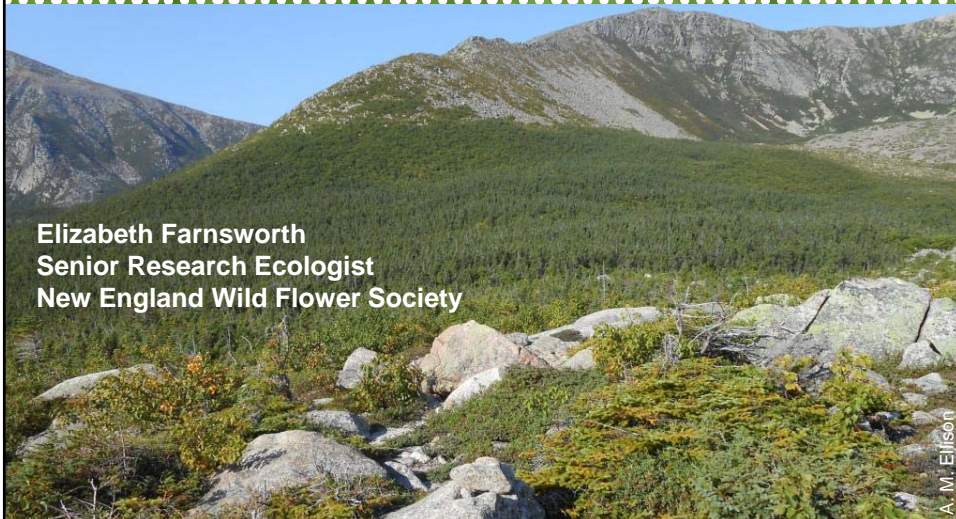


State of the Plants in New England Conservation Challenges and Opportunities for Conserving Forest Habitats

NEW ENGLAND
**WILD
FLOWER
SOCIETY**



Elizabeth Farnsworth
Senior Research Ecologist
New England Wild Flower Society



A. M. Ellison

Why a report on plants?



CLIMATE CHANGE AND MARINE FISHERIES

VOLUME HABITAT SPECIES

REPORT IN BRIEF

STATUS OF POLLINATORS IN NORTH AMERICA

October 2010

One of the members of the world's disappearing bird species is a population of the...
birds, bats, and other pollinators... in a region that has been the focus of...
can be expected there. There is also a need to...
America. For more...
whether or not that...

State of the Birds

the State of the Birds

LOSING GROUND

Planning for Resilience

Patterns of development and their impact on the nature of Massachusetts

Fifth Edition of the Losing Ground Series

June 2014

Mass Audubon
Protecting the Nature of Massachusetts

Plants *are* the habitat



Plants are vital to humans

Oxygen
Filter air pollutants
Sequester carbon
Cleanse water
Control erosion
Lessen floods
Fuel
Fiber
90% of food energy
75% of major drugs



Plant blindness prevails



Protect plants, you protect many species



Goals of the report

- Document status of and trends in the New England flora
- Identify threats to plant species in the region
- Articulate research agenda
- Discuss frameworks for conserving and managing species
- Suggest what everyone can do to help



We have the data

Navigation menu: [About](#) | [Go Botany](#) | [Garden in the Woods](#) | [Take a Course](#) | [Garden Shops](#) | [Resources](#) | [Membership](#)

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SEARCH [input type="text"] [search icon] [Facebook icon] [Twitter icon] [YouTube icon]

CONSERVE | GROW | LEARN | VISIT | SUPPORT

Conserving and promoting the region's native plants to ensure healthy, biologically diverse landscapes

Investigating Your Yard and Woods in the Digital Age | Important Legal Victory for Conservation | Get Ready for Free Fun Friday! | Sponsor a Seed Help us save our region's

Sources of data – NEPCoP



New England Plant Conservation Program
Plant Conservation Volunteers
Rich botanical history
Herbarium Recovery Project
Flora Novae Angliae
Go Botany and PlantShare
Flora Conservanda
1,000's of published studies
New England experts



Sources of data – Volunteer monitoring

- 250+ Plant Conservation Volunteers active each year
700+ total trained
- 450+ surveys yearly
- 60,000 hours of fieldwork since 1998
- New discoveries, updates, surveys
- Management



Sources of data – Witness tree records



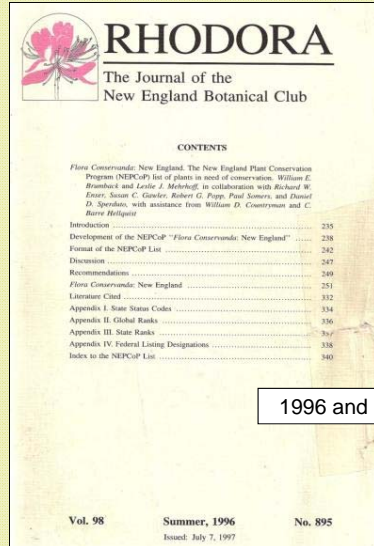
Charlie Cogbill, Vermont

Sources of data – Go Botany & PlantShare

The screenshot displays the Go Botany website interface. At the top, there is a navigation menu with links for Home, Simple Key, PlantShare, Full Key, Dichotomous Key, Teaching, and Help. A search bar is located on the right side of the header. The main content area is divided into several sections:

- PlantShare:** A sidebar menu with options like Post a Sighting, Manage Your Sightings, Sightings Locator, Recent Sightings, Ask the Botanist, Plant Checklists, Find People, Your Profile, and Log Out.
- Your Profile:** A section for the user 'efarnsworth-admin' located at 180 Hamenway Road, Framingham MA. It shows 0 sightings and 0 checklists.
- Sightings Locator:** A map of New England showing recent plant sightings. A red dot is placed on the map, indicating a sighting location. Below the map is a 'How to Use' section and a 'Don't see a plant you think should be there?' section.
- Ask the Botanist:** A section with a photo of a person and text explaining that botanists are available to help identify plants and provide expert scientific guidance.

Sources of data – *Flora Conservanda*



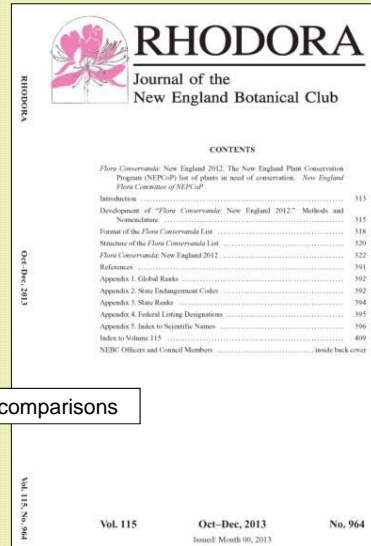
RHODORA
The Journal of the
New England Botanical Club

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Flora Conservanda, New England. The New England Plant Conservation Program (NEPCoP) list of plants in need of conservation. *William E. Bramblett and Leslie J. McIntosh*, in collaboration with Richard M. Egan, Susan C. Givler, Robert G. Papp, Paul Somers, and Daniel B. Sperduti, with assistance from William D. Courtyman and C. Barry Helgason

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Vol. 98 Summer, 1996 No. 895
Issued: July 7, 1997



RHODORA
Journal of the
New England Botanical Club

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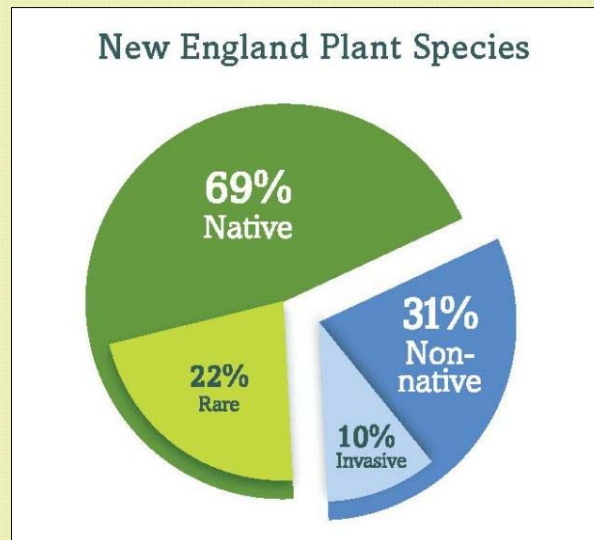
Flora Conservanda: New England 2012. The New England Plant Conservation Program (NEPCoP) list of plants in need of conservation. *New England Flora Committee of NEPCoP*

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NEPCoP Officers and Council Members	inside back cover

Vol. 115 Oct-Dec, 2013 No. 964
Issued: Month 09, 2013

1996 and 2012 comparisons

General findings: 3,514 species & counting



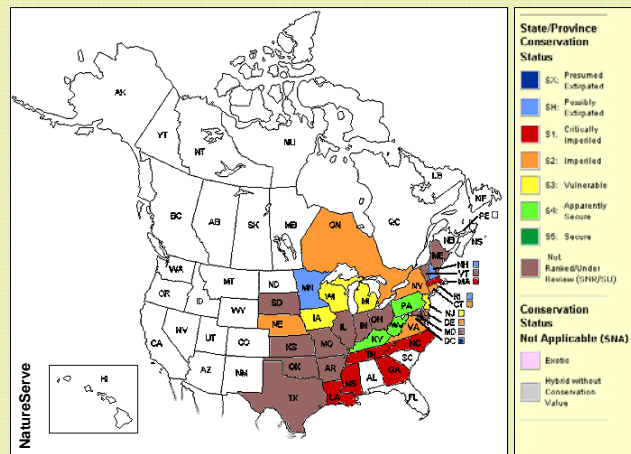
10 rare taxa endemic to New England



3 now extinct
1 removed from U. S. Endangered Species List

It's not *just* about New England

Species on average are listed in 38.5% of their North American range



Asclepias purpurascens

General findings

593 considered in *Flora Conservanda* 2012

Globally rare:	62 (2.5% of native taxa)
Regionally rare:	325 (13.4%)
Regionally declining:	6 (0.2%)
Disjunct:	51 (2.1%)
Historical:	96 (3.9%)

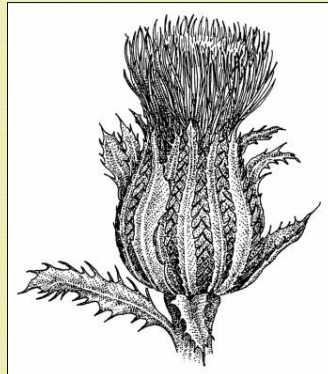
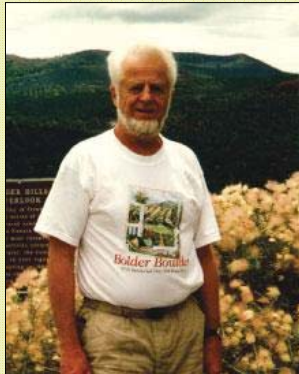
TOTAL: 540 (22.1% of the native flora)

Division IND (Indeterminate): 53 (1.5%)

Most staying the same, but 25 down-listed, 8 up-listed

De-listing of taxa

Previously unrecorded finds
Taxonomic revisions (lumping)
Hybrids
New information on nativity
Actual increases



Most imperiled groups

Ophioglossaceae
60%



Saxifragaceae
43%



Orobanchaceae
41%

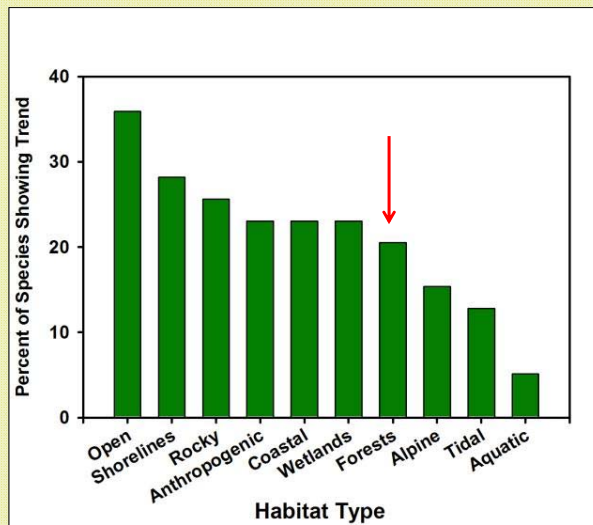


Orchidaceae
36%



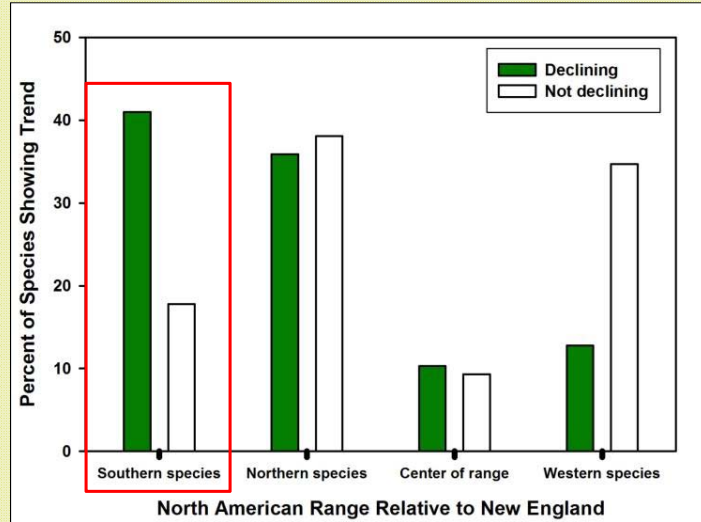
What do declining species have in common?

Habitat affinities



What do declining species have in common?

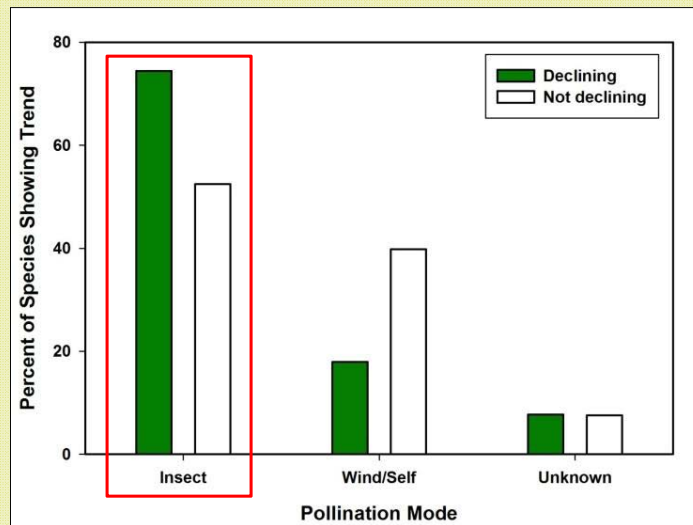
Species with southerly ranges declining



$P < 0.01$

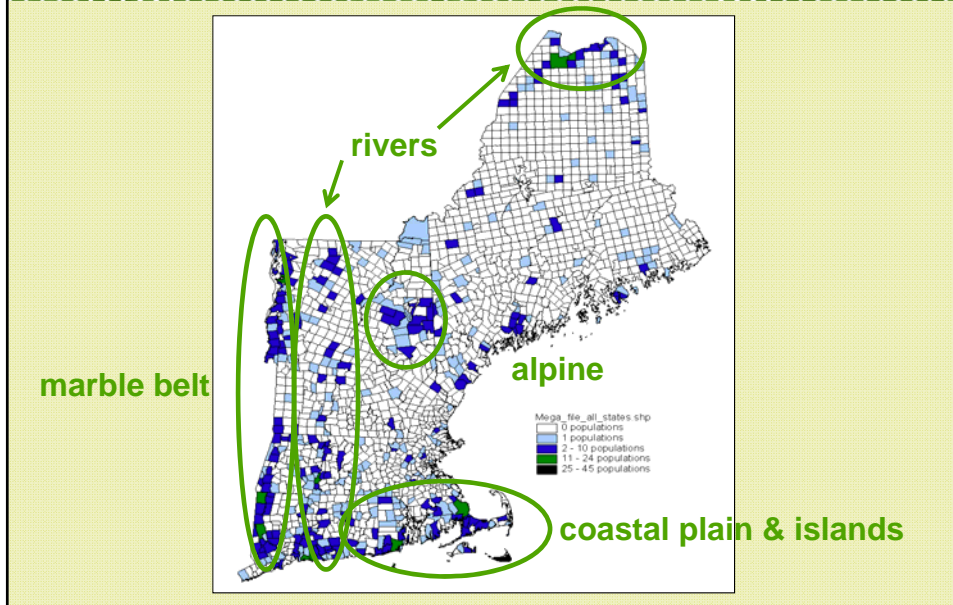
What do declining species have in common?

Insect-pollinated species declining

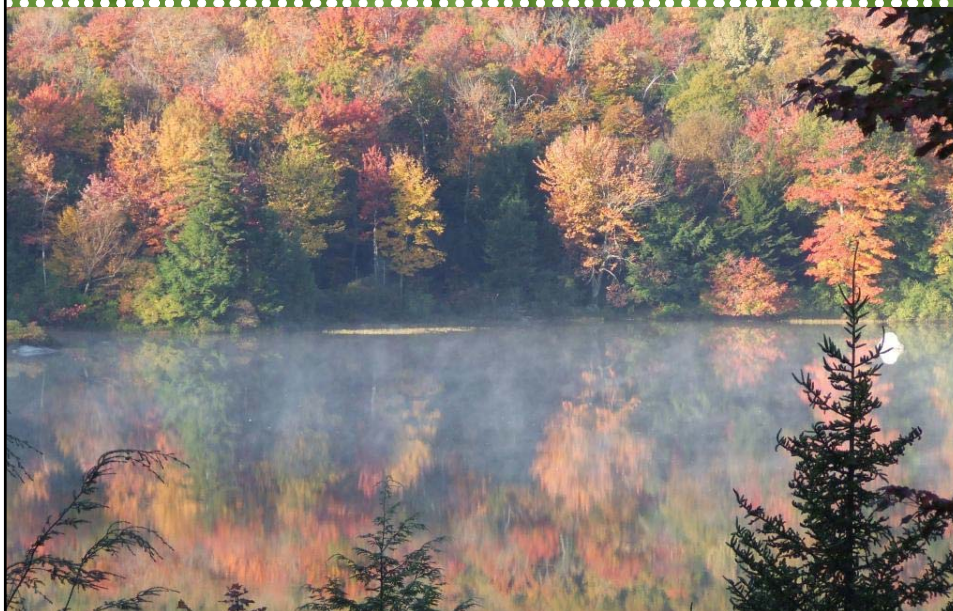


$P < 0.01$

Hotspots of rare plants



Case studies – A habitat-based approach

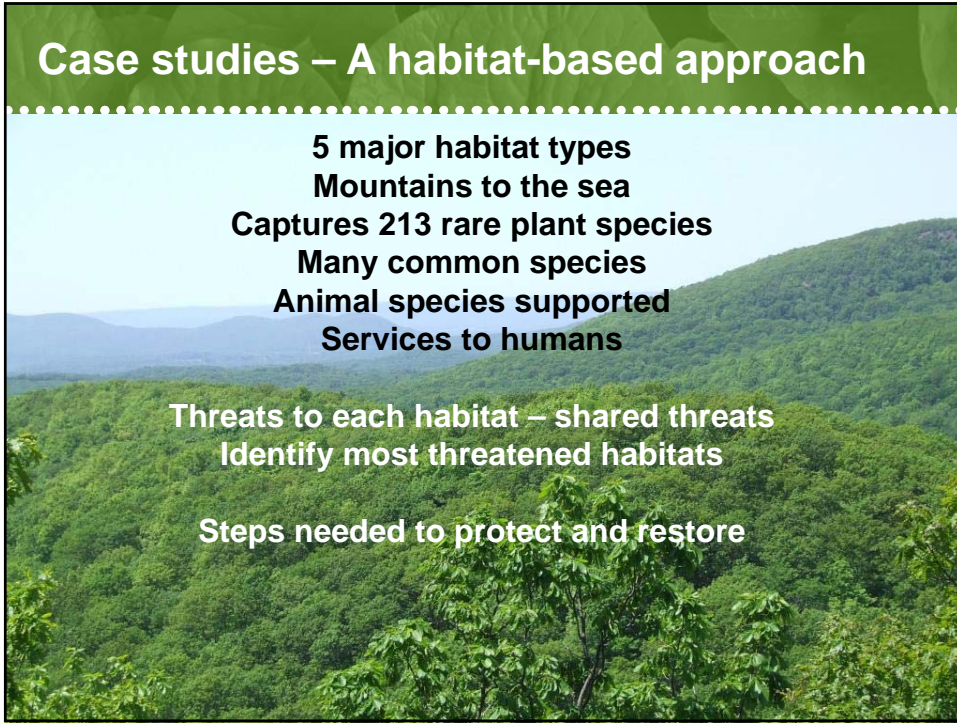


Case studies – A habitat-based approach

5 major habitat types
Mountains to the sea
Captures 213 rare plant species
Many common species
Animal species supported
Services to humans

Threats to each habitat – shared threats
Identify most threatened habitats

Steps needed to protect and restore



Alpine and Subalpine Habitats

Plants: 48 rare species, 4 globally rare



Geum peckii



Kent McFarland

Riparian Habitats

Plants: 44 rare species, 9 globally rare



Lisa Matei

Astragalus robbinsii var. *jesupii*



A. M. Ellison



William Hull

Sandplain Grasslands and Heathlands

Plants: 52 rare species, 12 globally rare



Eti Sambolin



Matie Neel

Agalinis acuta



USFWS

Estuarine Marshes

Plants: 21 rare species, 6 globally rare



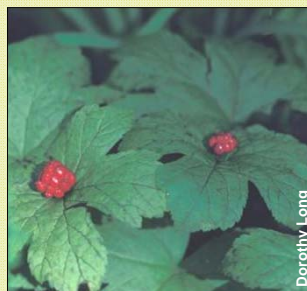
Sagittaria subulata



Derek Stoner

Mixed Northern Hardwoods Forest

Plants: 48 rare species, 5 globally rare



Hydrastis canadensis

Dorothy Long

Mixed Northern Hardwoods Forest

Other species: Forest-interior nesting birds, bear, moose,
rare salamanders, early hairstreak butterfly



Mixed Northern Hardwoods Forest

Threats: Clearing
Invasive invertebrates, pathogens, plants
Deer
Climate change forcing species north



Mixed Northern Hardwoods Forest

Clearing: Legacy effects



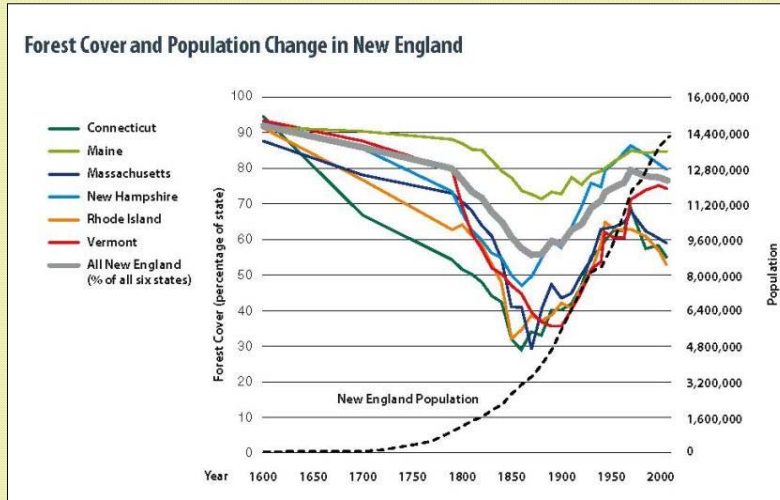
Mixed Northern Hardwoods Forest

Forest understory species few and declining



Mixed Northern Hardwoods Forest

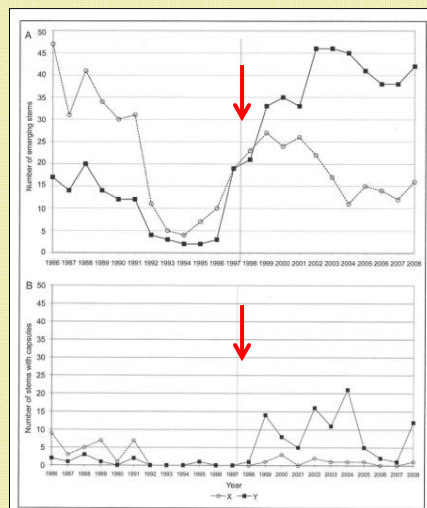
Clearing: Forests now declining again



Source: Harvard Forest

Mixed Northern Hardwoods Forest

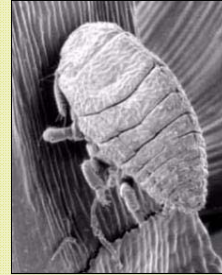
Restoring rare forest plants: Small whorled pogonia



Source: Brumback et al. *Northeastern Naturalist* 18:185-196. 2011

Mixed Northern Hardwoods Forest

Forest insects



Adelges tsugae

Mixed Northern Hardwoods Forest

Forest insects



Anoplophora glabripennis

Mixed Northern Hardwoods Forest

Forest insects



Agrilus planipennis

Mixed Northern Hardwoods Forest

Already being done: Restrict transport of infested wood products
Investigate resistant provenances of trees



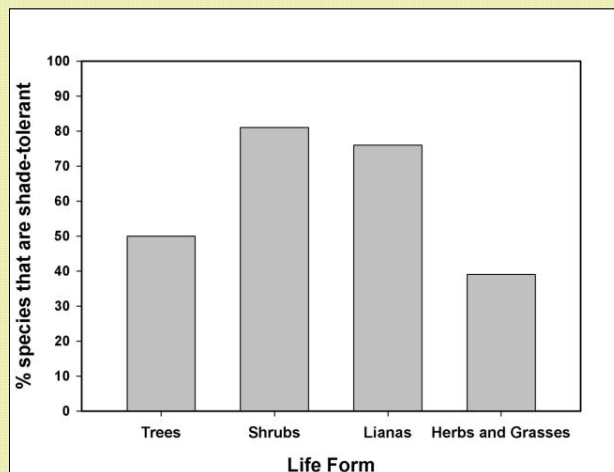
Mixed Northern Hardwoods Forest

Threats: Deer



Mixed Northern Hardwoods Forest

Invasive plants



Source: Martin et al. 2009

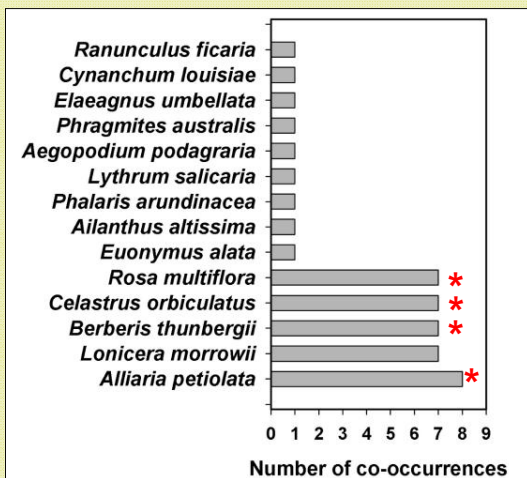
Mixed Northern Hardwoods Forest

Early leaf-out



Mixed Northern Hardwoods Forest

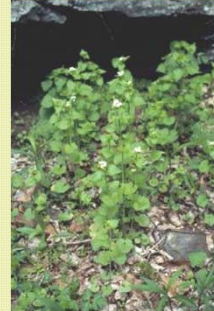
Major invasives



* Species occurring in 3 or more forest sites in Luken (2003) analysis of 144 surveys

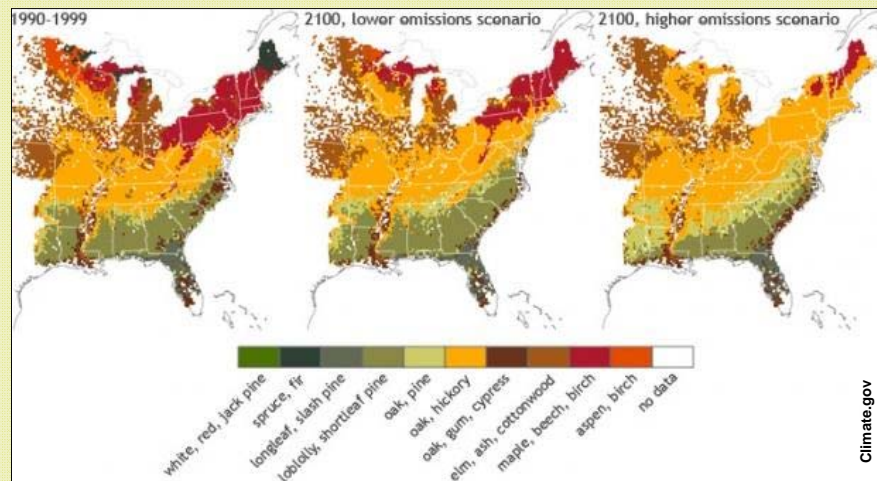
Mixed Northern Hardwoods Forest

Learn to recognize major invasives



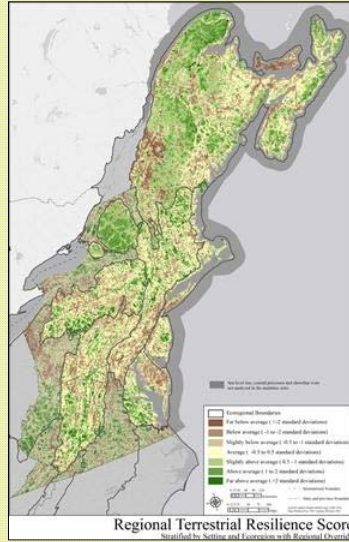
Mixed Northern Hardwoods Forest

Threats: Climate change forcing species north



Mixed Northern Hardwoods Forest

Conservation Needs: Protect large corridors of matrix forest



Mixed Northern Hardwoods Forest

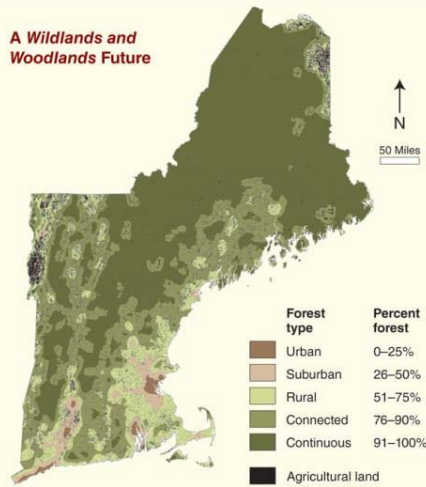
Already underway: Encourage sustainable forestry

New England Forests:
The Path to Sustainability



A REPORT BY NEW ENGLAND FORESTRY FOUNDATION

A Wildlands and Woodlands Future



Mixed Northern Hardwoods Forest

Already being done:

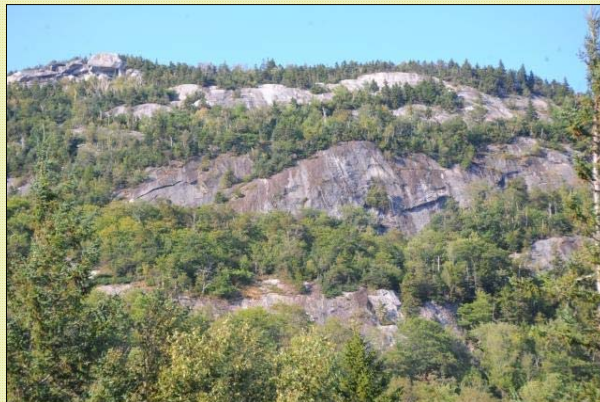
- Protect large corridors of matrix forest
- Encourage sustainable forestry
- Restrict transport of infested wood products
- Cull or reduce fecundity of deer
- Detect and remove early invasions
- Actively restore sensitive species



Recommendations

Overall Goal:

Functioning ecosystems with species continuing to evolve in the wild in response to evolutionary pressures, with little intervention and input.



Recommendations

Overall Strategies:

1. Protect as much intact, diverse, complex habitat as possible.
2. Monitor plant populations for health and threats.
3. Collect and bank seeds to preserve the genetic variation of plants.
4. Manage habitats for rare and common plants where necessary and feasible.
5. Augment, reintroduce and introduce plant populations within the historic range.
6. Perform managed relocation as necessary.
7. Spearhead a national strategy.

Recommendations

Fully fund efforts to conserve plant diversity

Endangered plants receive < 5% of funding for recovery

Cost to downlist 1 animal = cost to downlist 9 plant species

Cost to protect global biodiversity is 1/3,500th of the US GDP



Recommendations

What individuals can do

- Plant native plants
- Reduce herbicide and pesticide use
- Educate yourself and your kids to appreciate plants (Go Botany!)
- Remove invasives and prevent new ones
- Support land trusts



Bonnie Drexler

Recommendations

At the community level

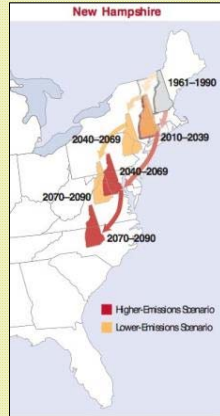
- Work with municipal officials
- Advocate for more plant education in schools
- Encourage local outlets to promote native plants
- Support local, sustainable agriculture and forestry



Recommendations

At the national level

- Reduce greenhouse gas emissions
- Funding for land protection and management
- Strengthen laws for wetlands and other sensitive habitats
- Eliminate loopholes in rare species laws



Acknowledgments

Coverts Program
Generous donors
Rick Enser
Lynn Harper
Bill Nichols
Bob Popp
Staff of the Maine Natural Areas Program

New England Natural Heritage Programs
NEPCoP Institutional Partners (60)
NEPCoP Task Force Members
Plant Conservation Volunteers
Members of New England Wild Flower Society





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*Conserving and promoting the region's native plants
to ensure healthy, biologically diverse landscapes*

www.newenglandwild.org