NH Forest Health Program

1920

1900-1950- 1 Billion board feet of WP cut per year in NE $100 million in stumpage in today's dollars

- 30% of all manufacturing in NE was tied to wood products
- 65% of that was pine

Maine is still the top producer of pine lumber in the Country. 1/3 of all the wood volume cut in Maine is white pine.

Low Altitude Scouting For Ribes - Pawtuckaway Reserv

1953

DEPARTMENT OF NATURAL AND CULTURAL RESOURCES

NEW HAMPSHIRE

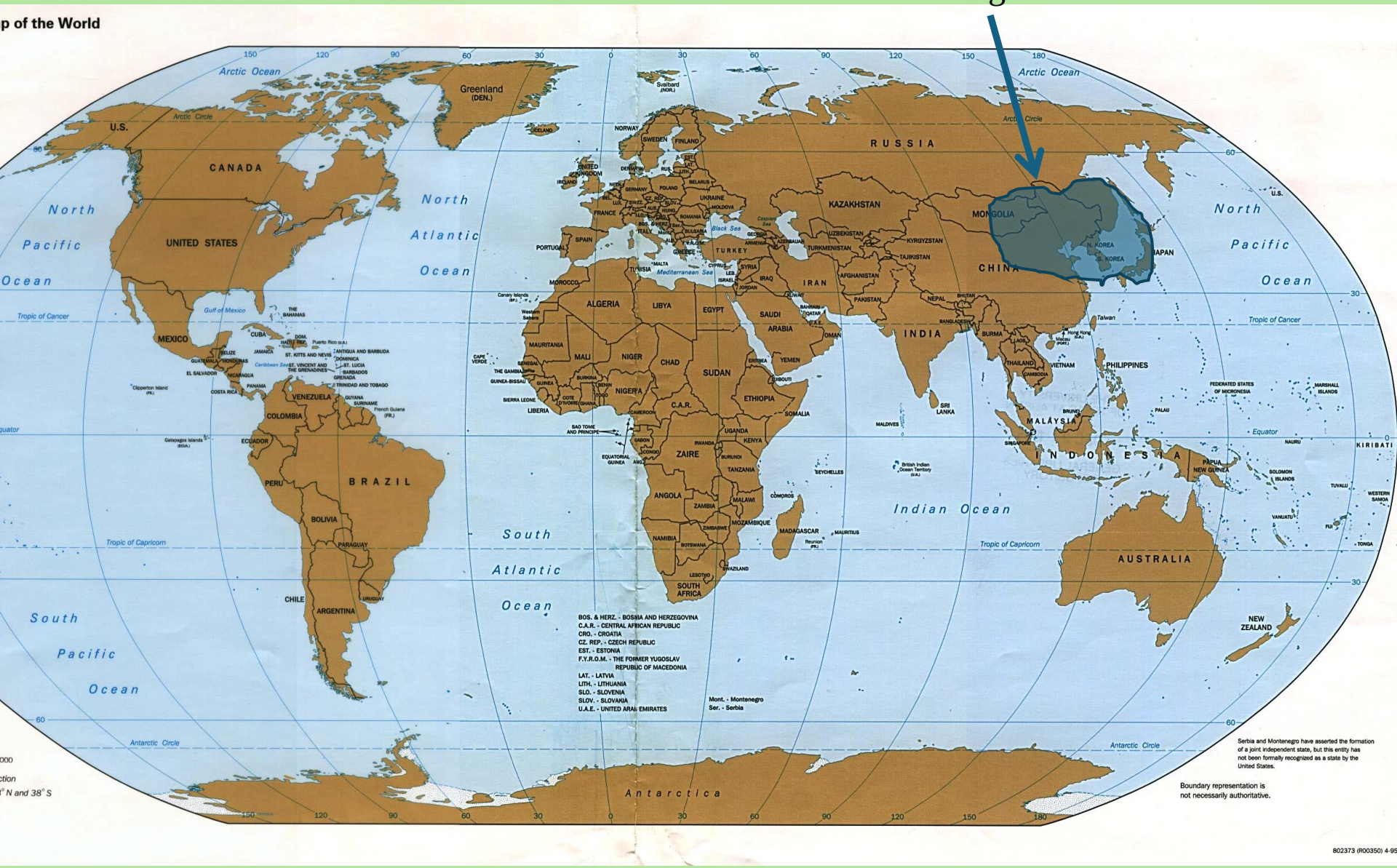
FORESTS & LANDS

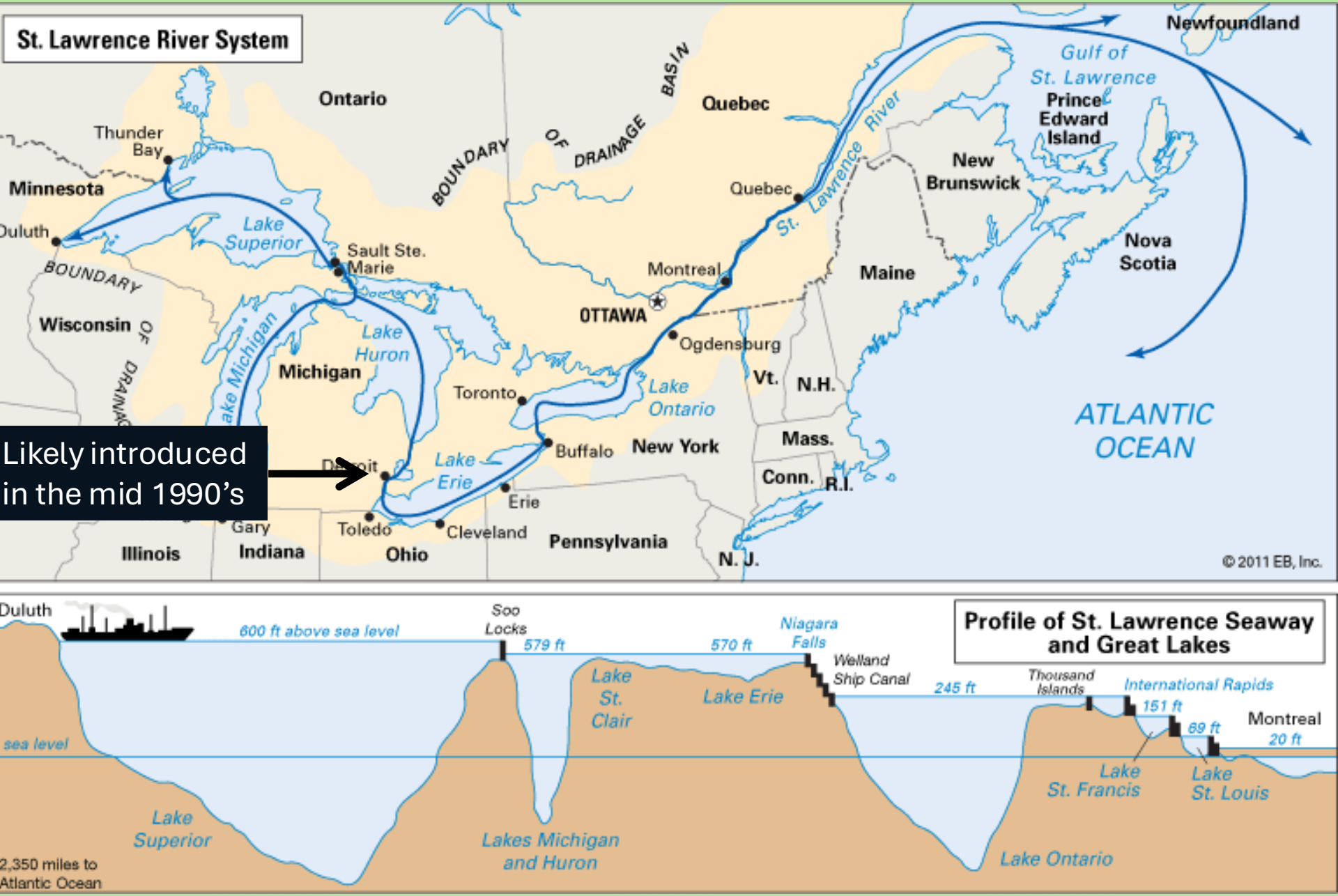
Emerald Ash Borer

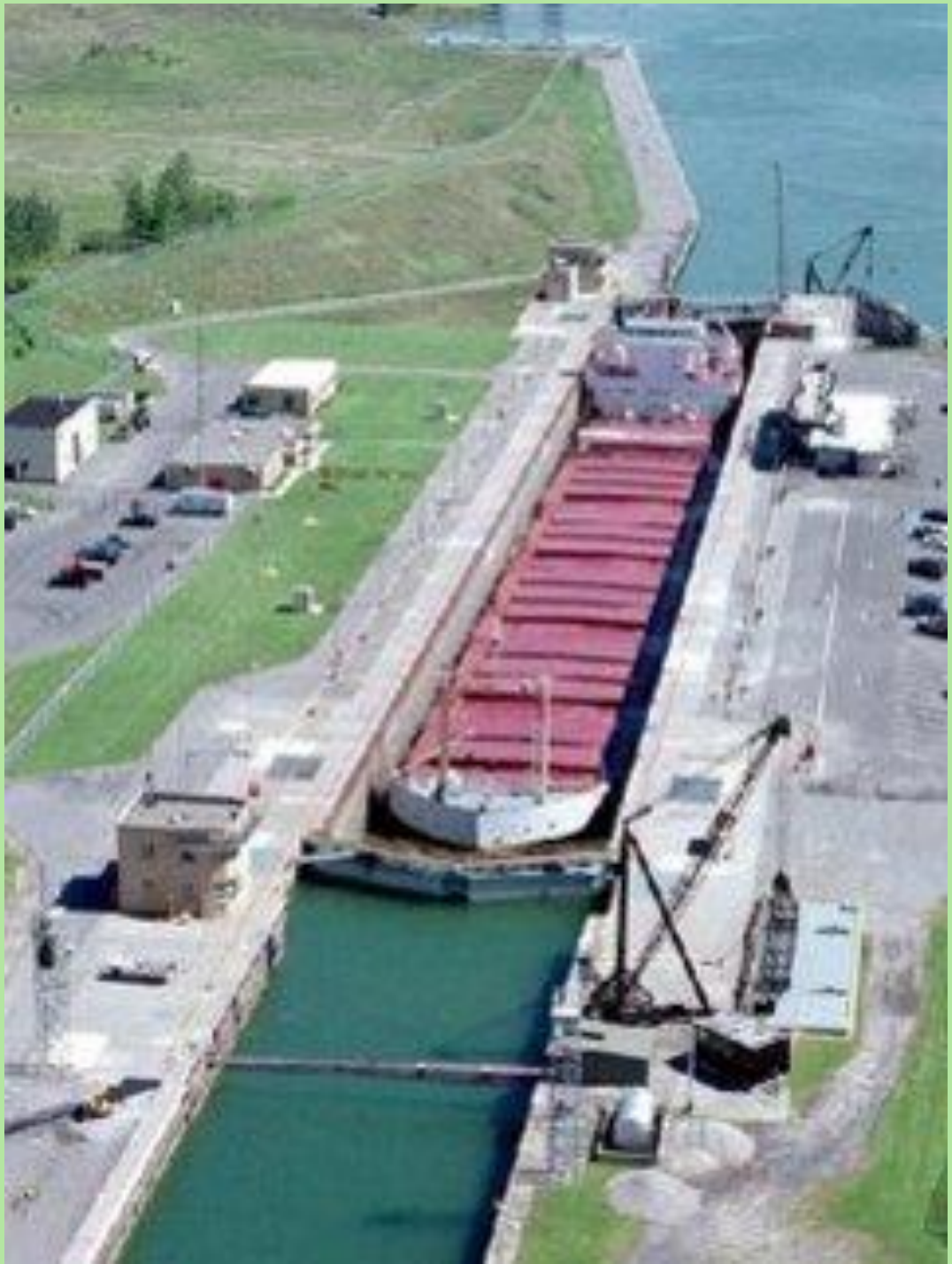
Agrilus planipennis


LIBERTY

Native range of EAB




St. Lawrence River System
Ontario
Quebec
Newfoundland
Gulf of St. Lawrence
Prince Edward Island
New Brunswick
Nova Scotia
Maine
Thunder Bay
Minnesota
Duluth
Lake Superior
Sault Ste. Marie
BOUNDARY OF DRAINAGE BASIN
BOUNDARY
Wisconsin
Michigan
Lake Michigan
Lake Huron
Quebec
St. Lawrence River
Montreal
OTTAWA
Ogdensburg
Vt.
N.H.
Lake Ontario
Toronto
Buffalo
New York
Mass.
Conn.
R.I.
ATLANTIC OCEAN
Likely introduced in the mid 1990's
Detroit
Lake Erie
Erie
Toledo
Cleveland
Pennsylvania
Gary
Illinois
Indiana
Ohio
N. J.
© 2011 EB, Inc.
Profile of St. Lawrence Seaway and Great Lakes
Duluth
600 ft above sea level
Soo Locks
579 ft
570 ft
Niagara Falls
Welland Ship Canal
245 ft
Thousand Islands
International Rapids
151 ft
69 ft
Montreal
20 ft
sea level
Lake Superior
Lake St. Clair
Lake Erie
Lakes Michigan and Huron
Lake St. Francis
Lake St. Louis
Lake Ontario
2,350 miles to Atlantic Ocean



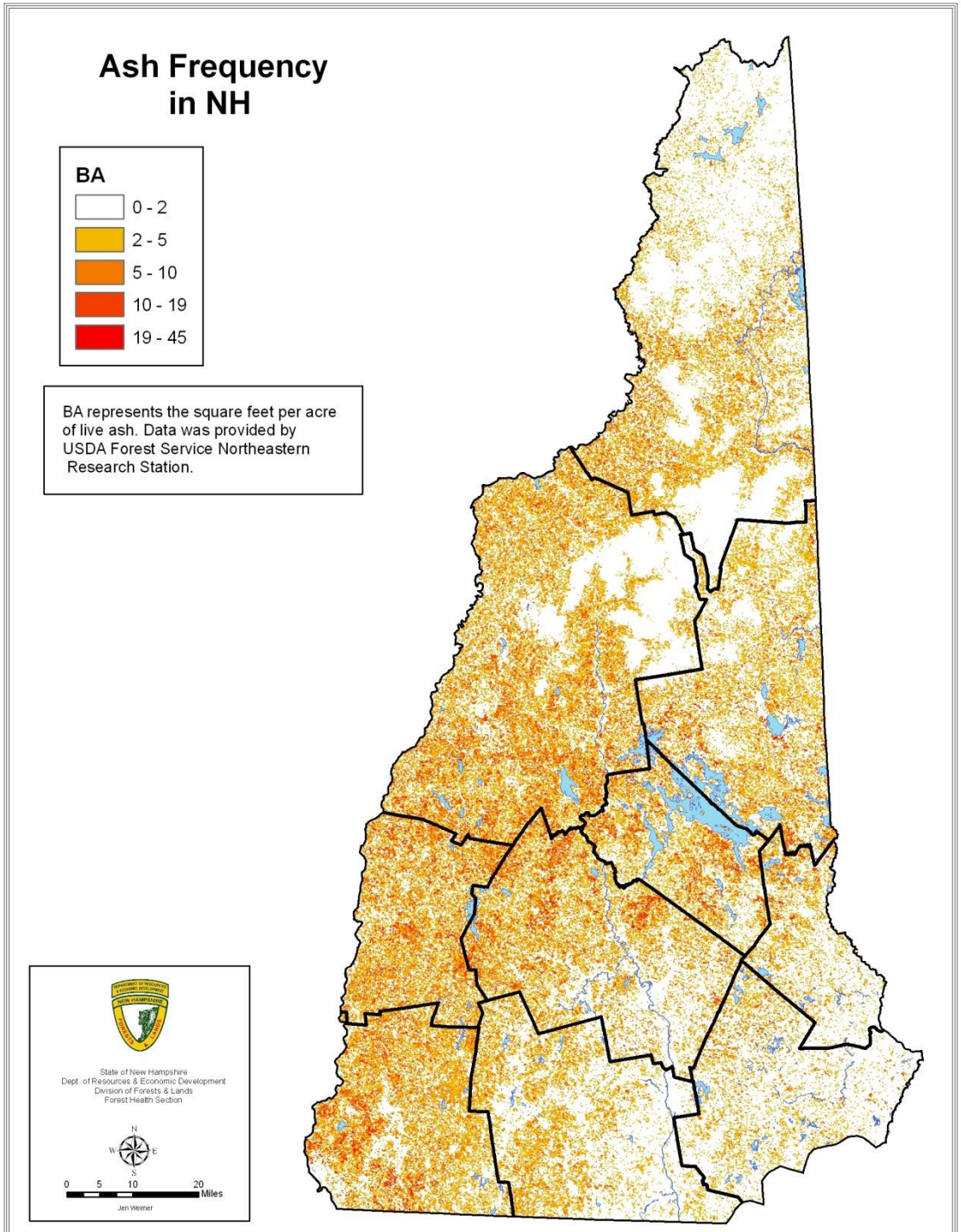
The Eisenhower Lock
Massena, NY

Looking down into a Russian steel ship in the port of Philidelphia in 1996

"Dunnage. The famous wooden cribbing that had to be removed from the ship and burned"

Identification - Signs

Serpentine Larval Galleries



What's at Risk in NH?

6% of the Northern Hardwood forest (2% of all trees in NH)

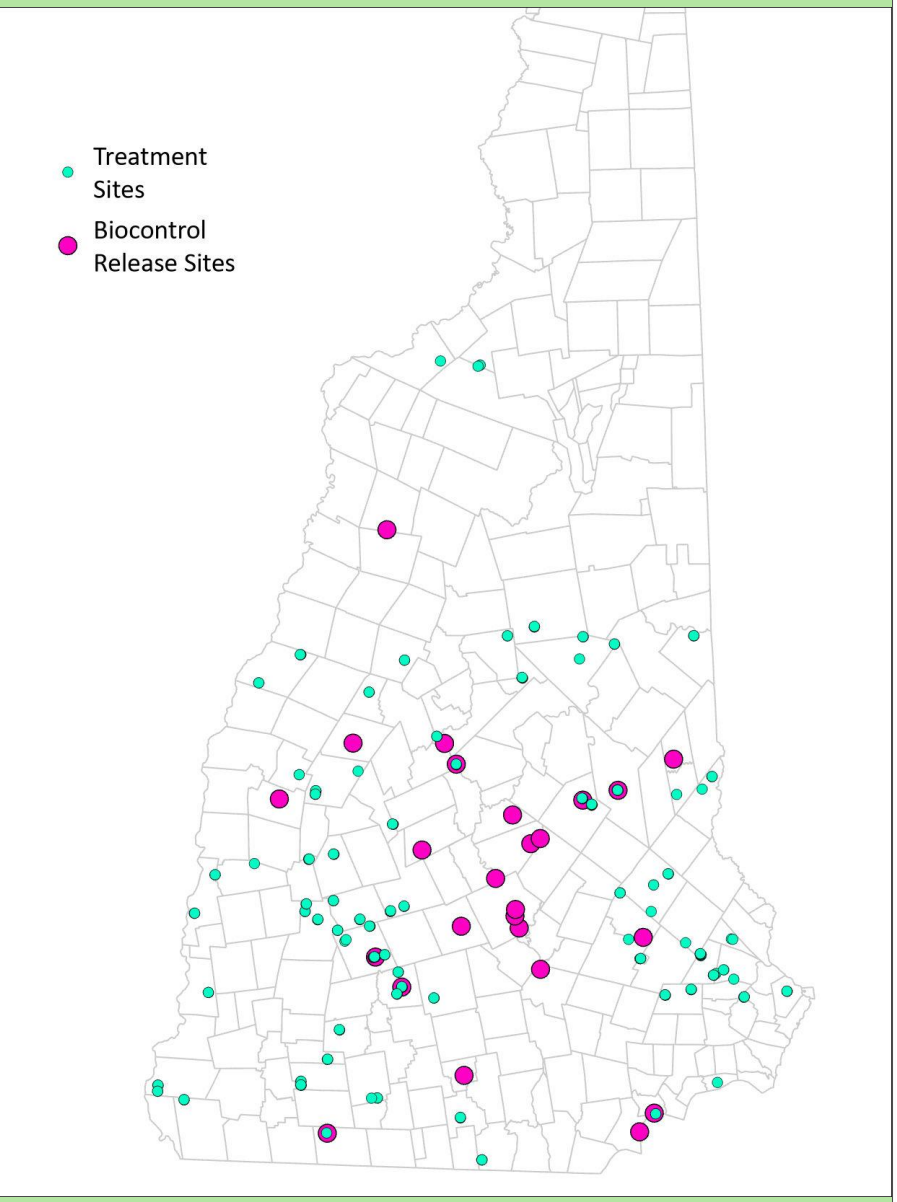
800 million white and black ash trees over 1" diameter

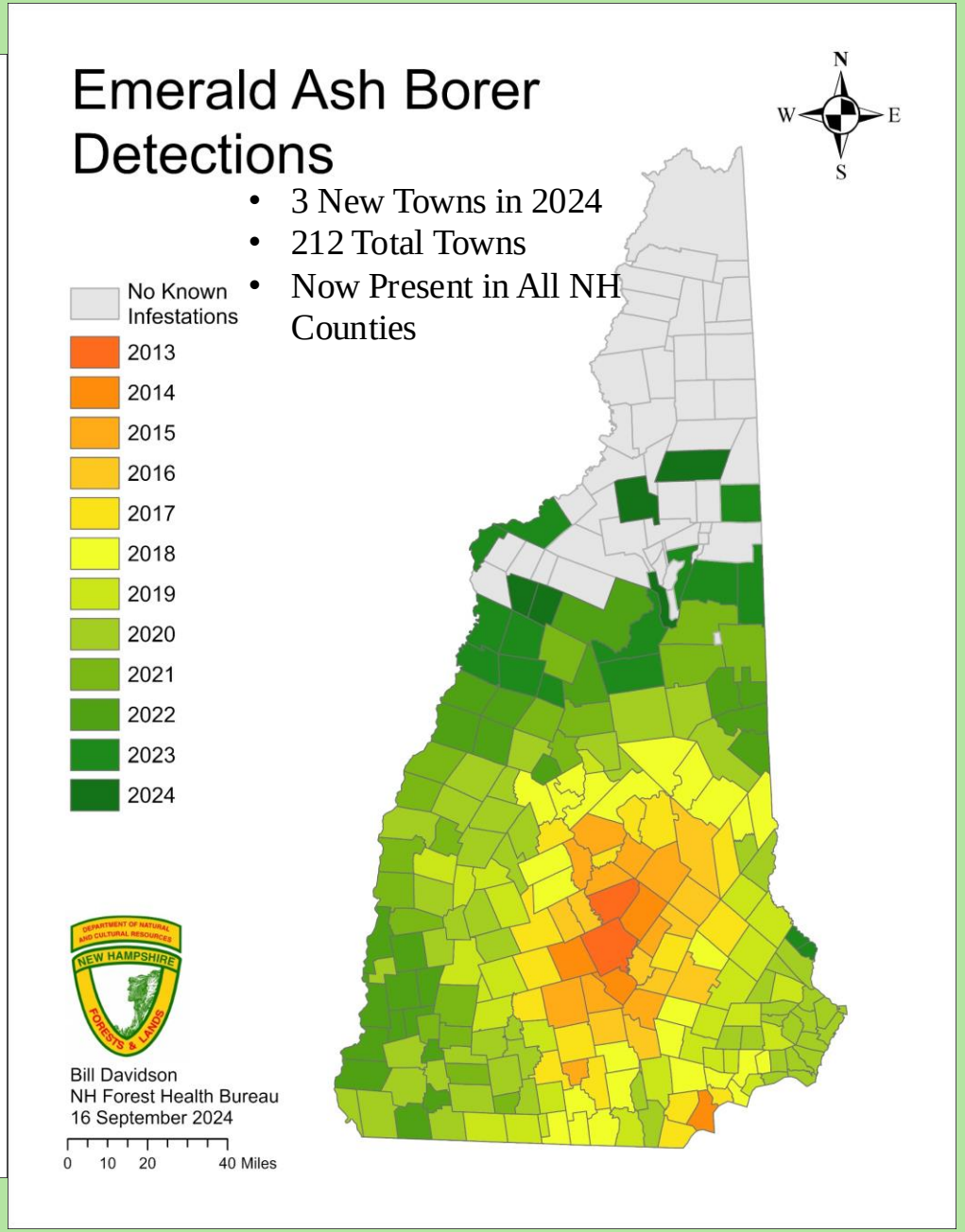
28 million ash over 5" diameter

Total of 290 million cubic feet of ash wood
80% of that total is "sawlog" quality valued at 230 million dollars to the landowner

The value added to the economy through harvesting, trucking, manufacturing, retail sales and distribution of ash products is immeasurable

Emerald Ash Borer





IQ Tree Infuser

Arbor-jet Quick jet AIR

46

Biological control

Tetrastichus planipennisi:
Larval parasitoid

Spathius agrili:
Larval parasitoid

Oobius agrili: egg parasitoid

granite state SAF - Search | nhbugs.org - Search | Damaging Insects & Diseases | N

https://www.nhbugs.org/damaging-insects-diseases

Getting Started | 2021-22 High Scho... | Local news Kearsar... | ePermits (APHIS) | Section 142-A:3 -... | Sign in | RecPro Charles RV... | Slow the Spread Pr... | New Hampshire 09... | Hemlock Woolly Ad... | Other favorites

University of New Hampshire

SEARCH NHBUGS

NHBugs

PROTECTING TREES AND FORESTS

Damaging Insects & Diseases | Firewood | Get Involved | News | Reporting Form

DAMAGING INSECTS & DISEASES

- Asian Longhorned Beetle
- Balsam Woolly Adelgid
- Beech Leaf Disease
- Butternut Restoration Project
- Elongate Hemlock Scale +
- Emerald Ash Borer +
- Hemlock Woolly Adelgid +
- Jumping Worms
- Native Insects and Diseases
- Oak Wilt

Damaging Insects & Diseases

There are many different damaging insects and diseases that currently threaten New Hampshire's towns and forests. Most are not native to North America and spread quickly. Please use the resources provided to learn more and how you can help combat these invasions

REPORT A SUSPECT TREE OR INSECT

RECEIVE BUG UPDATES

Insects

- Asian Longhorned Beetle
- Balsam Woolly Adelgid

Diseases

- Beech Leaf Disease
- Oak Wilt

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Type here to search

12:42 PM
1/30/2024

Work of the Maine Forest Service FHM

- Annualized Forest Inventory (FIA Unit)
- Statewide Forest Health Monitoring Network (Surveys and Monitoring)
- Technical Advice & Assistance
- Forest Pest Control Actions (Biological Control, Containment Measures)
- State and Federal Quarantine Administration
- Applied Research on Forest Health Management

A contrast of moths

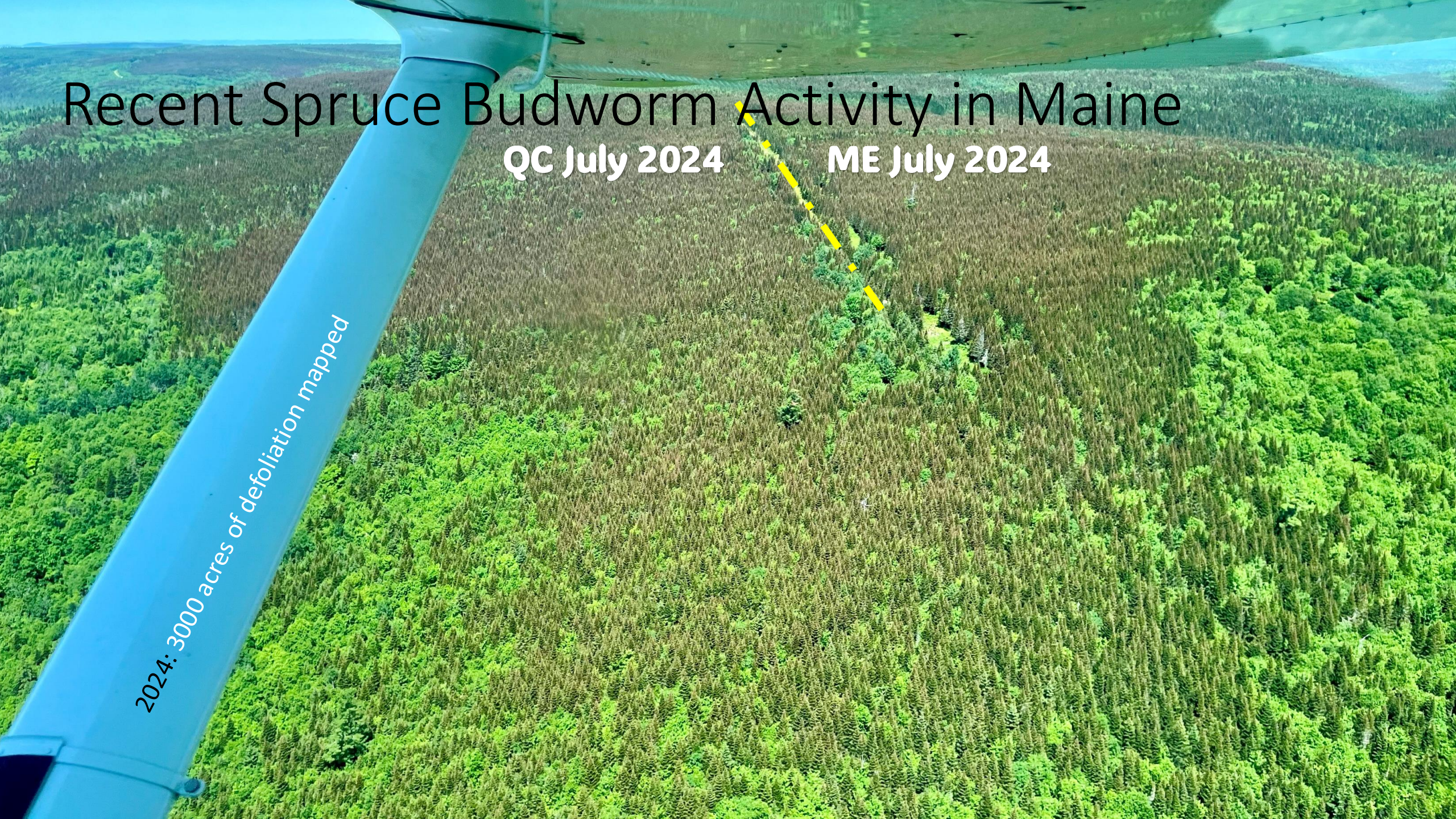
Spruce budworm:

- native moth (softwood)
- with significant epidemics;
- impacts to forest composition, forest economy

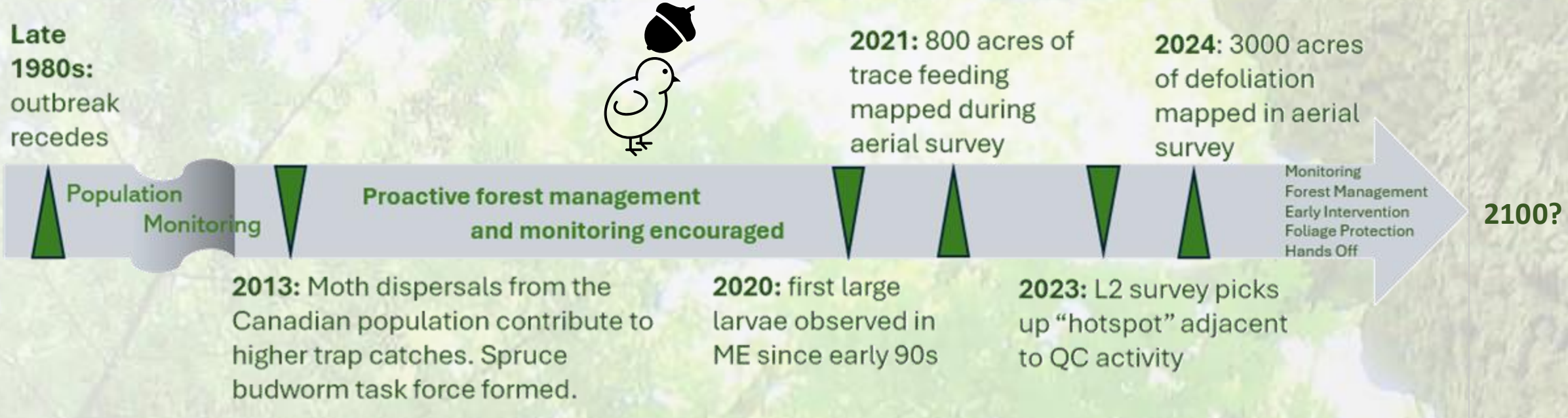
Browntail moth:

- Invasive moth
- Human nuisance/hazard
- Unquantified impacts to recreation/tourism economy

Recent Spruce Budworm Activity in Maine



Spruce Budworm Past and Future in ME



Visible defoliation, large populations in the west, continued higher trend in population measures reinforce need for continued engagement in monitoring and mitigation

Approaches currently on the regional landscape include

- **Forest management to reduce favored forest type**
- **Foliage protection with insecticides to keep trees alive**
- **Early Intervention with insecticides to keep outbreak at bay**
- **Hands off**

Last generation of loggers/landowners/foresters to respond to a budworm outbreak in ME?

Browntail Moth Intro for the lucky

- 1 generation/year
- Overwinter as caterpillars in a communal web
- Emerge and begin feeding in very early spring (ahead of leaf expansion)
- Pupate in early summer
- Adults Mid-Summer
- Feeding Larvae Late-summer-early fall

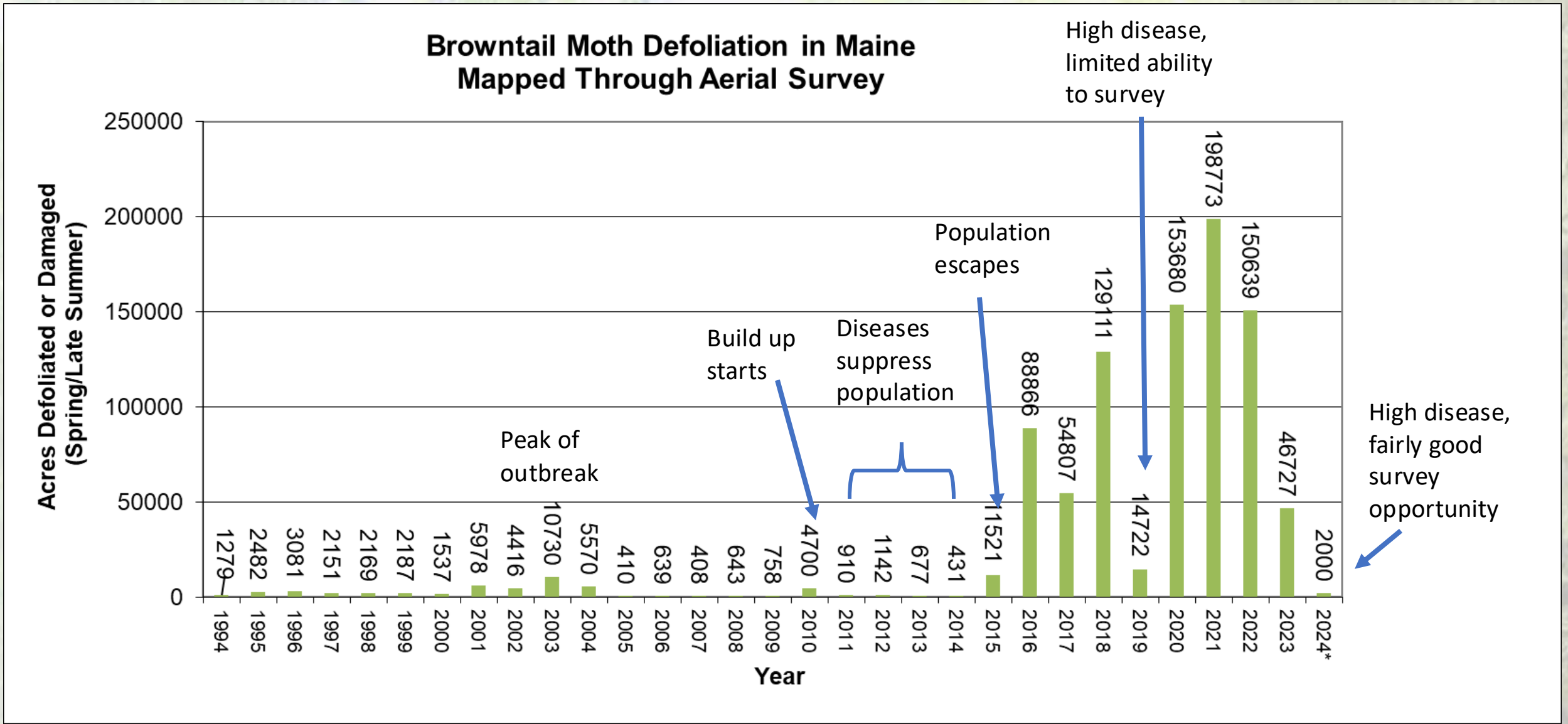
Highest Exposure Risk for Hairs*

Winter Webs	Feeding Larvae	Pupae	Adults	Eggs	Feeding Larvae
Sept-April	April-June	June-July	July-Aug	July-Aug	Aug-Sept

* Toxin in hairs is extremely stable (**3+ yr**); exposure most likely in dry conditions. In infested areas use PPP whenever conducting activities that might stir up hairs.

Photos by MFS except: Adult: Anne Burton, Egg mass: Bath Division of Forestry

Damage History in Maine 1994-2024 (acres of moderate to high populations mapped through aerial survey)



Climate Impacts to Outbreaks?

Browntail Moth

- Spring moisture important in promoting population control (diseases)
  - >spring dryness=better caterpillar survival
- Warmer late-summer temperatures promote more rapid development; more robust overwintering caterpillars

When Increased Populations

- Quality of life impacted over a broader geographic footprint
- Tree/Forest damage with sustained outbreaks (Oak forest types)

What Can We Do?

Support Continued Research

Past findings may not be applicable to the current environment

Take/Support Mitigation Actions

- Cultural
- Silvicultural
- Mechanical
- Pesticide
- Biological control

Be Informed

- Newsletters
- Presentations
- On-line resources

Share your Knowledge

- Peer to Peer
- Social Network
- Municipal Planning

Be on the Lookout

- Casual
- Official

Report Concerns

- State/Federal Agencies

Keep “it” Local

MFS Newsletters

Mailing List Subscription Form

SUBSCRIBE ONLINE using the sign up box in the right column of this page will subscribe you to our electronic mailing list and you will receive the Conditions Reports in your email inbox. You will also receive Special Alerts and a copy of the Annual Summary Report electronically.

If you wish to receive hard copies of these reports complete this form (Word | 18 KB) and mail it to: **Insect & Disease Laboratory, 168 Statehouse Station, Augusta, Maine 04333-0168**

Some of the files below are PDF files which require the free Adobe Reader.

- Forest Health Highlights
- Annual Summary Reports
- Conditions Reports

Get Forest Insect & Disease Conditions Reports

Enter your email to sign-up:

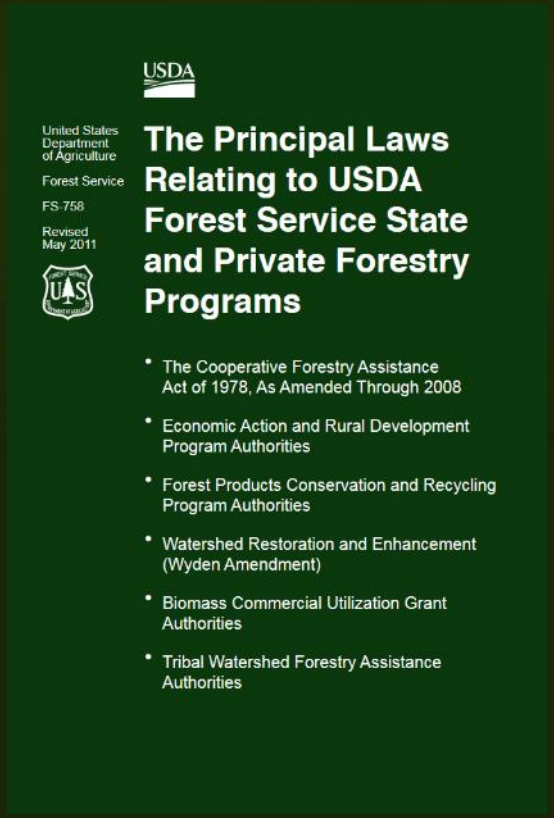
Go

Credits

maine Department of Agriculture Conservation & Forestry

USDA Forest Service
Forest Health

Michael Bohne
Forest Health Group Leader
USDA Forest Service
michael.bohne@usda.gov
802.238.7516



USDA

United States Department of Agriculture

Forest Service

FS-758

Revised May 2011

The Principal Laws Relating to USDA Forest Service State and Private Forestry Programs

- The Cooperative Forestry Assistance Act of 1978, As Amended Through 2008
- Economic Action and Rural Development Program Authorities
- Forest Products Conservation and Recycling Program Authorities
- Watershed Restoration and Enhancement (Wyden Amendment)
- Biomass Commercial Utilization Grant Authorities
- Tribal Watershed Forestry Assistance Authorities

Pages
18-20

(1) conduct surveys to detect and appraise insect infestations and disease conditions and man-made stresses affecting trees and establish a monitoring system throughout the forests of the United States to determine detrimental changes or improvements that occur over time, and report annually concerning such surveys and monitoring;

(2) determine the biological, chemical, and mechanical measures necessary to prevent, retard, control, or suppress incipient, potential, threatening, or emergency insect infestations and disease conditions affecting trees;

(3) plan, organize, direct, and perform measures the Secretary determines necessary to prevent, retard, control, or suppress incipient, potential, threatening, or emergency insect infestations and disease epidemics affecting trees;

(4) provide technical information, advice, and related assistance on the various techniques available to maintain a healthy forest and in managing and coordinating the use of pesticides and other toxic substances applied to trees and other vegetation, and to wood products, stored wood, and wood in use;

(5) develop applied technology and conduct pilot tests of research results prior to the full-scale application of such technology in affected forests;

(6) promote the implementation of appropriate silvicultural or management techniques that may improve or protect the health of the forests of the United States; and

(7) take any other actions the Secretary determines necessary to accomplish the objectives and purposes of this section.

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Forest Health Activities

1. Survey and Monitoring
2. Prevention, Suppression, Eradication
3. Technical Information and Advice
4. Applied Research and Methods Development
5. Forest Health Silvicultural or Management Techniques

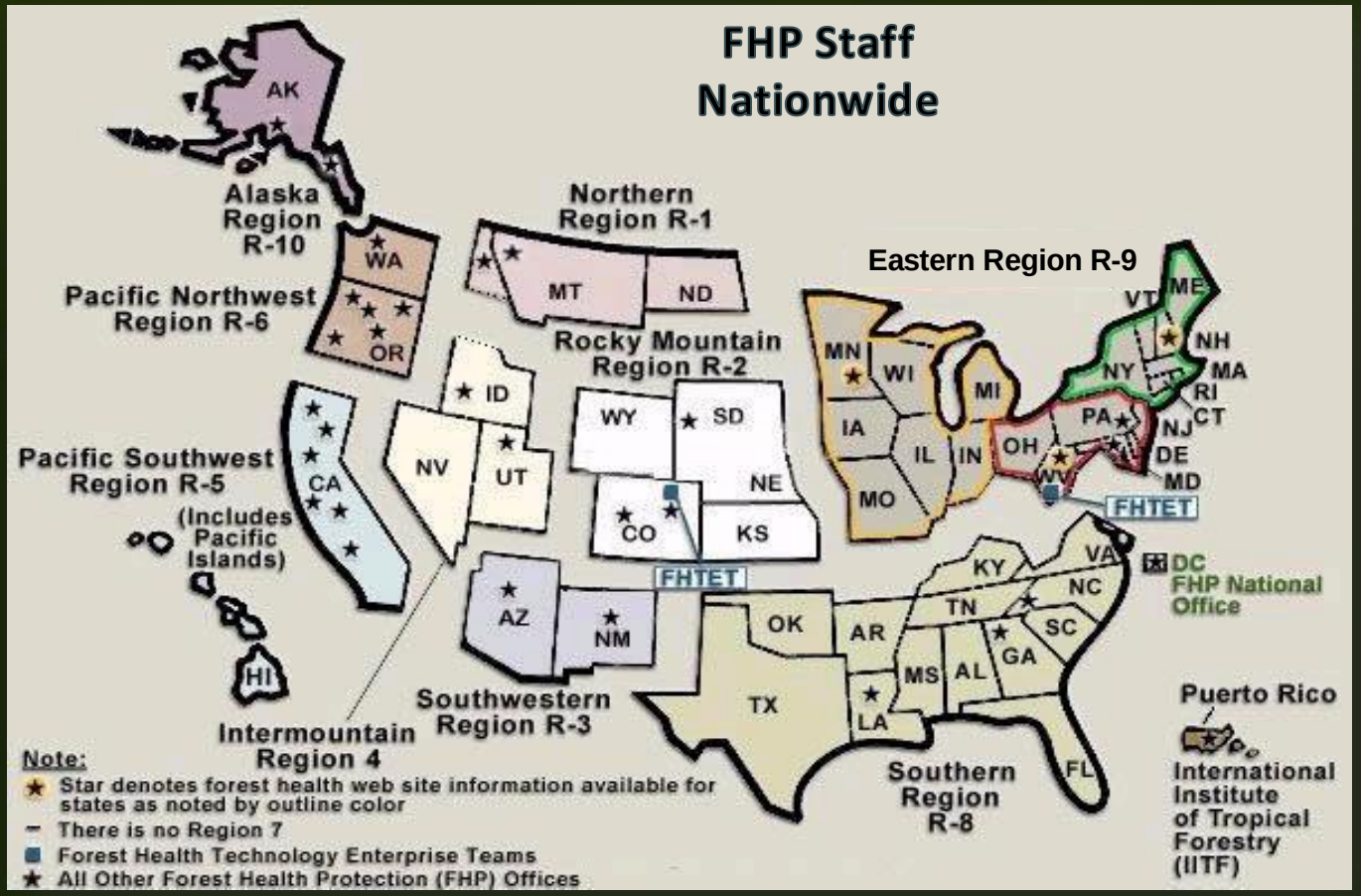
Forest Health Activities

1. Survey and Monitoring
2. Prevention, Suppression, Eradication
3. Technical Information and Advice
4. Applied Research and Methods Development
5. Forest Health Silvicultural or Management Techniques

Cooperative and Federal Programs

190 forest entomologists, forest pathologists, foresters and technical staff

9 Regions



Budget

$48 million* (not including S&E)

$32 million coop

$8.4 million to states for core programs

$16+ million to states for pest treatments

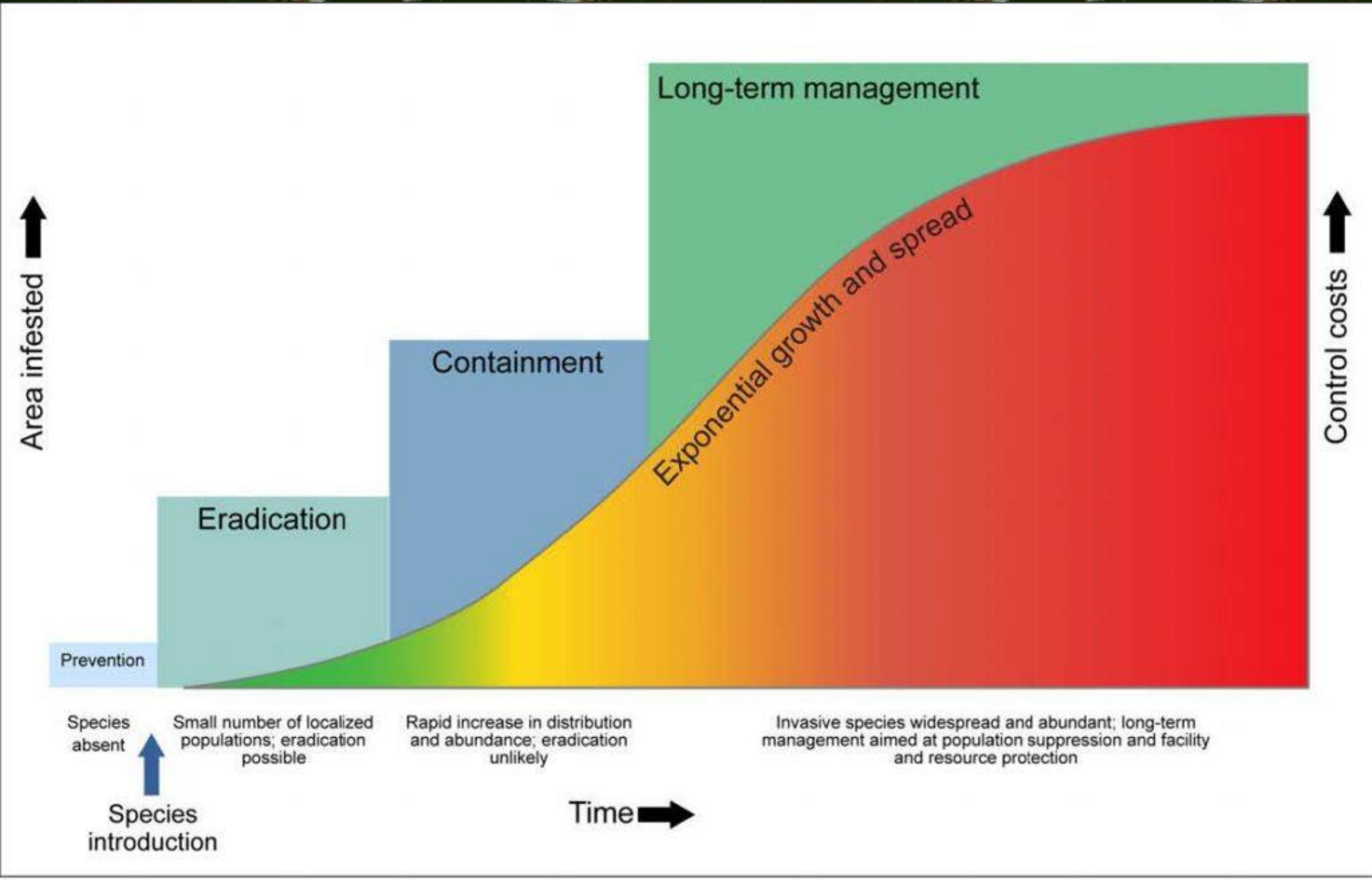
$4.4 million for special projects

*not including Infrastructure Investment and Jobs Law

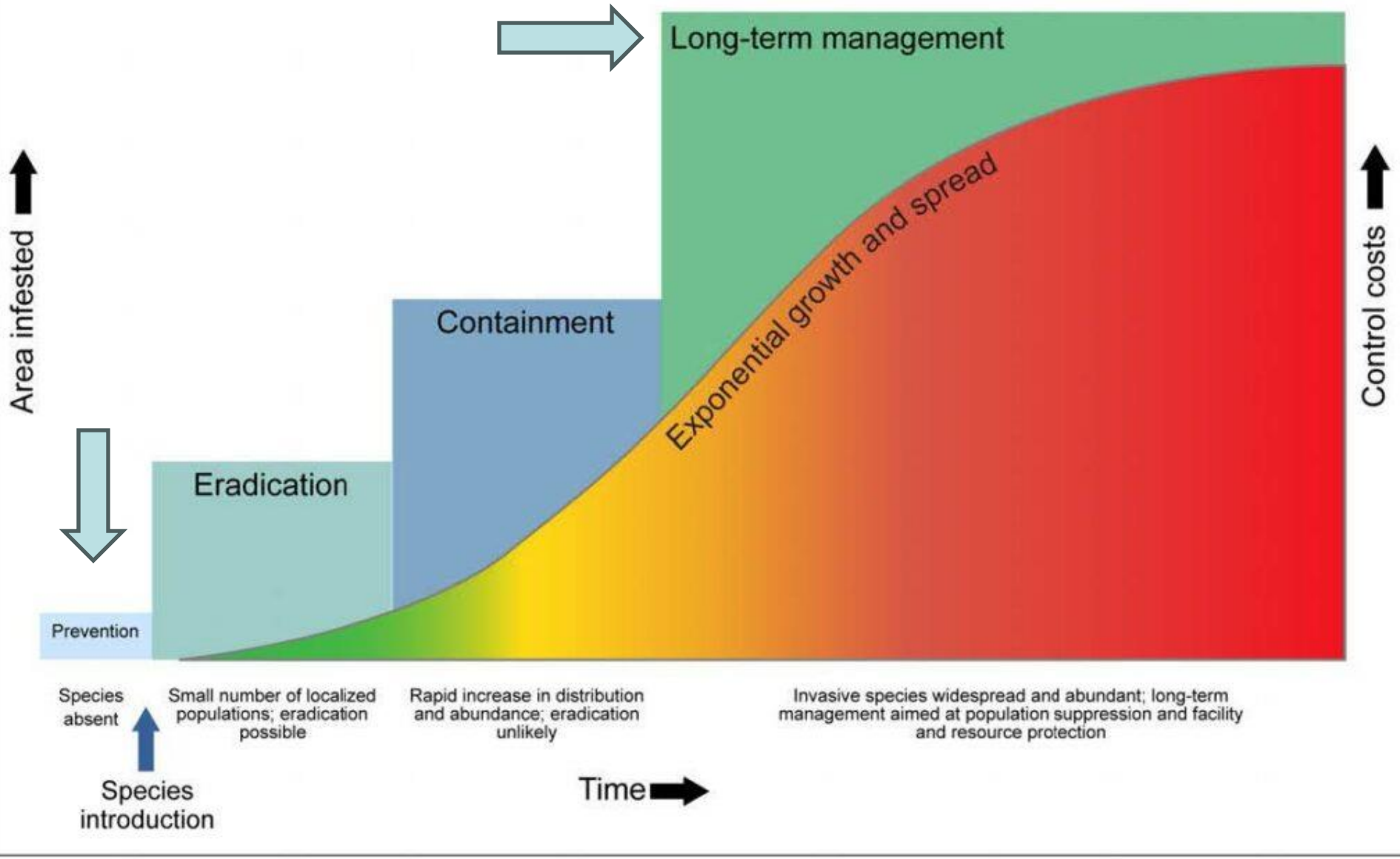
Infrastructure

$200,000,000 shall be made available for invasive species detection, prevention, and eradication, including conducting research and providing resources to facilitate detection of invasive species at points of entry and awarding grants for eradication of invasive species on non-Federal land and on Federal land, of which— (A) $100,000,000 shall be made available to the Secretary of the Interior; and (B) $100,000,000 shall be made available to the Secretary of Agriculture.

- $20 mil/year, split between federal, state and research



Sources: National Invasive Species Council; U.S. Department of Agriculture; National Park Service; U.S. Fish and Wildlife Service; Rodgers, L, South Florida Water Management District; Department of Primary Industries, State of Victoria, Australia; and GAO. | GAO-16-49



Sources: National Invasive Species Council; U.S. Department of Agriculture; National Park Service; U.S. Fish and Wildlife Service; Rodgers, L, South Florida Water Management District; Department of Primary Industries, State of Victoria, Australia; and GAO. | GAO-16-49

Survey and Monitoring

Remote sensing for forest health issues

- Visual, plane or satellite sensors

Trapping surveys for general and specific forest pests

- Firewood, arboreta, southern pine beetle, forest tent caterpillar, oak wilt

Visual and plot surveys to monitor forest health conditions

- Invasive plants, deer overabundance, emerald ash borer, southern pine beetle, hemlock woolly adelgid, pine health, chaga, etc

EDRR

- Each year team selects states based on risk
- ~12 sites per state are selected by state cooperators
- 3 traps/site, traps baited with: ethanol, three-component exotic Ips-lure, and ethanol plus alpha-pinene
- Traps are monitored every 2 weeks for 12 weeks

- >850,000 specimens of scolytids have been identified in >300 different taxa
- >480,000 specimens were of non-native species already established in US
  - ~90% were of 10 most common species

Xyleborinus saxesenii	149,632
Xylosandrus crassiusculus	149,062
Xylosandrus germanus	76,921
Scolytus schevyrewi [b]	18,796
Cnestus mutilatus	17,255
Xyleborinus attenuatus	11,200
Euwallacea validus	7,682
Cyclorhipidion pelliculosum	7,366
Ambrosiophilus atratus	6,590
Dryoxylon onoharaensum	6,280

3 species new to North America found since 2007 by EDRR

Xylosandrus amputatus in FL

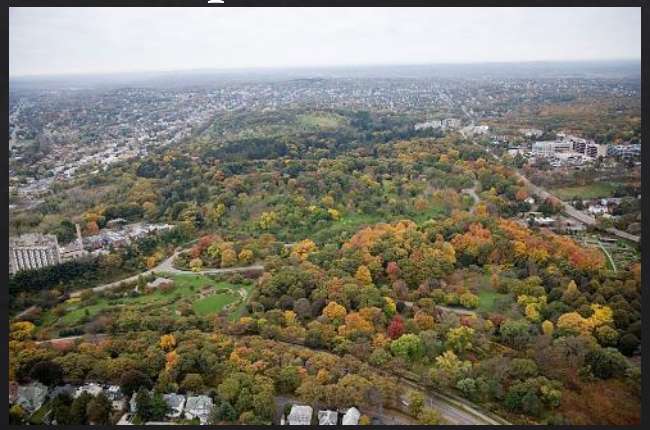
Xyleborinus artestriatus in GA & TX

Xyleborinus octiesdentatus in LA & AL

Urban Arboreta

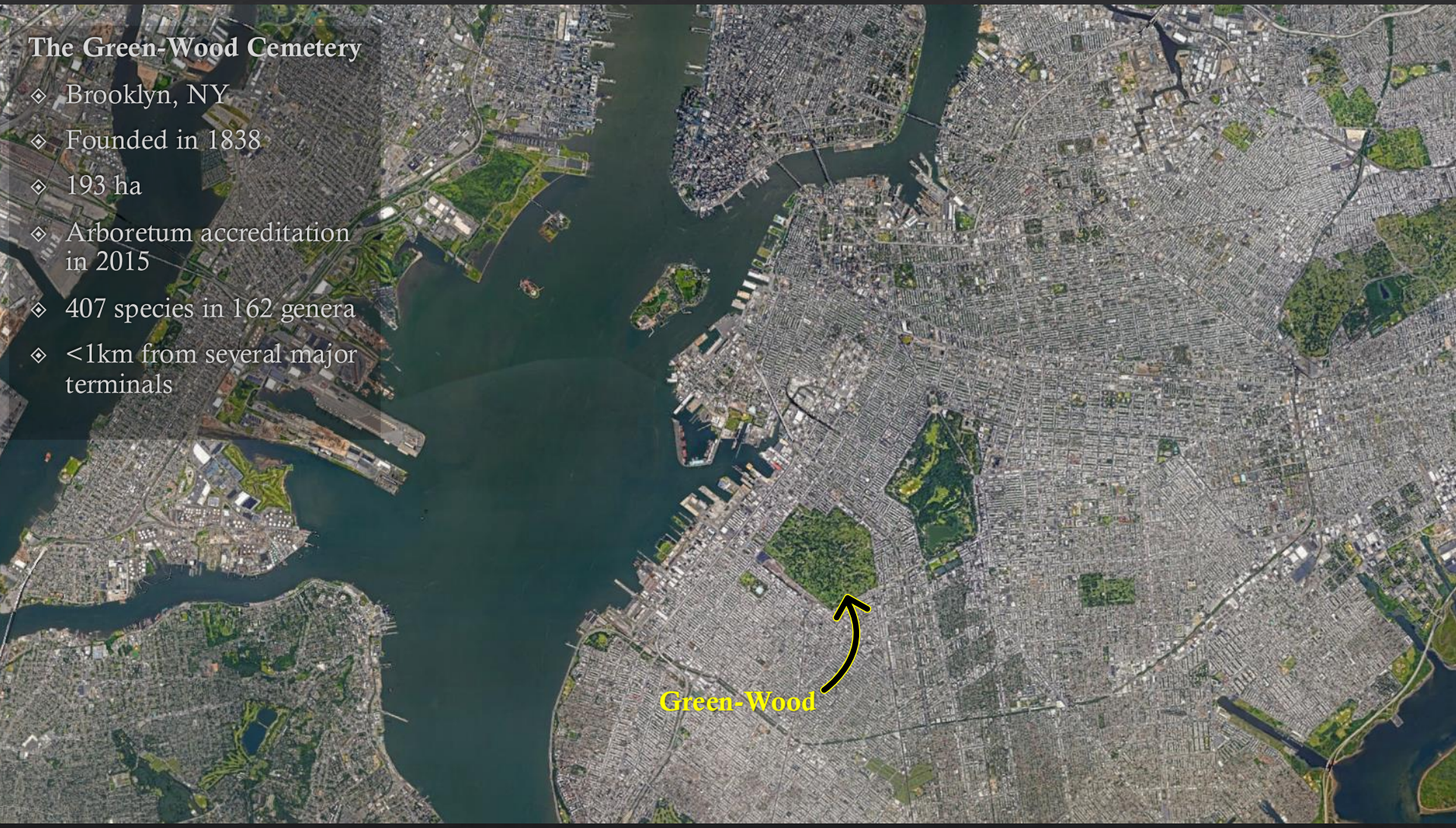
Proximity to large ports of entry

Refuge of habitat within an urban landscape



Diversity of potential host species

All trees are mapped, tagged and databased


The Green-Wood Cemetery
Brooklyn, NY
Founded in 1838
193 ha
Arboretum accreditation in 2015
407 species in 162 genera
<1km from several major terminals
Green-Wood


A


B


C


D

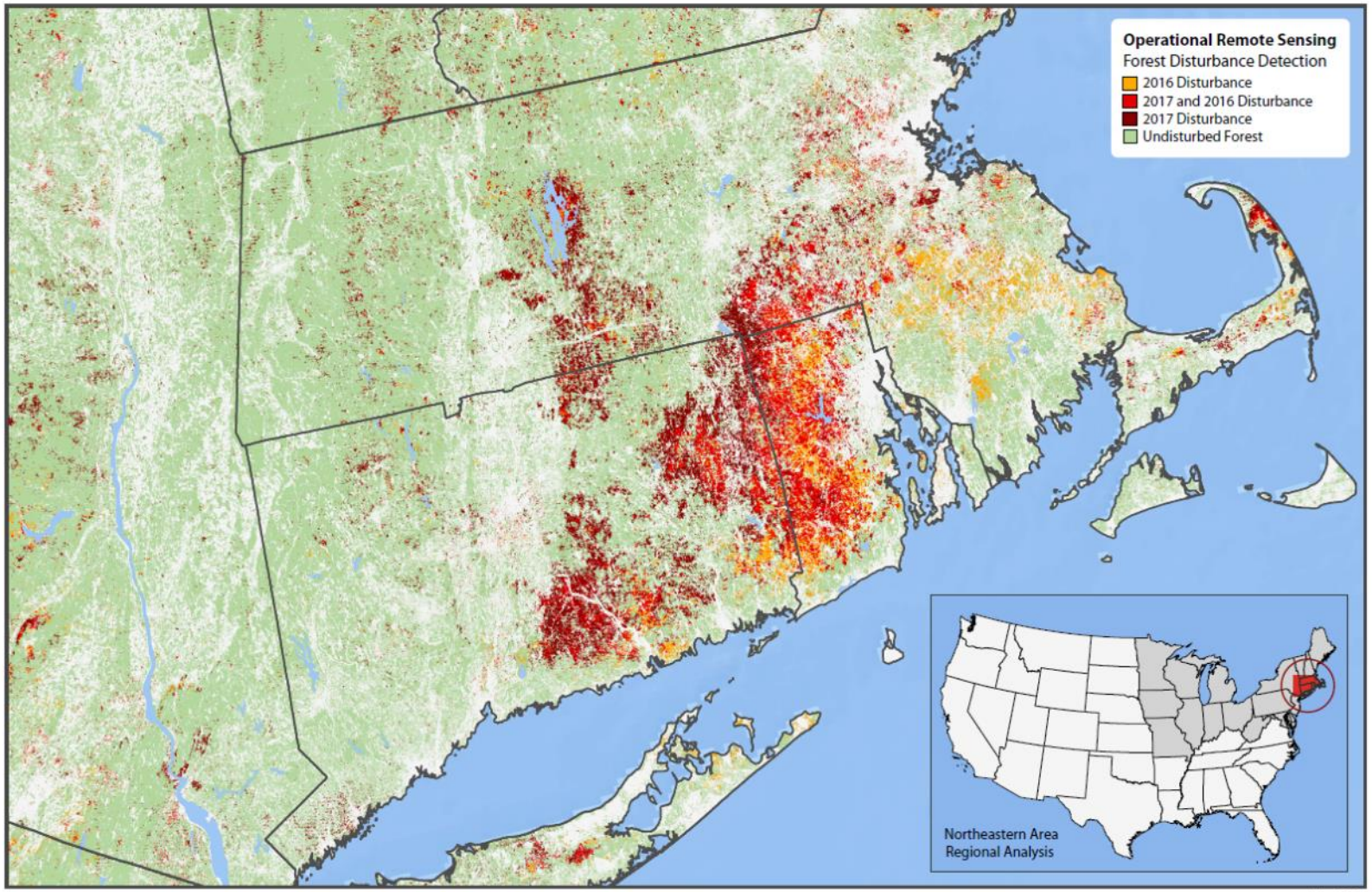
An Unknown Unknown:

A **new species** of *Agrilus*
discovered from an urban
arboretum detection survey

USDA
United States Department of Agriculture

FOREST HEALTH ASSESSMENT AND APPLIED SCIENCES TEAM

2017 and 2016 Gypsy Moth Defoliation*

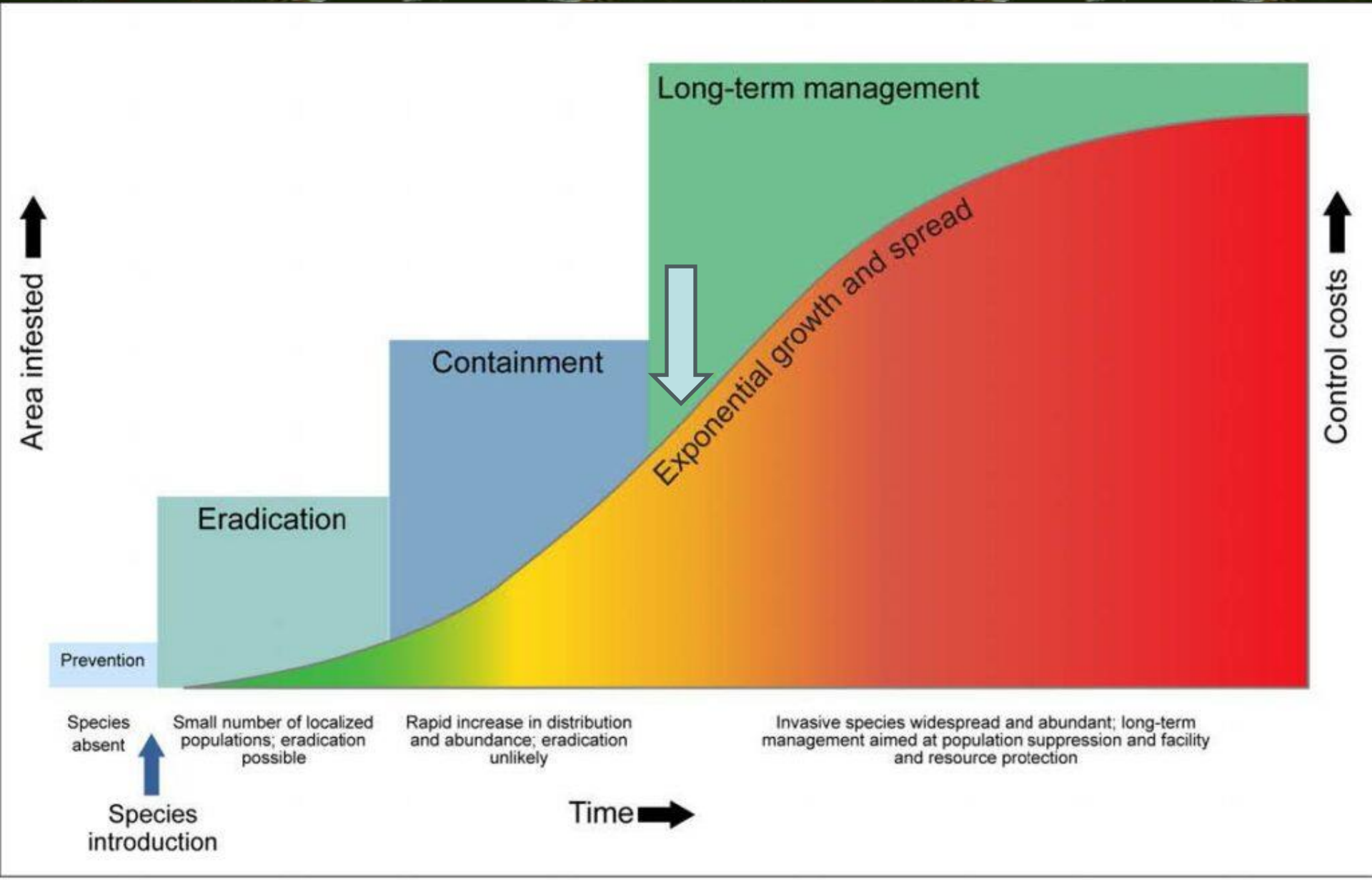


July 2017

Forest Service

FHAAST's Forest Disturbance Mapper (FDMapper) uses a library of Landsat and Sentinel-2 imagery to compare greenness and other forest characteristics between one or two analysis years and several baseline years. Using this technique, called a Z-score algorithm, we can detect areas of greenness decline which correspond to defoliations, mortality, or other disturbances. *Includes other disturbances.

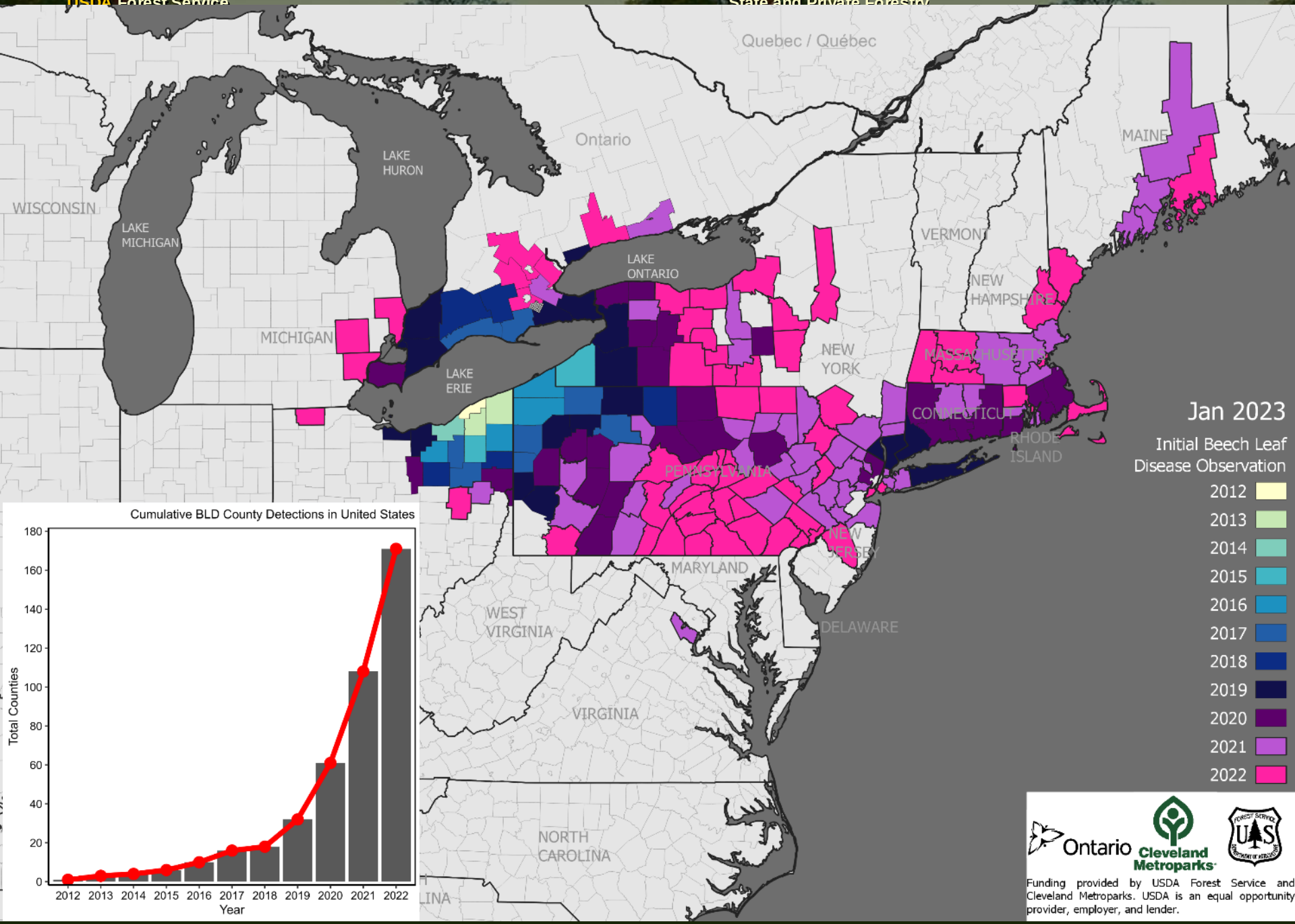
FOREST HEALTH
ASSESSMENT AND APPLIED SCIENCES TEAM



Sources: National Invasive Species Council; U.S. Department of Agriculture; National Park Service; U.S. Fish and Wildlife Service; Rodgers, L, South Florida Water Management District; Department of Primary Industries, State of Victoria, Australia; and GAO. | GAO-16-49

Beech Leaf Disease

Photo: T. Macy

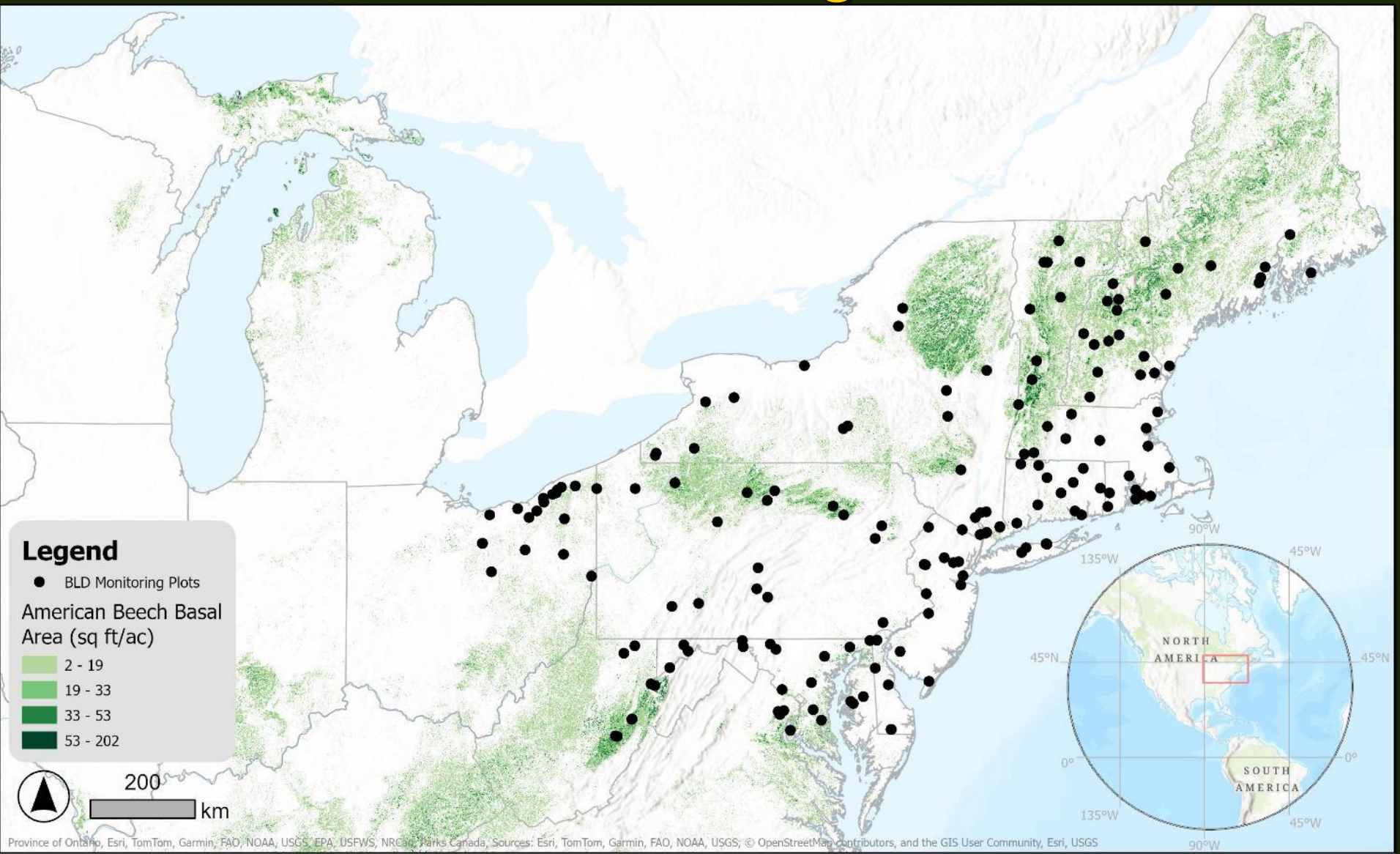


Ontario
Cleveland Metroparks
Funding provided by USDA Forest Service and Cleveland Metroparks. USDA is an equal opportunity provider, employer, and lender.

BLD Current Activities

Title	Collaborators	Funding Source
Assessing impacts of beech leaf disease on forest structure and composition: towards informing management along a gradient of anthropogenic influence	City University of New York	US Forest Service Evaluation Monitoring
The Prognosis for Beech Leaf Disease: Quantifying growth declines and forecasting mortality across the eastern United States	University of New Hampshire	US Forest Service Evaluation Monitoring
Impacts of beech leaf disease on mature tree carbon allocation and storage	Bartlett Tree Experts, USFA Northern Research Station	Bartlett Tree Experts
An International Collaborative Effort to Identify Vectors Associated with Local and Long-Distance Transmission of Beech Leaf Disease	Penn State University, Ontario Ministry of Natural Resources	US Forest Service International Programs
Finding the Origin of Litylenchus crenatae mccannii, the invasive Nematode causing widespread decline of American beech	Connecticut Agricultural Experiment Station, USDA Agricultural Research Station	US Forest Service International Programs
A regional network of long-term monitoring plots for beech leaf disease	US Forest Service R9 state agencies	US Forest Service Emerging Pest

BLD Monitoring Plots



USDA Forest Service

HELP US FIND BEECH LEAF DISEASE

What is it?

A foliar disease of American beech that is strongly associated with a parasitic nematode.

What are the symptoms?

Mild symptoms occur inside the veins of infected leaves that look like darkened stripes or bands. Severe symptoms cause leaves to be shrunken, curled, and leathery to the touch. Heavily infested trees can have thin crowns and advanced branch dieback.

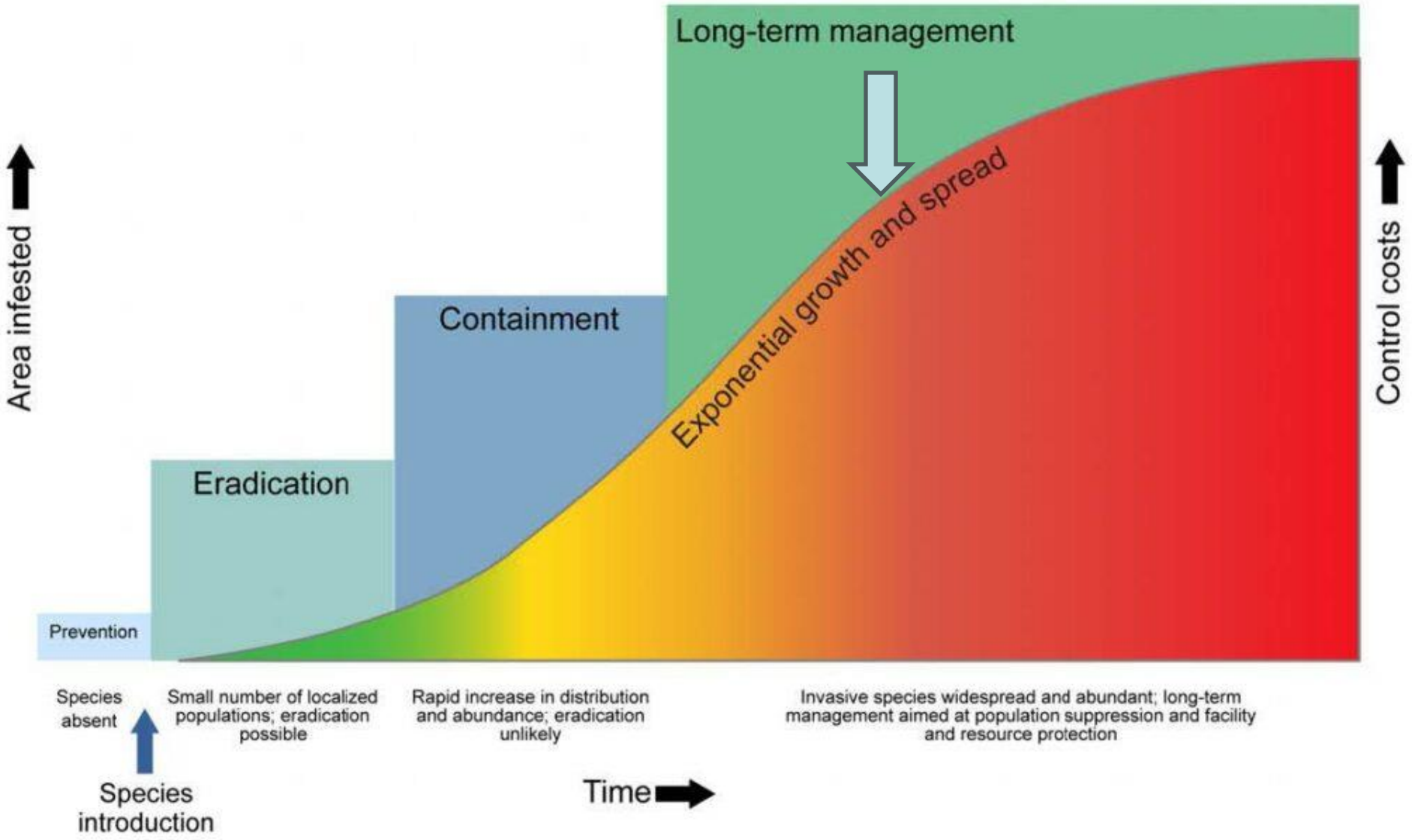
What can you do?

If you suspect you've found this disease, take a photo of the symptoms and file a report using the QR code below.

Report this disease at NHBugs.org

White Mountain National Forest

Caring for the Land and Serving People



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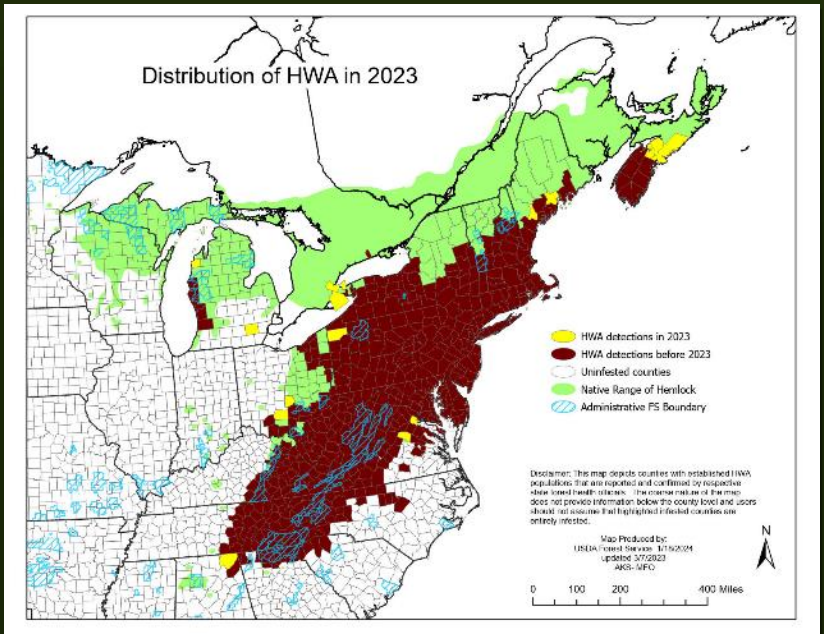
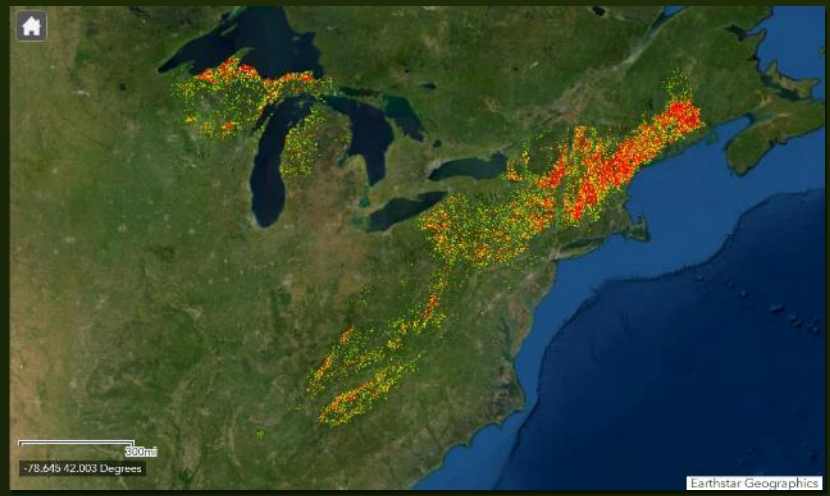
Hemlock Woolly Adelgid

M. J. Raupp

HWA and e. hemlock abundance

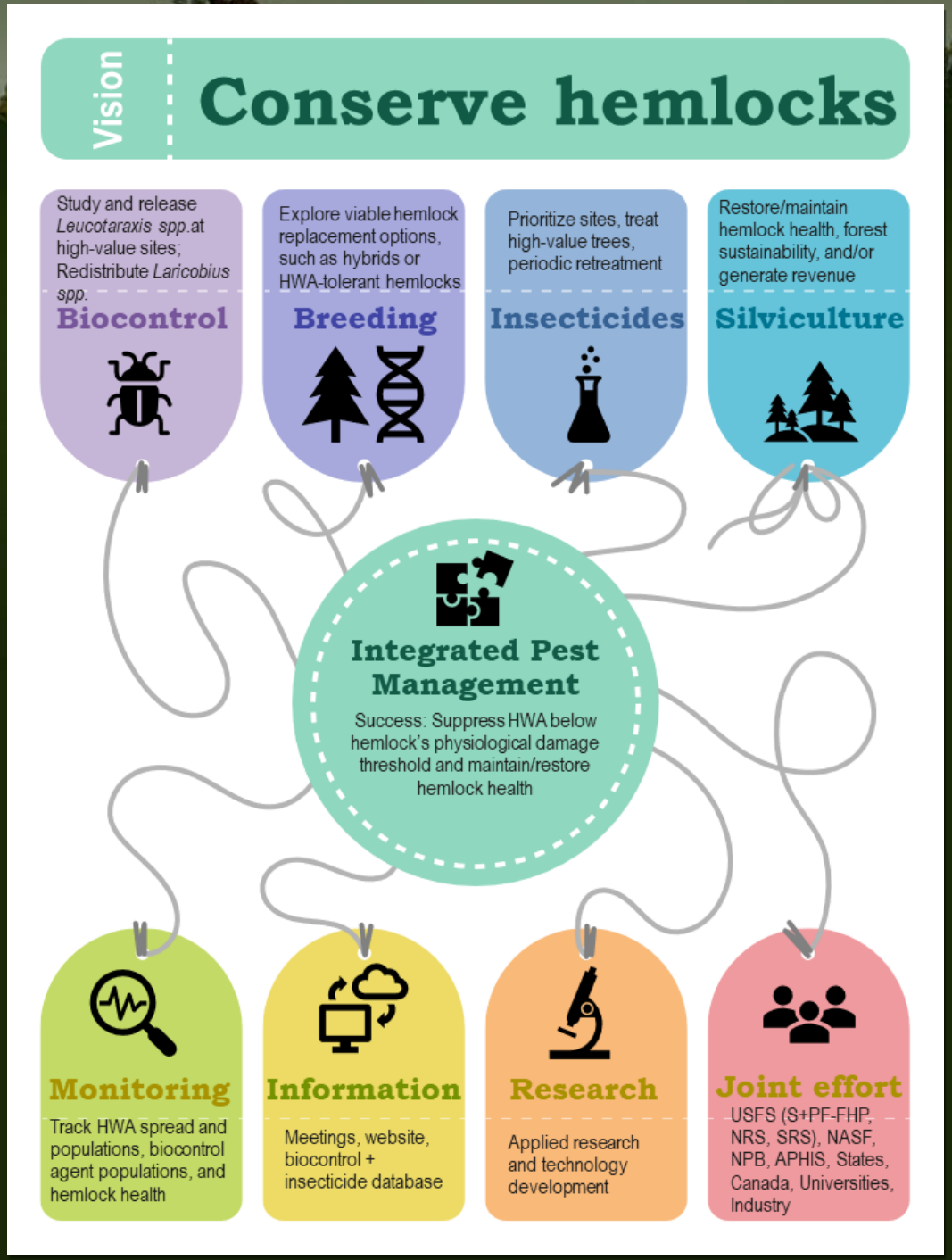


https://hiro.ento.vt.edu/hwa/



Forest inventory and analysis (USA only)

HWA Initiative Mission: development and implementation of effective integrated pest management options



HWA Biocontrol

- **Sistens generation**
  - *Laricobius nigrinus*
  - *Laricobius osakensis*
- **Progrediens generation**
  - *Leucotaraxis piniperda*
- **Both HWA generations**
  - *Leucotaraxis argenticollis*
  - *Sasajiscymnus tsugae*

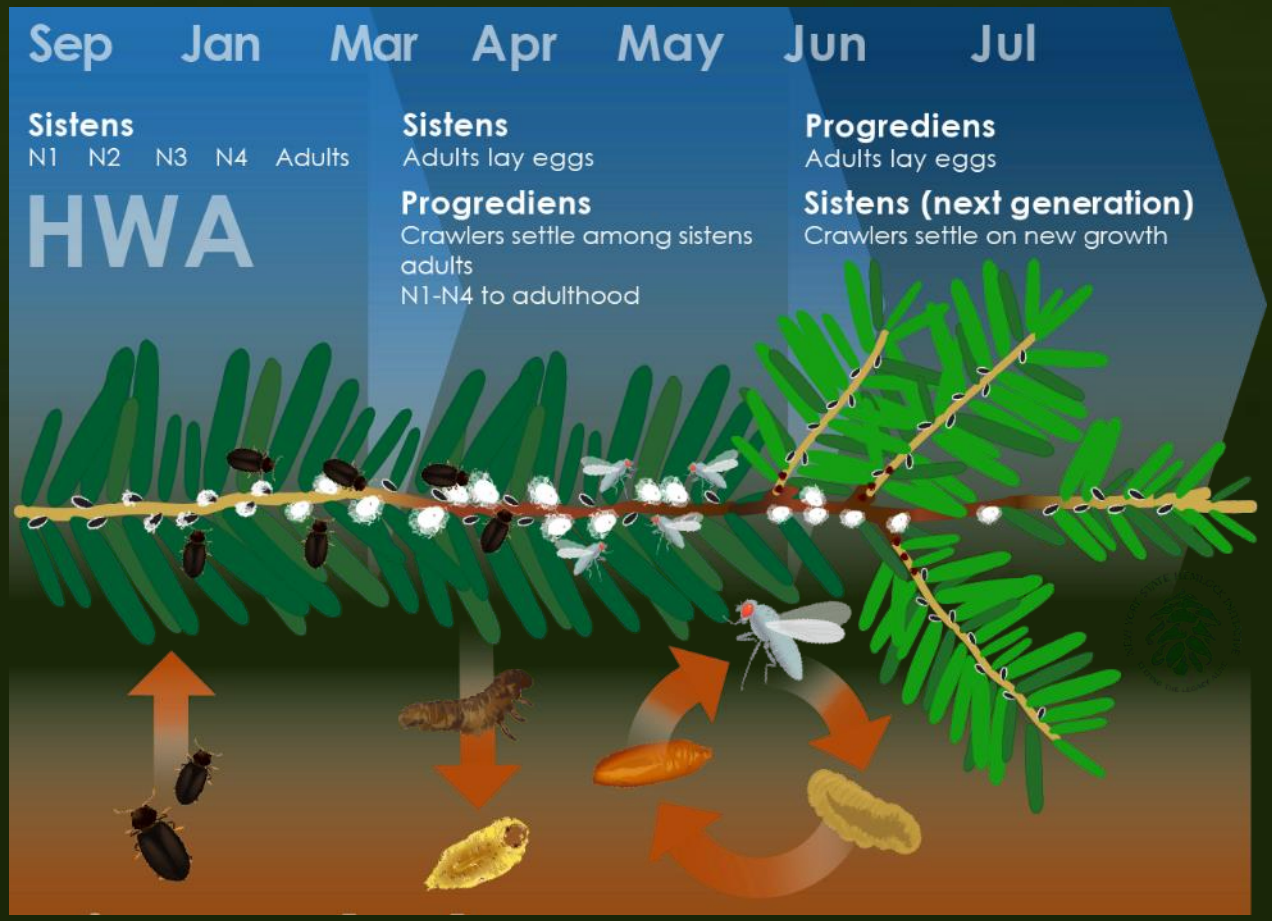


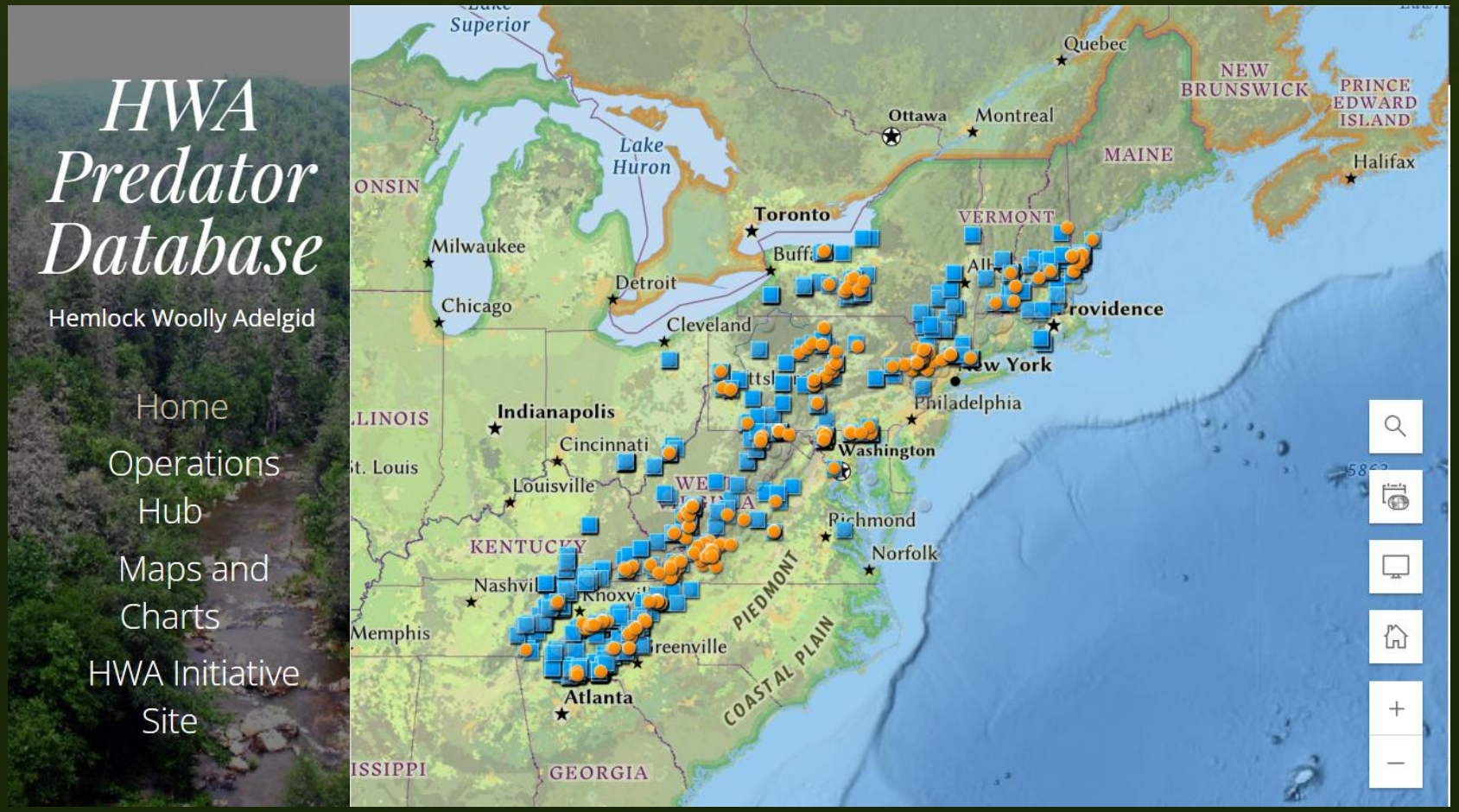
Figure by: NY State hemlock initiative

L. nigrinus (Col: Derodontidae) status

- Widely established and locally abundant
- Being redistributed from abundant sites and field insectaries
  - E.g. 12,000+ redistributed from Rocky Gap State Park, MD
  - Impacts on HWA have been periodically assessed and results are significant
- In conclusion: On the path to success. Rearing can be phased out, continue to redistribute to enhance dispersal. Monitor non-target impacts in the field (New project out of Univ. of Maine).

Photo: T. Macy, OH-DNR

L. nigrinus releases (2003 - present) and recoveries



Contact:

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Safeguarding America's Crops and Forests

Forest Pests: What They Are & What We Can Do About Them

Kathryn Aroian
State Plant Health Director
United States Department of Agriculture

October 2, 2024

Animal and Plant Health Inspection Service (APHIS)

APHIS protects the health and value of American agriculture and natural resources

www.aphis.usda.gov

APHIS Priorities

- Animal Care
- International Services
- Veterinary Services
- Tribal Relations
- Wildlife Services
- Biotechnology Regulatory Services
- **Plant Protection and Quarantine**

Plant Protection and Quarantine (PPQ)

Safeguarding our Nation's crops and forests against the **entry**, **establishment**, and **spread** of economically and environmentally significant pests.

https://www.aphis.usda.gov/plant-protection-quarantine

PPQ Priorities

- Facilitate Safe Trade
- Imports: Establish Effective Regulations and Policies
- Exports: Assist American Farmers and Exporters
- Safeguard U.S. Agriculture from Invasive Pests

Domestic Programs Examples:

Fruit Fly
Citrus Greening
Giant African Snails
Imported Fire Ant
Asian Longhorned Beetle

We begin our fight against pests and diseases before they ever have a chance to come here.

Risk and Pathway Analysis and Targeting

Around the World

Offshore Programs

Around the World

Offshore Programs (cont’d)

Around the World

At the Border

U.S. ports of entry are our last chance to keep plant pests and diseases out of our country. And we mount a powerful defense against them.

Import Requirements and Permitting

At the Border

Live Plant Inspections

Pest Identification

At the Border

Across the Nation

When a pest or disease does enter the United States, our Safeguarding Continuum stretches out across the Nation.

Trade Compliance and Enforcement

Across the Nation

Export Certification

Across the Nation

Pest Survey and Response

[APHIS list of 59 pests and diseases that pose the most significant threat to U.S. Agriculture]

Across the Nation

Take Aways

- Don’t move firewood
- Don’t move soil
- Buy seasonal and local grown products & plants

Thank you!!

Watch For & Report

- Known Invasives such as Spotted Lanternfly, Asian Longhorned Beetle
- Unusual signs or symptoms on plants

Remember to take a photo and mark your exact location

Across the Nation

APHIS State Plant Health Directors

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New York	Ted Lewis (Acting) theodore.lewis@usda.gov
Maine	Rachel Nyce rachel.s.nyce@usda.gov

Cooperating Agencies / Helpful Links

NH Department of Agriculture Markets & Food https://www.agriculture.nh.gov/
VT Agency of Agriculture Food & Markets https://agriculture.vermont.gov/
www.nhbugs.org
www.vtinvasives.org
www.dontmovefirewood.org
Asian Longhorned Beetle Quarantined Areas (usda.gov)
www.usajobs.gov