

# Forest stewardship in southern New England natural areas – applying history, science, and values

Edward K. Faison

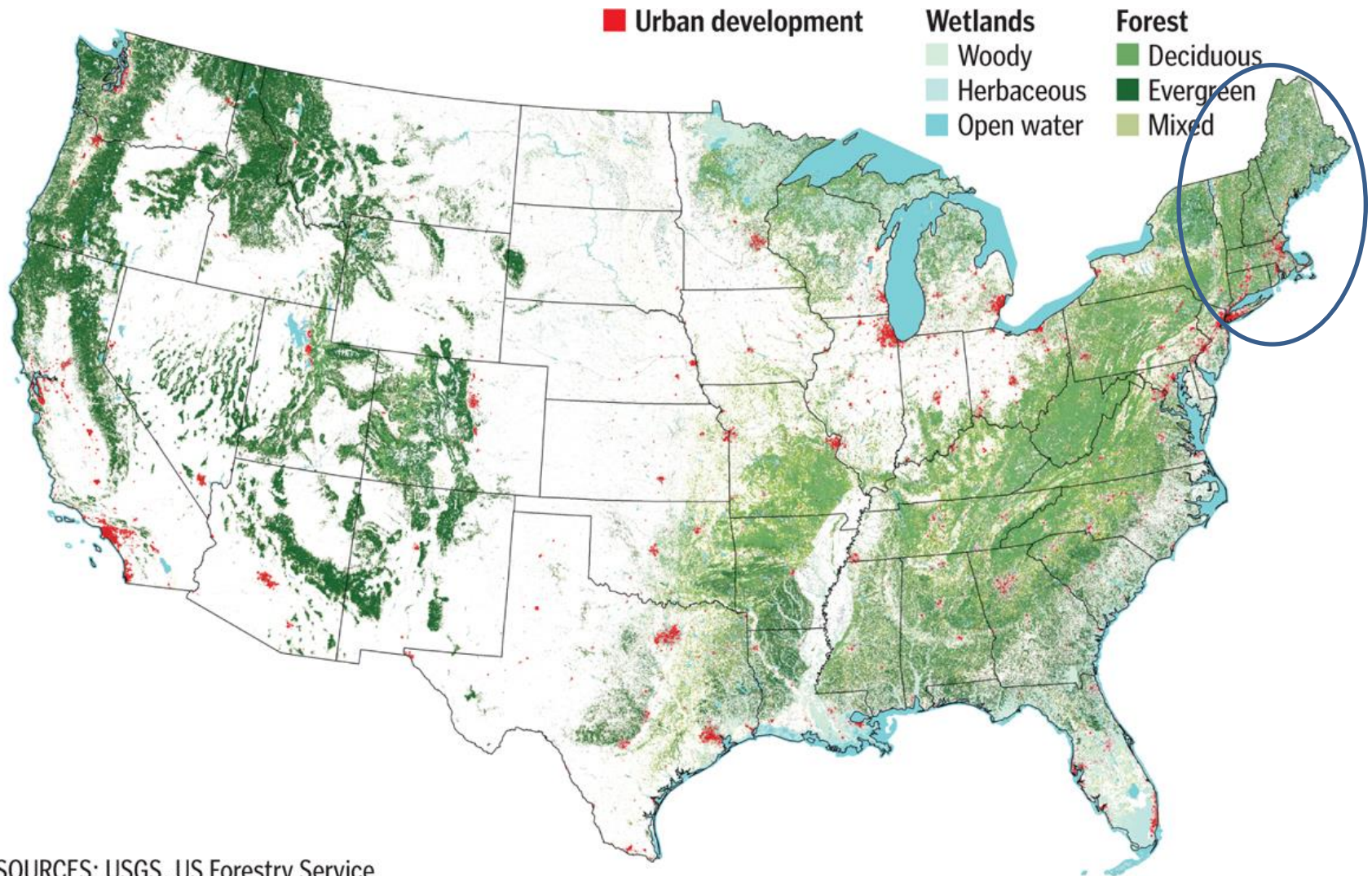
Highstead Foundation



# Outline

1. A brief ecological history of southern New England (SNE)
2. some of the important ecological and forest conservation issues in SNE
  - i. forest fragmentation
  - ii. deer and forests
  - iii. non-native species
  - iv. missing old growth forests
  - v. decline of early successional habitats
  - vi. wildlands vs. managed woodlands
3. stewardship and management: applying values informed by history and science

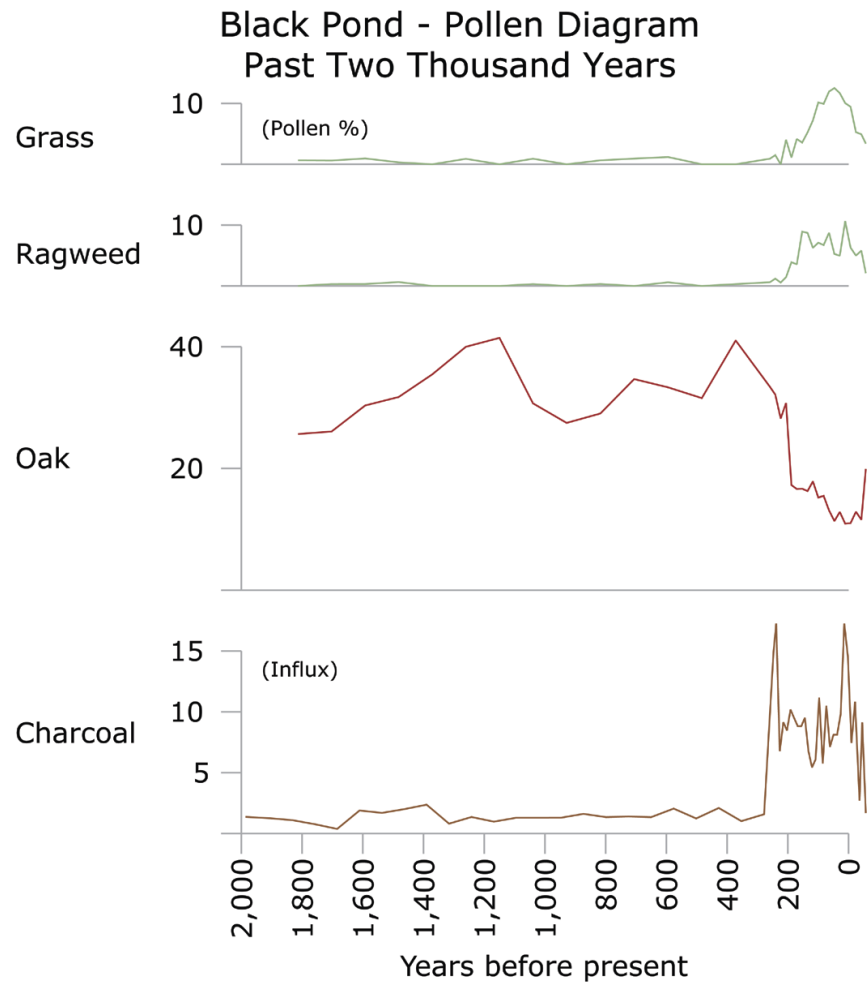
# Part 1. History



SOURCES: USGS, US Forestry Service



# Fossil pollen from lake sediments reveals the structure and composition of past landscapes





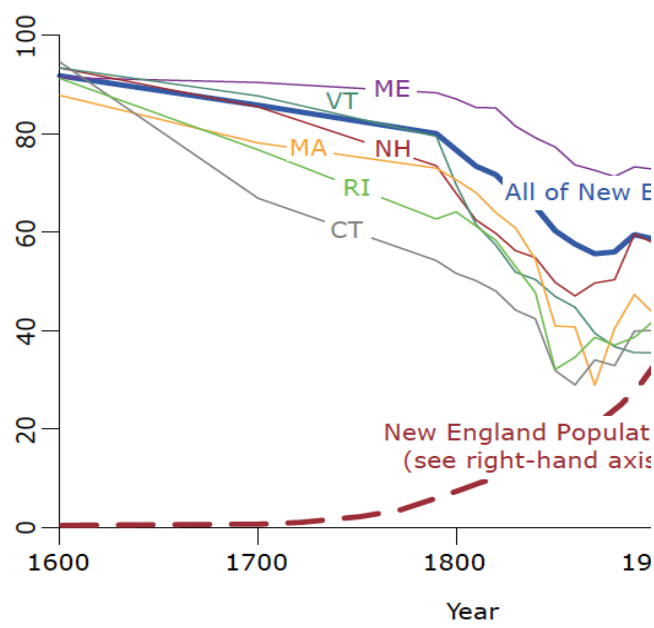
“When the Pilgrims came to this continent, New England was covered by forest interrupted only where lakes or bogs and river swamps made tree growth impossible; where sand deposits near the coast were unsuitable for closed stands; where fire or windfall had temporarily destroyed the forest; where Indians had burned the forest (especially near the coast); and where rock outcrops occurred in the more rugged sections.” (E. Lucy Braun 1950)



A. Bierstadt 1858 *Gosnold at Cuttyhunk*

# From forest to farm field (1620-1870)

Forest cover  
(% of state  
or region)



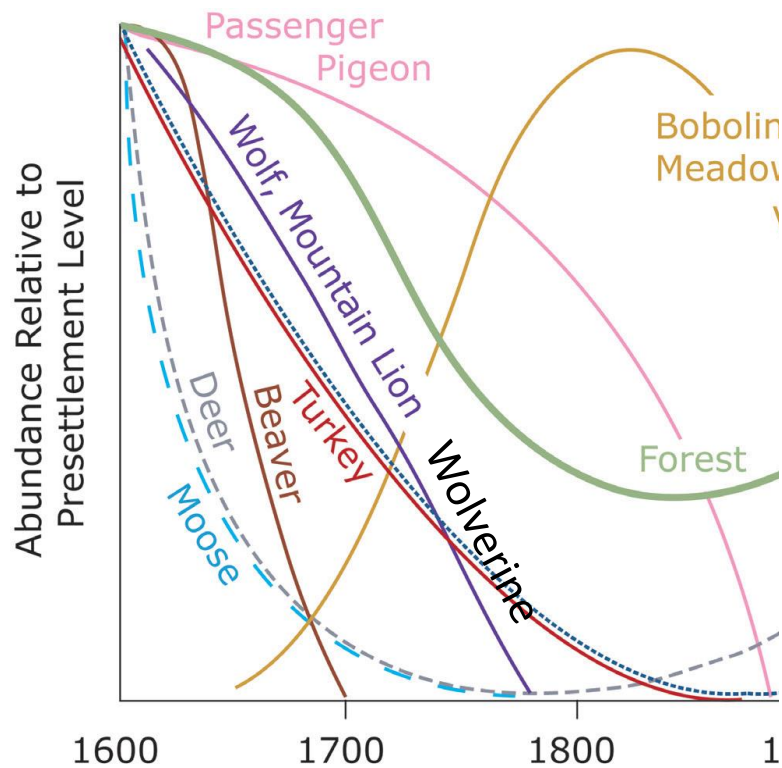
1600



1850



# Changes in wildlife populations with changes in vegetation structure

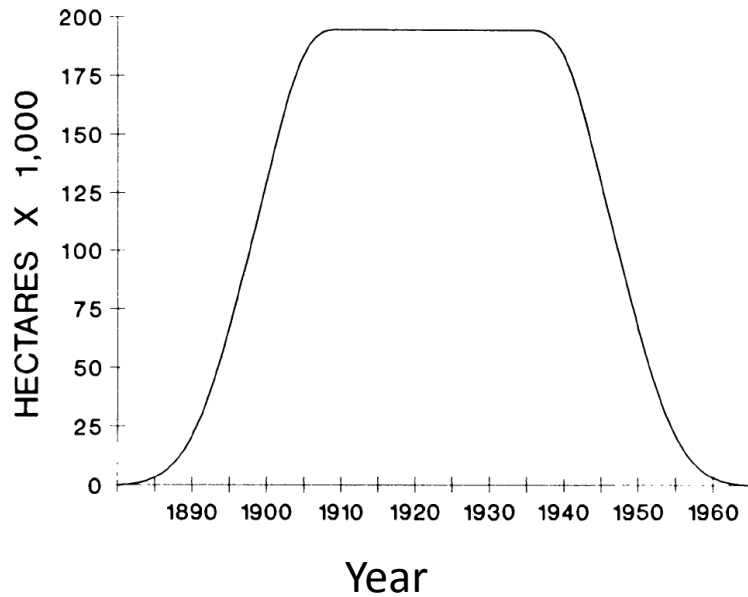




# Farm abandonment and successional woodlands (1870-1925)

**95% of Litchfield County Connecticut forests were less than 40 years old in 1909.**

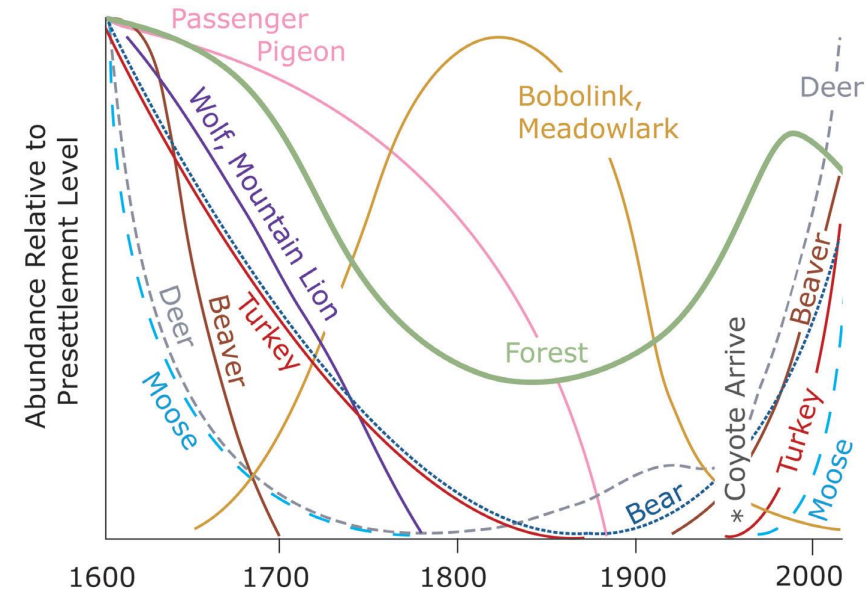
Young forest habitat



Harvard Forest dioramas



# The great rewilding (1870-1980)



1880



1990

# Arrival and spread of Eurasian ornamental shrubs

- Japanese Barberry
- Oriental Bittersweet
- Multi-flora Rose
- Winged Euonymus
- Olives
- Honeysuckles
- Buckthorns





# Arrival and spread of Eurasian forest insects and diseases

## Arrival date in CT

Gypsy Moth	1904
Chestnut Blight	1910
White Pine Blister Rust	1914
Dutch Elm Disease	1930
Beech Bark Disease	1932
Hemlock Woolly Adelgid	1985



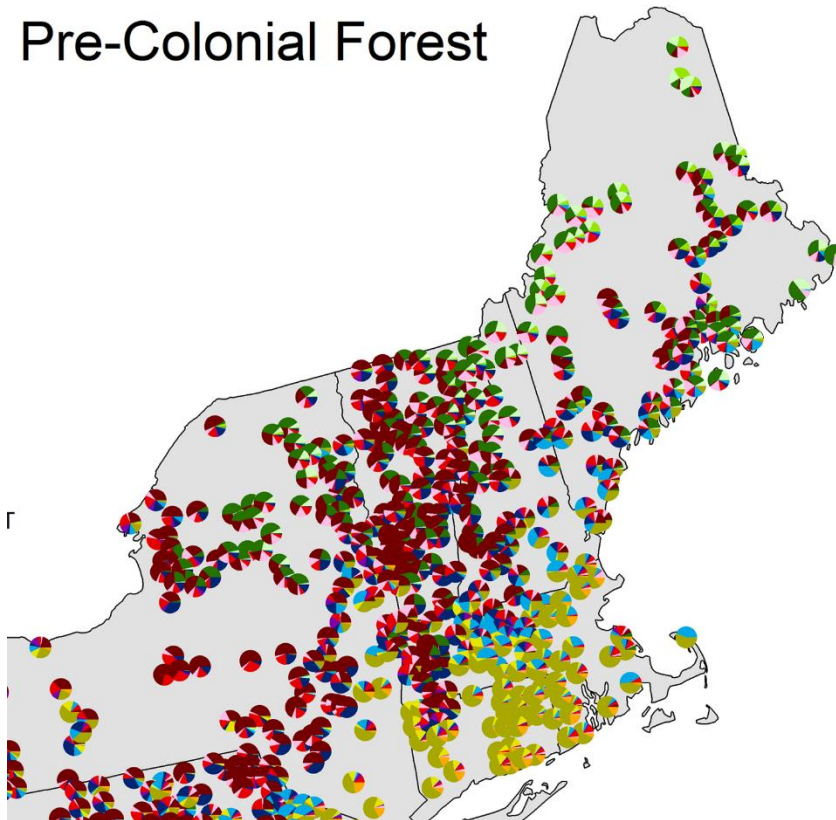
# The loss of American chestnut



# Change in forest composition

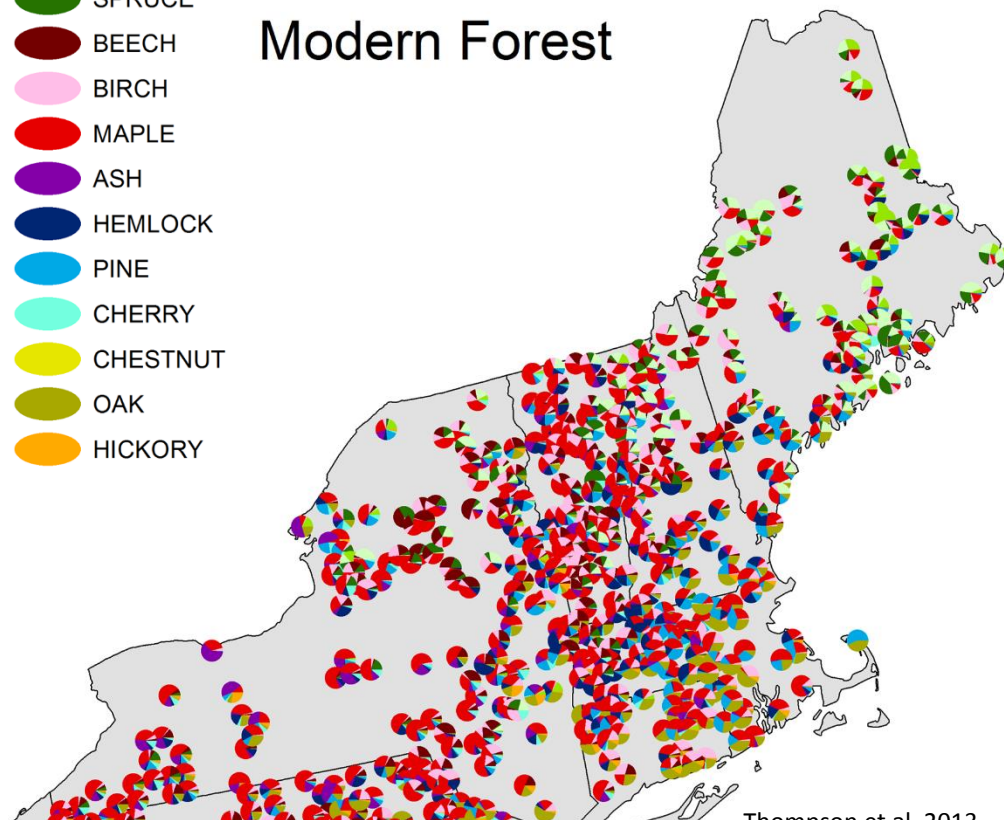
White oak = 33%  
Chestnut = 10%  
Red maple = 3%

Pre-Colonial Forest



White oak = 5%  
Chestnut = 0  
Red maple = 33%

Modern Forest



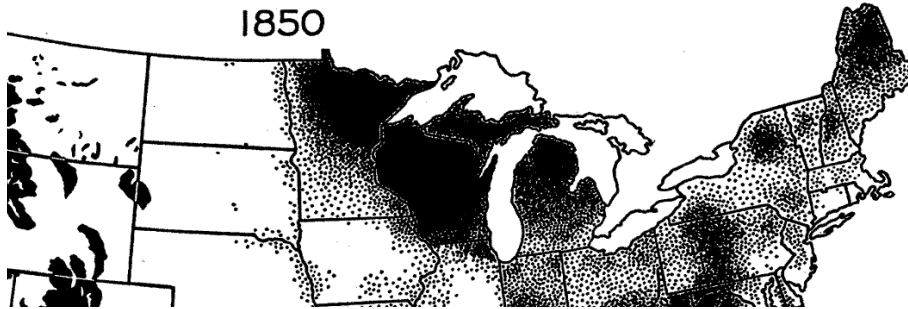


# Loss of old growth forest

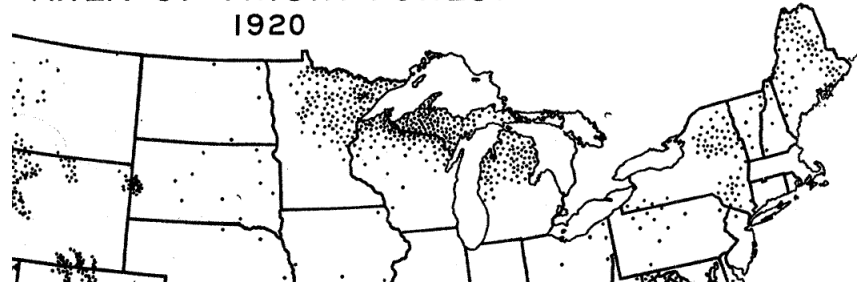
AREA OF VIRGIN FOREST  
1620



AREA OF VIRGIN FOREST  
1850



AREA OF VIRGIN FOREST  
1920

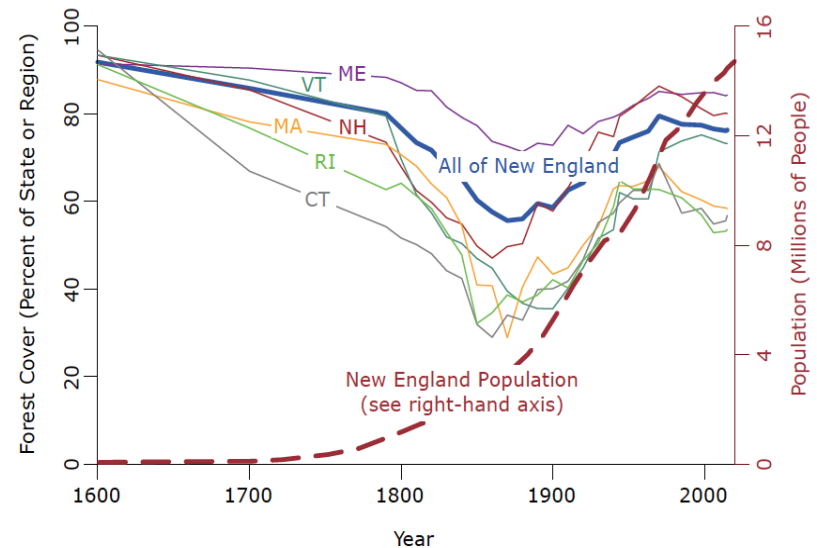


Greeley 1925

## Second (hard) deforestation (1980-present)



- Since 1985 – almost a million acres of forest lost to development
- in NE (over 25,000 acres per year).



## **Part 2. Some of the major topics of forest ecology and conservation in SNE today**



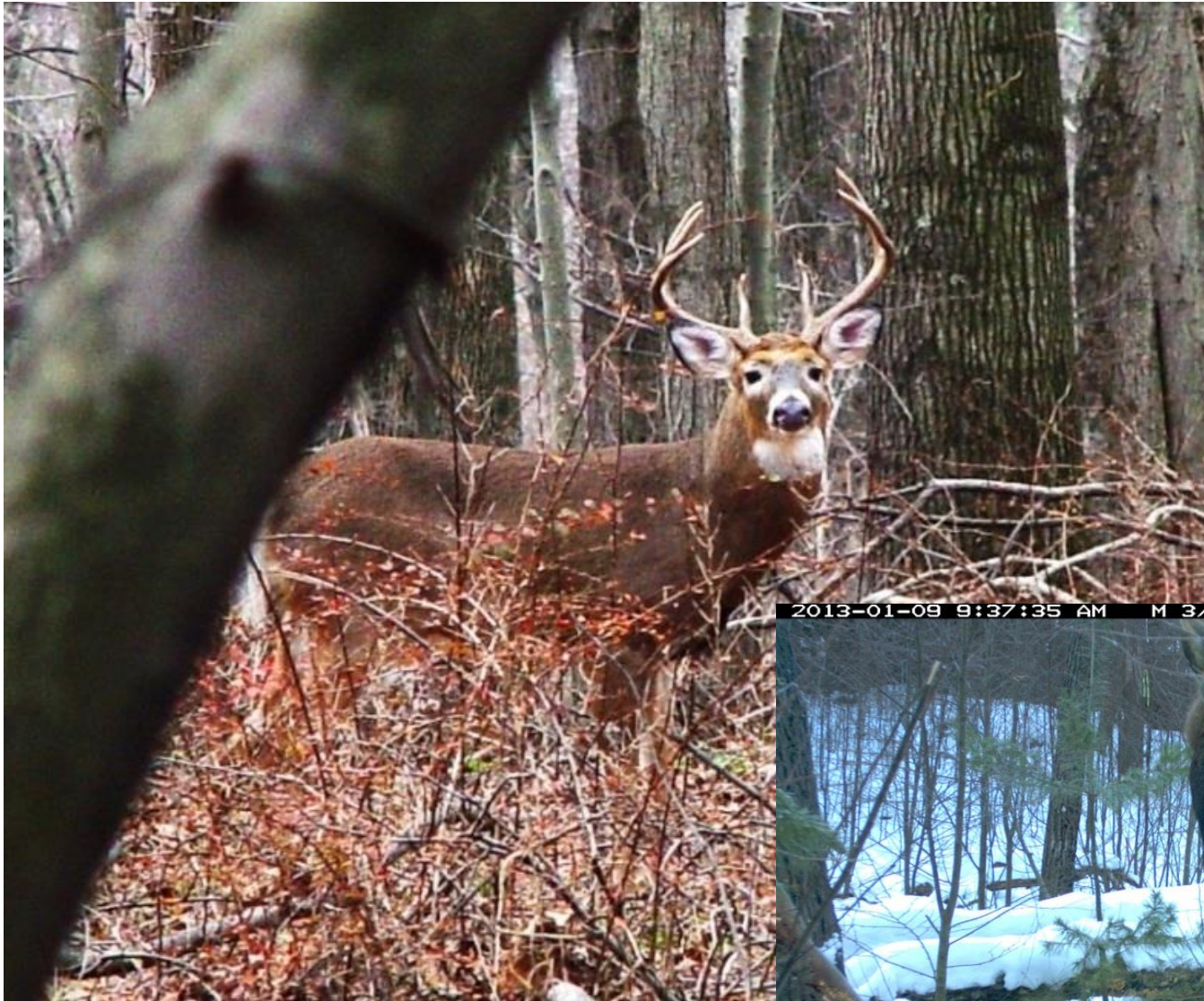
## i. Effects of forest fragmentation on wildlife and people



- 25 forest songbirds less abundant in small, isolated patches of forest compared to larger forest blocks
- greater abundance of edge species (raccoons, opossums, crows, cowbirds)
- 7 of 11 turtle species in Massachusetts are globally threatened or endangered
- Higher Lyme disease risk – (greater densities of infected deer ticks)



## ii. Deer and forests

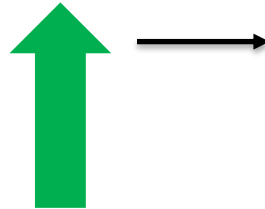




# Browsing effects are often complex and not unilaterally negative

2008

- Tree regeneration density and height
- forest succession



- Herb and low shrub diversity

2014





### **iii. Non-native organisms (“exotics” or “invasives”)**

# How prevalent are exotic plants in southern New England forests?

## Trees:

only 1 of every 200 trees (0.5%)  
in SNE forests are exotic species



Norway maple (1756)



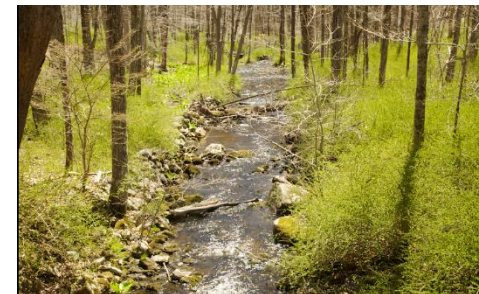
Tree of heaven (1700s)

## Shrubs and herbs:

Almost 50% of US Forest Service inventory  
plots in the northeast have exotic invasive  
plants

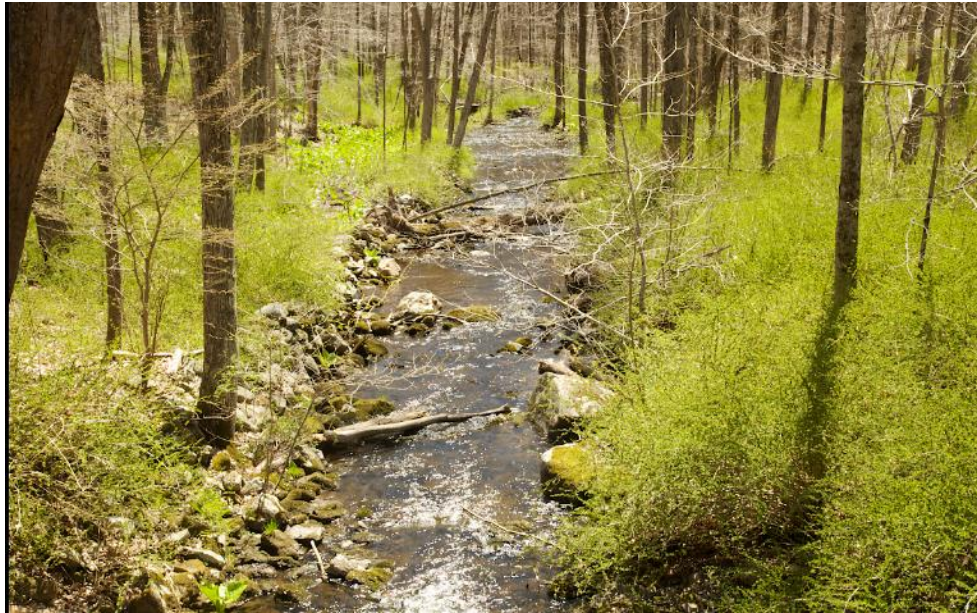


Garlic mustard



Japanese barberry

# Impact of exotic plants on native plants: depends on density



Dense barberry

- native plant richness
- tree regeneration



Low-moderate density barberry

- no effect on native plant richness



Dense Rhododendron =

**6 native plant species**  
**tree regeneration low**

Low density Rhododendron =

**26 native plant species**  
**Tree regeneration high**



# Do exotic shrubs provide inferior nesting habitat for birds compared to native shrubs?

## Yes and No



- Common yellowthroat territory sizes increased as invasive shrub cover increased



Barberry:

- provided greater refuge from nest predators during rodent outbreak than other shrubs
- Veery used more than any other nest substrate in eastern NY

## iv. Missing benefits of old growth forest

>200 years old

~0.04% of forested land in Massachusetts is old growth.

### Organisms of limited mobility

**Lichens** -large number of species restricted to old growth

**Forest herbs** – generally much higher abundance and diversity (ant and gravity dispersed)

**Salamanders** - Clearcutting old forest can result in 80% reduction in salamander populations – can take ~ 70 years for populations to recover

**Carbon** - Store 30% more carbon than 2<sup>nd</sup> growth forests



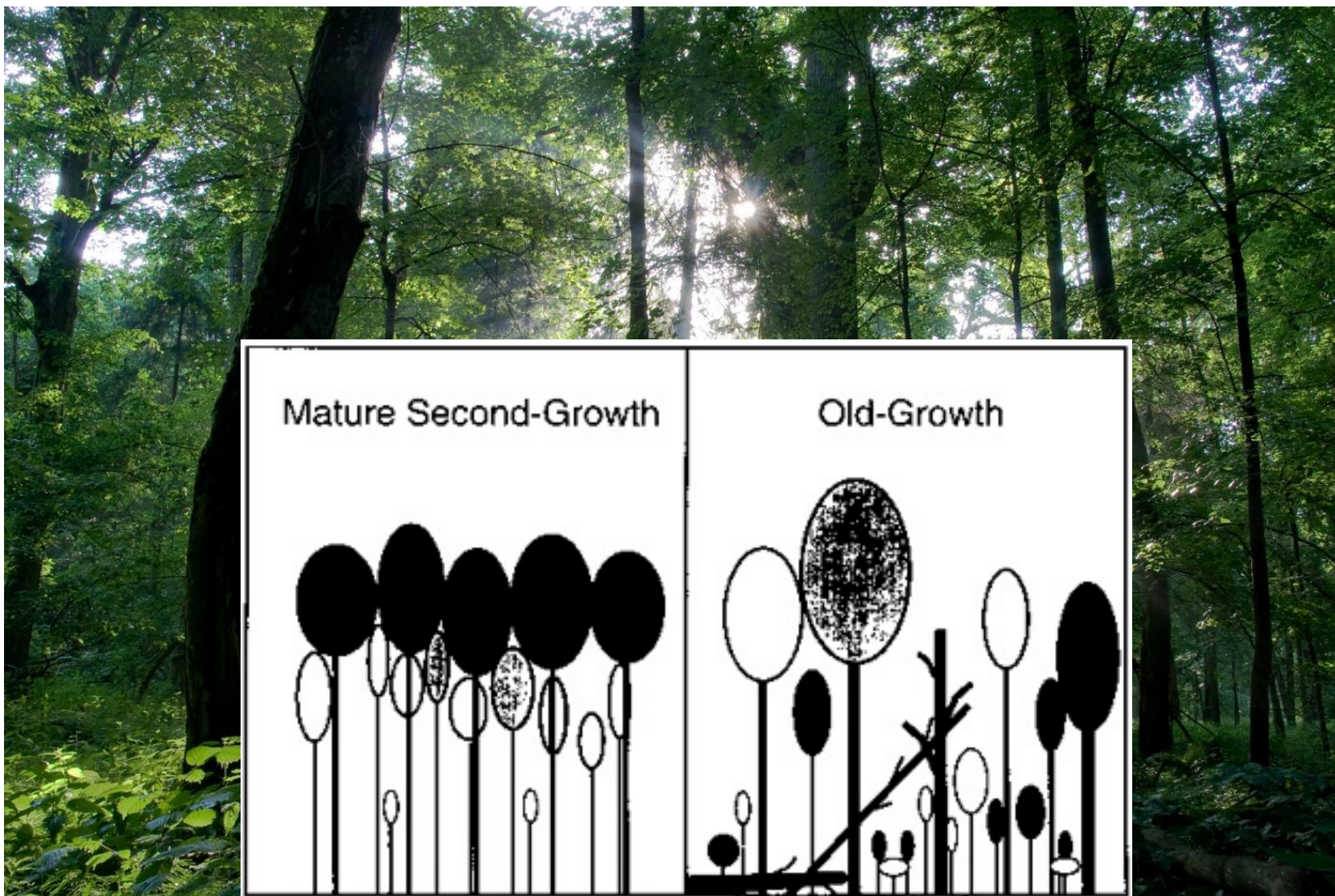
Asher Durand *Forest in the morning light* 1855





“As their eyes became used to the dimness they could see a little way to either side in a sort of darkened green glimmer. Occasionally a slender beam of sun that had the luck to slip in through some opening in the leaves far above...stabbed down thin and bright before them. But this was seldom, and it soon ceased altogether.” JRR Tolkien *The Hobbit*





Bialowieza, one of Europe's last virgin forests © Tomasz Wilk

# Old growth openings and bird habitat

*"Eventually, as beavers return to more regions in the eastern forest and as the forests age and produce more large canopy gaps, natural processes may provide much of the habitat needed by shrubland birds."* Dr. Robert Askins



(Gerrit Vyn; Cornell Ornithology)

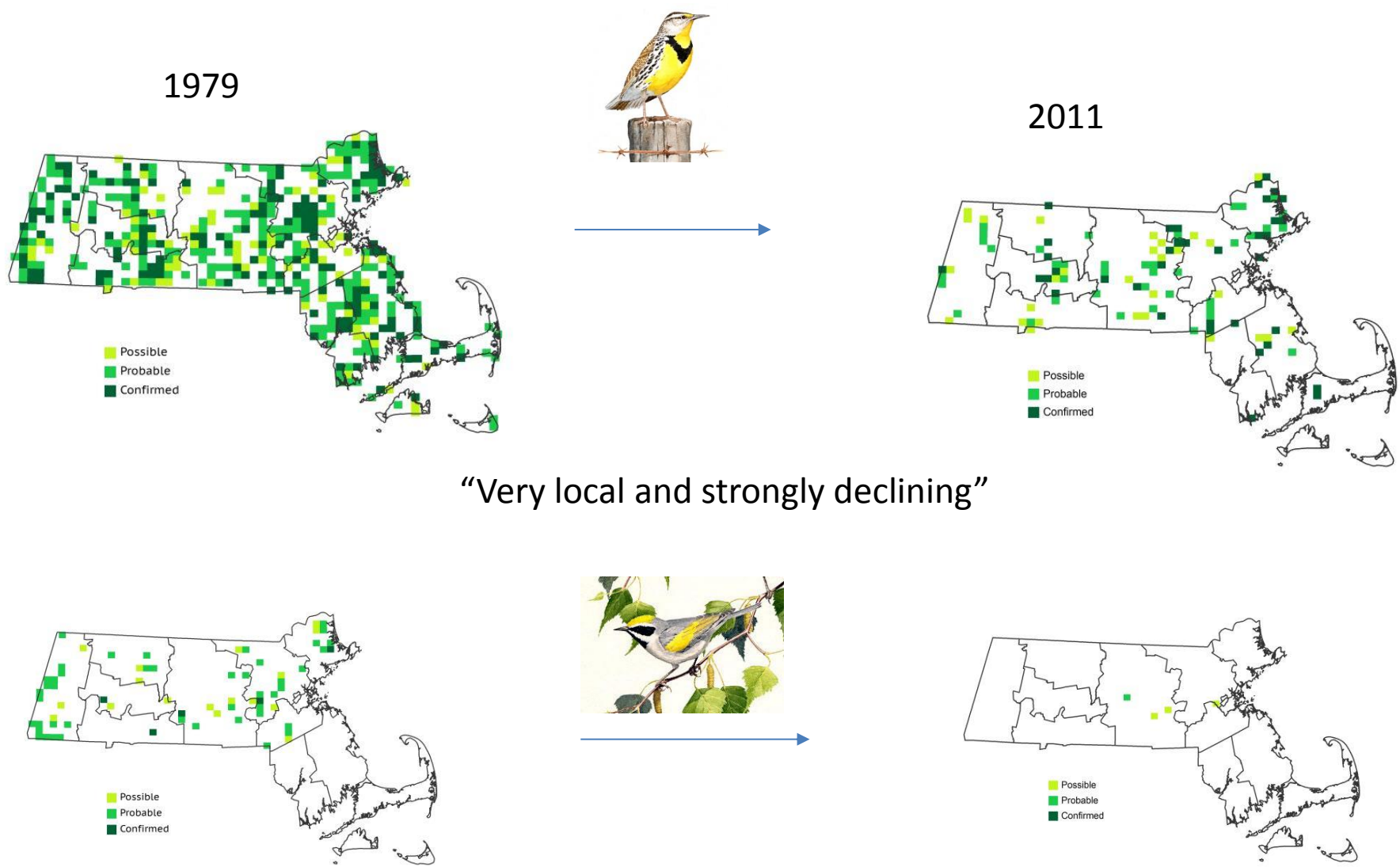


## v. Decline of “early successional” habitats





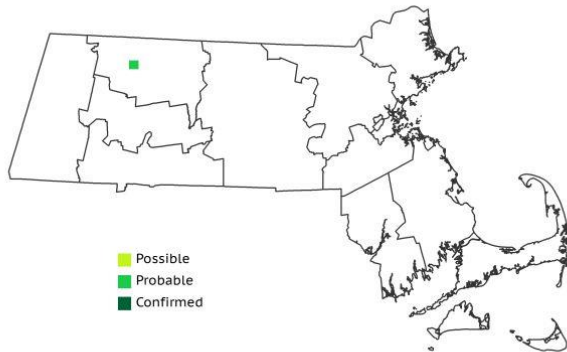
# Grassland and shrubland birds are generally in decline



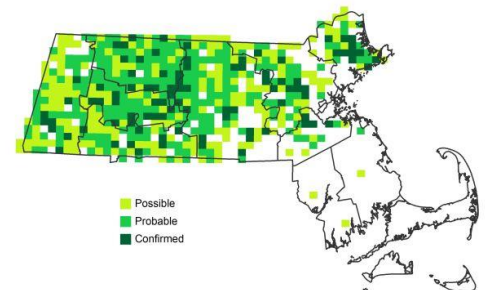
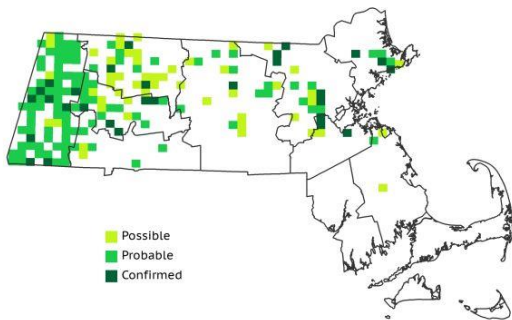
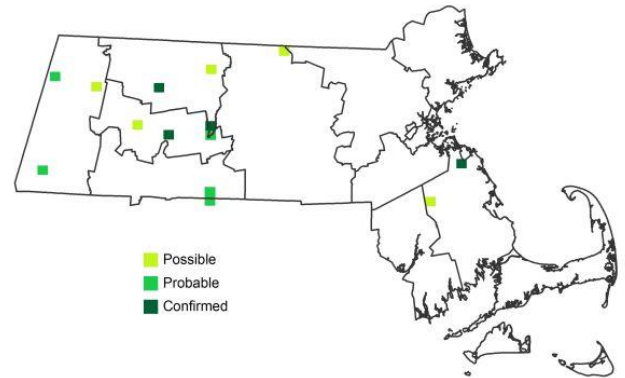
# Many forest birds on the other hand are increasing

“Very local and strongly increasing”

1979



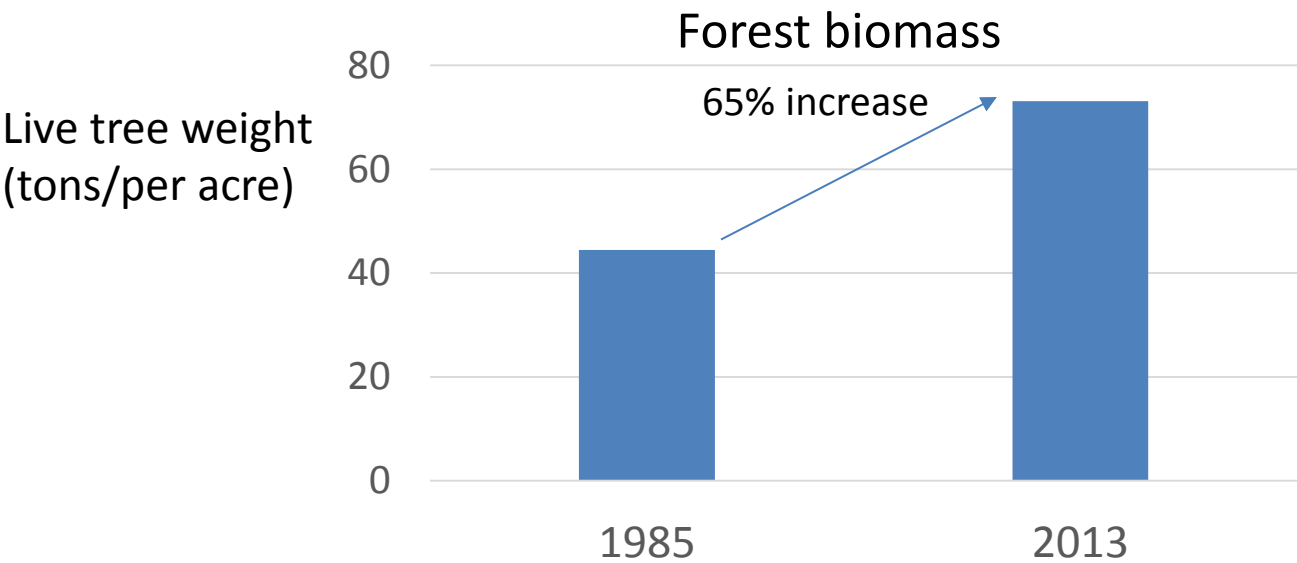
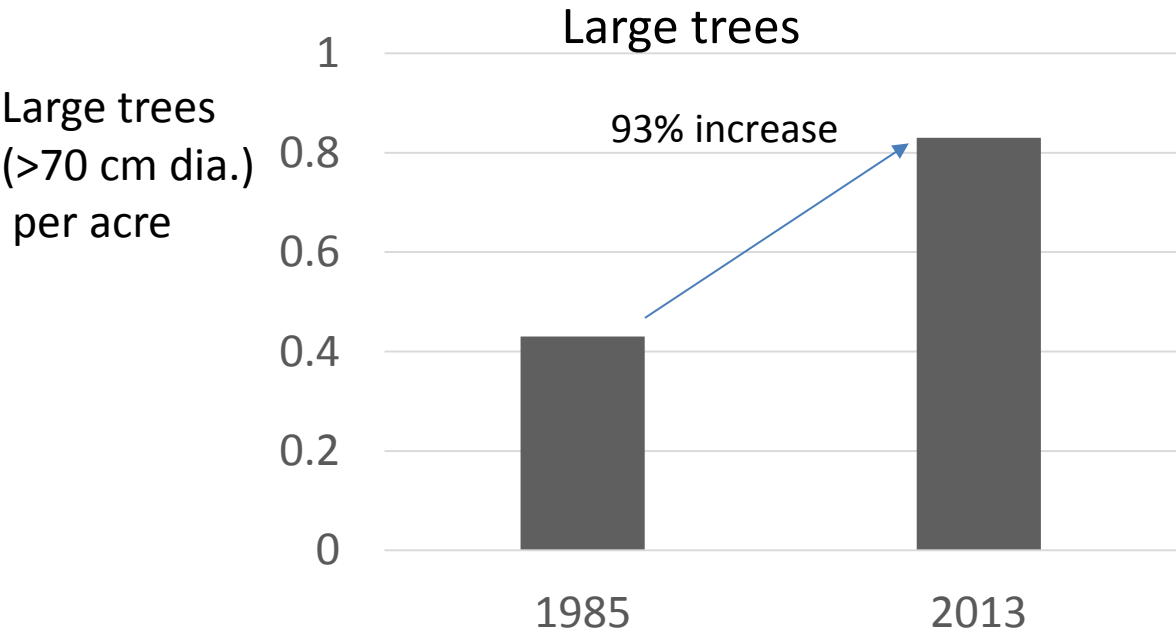
2011



“Widespread and strongly increasing”

(Data, maps, and art from Massachusetts Audubon Breeding Bird Atlas)

# Forests continue to grow bigger in Southern New England





# Rare plant populations in New England have increased in forests but declined in open habitats over past 15 years\*

**\*Overall, the numbers of reported occurrences for rare plants increased for 118 taxa and declined for 40 taxa**



© Kathy Schlosser

Eastern silver aster

## vi. Wildlands (wilderness areas) vs. woodlands in New England



Asher Durand *Adirondack Mountains, NY* 1870

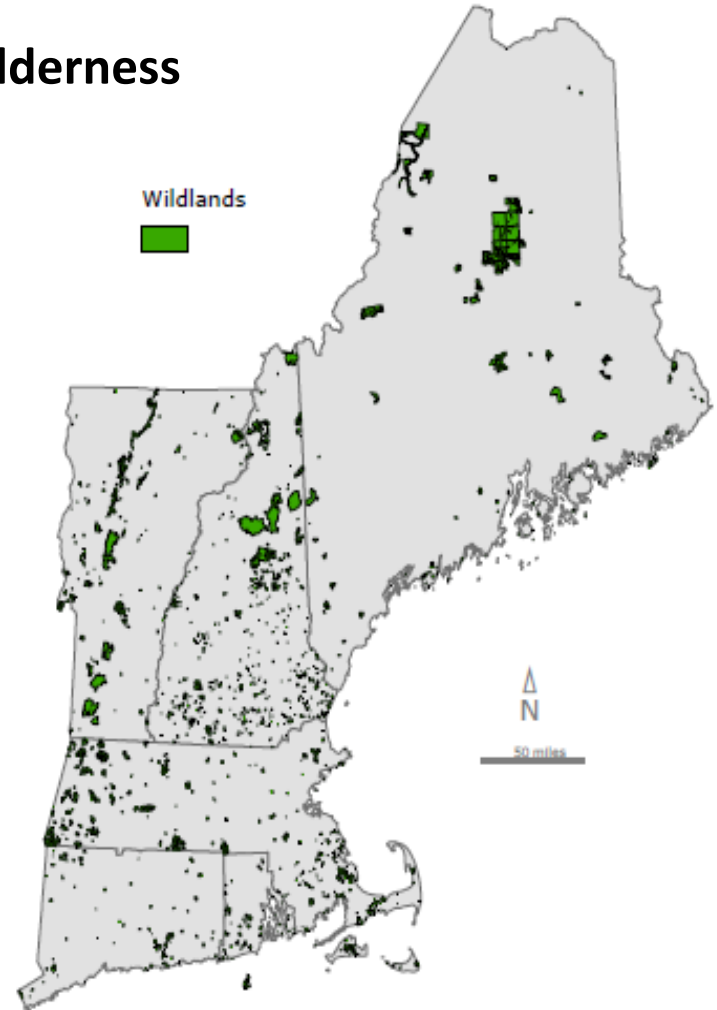


# Wildlands (wilderness areas) are rare in New England

~2 percent of New England is designated wilderness



Asher Durand *Adirondack Mountains, NY 1870*





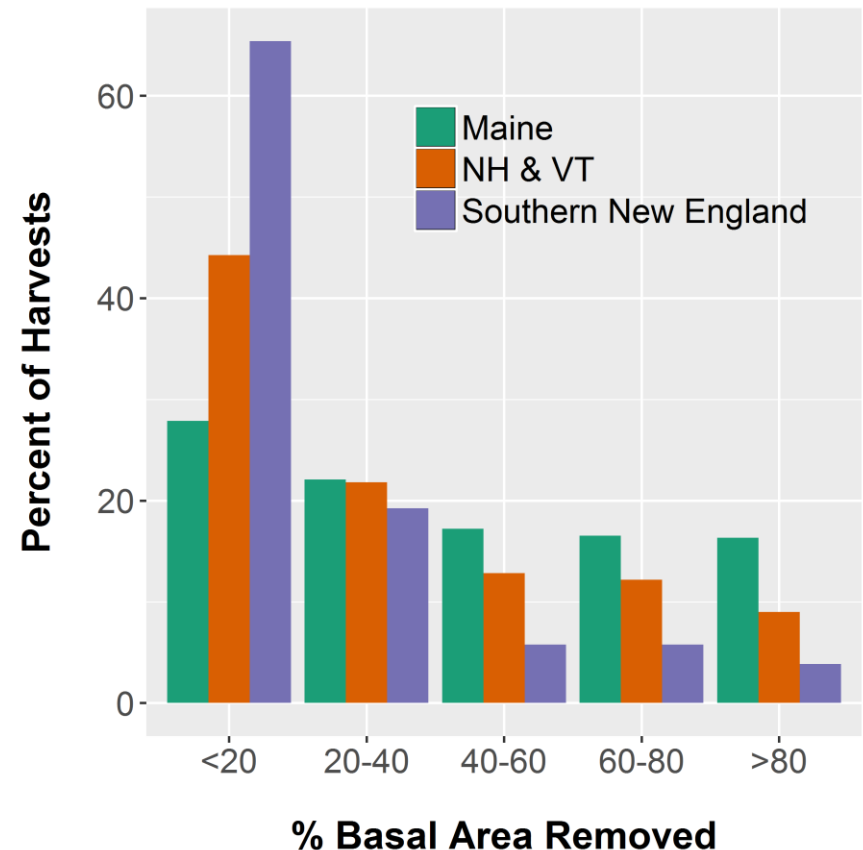
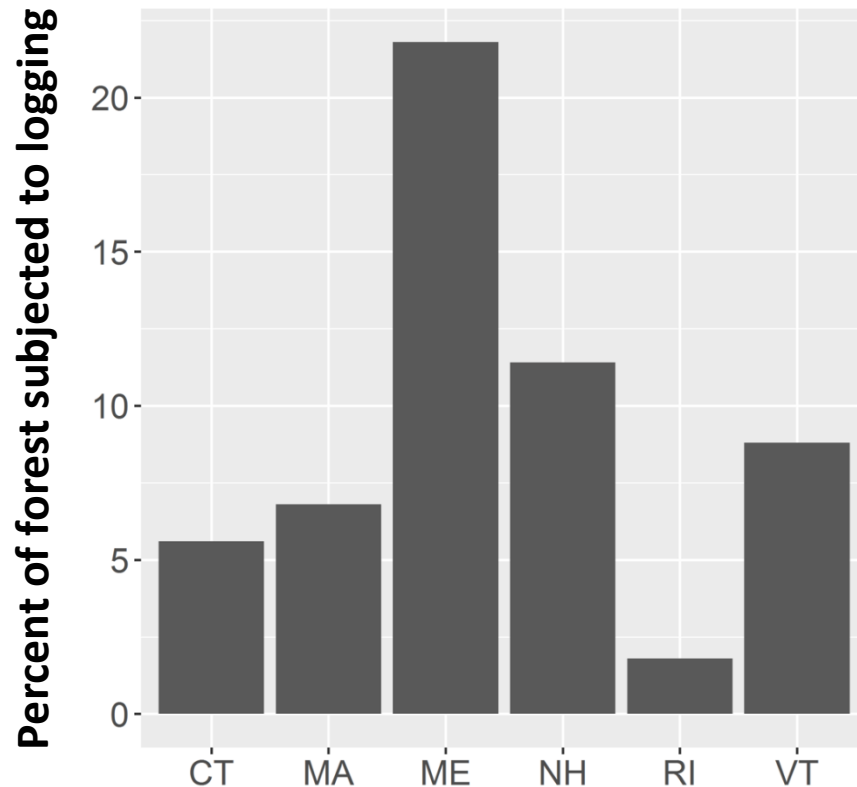
# Timber harvesting is a larger cause of tree mortality in the region than all other sources combined

**Wood products:** about 25% of New England's wood comes from local sources;

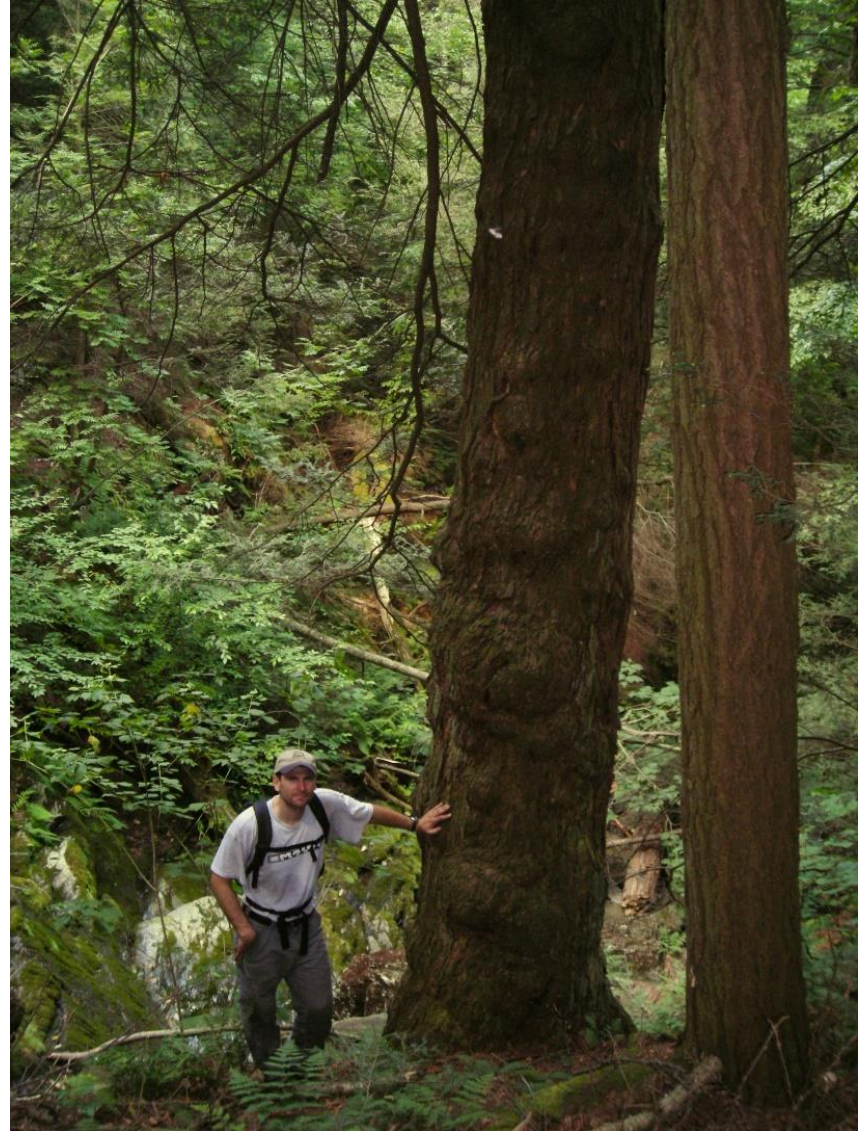
**Habitat:** canopy gaps for early successional species



Percent Harvested in Five Years



## Part 3. Forest stewardship: applying values informed by history and science



# Establishing conservation priorities for a natural area: you can't satisfy all values.

**Value 1** - manage as a wildlands preserve (“wildwood”) where people can enjoy a forest largely undisturbed by human activity

**Value 2** - manage the preserve to support a maximum of biodiversity



# The landscape context in which a natural area sits might determine your conservation priorities



Holly Harper (both)

# Ecological monitoring: knowing what's on your preserve so you can make more informed decisions



invasive plants



wildlife movement



coarse woody debris



birds



rare reptile



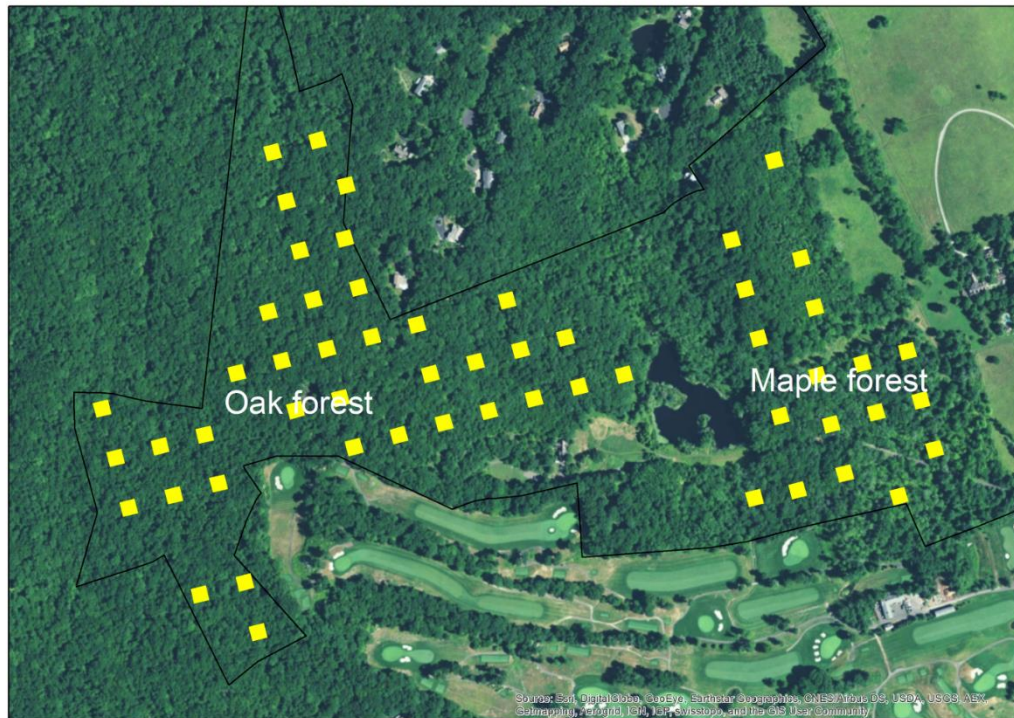
rare plants



deer population estimates



# Forest monitoring:



0.15 0.075 0 0.15 Kilometers



## WILDLANDS AND WOODLANDS STEWARDSHIP SCIENCE

*Manual for Long-Term Forest Monitoring*





# Photopoints

2009



2015



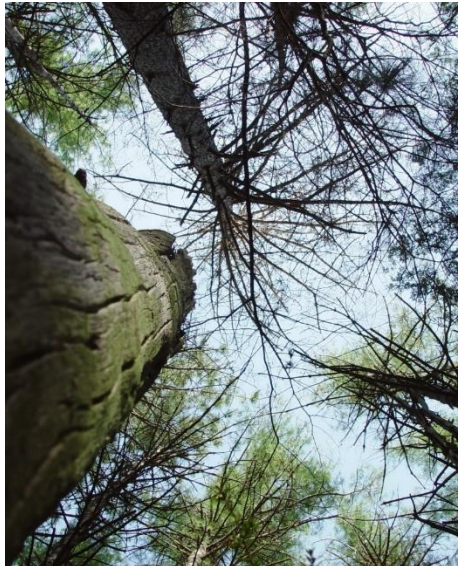
# Forest insects and pathogens: to manage or not?

You can protect some residual trees by removing diseased trees

## But consider:

Removing diseased trees will:

- (1) reduce habitat for woodpeckers and other cavity nesters, as well as numerous insects
- (2) reduce coarse woody debris and den habitat on ground
- (3) Increase soil disturbance - can increase erosion, facilitate non-native species colonization, modify hydrology.





# Invasive plant species: to manage or not?



Multi-flora rose



Improve aesthetics,  
native plants

**But consider:**



Are there alternative nesting sites for shrub nesting birds and escape cover for New England cottontails?

Do you have the resources to initiate a long-term, intensive 'gardening' project?



# Early successional species in decline: manage for or not? (i.e. by opening up forest patches)

- New England cottontail is globally “vulnerable” and endemic to our region

## But consider:

- Many species likely occurred at low densities in the pre-European SNE landscape (or were absent altogether)...and increased only after European land clearance and farm abandonment
- Many species have ranges that are much larger than SNE (except NE Cottontail!)



**Yellow-breasted chat**  
Connecticut DEP: “endangered”



# Is 'let nature take its course' (no mgmt. at all) an acceptable management option? **YES**

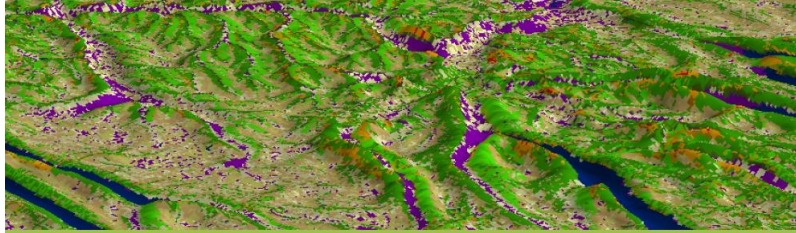
- Forestry values (e.g., diversity of stand ages, tree regeneration levels, tree stocking levels) that advocate active timber mgmt. often differ from values associated with managing a natural area
- You can't be faulted for allowing the vegetation to self-organize – (it has always done so in our absence)
- Most efficient use of limited resources is not to oppose the self organization of the vegetation
- many species and people will benefit (others will not)

**The choice is yours...**





# Managing for climate change – TNC's resilient landscapes



The Nature Conservancy  
Protecting nature. Preserving life.

## Resilient Sites for Terrestrial Conservation in the Northeast and Mid-Atlantic Region

The Nature Conservancy · Eastern Conservation Science  
Mark G. Anderson, Melissa Clark, and Arlene Olivero Sheldon

- areas best able to support plants and animals in a changing climate

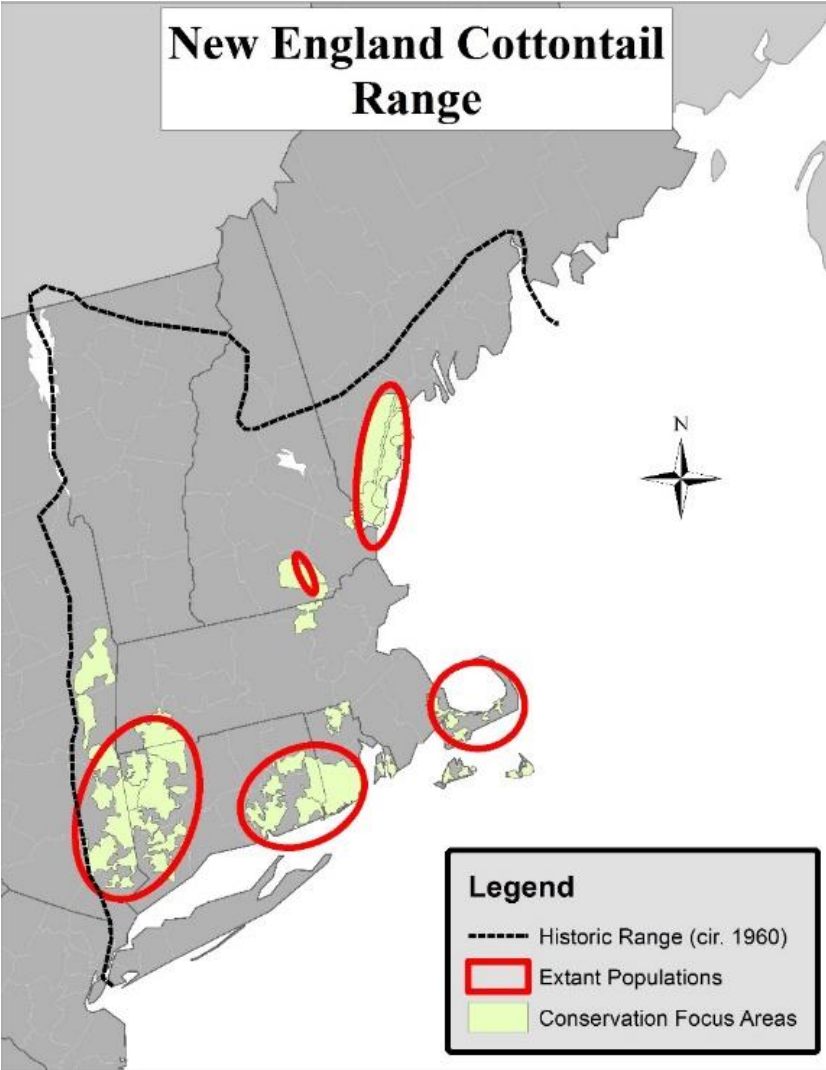
### sum of two variables:

1. diversity of topography and range of elevation
2. local connectedness to other undeveloped land



January 30<sup>th</sup> 2012

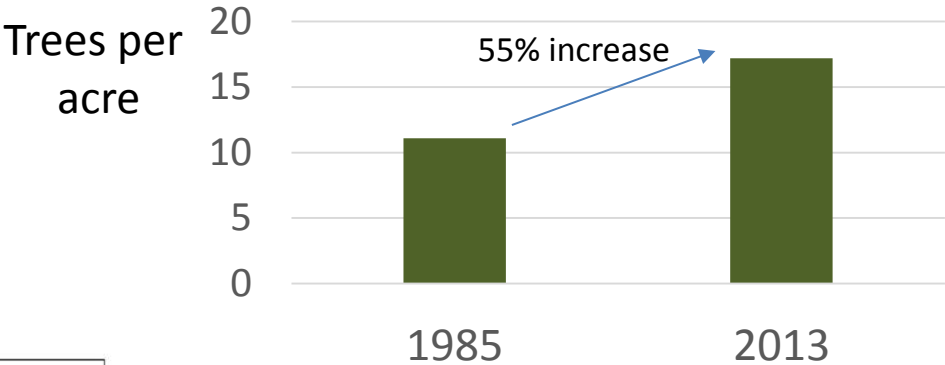
# Recent uptick in timber harvesting (patch cuts) in SNE to provide habitat for New England cottontail





# Impact of forest pests and pathogens: Hemlock Woolly Adelgid

Hemlock trees in SNE



USDA Forest Inventory Data

