Forest Management and Ash Preservation in Response to Emerald Ash Borer

Paul Catanzaro

University of Massachusetts

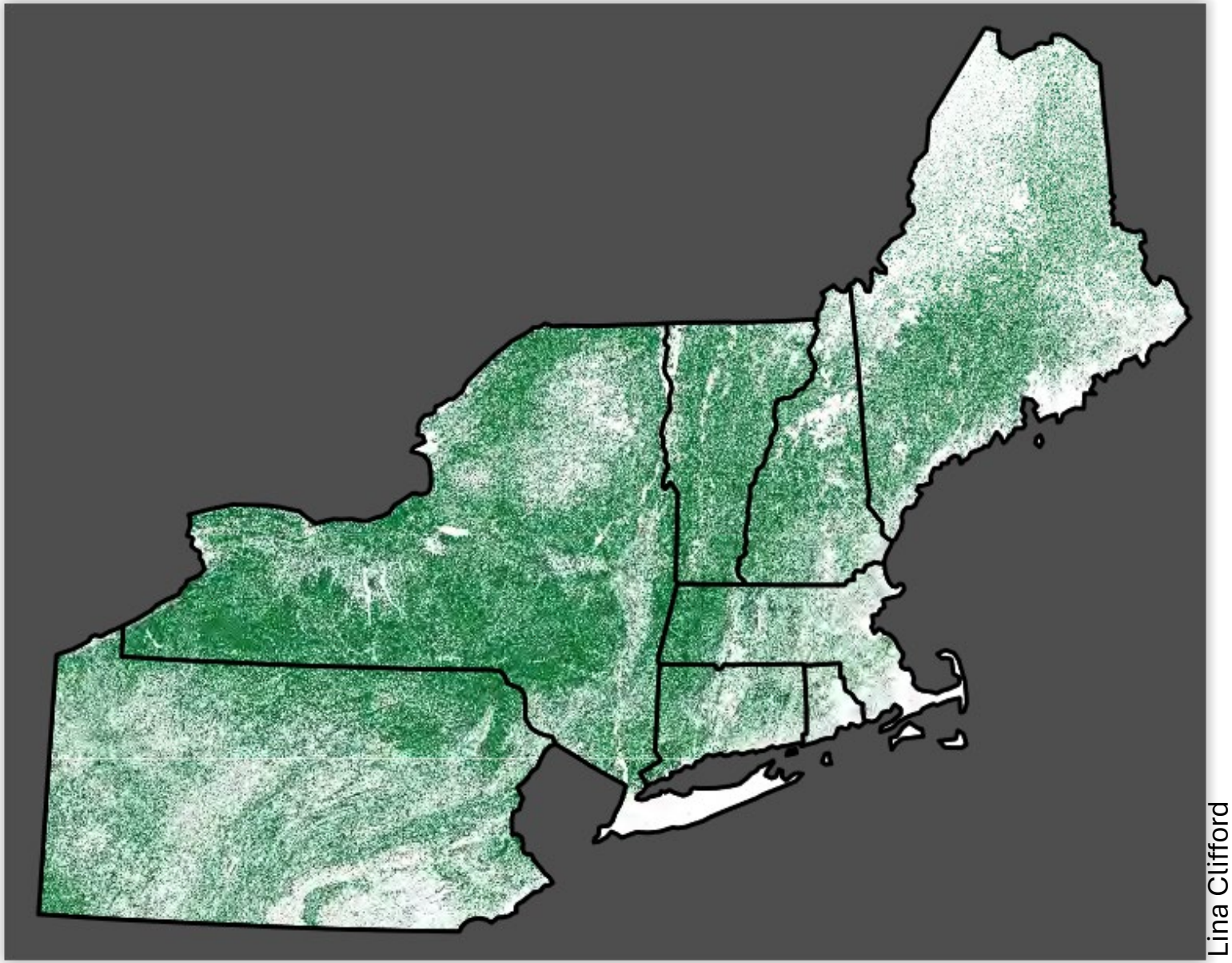
Anthony D'Amato

University of Vermont

Photo: Tony D'Amato


Good Housekeeping

Distribution of Ash Species



Lina Clifford

Ash Identification: branching pattern

Frank Bramley, Native Plant Trust

Strongly Opposite Branches

Ash Identification: bark

white ash

Nate Siegert

deep fissures,
diamond pattern,
firm

green ash

Go Botany

fissures,
diamond pattern,
Less firm, more flaky

black/brown ash

Go Botany

Corky,
flaky

Ash Identification: leaves

white ash

Nate Siegert

green ash

Bplant.org - Derek

black/brown ash

Go Botany

Compound Leaves – Typically 7 – 9 Leaflets

Ash is the only opposite branched tree with compound leaves in our forests

Ash Silvics: Site

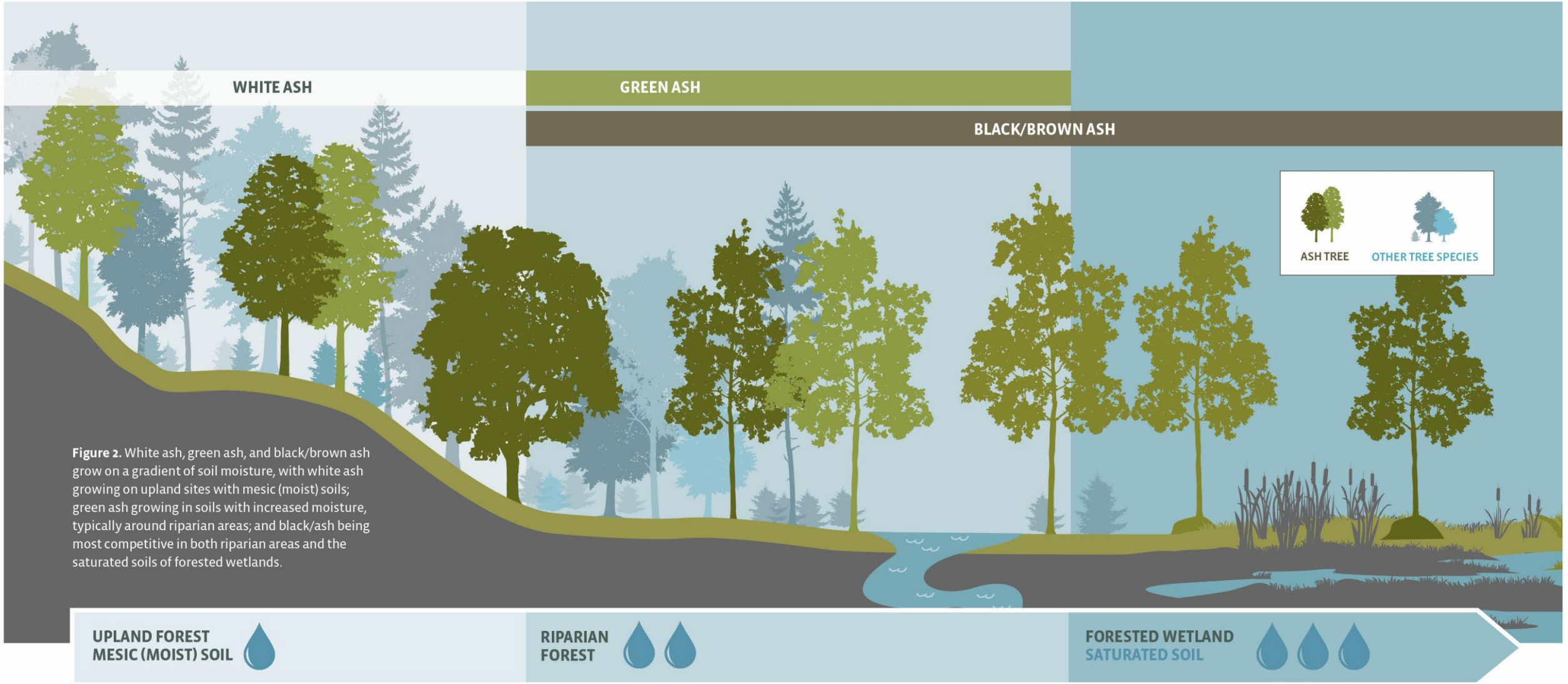


Figure 2. White ash, green ash, and black/brown ash grow on a gradient of soil moisture, with white ash growing on upland sites with mesic (moist) soils; green ash growing in soils with increased moisture, typically around riparian areas; and black/ash being most competitive in both riparian areas and the saturated soils of forested wetlands.

Ash Silvics: Reproduction & Early Growth

- Ash is dioecious (di-ee-shus), male and female individuals
- They can self-pollinate, but male pollinated seeds are genetically richer.
- Only individuals with female flowers will yield seeds.
- Flowers appear with leaves in April – May

Female flower

Ash seed
(only females)

Ash Silvics: Reproduction & Early Growth

- Minimum seed-bearing age is 20 years old or 8 – 10” DBH
- Seeds are wind dispersed, traveling up to 450’
- Germination best in partial sun (50/50)
- **Shift in shade tolerance from tolerant to intolerant**

National Park Service

Ash regeneration

Emerald Ash Borer

- First detected in MI in 2002…likely introduced in mid-1990s
- Introduced from Asia
- Likely wood packing material
- Rapid spread due to human movement
- Killed hundreds of millions of ash trees across North America

Adult EAB - <1/2”

UMN Extension

Emerald Ash Borer: Life Cycle

- Adults emerge in late May – early June & feed on leaves, causing little damage.
- Lay eggs in crevices of bark
- ~Week later larva emerge, bore under the bark, and feed on the inner bark and phloem
- As larvae feed, they create S-shaped galleries
- Feeding disrupts flow of water & nutrients, ultimately leading to tree mortality
- Symptoms typically appear in the upper canopy first

Invasive Species Centre

adult (left) and larvae (right)

Signs of EAB: Thinning Crowns

Dave Orwig

Signs of EAB: Blonding

Appears in the upper canopy first

Nathan Siegert

Nthan Siegert

Signs of EAB: Epicormic Branches & Sprouts

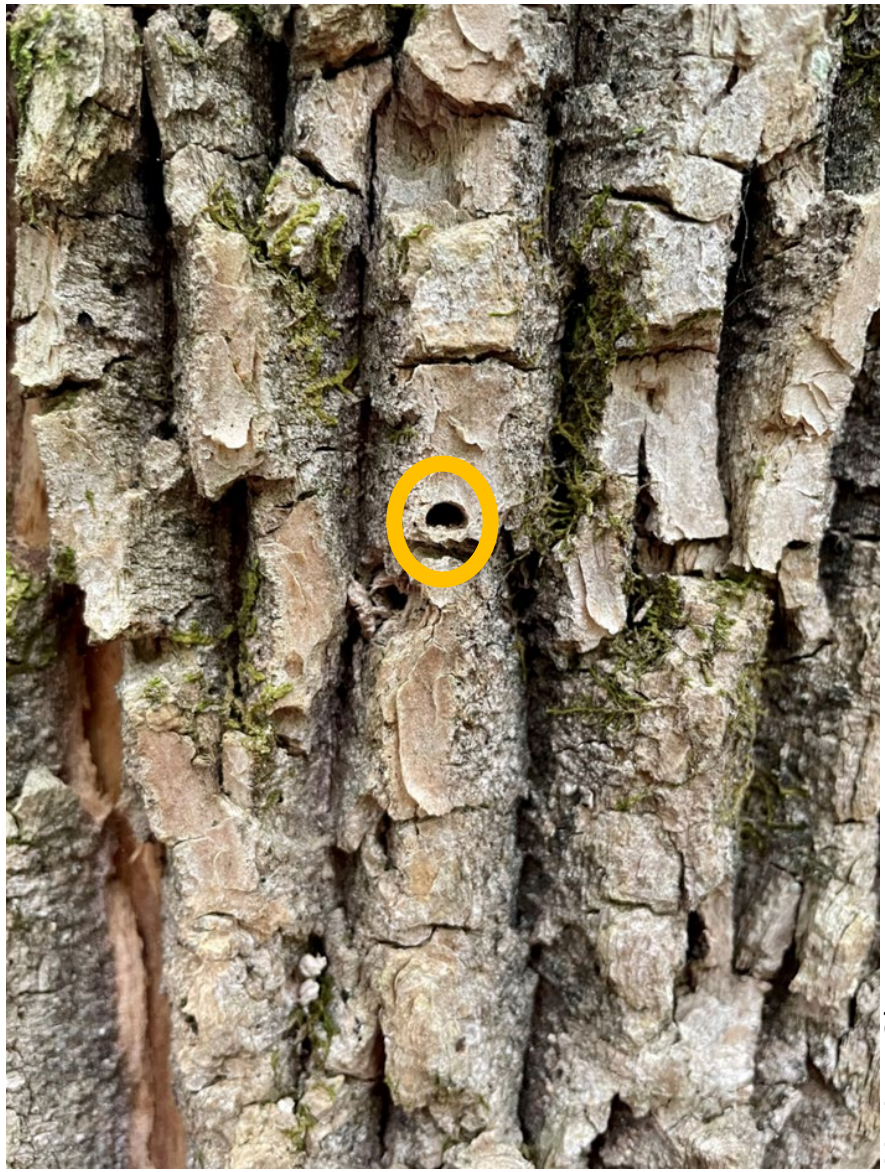
Nathan Siegert

Epicormic Branch

Nathan Siegert

Basal Sprouts

Signs of EAB: D-shaped emergence holes



Nathan Siegert

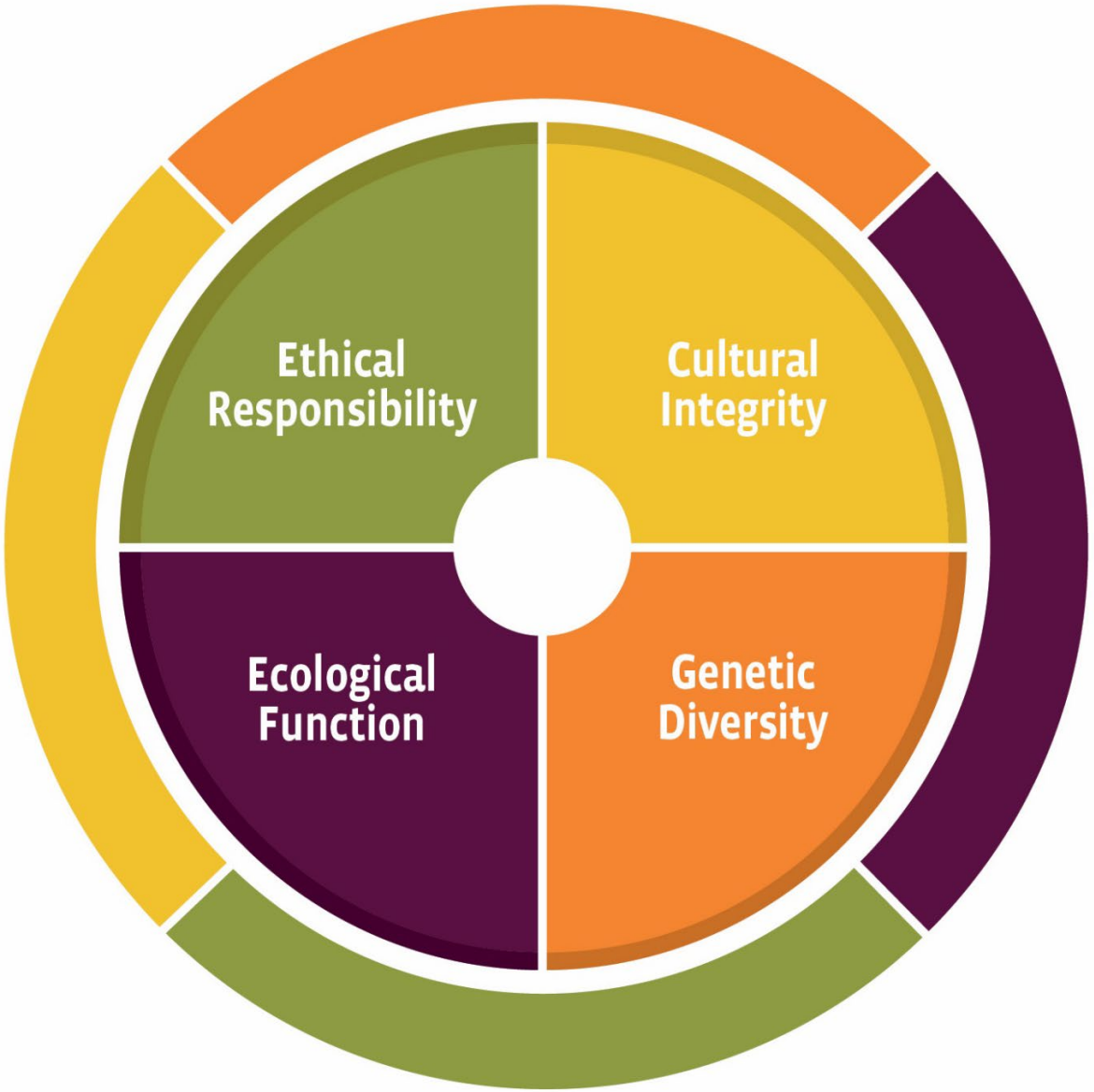
David Orwig

Signs of EAB: S-shaped larval galleries

Nathan Siegert

Nathan Siegert

Goals


Ethical Responsibility
Cultural Integrity
Ecological Function
Genetic Diversity

Goals: Ethical Responsibility

"A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise."

— Aldo Leopold, A Sand County Almanac

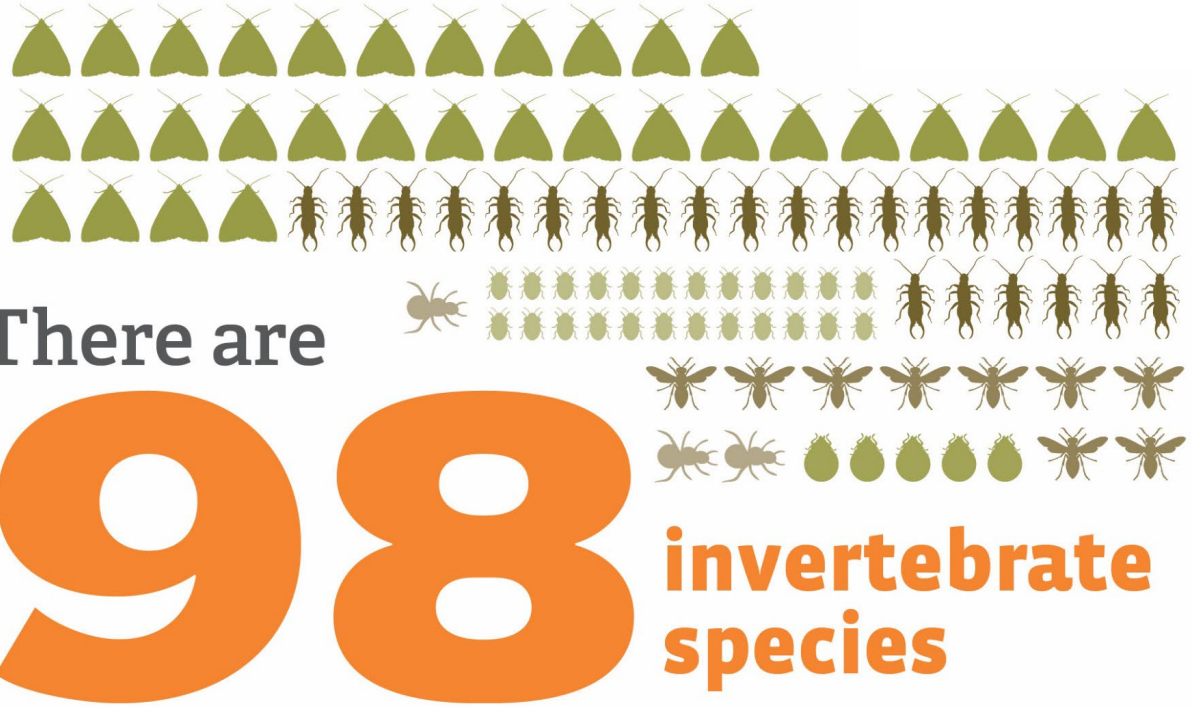
Susan Campbell

Goals: Cultural Integrity

Tyler Everett

According to one Wabanaki creation story, Gluskabe fired an arrow into a brown ash tree, and women and children emerged from its bark singing and dancing

Goals: Sustain Ecological Function



Tony D'Amato

Goals: Preserve Genetic Diversity

Tony D'Amato

Goals: Cultural Integrity and Ethical Responsibility

"Many of our traditional teachings recognize that certain species are our helpers and guides. The Original Instructions remind us that we must return the favor. It is an honor to be the guardian of another species—an honor within each person's reach that we too often forget. A black ash basket is a gift that reminds us of the gifts of other beings, gifts we can gratefully return through advocacy and care."

Robin Wall Kimmerer
Braiding Sweetgrass

Les Benedict
Saint Regis Mohawk Tribe

Active Forest Management in the Uplands: Helping Forests Move Through EAB

"Manage the forest,
not the insect."

Tony D'Amato
University of Vermont

Focus on Regeneration, including ash

- Favor well-adapted species
- Release desirable advance regeneration (e.g., sugar maple, yellow birch) with small openings
- Regenerating white ash requires gaps at least 1/4 - 1/3 acre in size, group selection
- Shelterwood providing partial shade across the site (30-60 sq. of basal area or 40 – 60% of the canopy)

Tony D'Amato

Focus on Regeneration: Herbivory

Tony D'Amato

Nat Siegart

Focus on Regeneration: Competing Vegetation

Anthony D'Amato

American beech understory
...also sugar maple on rich sites will outcompete ash with small openings

Anthony D'Amato

Oriental Bittersweet
and
Glossy Buckthorn

Retain a Diversity of Ages

Anthony D'Amato

Large white ash legacy tree

Retain Male and Female Individuals

- **MORTALITY IS NOT A FORGONE CONCLUSION!! (lingering trees >15 years)**
- Maintain sexually mature males and females to provide seed source.
- Female flowers in late spring.
- Seeds (in good seed years) late summer
- Wind pollinated, keep male sin the landscape

Anthony D'Amato

Passive Forest Management

- Very likely that trees will succumb to EAB
- Increased dead wood
- Gap of a tree typically **too small to regenerate ash**
- Control invasive plants and herbivory will help with successful regeneration

Preserving Ash: Uplands, Riparian, and Wetlands

Paul Catanzaro

Lingering Ash

- **If we don’t leave any ash, we’ll never know which are resistant**
- Are there trees that are resistant to EAB without treatment?
- If so, it’s critical to identify them to maintain the genetic source.
- Flagging, paint, GPS
- Encourage regeneration of these individuals
- Seed collection

Anthony D’Amato

Preservation Patches

- 12 – 15 trees
- 1 – 3 acres
- Variety of diameters 12” – 30+”
- Ash sites
- High crown vigor, dom./co-dom.
- Heavy to females (60-75%)
- Fewer patches with more trees better than more patches with fewer trees

David Orwig

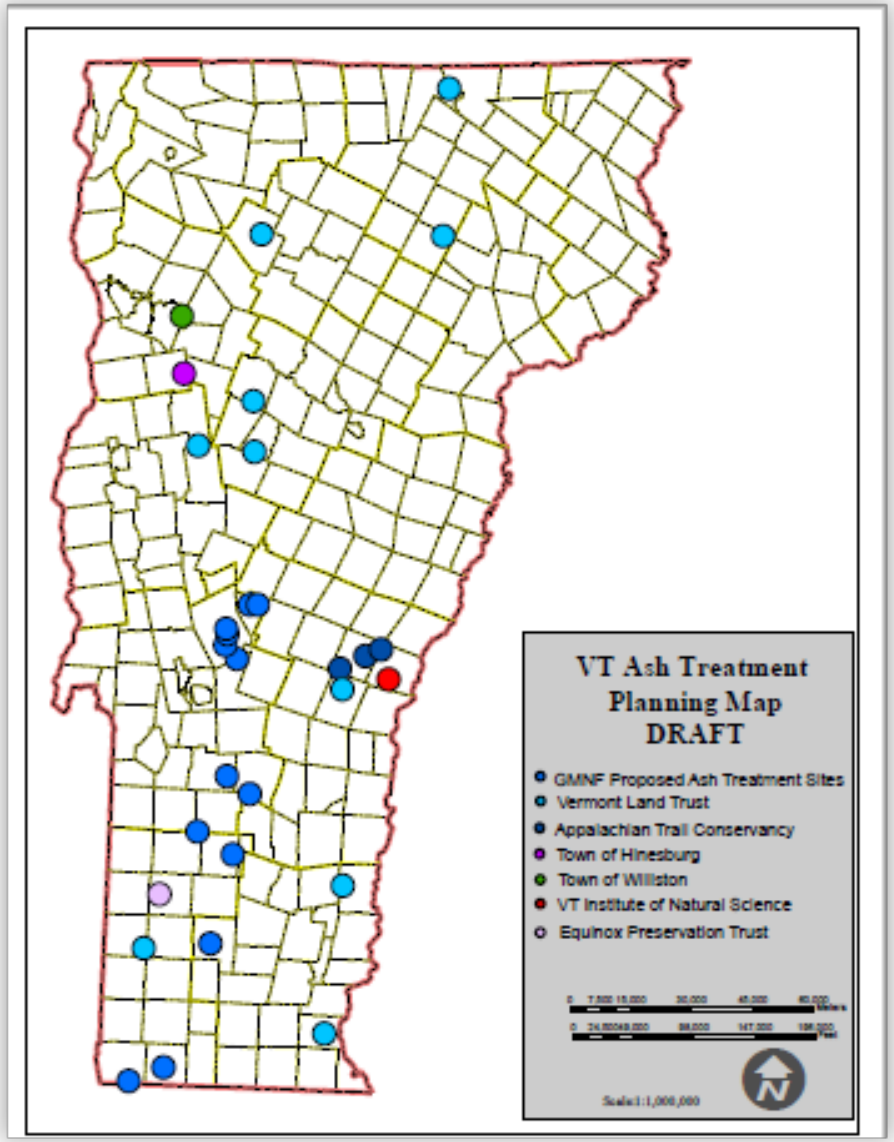
Chemical Injections

- Without treatment, it's very likely that the patch will succumb to EAB
- Work with a forester or arborist with pesticide applicator's license
- Direct stem injections of *emamectin benzoate,* following the label, before >50% crown loss
- Treat between May and July
- Treatments good for up to ~4 years
- Treating all trees is cost prohibitive, focus on preservation patches.
- Don't have to treat all trees in preservation patch. There is an adjacency effect.

Vermont Land Trust

Work to Promote Preservation in the Landscape

- **VLT** – 12 – 20 trees (12” - 20”),
  10 fee properties, 4 (females): 1 (males)
- **TNC** – 6 properties, black/brown & green ash
- **Equinox Preservation Trust** – 1 patch (10-12 trees), 1 preserve
- **Vermont Institute of Natural Science** – one patch, including large diameter
- **Appalachian Trail Conservancy** – 40-100 trees, including black/brown & green
- **Town of Williston** – 12-15 trees in town forest
- **USFS GMNF** – 30 trees/site, multiple sites and individuals



Caitlin Cusack - VLT

Promote Preservation with Family Forest Owners

Cultivate Indigenous Partnerships

- Your black/brown ash is likely more valuable to others
- Ash inventory
- Seed saving
- Cultural Respect Agreements

Ash Protection Collaboration Across Wabanakik (APCAW)

https://umaine.edu/apcaw/

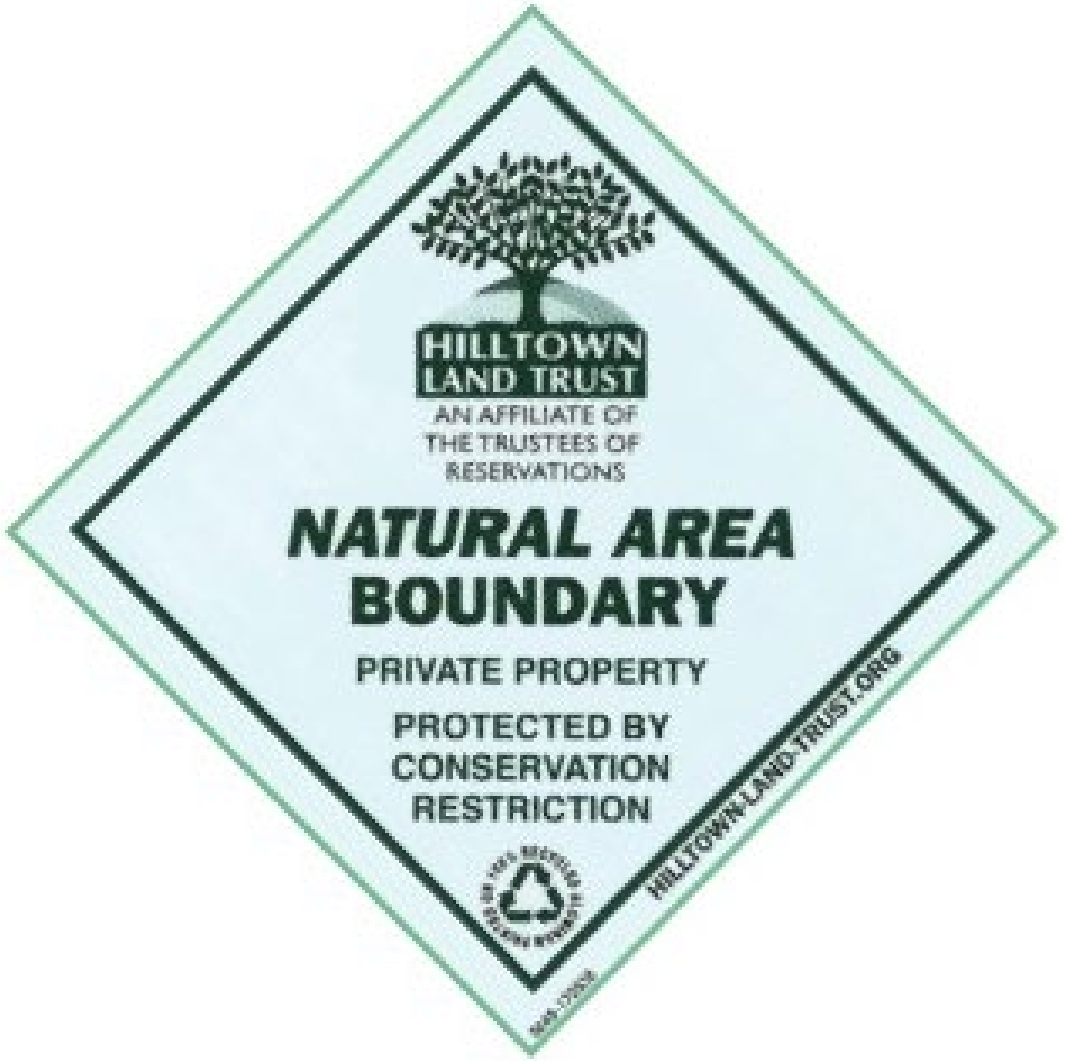
MA Wetlands Protection Act

Massachusetts Department of Environmental Protection
Bureau of Resource Protection — Wetlands and Waterways — Herbicide
BRP WM 04 Application Completeness Instructions

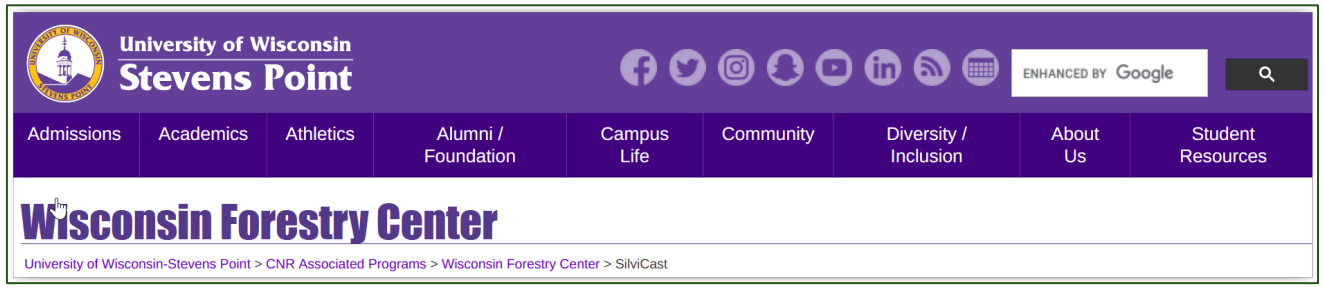
Tony D'Amato

Conservation Easements

- Chemicals allowed?
- Future forest health issues?



Silvicast



https://www3.uwsp.edu/cnr-ap/WFC/Pages/Research-Development/SilviCast.aspx

Related Work Advocating for Species Preservation

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Advance access publication 26 June 2023
Field Notes - forest threats

OXFORD

Species Preservation in the Face of Novel Threats: Cultural, Ecological, and Operational Considerations for Preserving Tree Species in the Context of Non-Indigenous Insects and Pathogens

Anthony W. D'Amato,[1,*] David A. Orwig,[2] Nathan W. Siegert,[3] Amanda Mahaffey,[4] Les Benedict,[5] Tyler Everett,[6] John Daigle,[7] Logan Johnson,[8] Paul Catanzaro,[9] and Caitlin Cusack[10]

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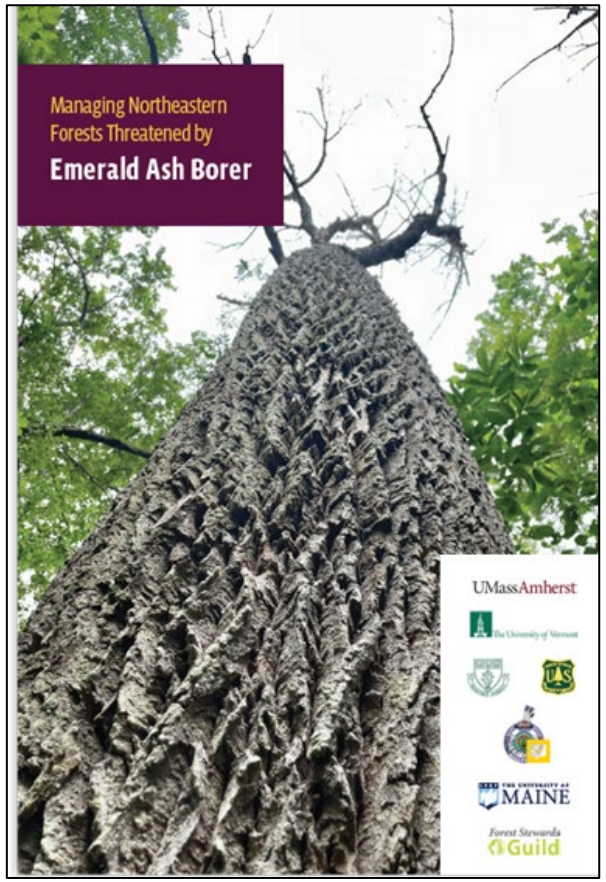

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