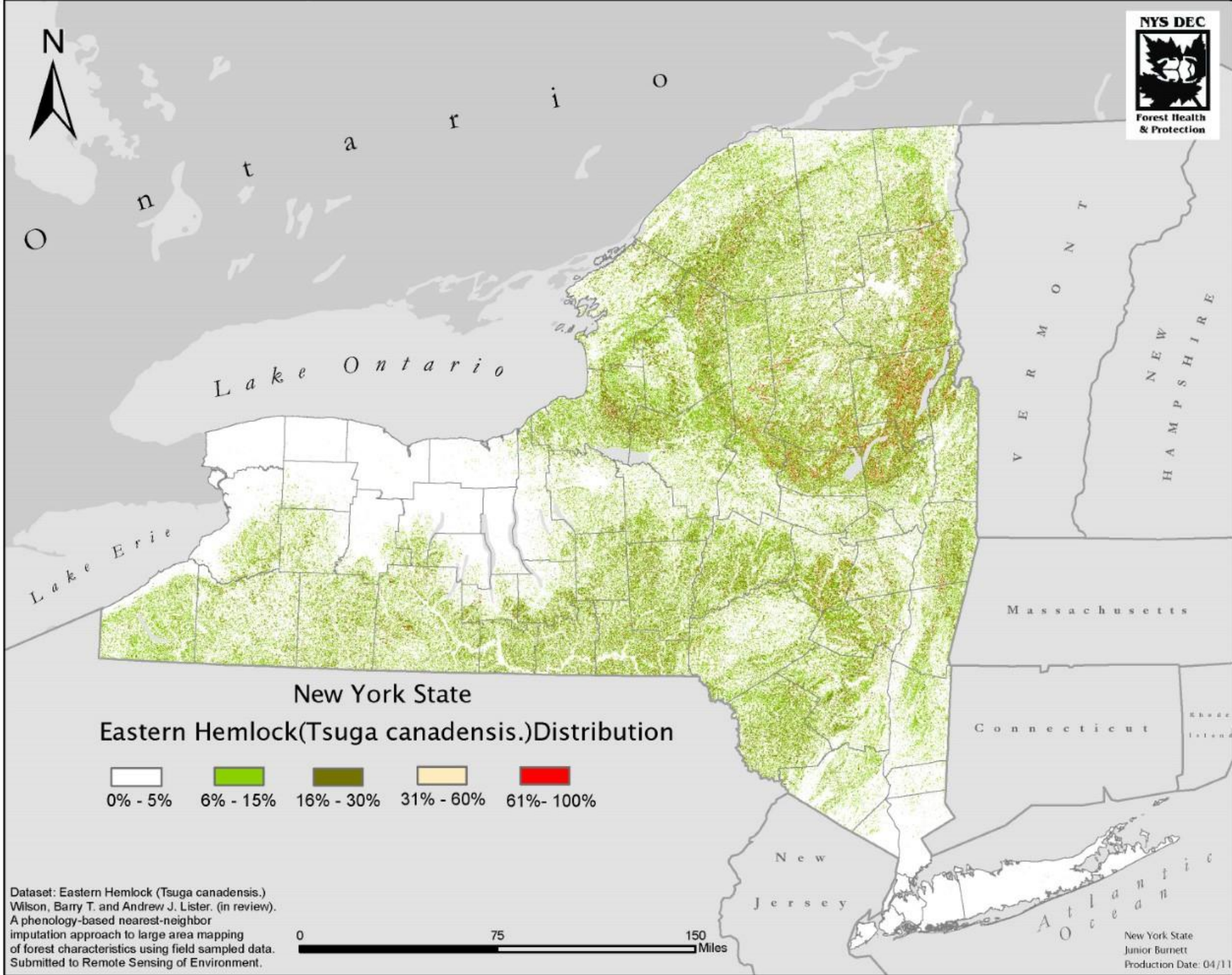
**HEMLOCK WOOLLY  
ADELGID**

# HEMLOCK WOOLLY ADELGID NATIVE RANGE



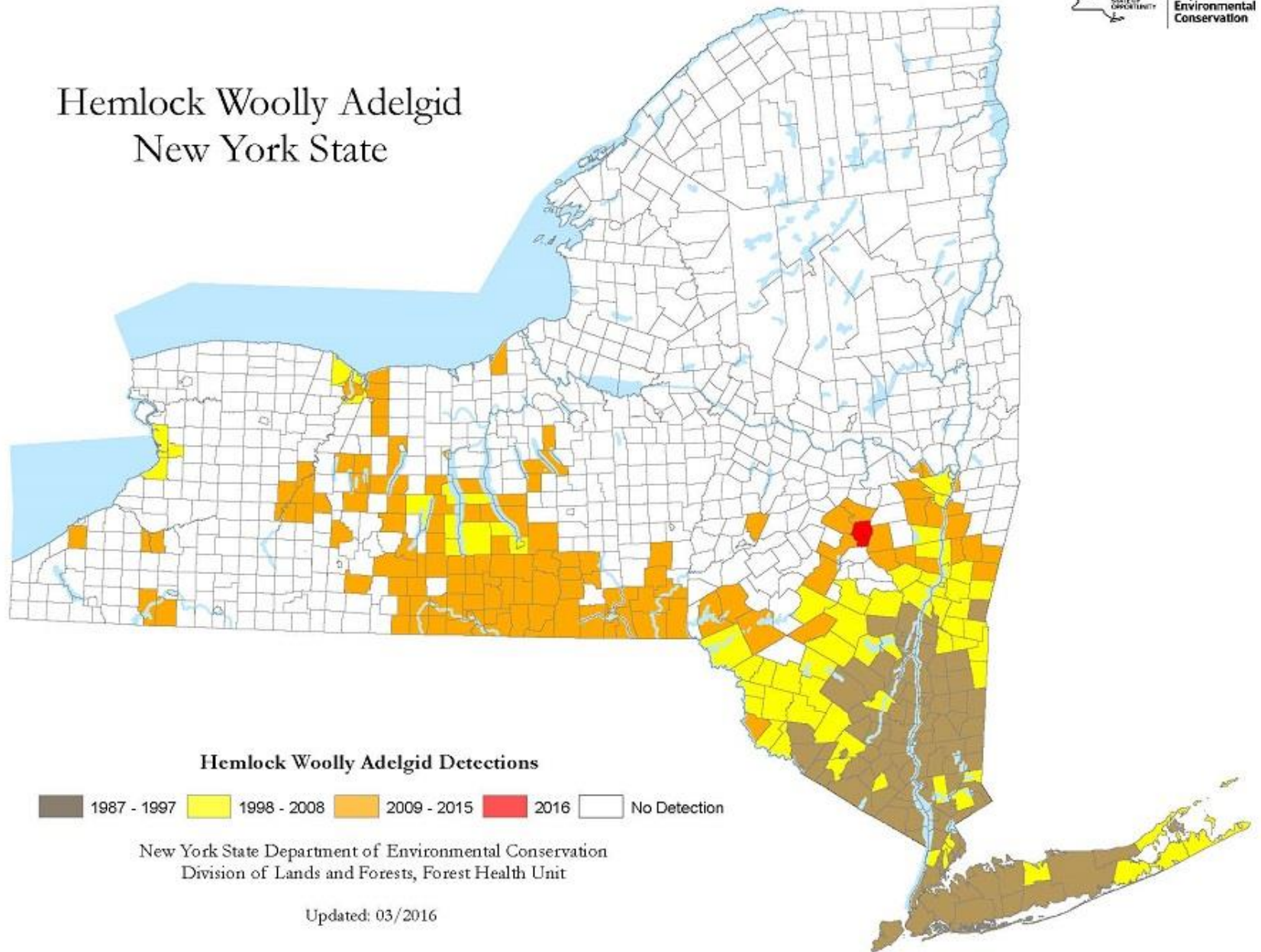
● = native range





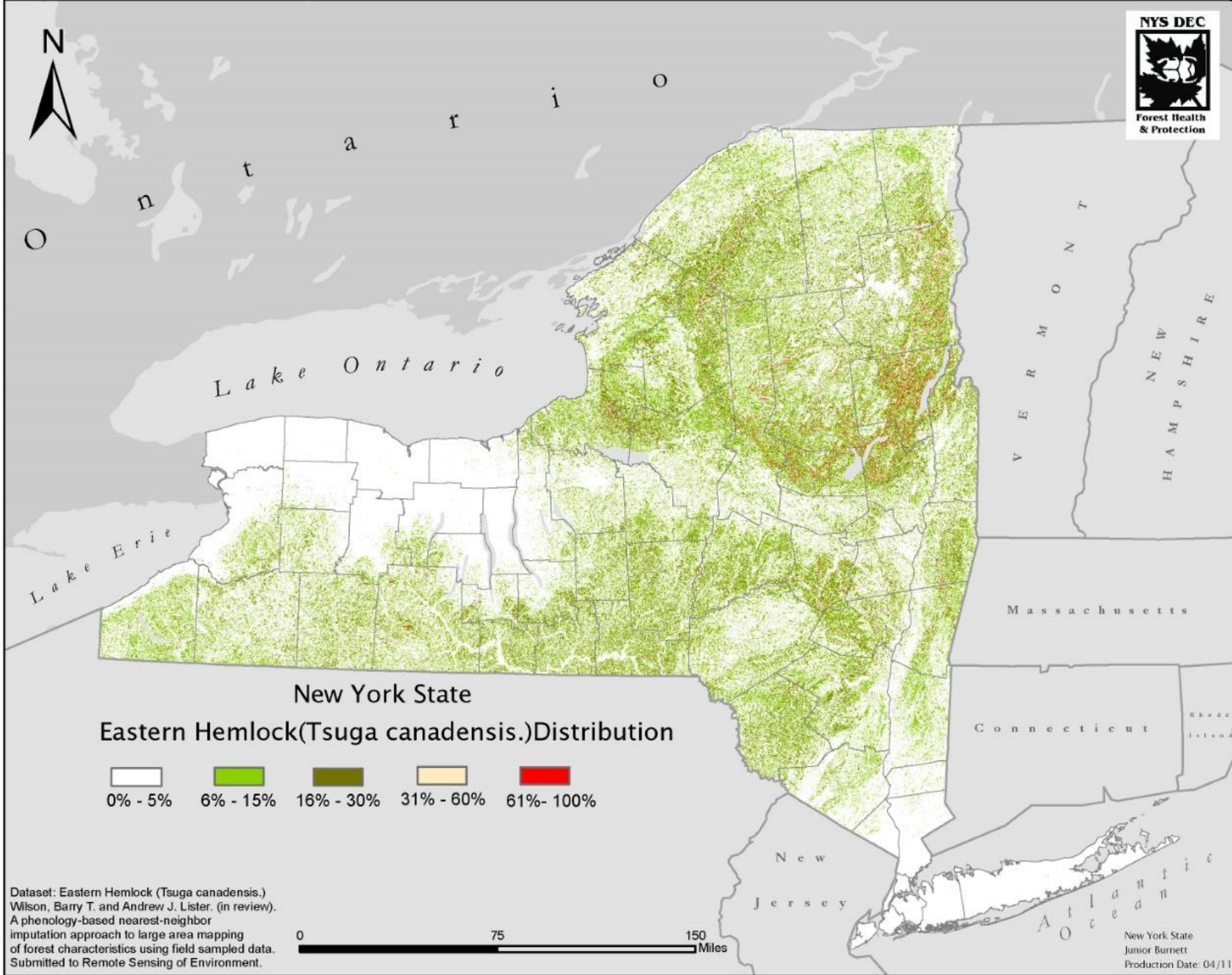
Dataset: Eastern Hemlock (*Tsuga canadensis*)  
 Wilson, Barry T. and Andrew J. Lister. (in review).  
 A phenology-based nearest-neighbor  
 imputation approach to large area mapping  
 of forest characteristics using field sampled data.  
 Submitted to Remote Sensing of Environment.

# Hemlock Woolly Adelgid New York State









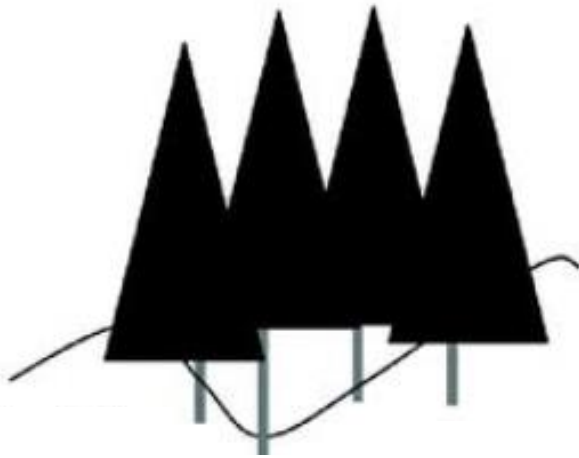
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EASTERN  
HEMLOCK  
IS A  
**FOUNDATION  
SPECIES**

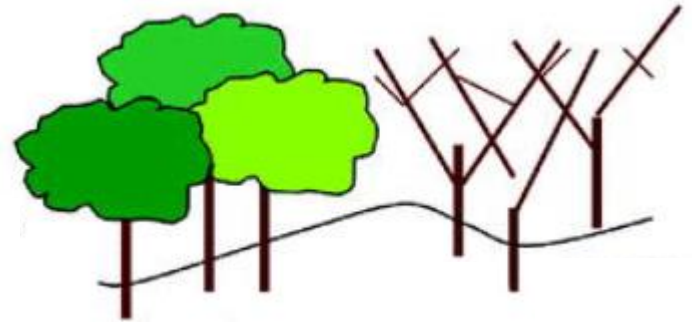
A SPECIES WITH A  
DISPROPORTIONALLY STRONG  
ROLE IN STRUCTURING A  
COMMUNITY

# NORTHERN HEMLOCK FOREST



**YEAR-ROUND: CLOSED CANOPY**

# NORTHEASTERN DECIDUOUS FOREST



**GROWING SEASON: CLOSED CANOPY**  
**FALL/WINTER: OPEN CANOPY**



# **INCREASED SUSCEPTIBILITY TO INVASIVE PLANTS**

(Ellison et al. 2015)



# INCREASED WATER FLOW

(Kim et al. 2017)



# CHANGE IN WATER TEMPERATURE

(Webster et al. 2012; Roberts et al 2009; Siderhurst et al. 2010; Ford et al. 2012)



# IMPACTS TO COLD WATER FISH AND INVERTEBRATES

(Ross et al. 2003; Synder et al. 2002)





**BLACK THROATED  
GREEN WARBLER**



**BLACKBURIAN  
WARBLER**



**OVENBIRD**



**HERMIT  
THRUSH**



**BLUE HEADED  
VIREO**



**ACADIAN  
FLYCATCHER**

# **REDUCED AVIAN DIVERSITY**

(Tingley et al. 2002)



# LOSS OF WINTER DEER SHELTER

(Euler & Thurston, 1980)



**INDUSTRY IMPACTS**

A scenic landscape featuring a river in the foreground with white water rapids. The river flows through a lush green forest of various trees, including tall evergreens. The sky is filled with large, white, fluffy clouds. A bright sun is visible on the left side of the frame, creating a strong lens flare effect that radiates across the scene. The overall atmosphere is serene and natural.

**WHAT IS  
BEING DONE?**

# CITIZEN SCIENCE!



# Biocontrol Research



*Laricobius nigrinus*



*Leucopis argenticollis*



Photo Credit: Mark Whitmore

# Strategic Planning





# NASA Develop Program

## New York Ecological Forecasting

### Project Goals:

1. Map existing range of eastern hemlock in the Adirondack Park and Tug Hill Region
2. Forecast the susceptibility of mapped hemlock to potential HWA infestation based on climate models for 2035



NASA DEVELOP project team (left to right): Rachel Soobitsky, Ariel Walcutt, Sara Lubkin, Madeline Ruid, Sean McCartney. Photo provided by Sean McCartney



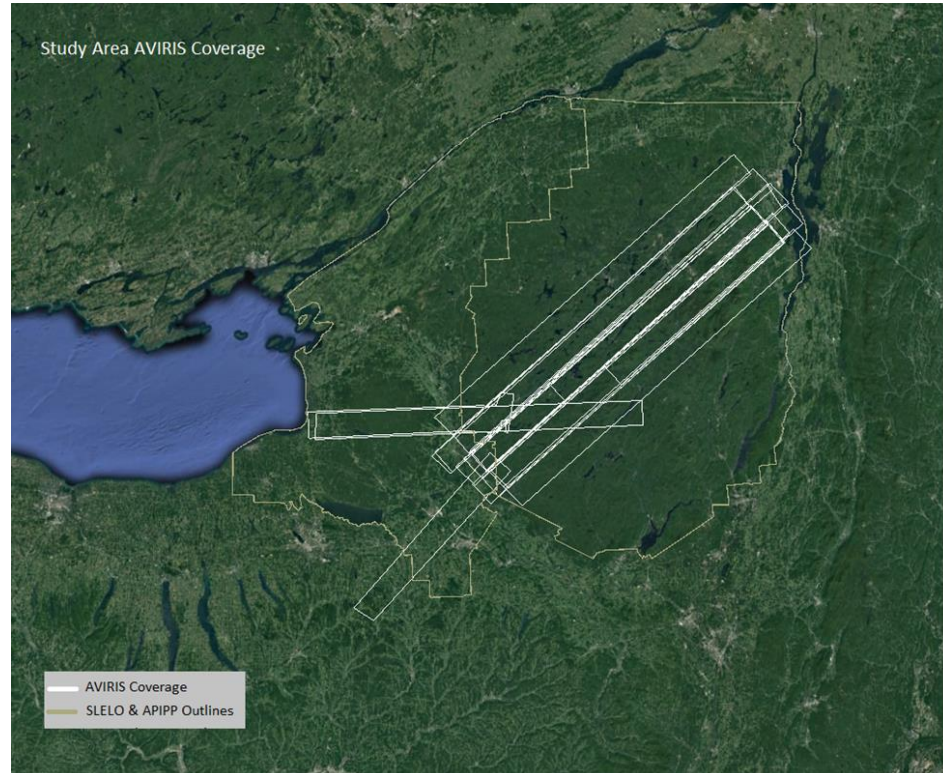
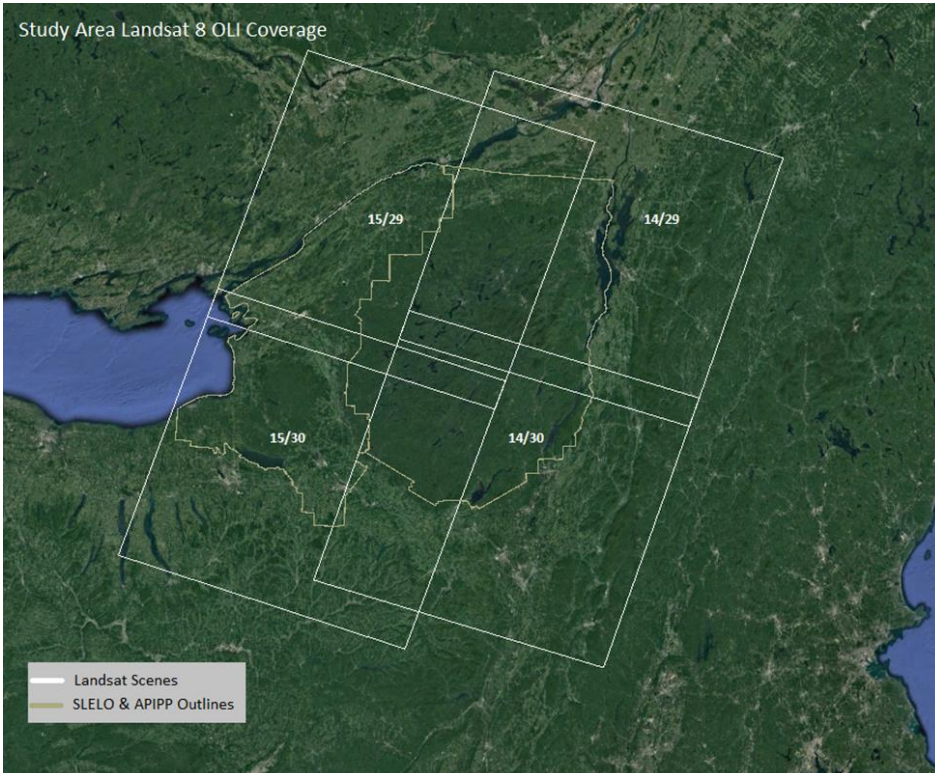
# Data Sources



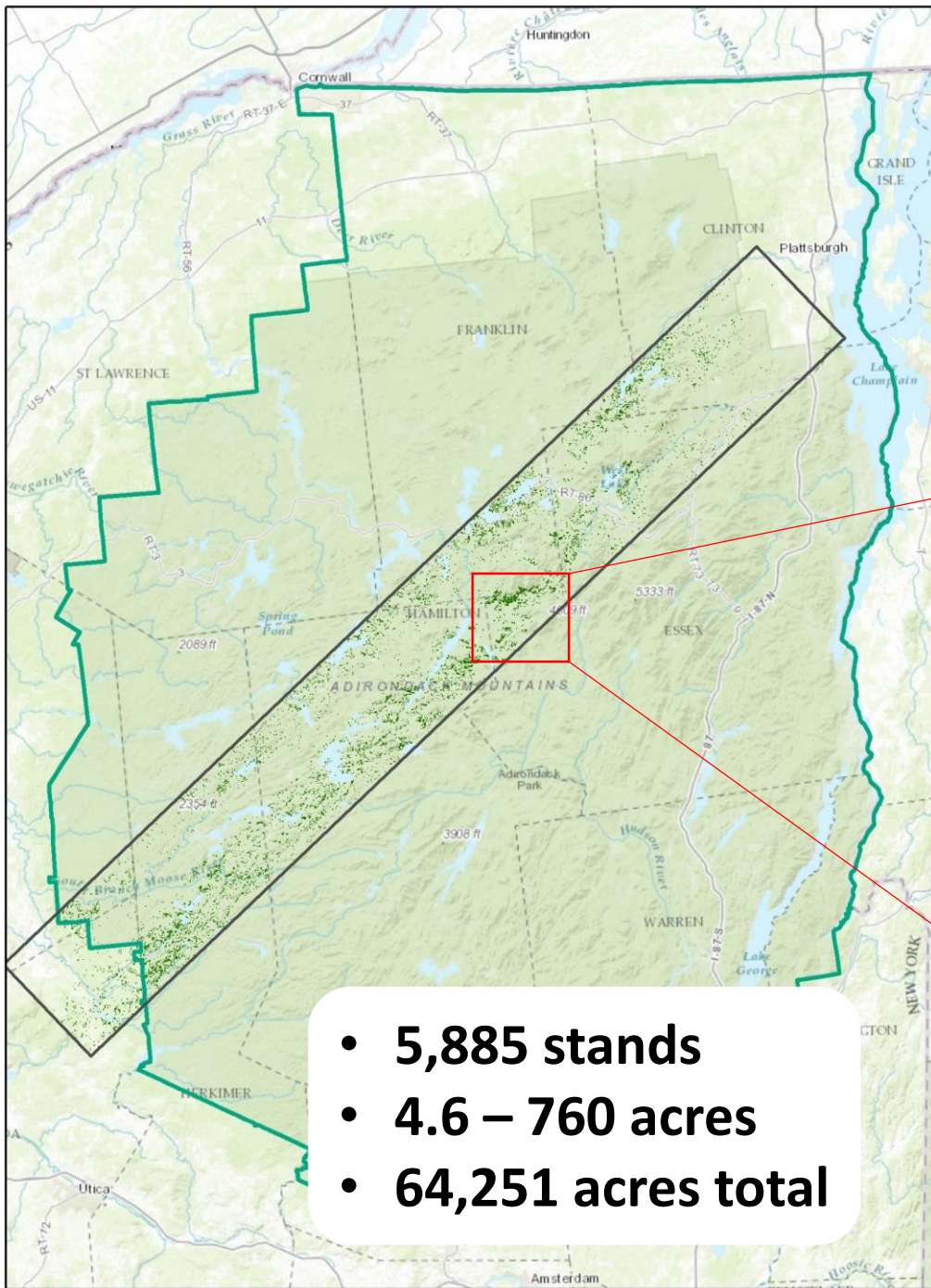
**Landsat 8**



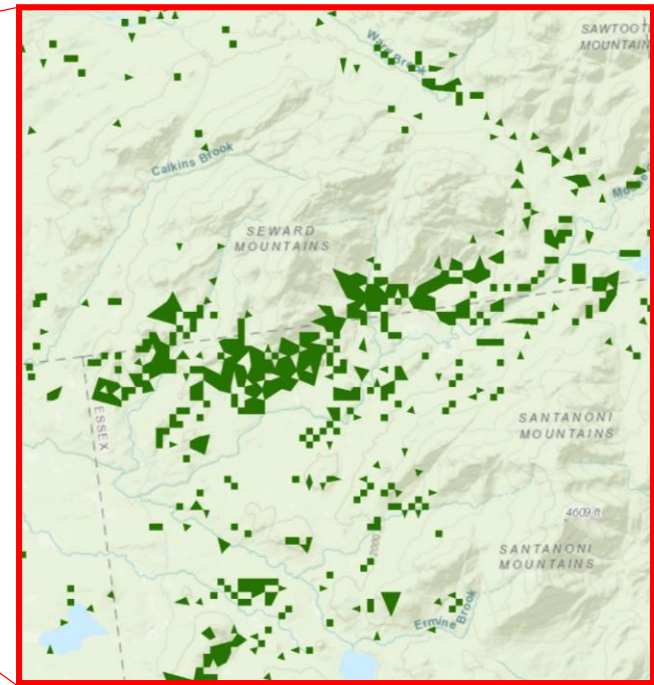
**AVIRIS**



# Hemlock Distribution Map



- 5,885 stands
- 4.6 – 760 acres
- 64,251 acres total



**6% STUDY AREA IS  
HEMLOCK DOMINATED**

# What Can You Do?



# Take Preventative Actions



**STOP AQUATIC  
HITCHHIKERS!**

# Learn More: Attend an APIPP Training!



# Report Your Findings



# Important Messages

- **Invasive species come in all shapes and sizes**
- **Invasive species can negatively impact the ecological and economic value of the watershed**
- **Prevention is the highest priority**
- **Early detection and rapid response are critical to reduce potential impacts**
- **Its not too late!**



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# **QUESTIONS?**

## **Terrestrial Invasive Plant Identification & Management Training**

July 18<sup>th</sup> – Northville

July 19<sup>th</sup> - Malone

## **Terrestrial Invasive Plant Identification & Survey Training**

July 11<sup>th</sup> - Willsboro

## **Aquatic Invasive Plant Identification & Survey Training**

June 19<sup>th</sup> – Bolton Landing

June 22<sup>nd</sup> – Paul Smiths

June 27<sup>th</sup> – Blue Mountain Lake

## **Aquatic Animal Identification & Survey Training**

August 8<sup>th</sup> – Piseco Lake