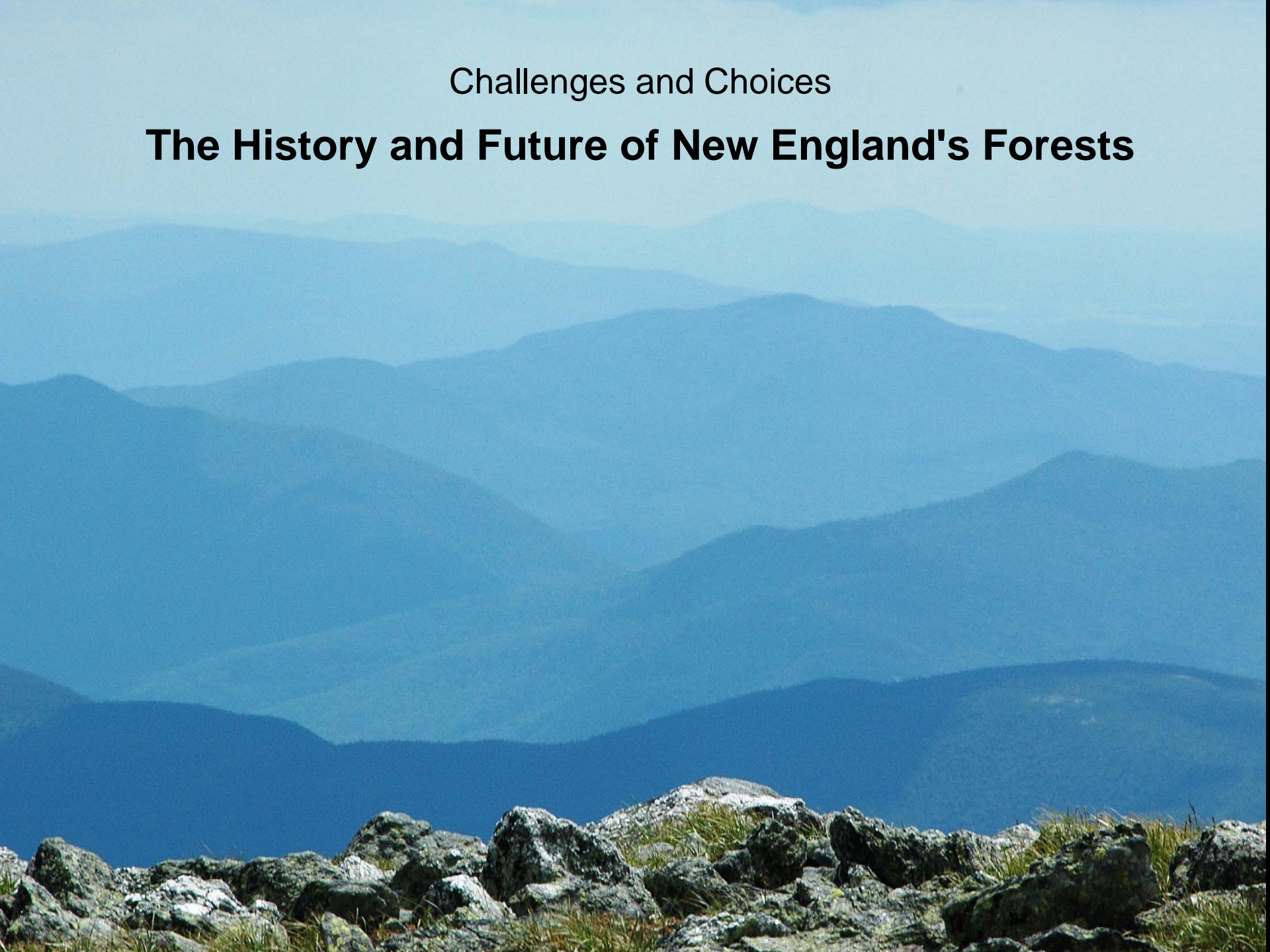
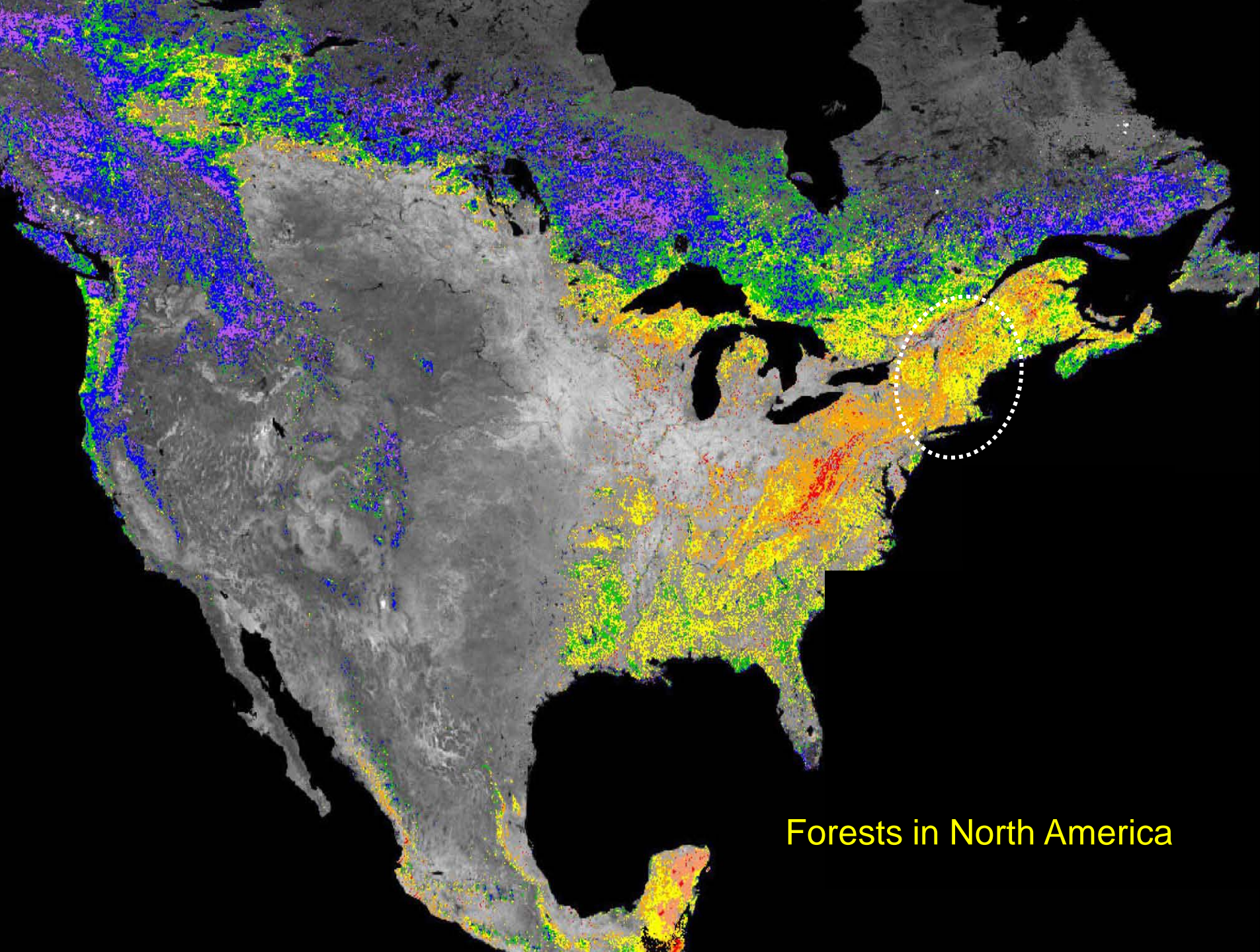


Challenges and Choices

The History and Future of New England's Forests





Forests in North America

Harvard Forest

Harvard University's 3500-acre Laboratory and Classroom

NSF - Long-Term Ecological Research site since 1988

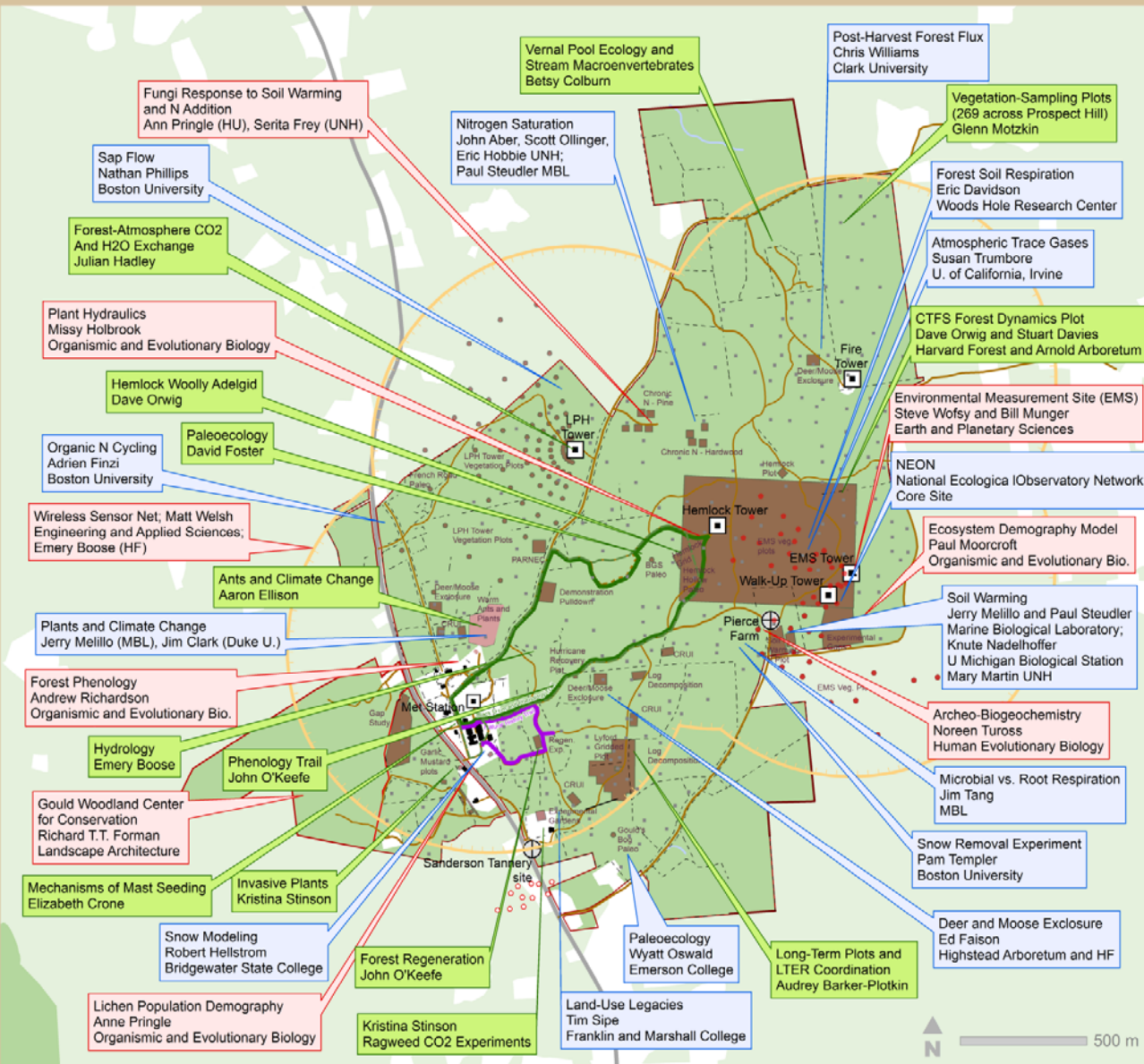
NSF - NEON Core Site since 2010



Est. 1907



Harvard Forest - Major Research Activities on Prospect Hill



 HU Faculty

 HF Scientists

 Scientists from Other Institutions

Brian Hall 06/14/2011

Harvard Forest Scientists

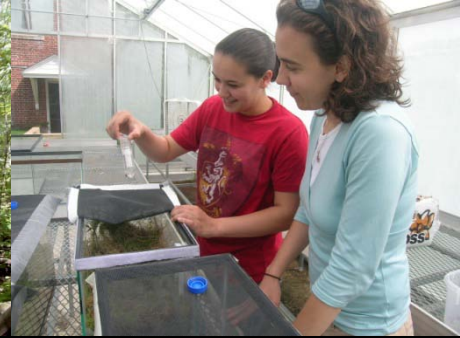
Aaron Ellison
Dave Orwig
Kristina Stinson
Audrey Barker Plotkin
Betsy Colburn
Elizabeth Crone
Emery Boose
Brian Hall
Wyatt Oswald
Clarisse Hart

Other Harvard Scientists

Missy Holbrook
Anne Pringle
Steve Wofsy
Bill Munger
Andrew Richardson
Paul Moorcroft
Noreen Tuross
Richard Forman
Matt Welsh
Stuart Davies
Peter Del Tredici

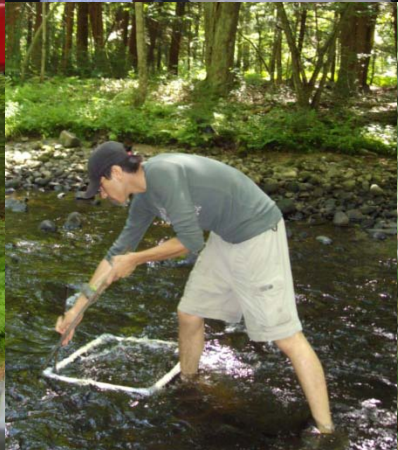
Some of >100 Institutions

MBL – Ecosystems Center
Boston University
U California – Irvine
Smithsonian Institute
Emerson College
Notre Dame
Duke University
Yale University
University Vermont
University of Connecticut
University of New Hampshire
University of Wyoming
Oregon State University
Cornell University
Syracuse University
Princeton University



Summer Undergraduate Research Program - 35+ students

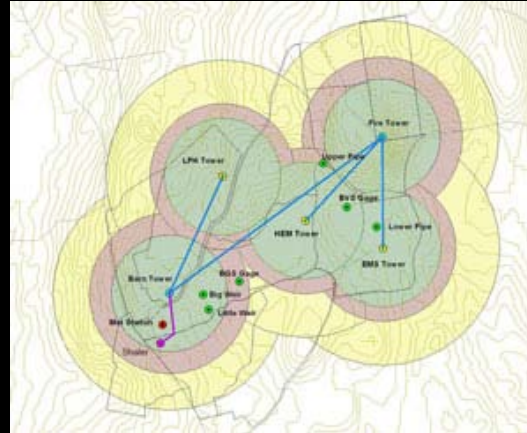
- Forest-Atmosphere Exchange
- Microbial Ecology
- Forest Conservation and Management
- Invasive Species & Public Health
- Biodiversity Studies & Population Dynamics
- Population & Evolutionary Ecology
- Paleoecology
- Informatics & Modeling
- Plant Physiology
- Environmental History



Research Infrastructure



Meteorological Station



Field-based Wireless Network



Diverse Permanent Plots
&
Large Long-term Experiments



Greenhouses, Shade Houses, and Exp. Garden



Fleet of Vintage Field Vehicles



Electronic Data Archive & Real-time Data



Microbial and Molecular Biology,
Biogeochemistry, Plant Physiology,
Soils, and Paleoecology Labs

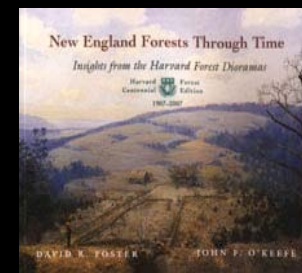
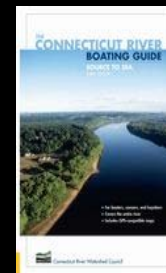
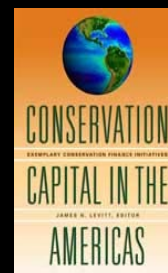
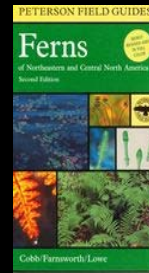
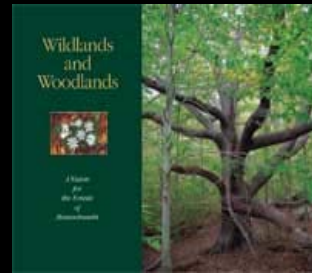
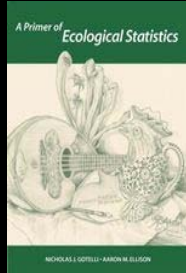


Herbarium of Local Flora

Archives

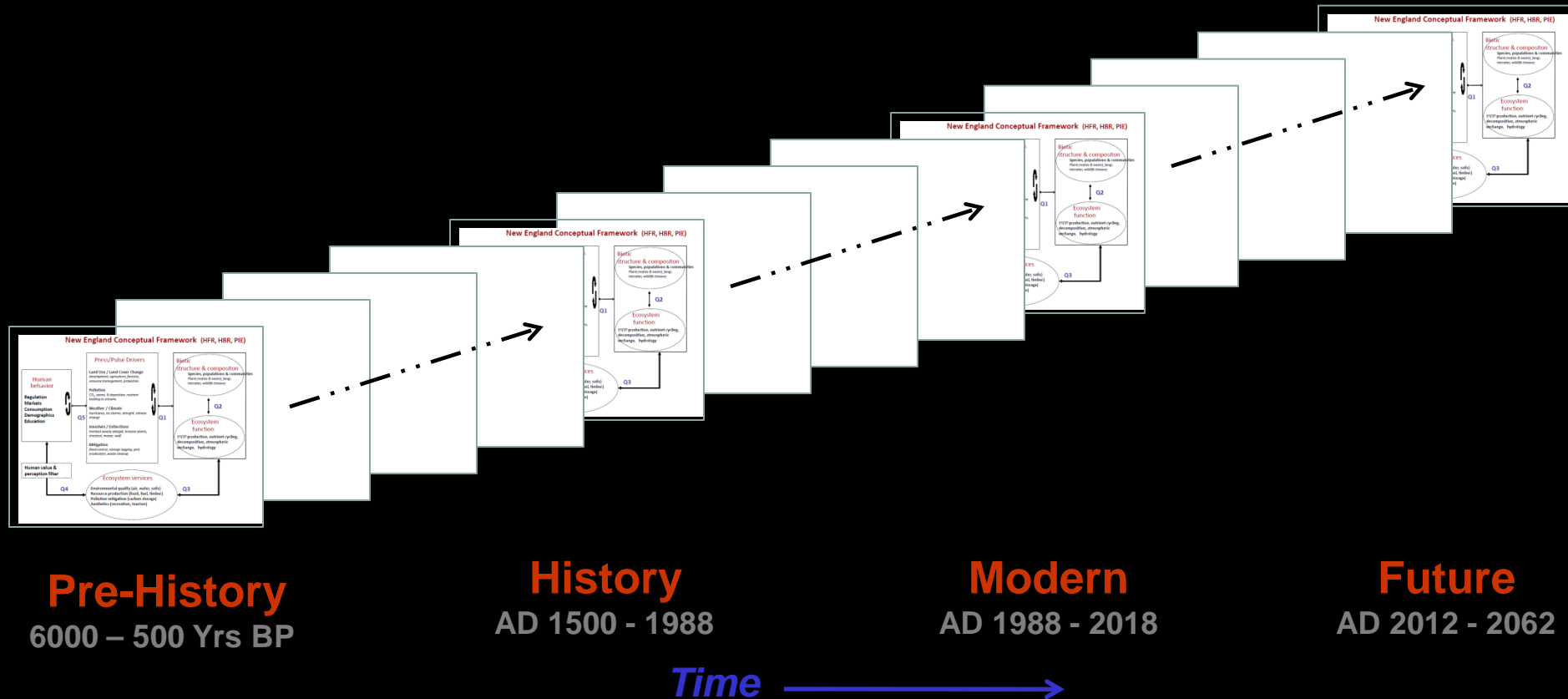


100 years of maps, photos, original research notes, records and samples
and our books and other publications



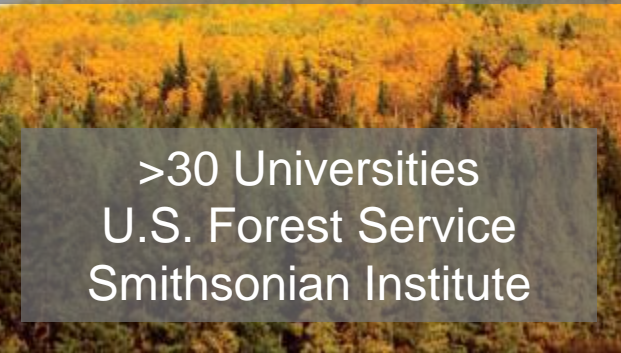
Harvard Forest Studies Through Time

Application of Ecology and History to Conservation





Future Scenarios of Landscape Change in the United States



>30 Universities
U.S. Forest Service
Smithsonian Institute



Ragweed

Chestnut

Hickory

Maple

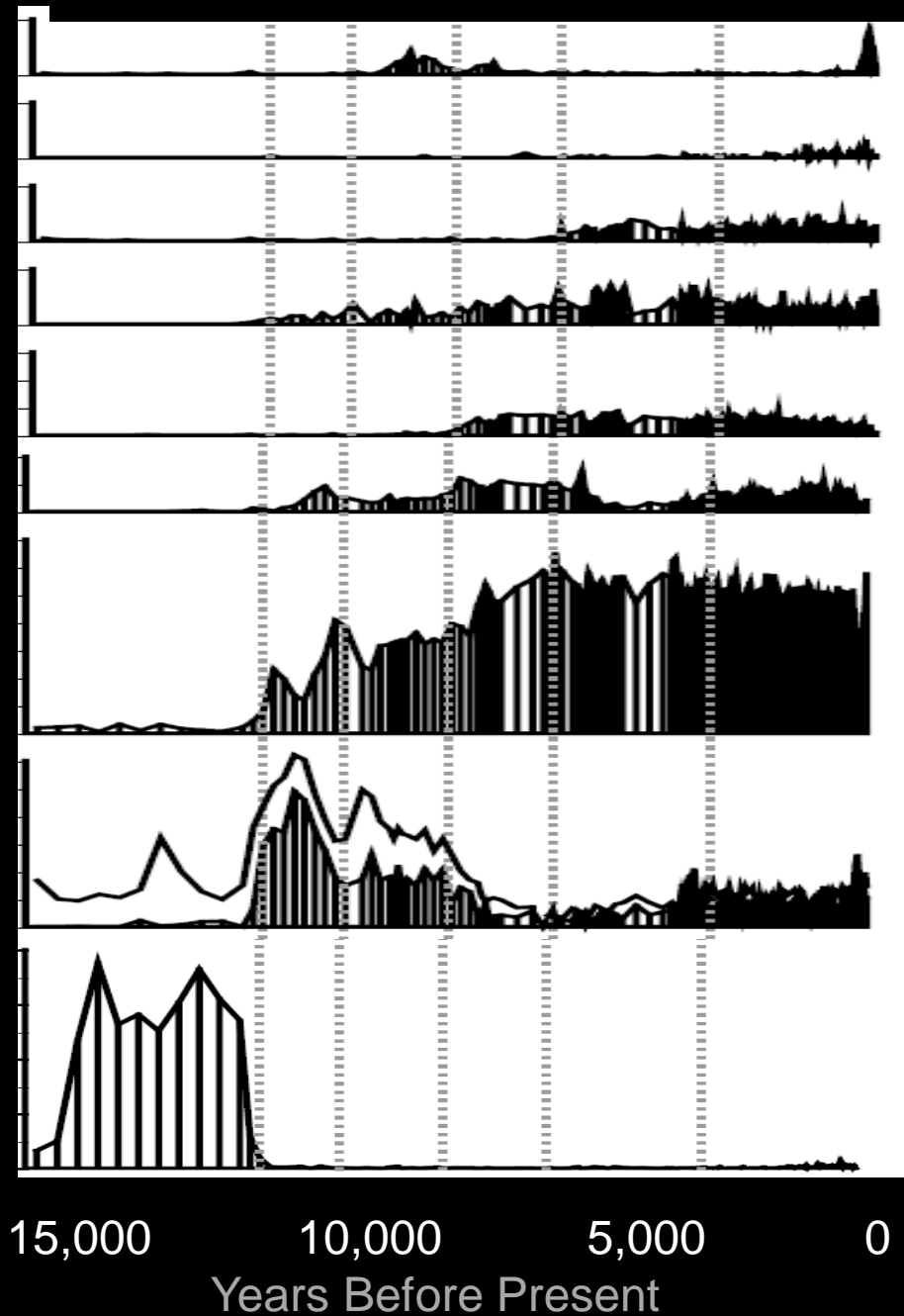
Beech

Hemlock

Oak

Pine

Spruce



R
e
l
a
t
i
v
e

A
b
u
n
d
a
n
c
e

Massachusetts

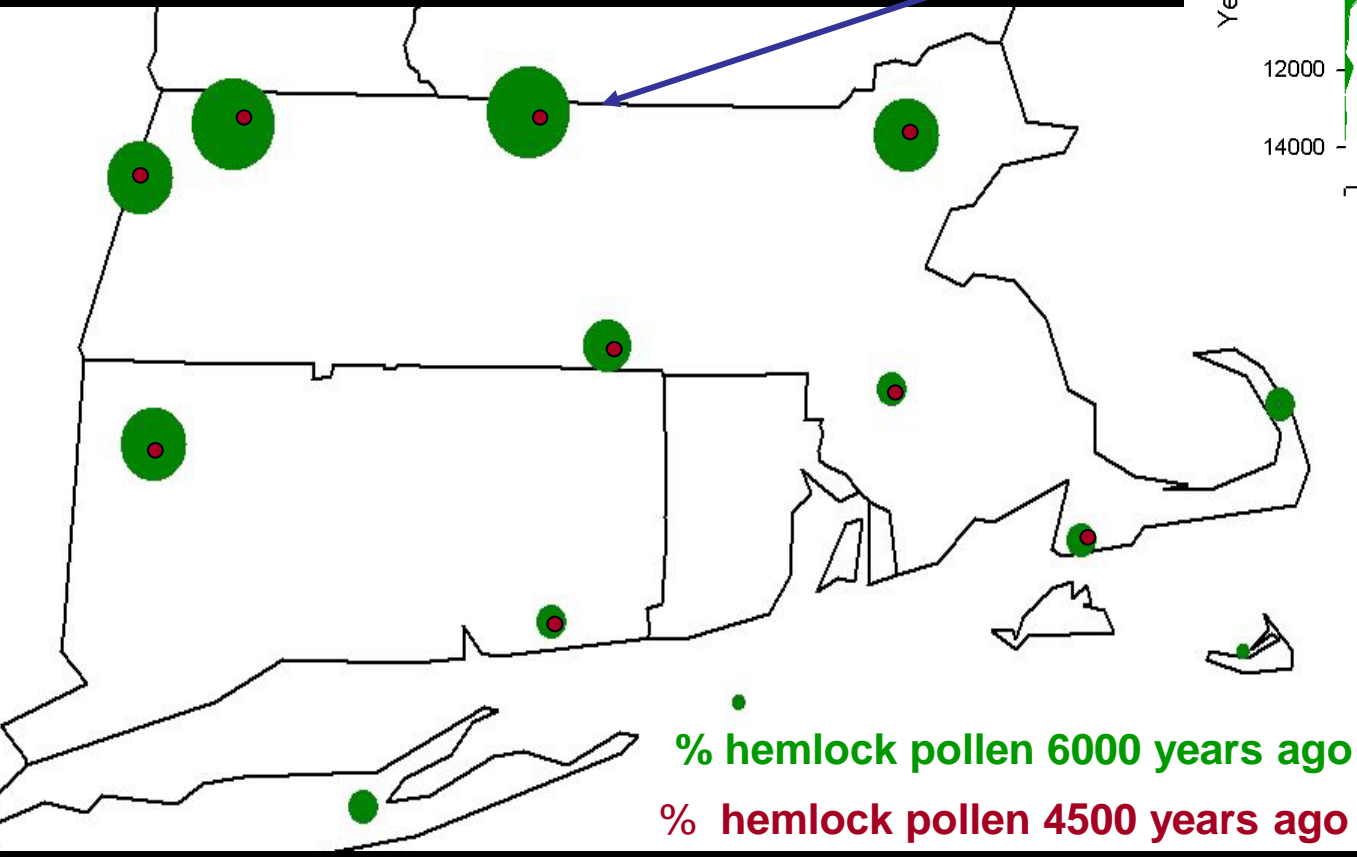
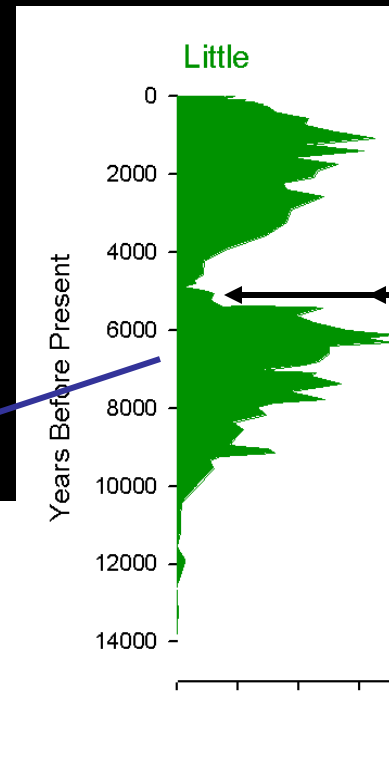
Long-term

Forest

Dynamics

Mid-Holocene Hemlock Decline

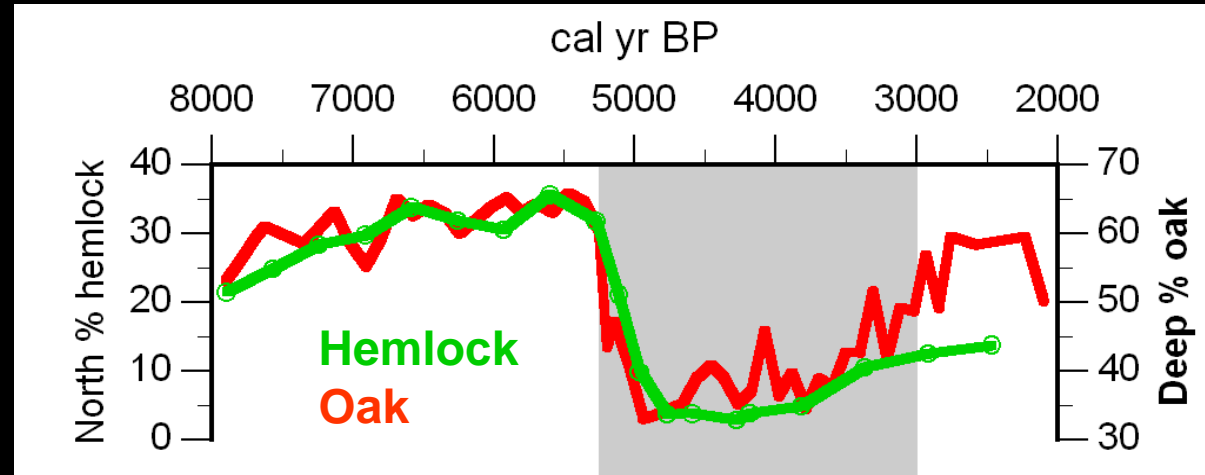
5000 Years BP



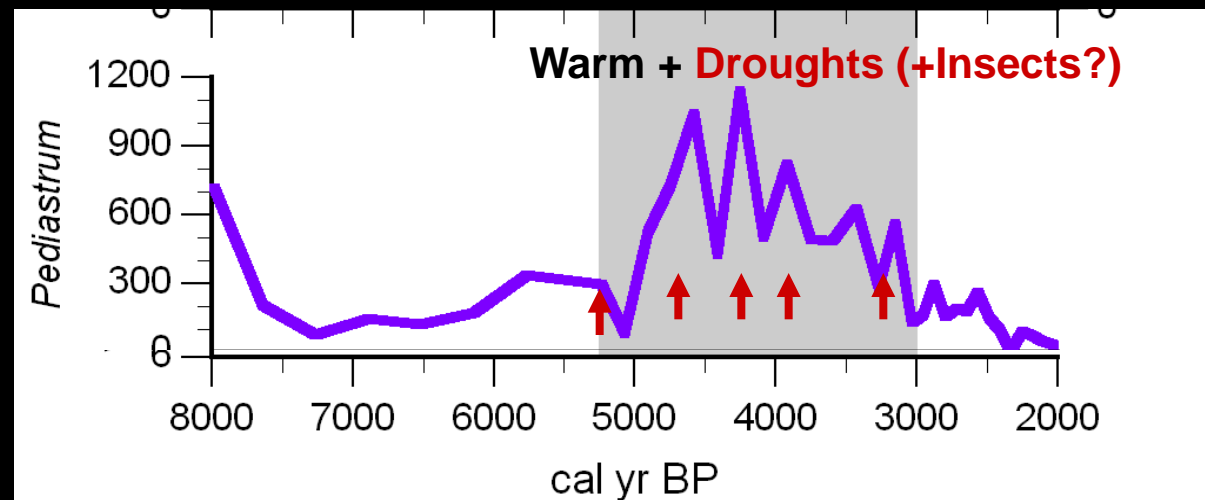
Abrupt Forest Dynamics With Climate Change & Disturbance

Regional Records

— West Mass
— Coastal Mass

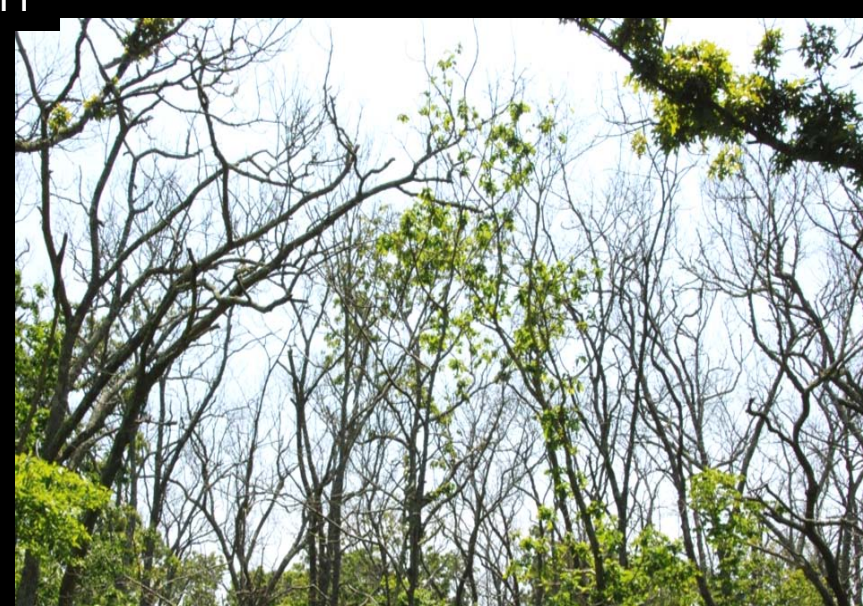
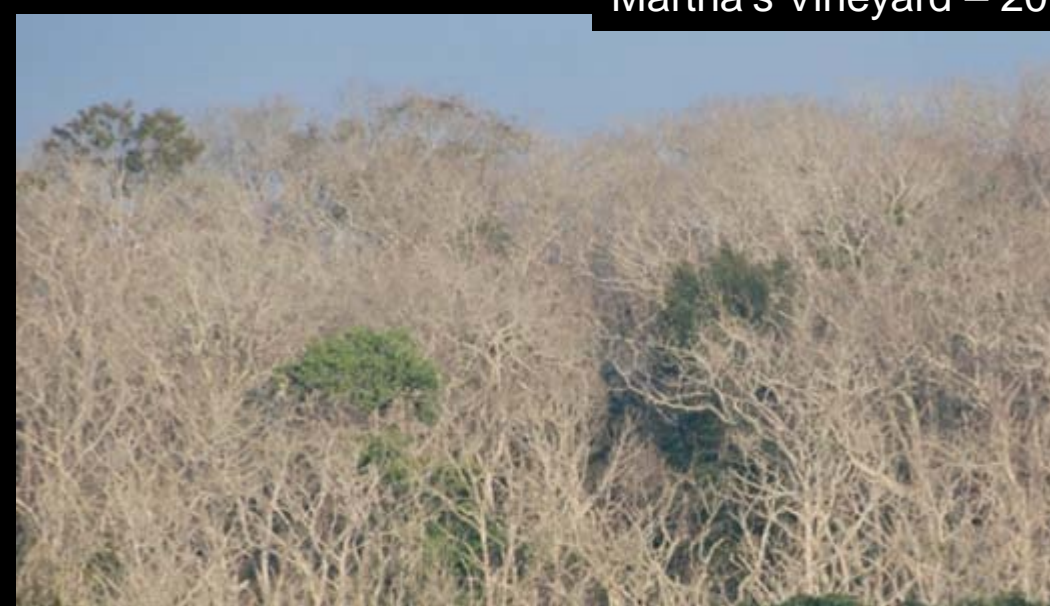


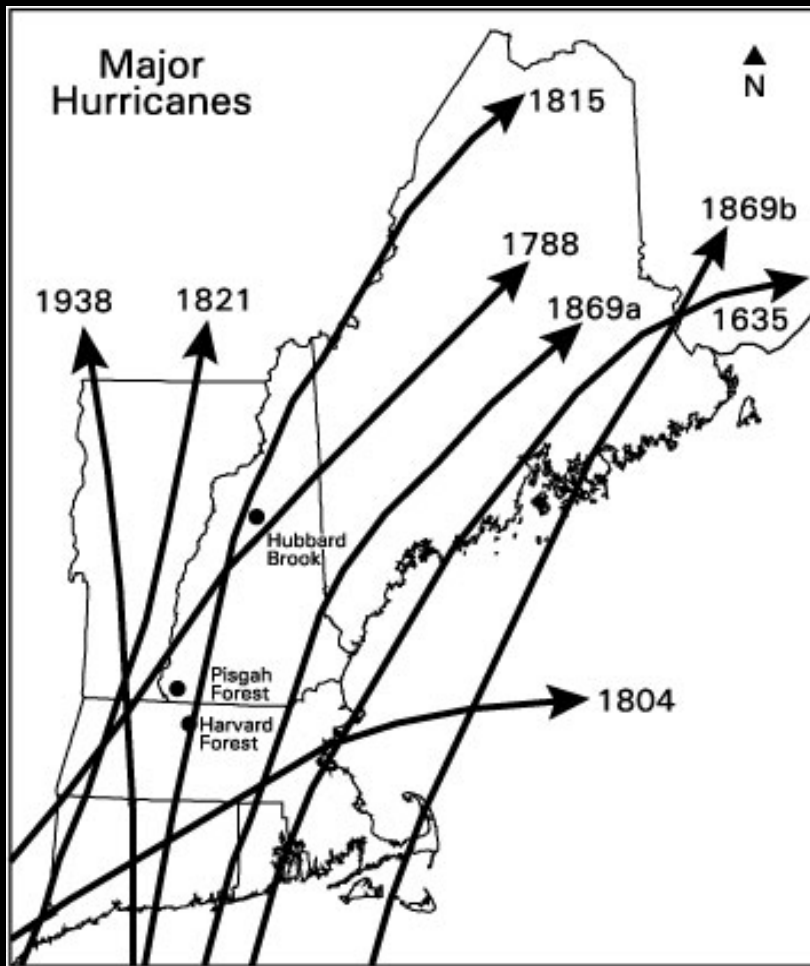
Indicator of
Drop in Water Table



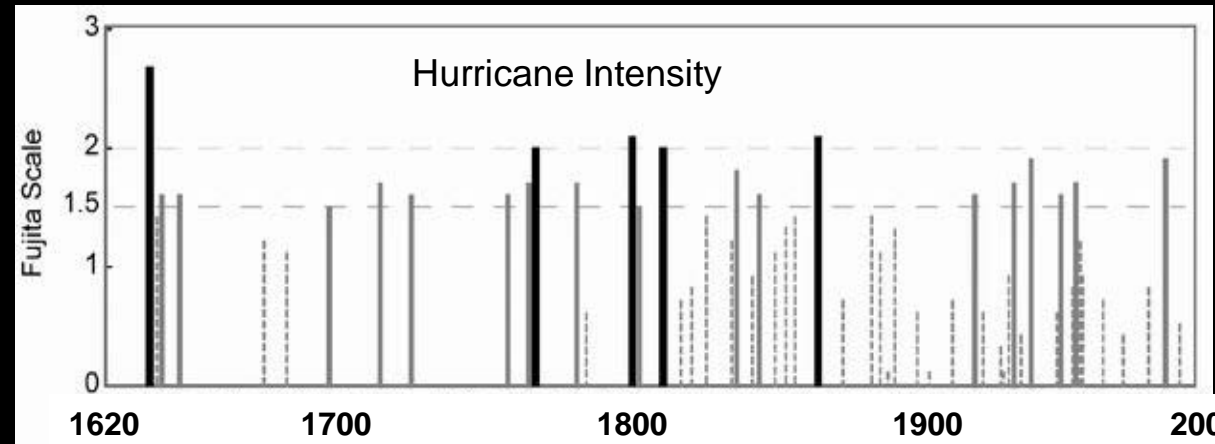


Martha's Vineyard – 2011

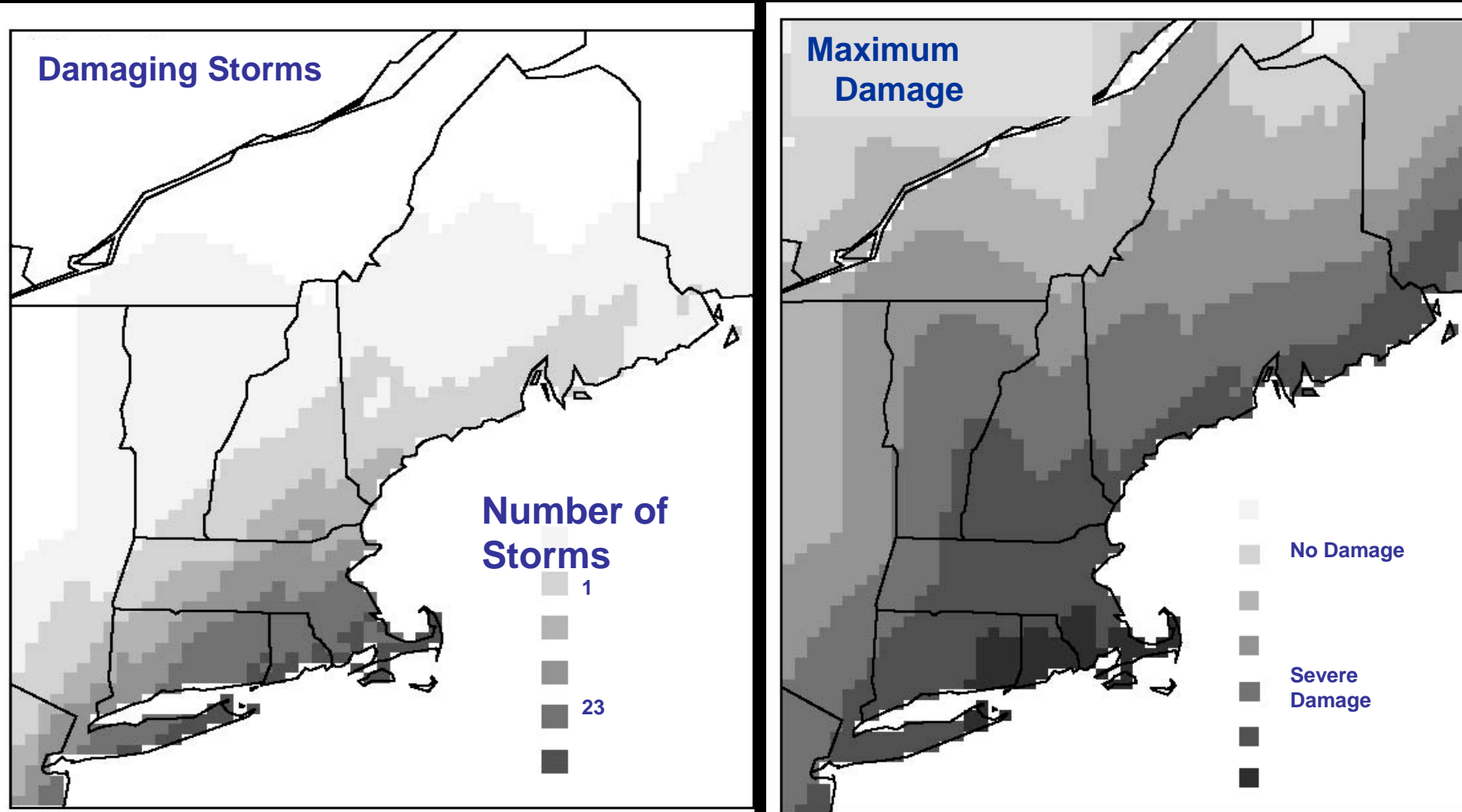




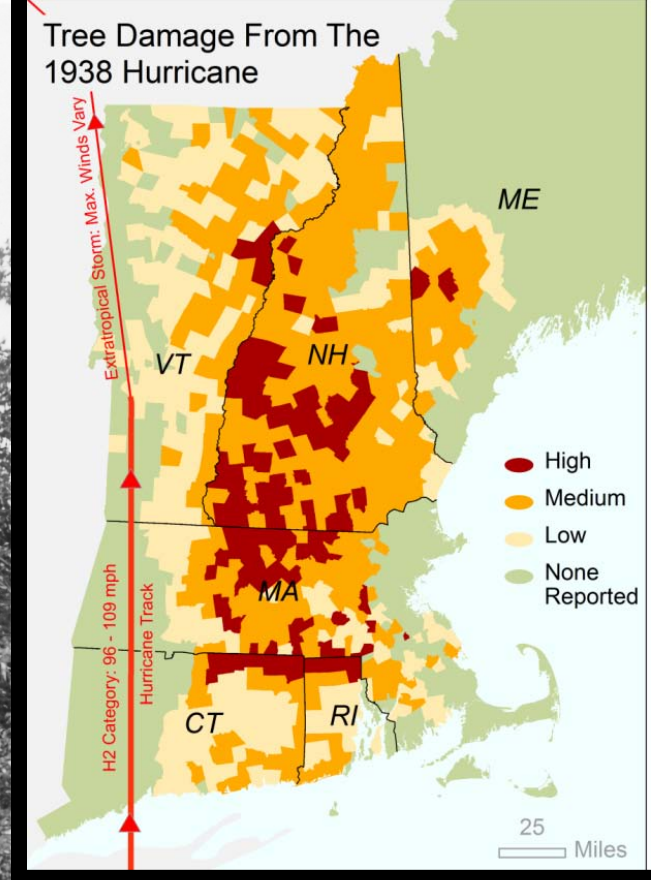
Great Hurricanes



Hurricanes 1620 - 2010



Harvard Forest Pisgah Tract Winchester, NH 1938 Hurricane



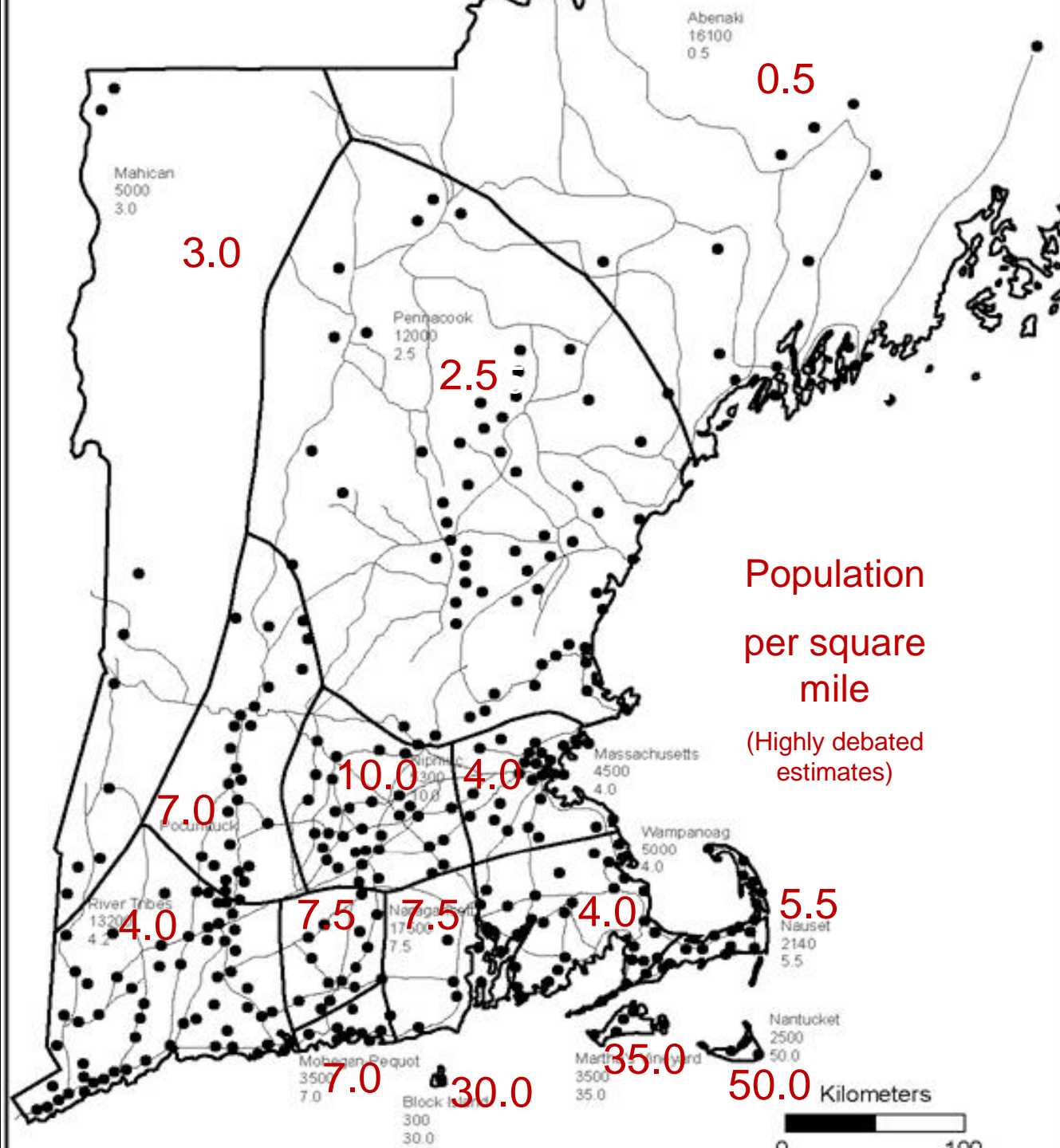


Pisgah Tract 2011



Late Woodland Indian Population (ca. 1000 – 1600 A.D.)

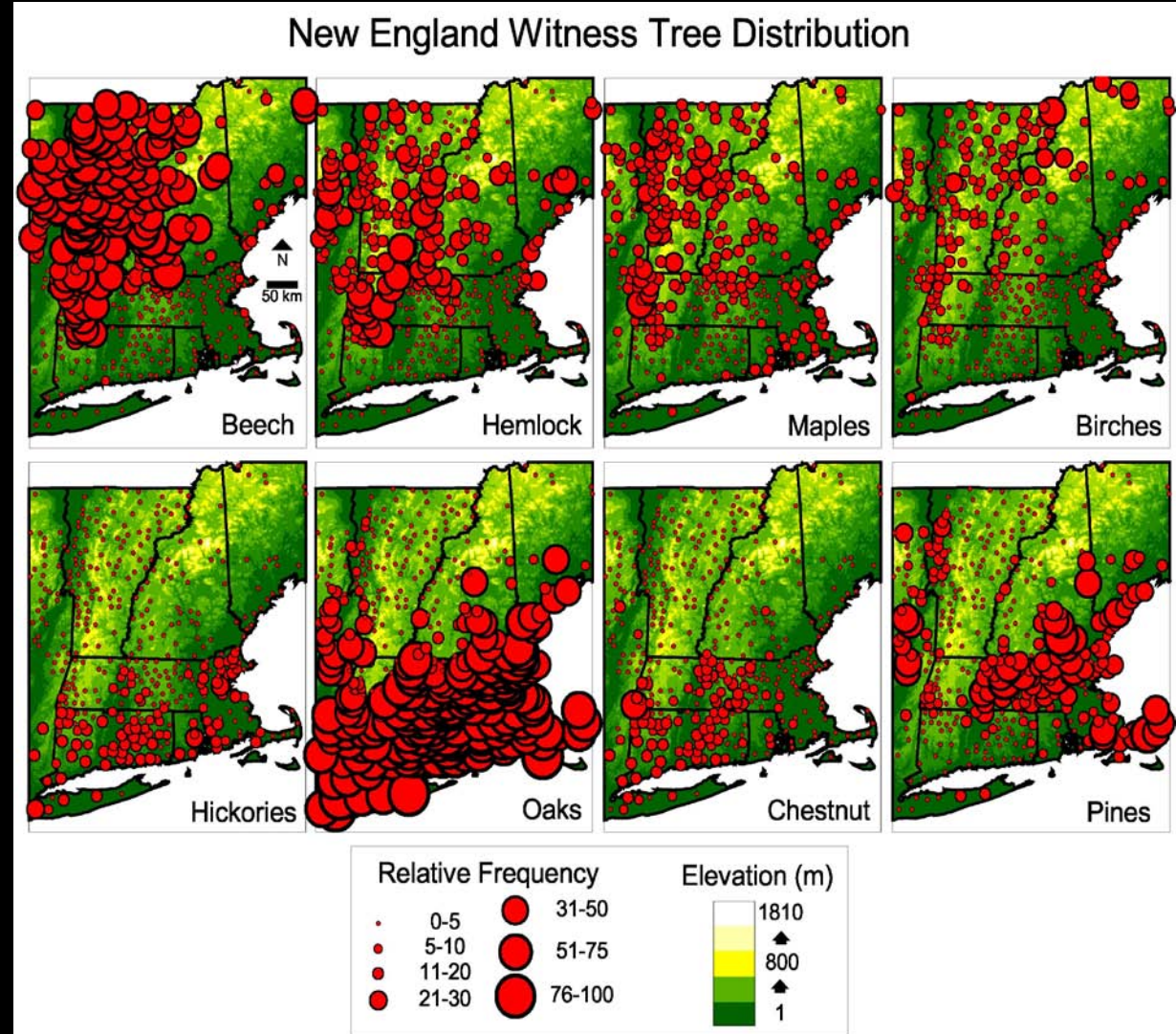
Major groups,
population centers,
and trails



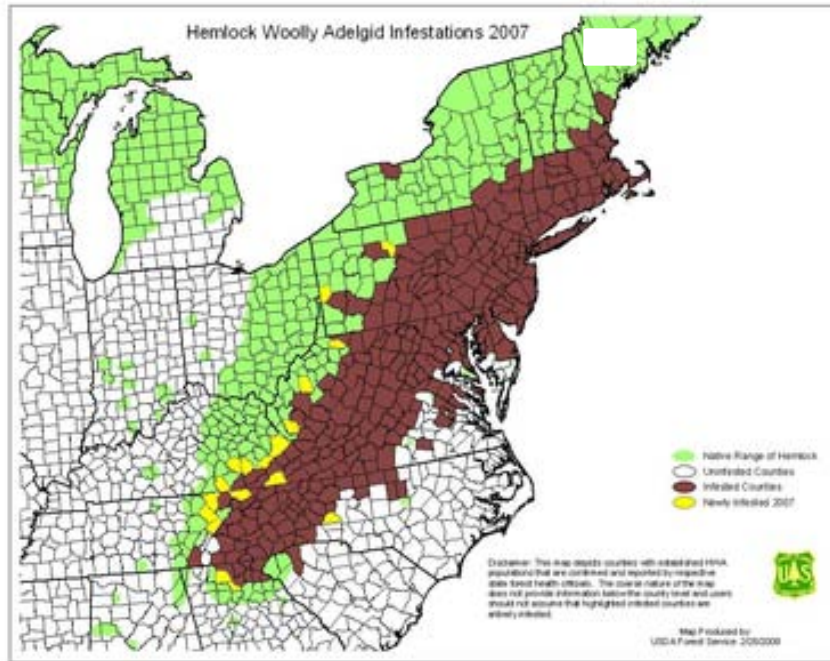
At European Settlement New England was a Forested Land



Harvard Pisgah Tract 1910s



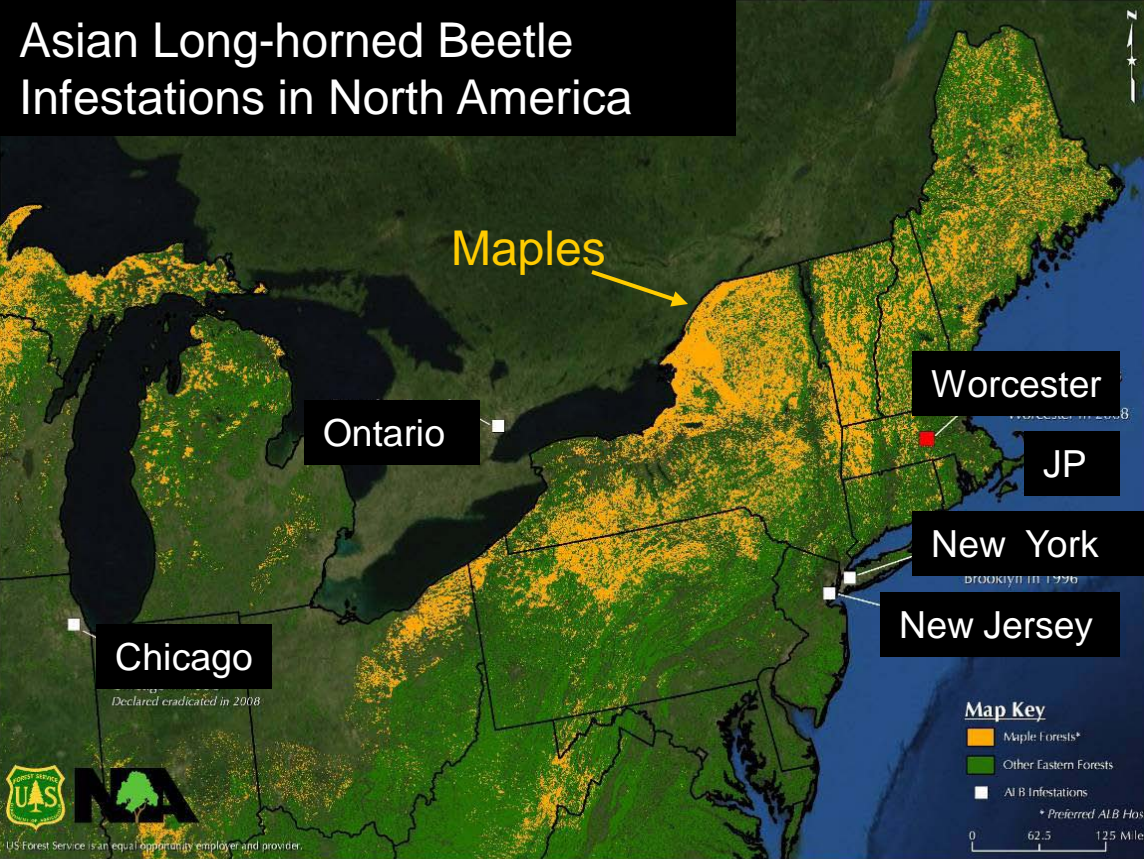
Dominated by Old Forests



Hemlock
Woolly
Adelgid

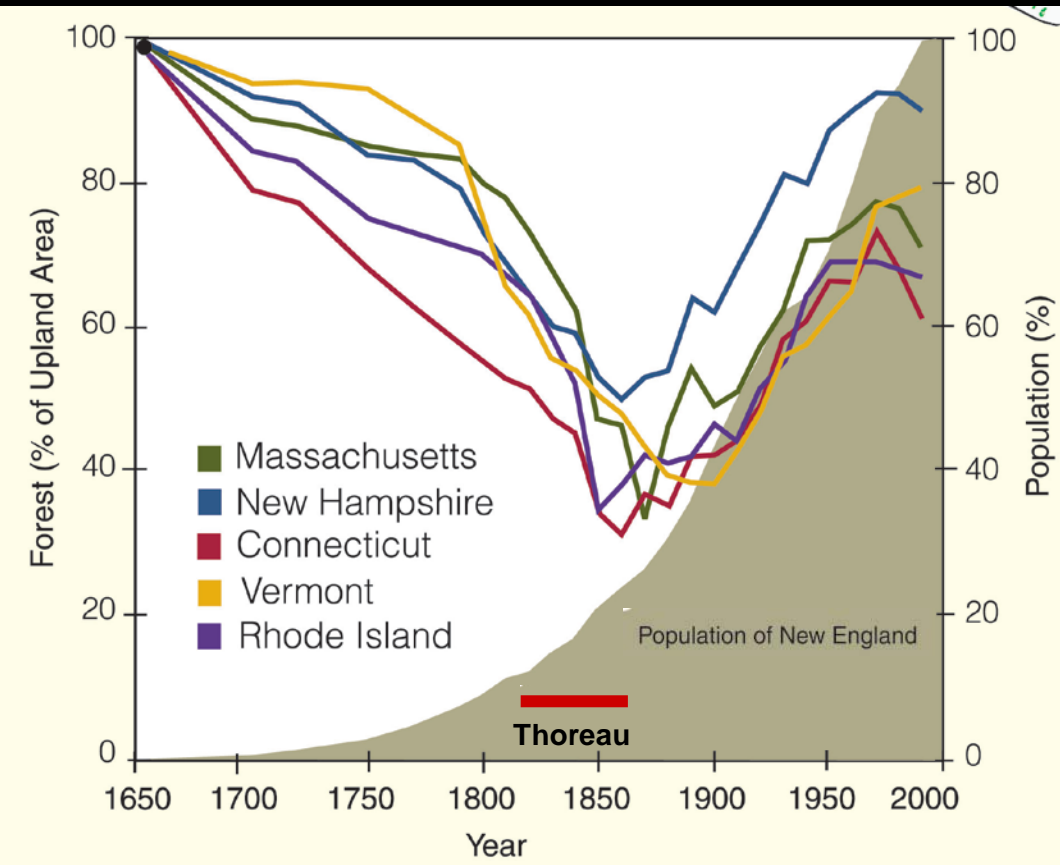


Asian Long-horned Beetle Infestations in North America



New England

Forest Cover and Population



1860s – Agriculture dominated

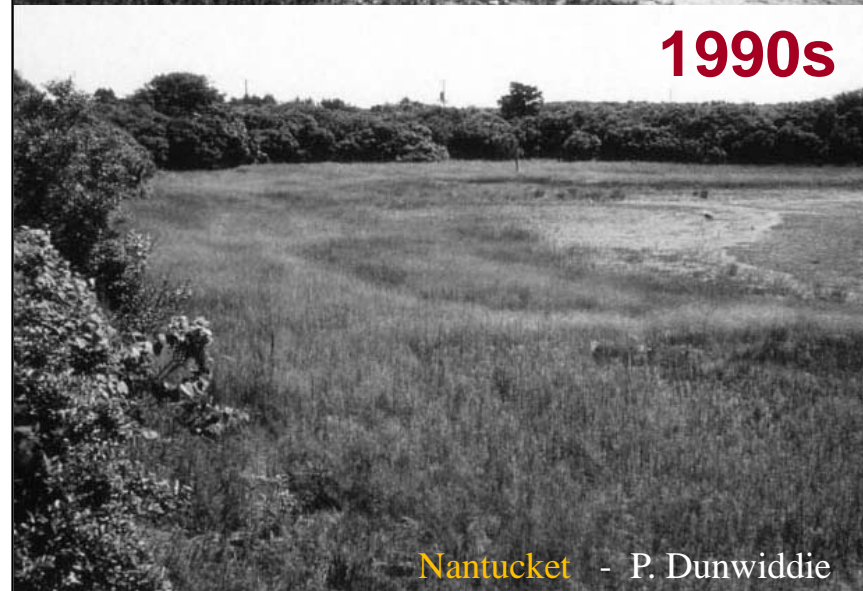
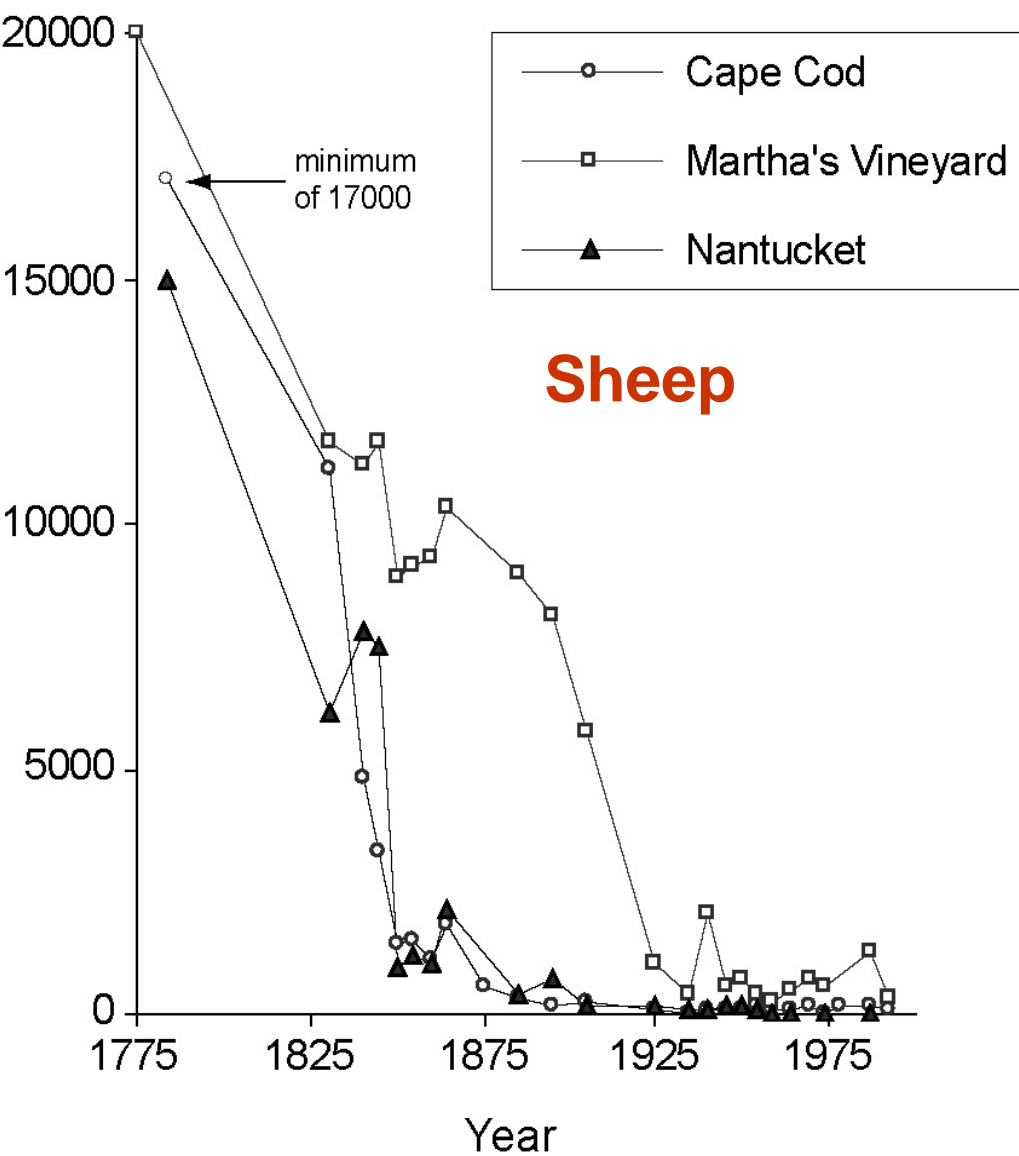


2010s – Forest dominated

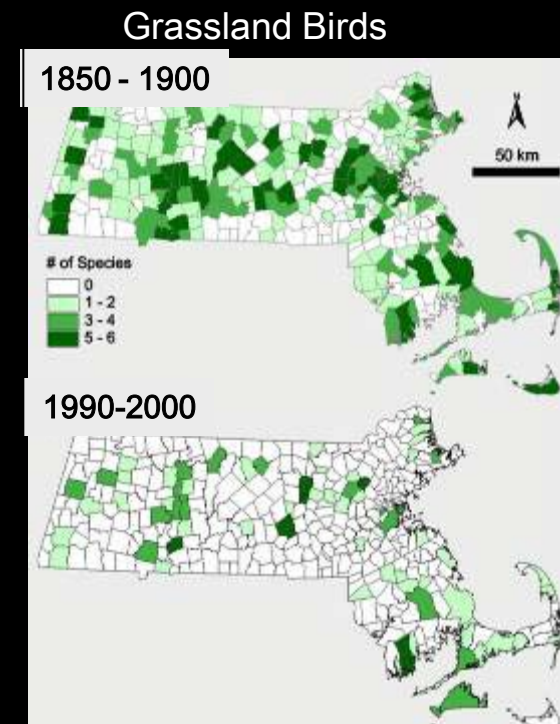
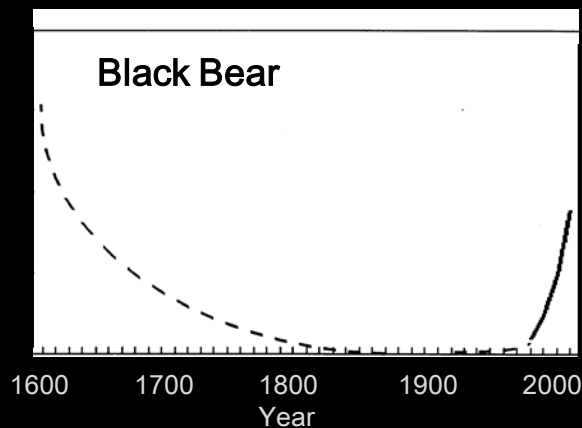
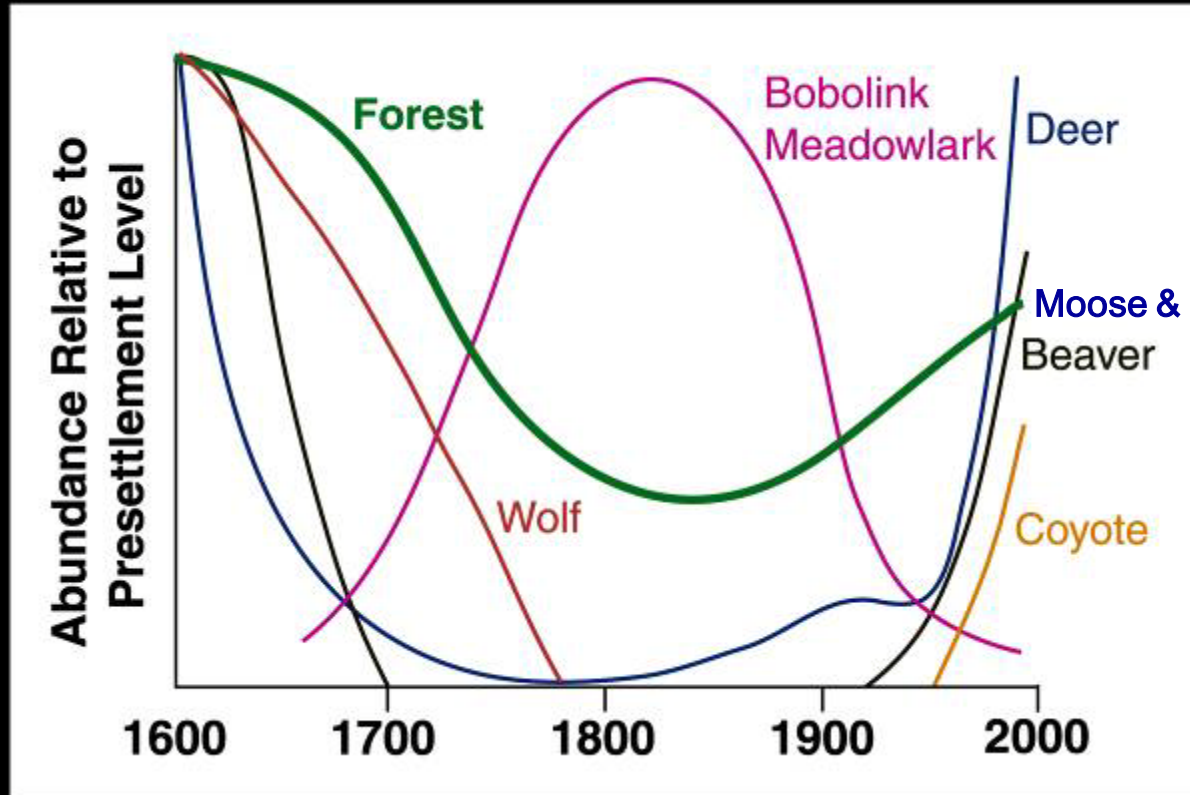


2060 – ???





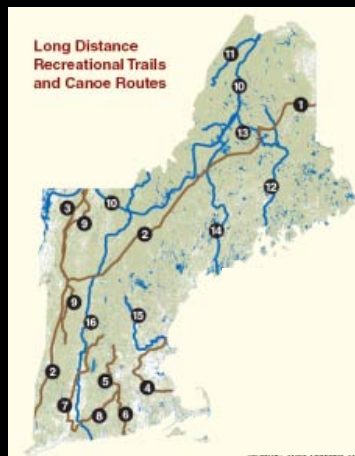
Wildlife Dynamics in the New England Landscape



**New Habitat
for
Moose
Oak Forest**



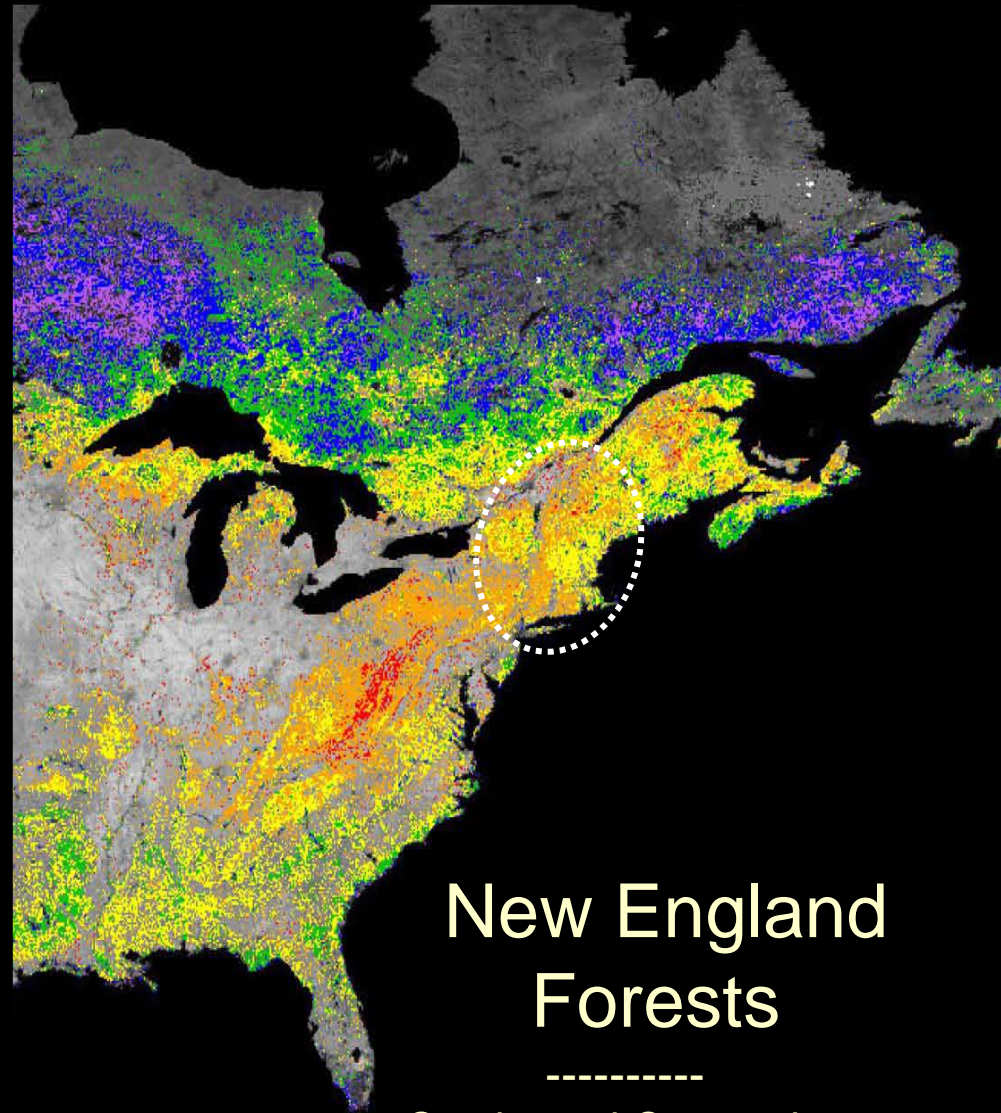
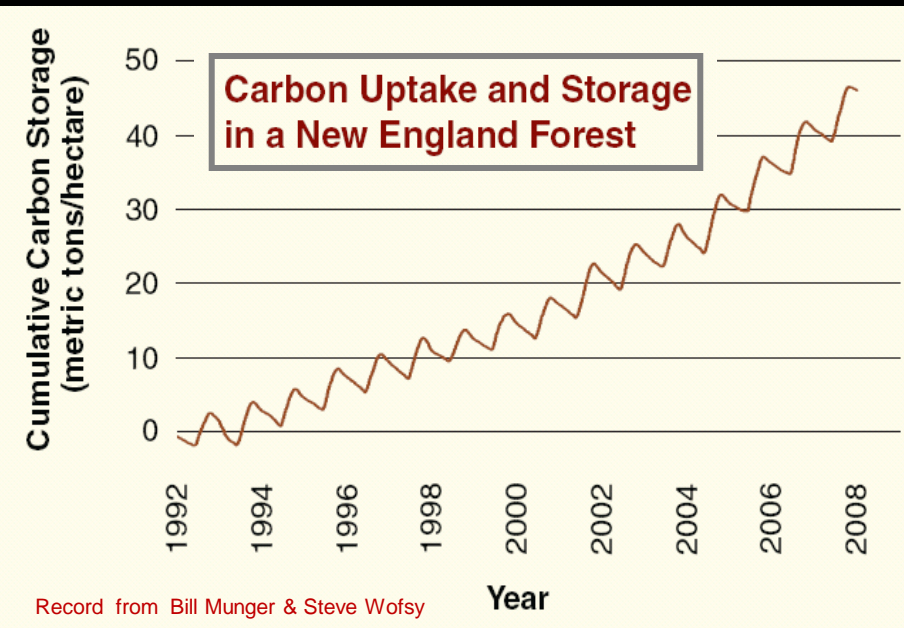
Forests = Direct Economic Benefits



Forests = Critical Infrastructure

e.g., Quabbin Reservoir = Unfiltered water source for 40% of Massachusetts Population





Globally important carbon storage
and climate mitigation

Threats

Deforestation

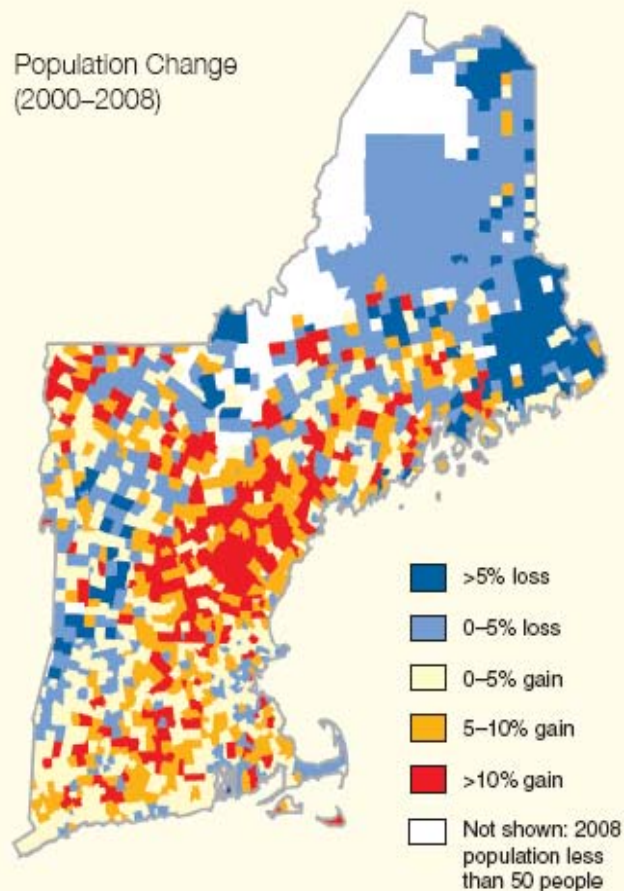
Perforation

Degradation

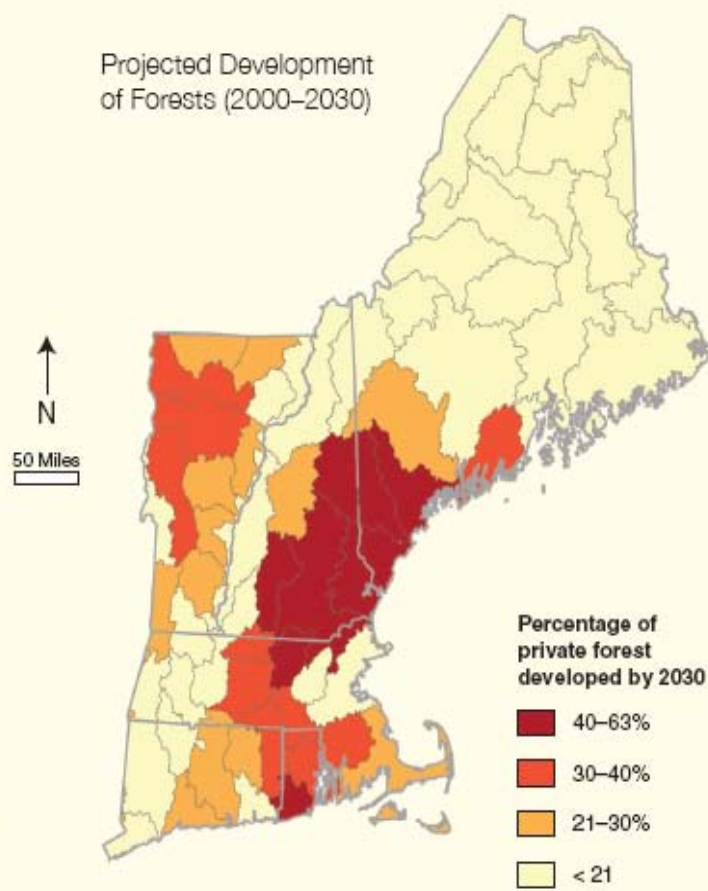


Recent Population Change and Future Development of Forest Land

Population Change
(2000–2008)



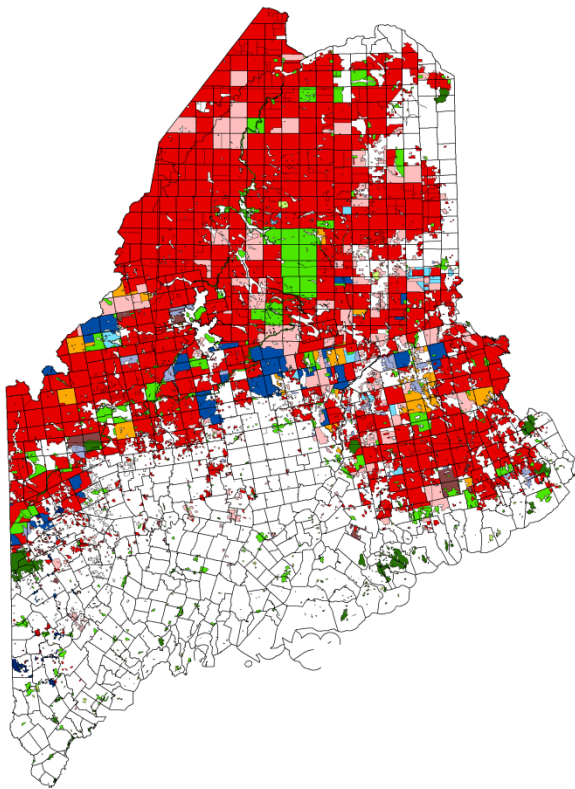
Projected Development
of Forests (2000–2030)



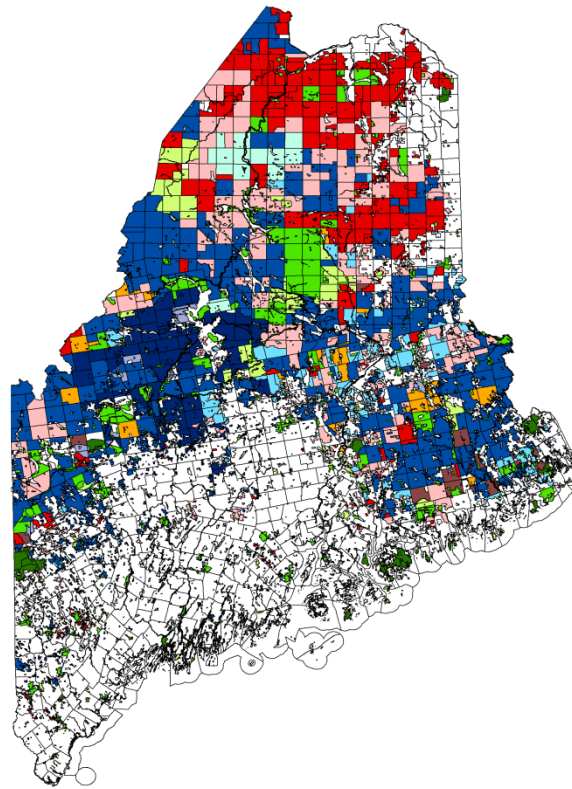
Threats

Change in Ownership & Management

Changes in Forest Ownership – Northern Maine



1994



2009

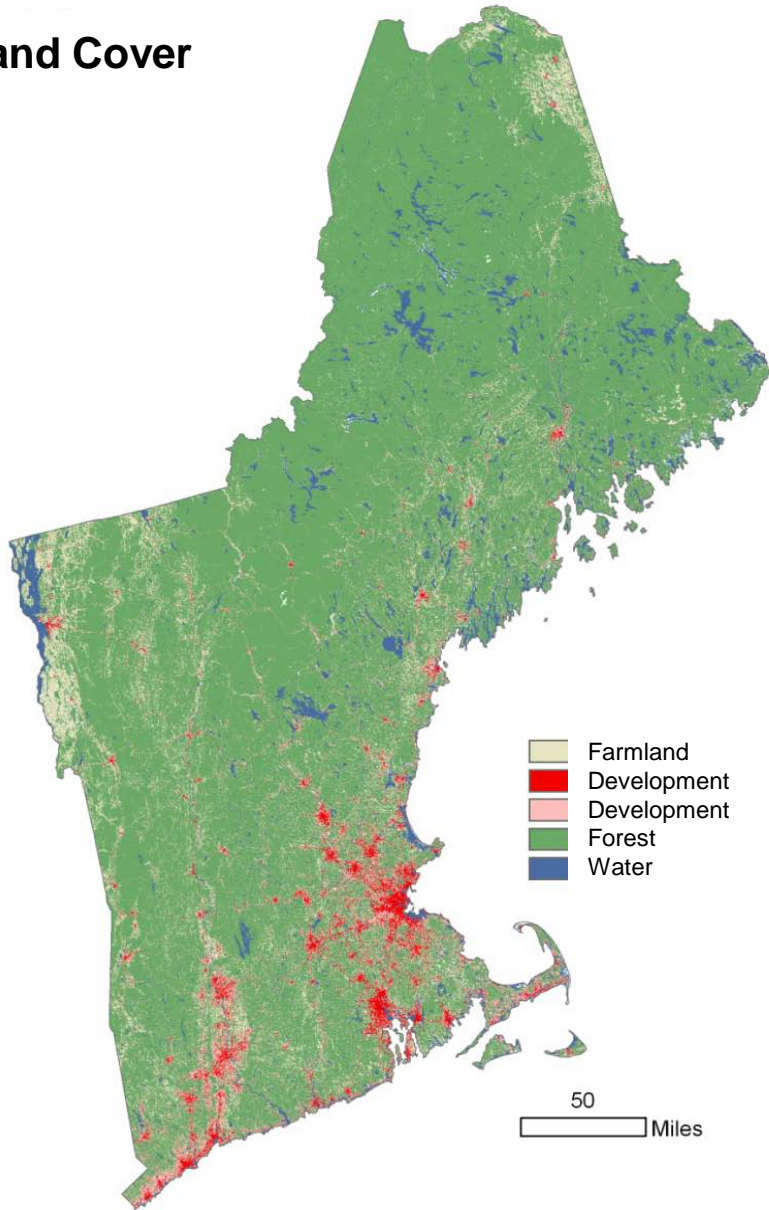
Copyright 2010 - James W. Sewall Co., Old Town, Maine

Legend

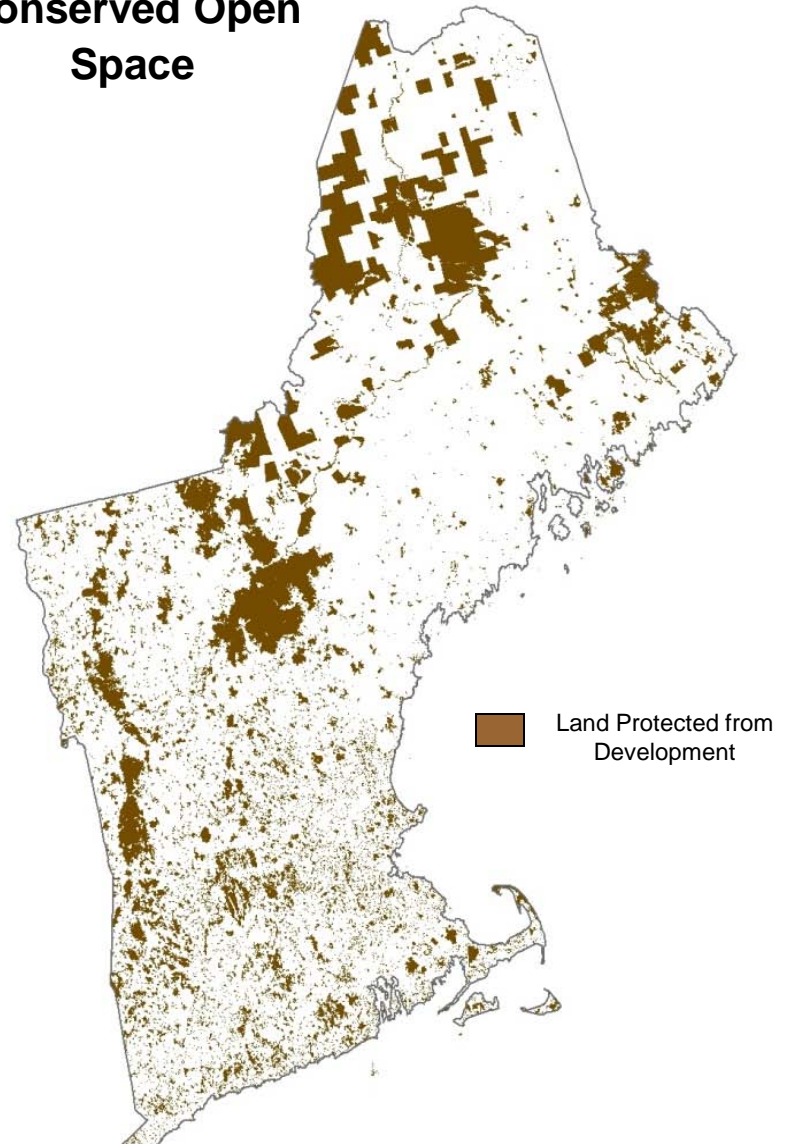
- Industry
- Old-line Family
- REIT
- Financial Investor
- Developer
- Contractor/New Timber Baron
- Individual/Family
- Tribal
- Federal
- Public (state)
- Non-profit
- Other

Two Remarkable Products of History

Land Cover



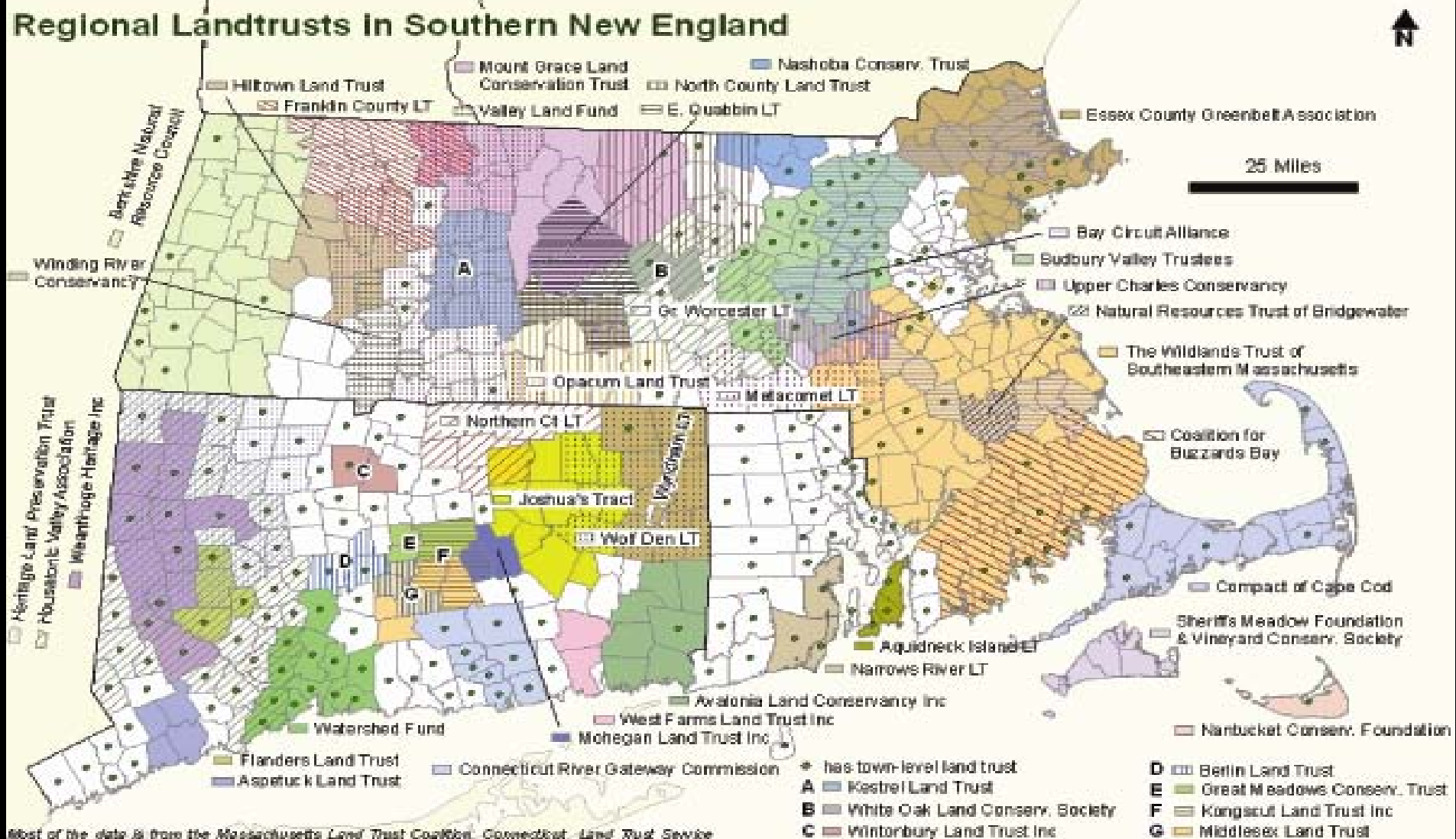
Conserved Open Space

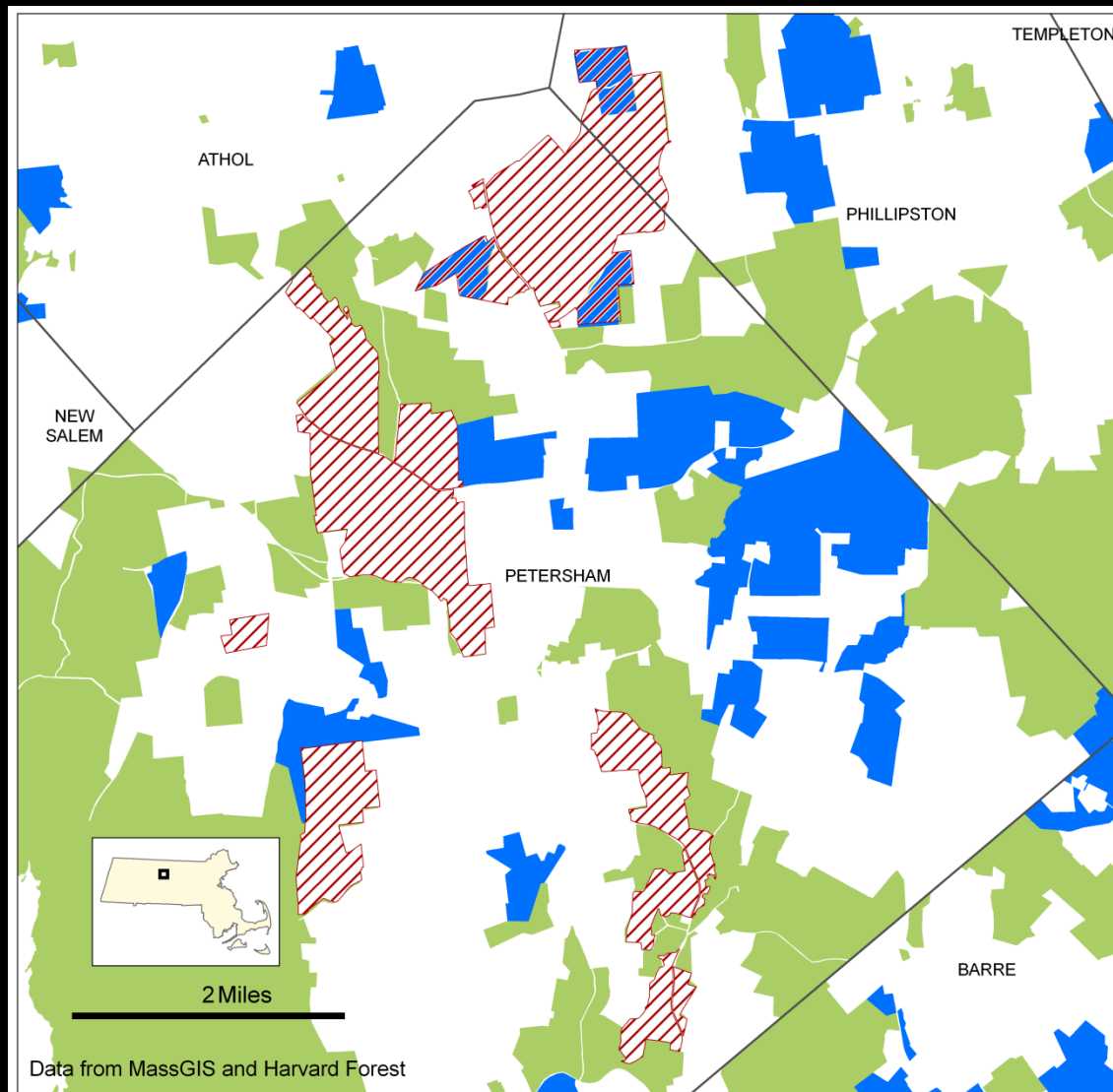


What can we do?



New England's Conservation Capacity





Harvard Forest

Protected Open Space - Period Protected



~1900 - 1990



1990 - 2010

Petersham, Massachusetts

>60% Conservation Land

- Individual Land Owners
- Individual Conservation Leaders
- State Conservation Priorities

A scenic landscape photograph showing a vast mountain range under a cloudy sky. In the foreground, there are large, light-colored rocks and green vegetation. A body of water is visible in the middle ground, nestled between the mountains. The overall scene is a mix of natural beauty and rugged terrain.

Wildlands and Woodlands

A Vision for the New England Landscape

John D. Aber *University of New Hampshire*
Charles V. Cogbill *Sterling College, Vermont*
Elizabeth A. Colburn *Harvard Forest, Harvard University*
Anthony W. D'Amato *University of Minnesota*
Brian M. Donahue *Brandeis University*
Charles T. Driscoll *Syracuse University*
Aaron M. Ellison *Harvard Forest, Harvard University*
Timothy J. Fahey *Cornell University*
David R. Foster *Harvard Forest, Harvard University*
Brian R. Hall *Harvard Forest, Harvard University*
Clarisse M. Hart *Harvard Forest, Harvard University*
Malcolm L. Hunter *University of Maine, Orono*
Lloyd C. Irland *Yale University*
William S. Keeton *University of Vermont*
David B. Kittredge *University of Massachusetts*
Kathleen F. Lambert *Harvard Forest, Harvard University*
James N. Levitt *Harvard Forest, Harvard University*
Robert J. Lilieholm *University of Maine*
David A. Orwig *Harvard Forest, Harvard University*
Jonathan R. Thompson *Smithsonian Institution*

W&W Authors



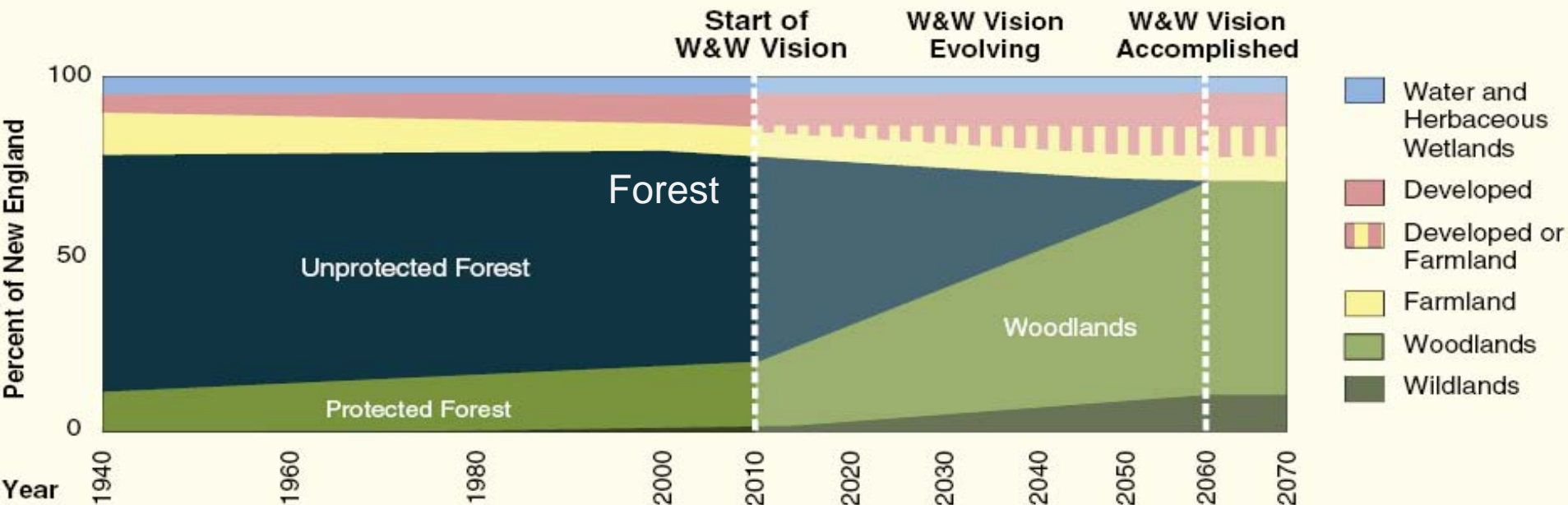
The *Wildlands and Woodlands* Vision

**Conserve at Least 70% of New England in Forest
(Double the pace of land conservation)**

Protect 30 million acres of New England's existing 33 million acres of forest

Retain or increase farmland (>7% of land)

Concentrate future development for energy and economic efficiency

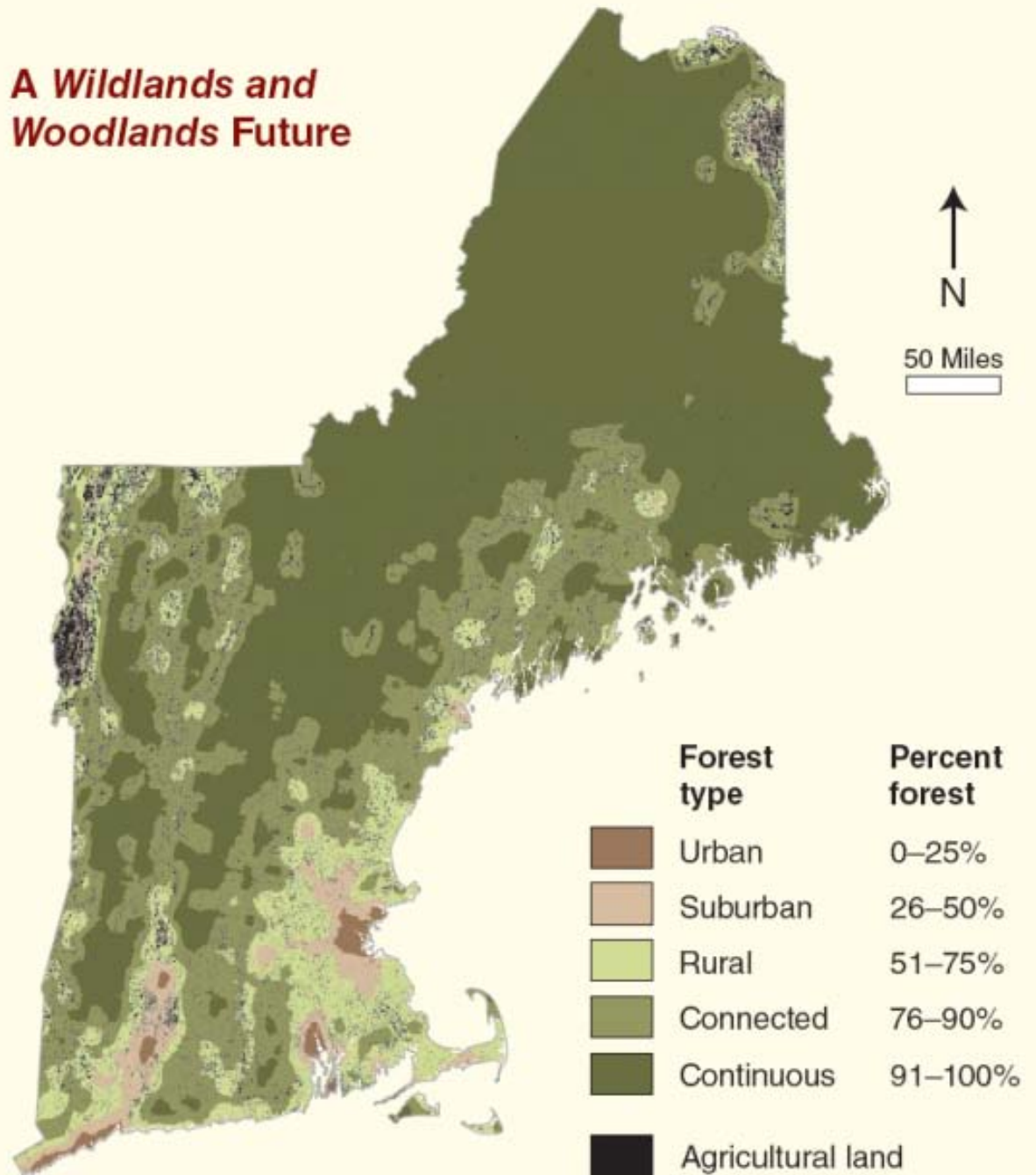


Conservation

On private land
through conservation
easements

Shaped by local
conditions and
interest

A Wildlands and Woodlands Future



Managed Woodlands

**90% of forest land
63% of New England
~27 million acres**

Well-managed forests
permanently conserved



Changes in New England Timber Volume



Wildland Reserves

**10% of forest land
7% of New England
~3 million acres**

Large forest landscapes shaped by
natural processes



And a place for agriculture and its landscapes





Report: New England's Forests Declining

The Boston Globe

Sunday October 10, 2010
THE GREEN ISSUE

ctpost.com

The forests of New England are disappearing too quickly, experts say

Forbes

Report: Forest cover declining across New England

The New York Times

June 7, 2010

New England Groups Plot to Save Their Dwindling Woodlands

By DINA FINE MARON of [ClimateWire](#)

THE SACRAMENTO BEE [sacbee.com](#)

New England Losing Forest Cover - Scholars Call for Accelerated Conservation



National Science Foundation
WHERE DISCOVERIES BEGIN

Press Release 10-087

New England Losing Significant Forest Cover, According to New Report

Burlington
FreePress.com

NEW ENGLAND SCIENTISTS CALL FOR FOREST CONSERVATION

BY CANDACE PAGE, FREE PRESS STAFF WRITER • THURSDAY, MAY 20, 2010

90.9 fm
wbur.org

npr BOSTON'S NEWS SOURCE

KENNEBEC JOURNAL

May 23

OUR OPINION: Developmental threat to forest can be mitigated

Study: Forests Declining Throughout New England

abc 40

FOX 6
SPRINGFIELD

People You Know, News You Can Trust

wpsb.com

Declining across New England

nashua telegraph.com

Thursday, May 20, 2010

Report: Forest cover declining across New England

HARVARD gazette

Rolling back the forest canopy

After expanding for 150 years, New England woods are declining

Memphis Business Journal

New England Losing Forest Cover - Scholars Call for Accelerated Conservation



U.S. Politics Today

AN EIM NEWS SERVICE FOR POLITICAL PROFESSIONALS

New England Losing Forest Cover - Scholars Call for Accelerated Conservation



July 2010

Forests of Tomorrow

New England Natural Resource Center

ADOPTION CERTIFIED BY THE NEW ENGLAND GOVERNORS' CONFERENCE
February 27, 2011.

A RESOLUTION HONORING CHARLES H.W. FOSTER

WHEREAS, Charles H.W. 'Hank' Foster has dedicated his professional career to academic and public service, particularly in the areas of environmental policy, conservation and forestry; and

WHEREAS, Dr. Foster served seven Massachusetts governors and was the first cabinet-level secretary of environmental affairs in the state, as well as holding numerous other public service positions; and

WHEREAS, Dr. Foster's contributions to professional and non-governmental organizations are too numerous to detail but include work with the Woods Hole Oceanographic Institution, the New England Aquarium, the Conservation Foundation, the Appalachian National Scenic Trail Advisory Board, the Cape Cod National Seashore Advisory Commission and a host of others; and

WHEREAS, Dr. Foster was the editor of the book 'Twentieth Century New England Land Conservation', which commemorated the 100th anniversary of the first meeting of the New England governors (in 1908), and led to the formation of the NEGC Commission on Land Conservation.

NOW, THEREFORE, BE IT RESOLVED, that the New England Governors salute the lifetime of achievements and public service of Charles 'Hank' Foster, and recognize him for the many contributions he has made to protecting the New England environment and preserving our natural places.

Deval L. Patrick
Governor of Massachusetts
Chairman

Dannel P. Malloy
Governor of Connecticut

Paul R. LePage
Governor of Maine

Lincoln D. Chafee
Governor of Rhode Island

Peter Shumlin
Governor of Vermont

John Lynch
Governor of New Hampshire

Highstead Foundation



Advancing Wildlands & Woodlands Conservation in New England and Beyond

Conservation Director

Regional Conservationist

Ecologist

Senior Fellow

Senior Fellow

Outreach & Communications

Staff & Administration

Communications Director

Operations Manager

Undergraduate Interns

Job Search Underway

Bill Labich

Ed Faison

Jim Levitt*

Kathy Lambert*

Clarisse Hart*

Jody Cologgi

Future Hire

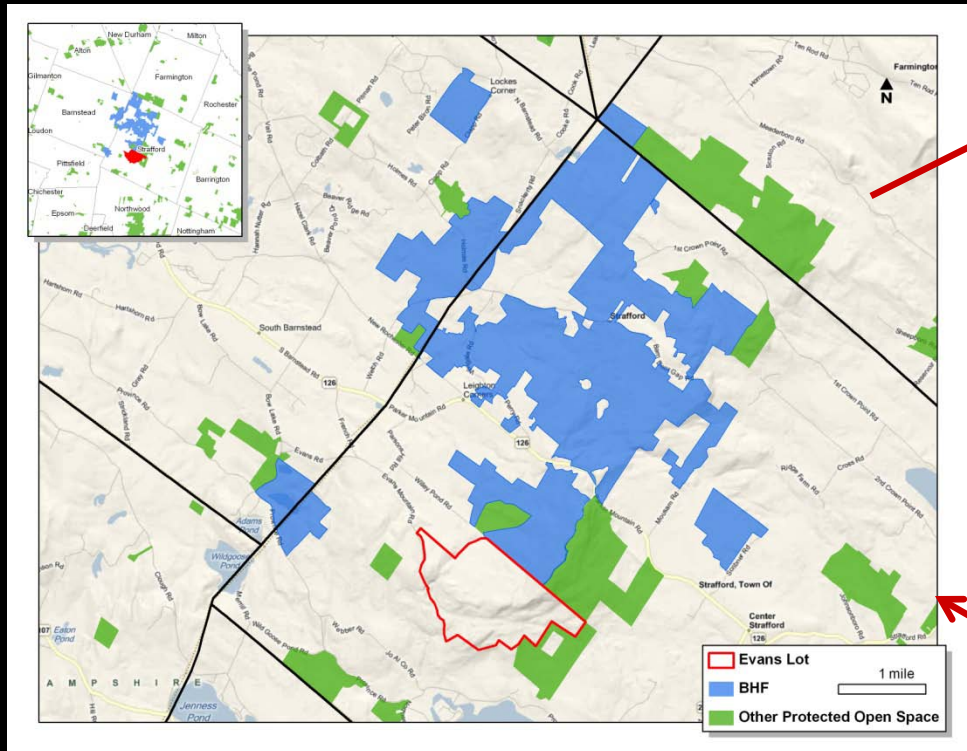
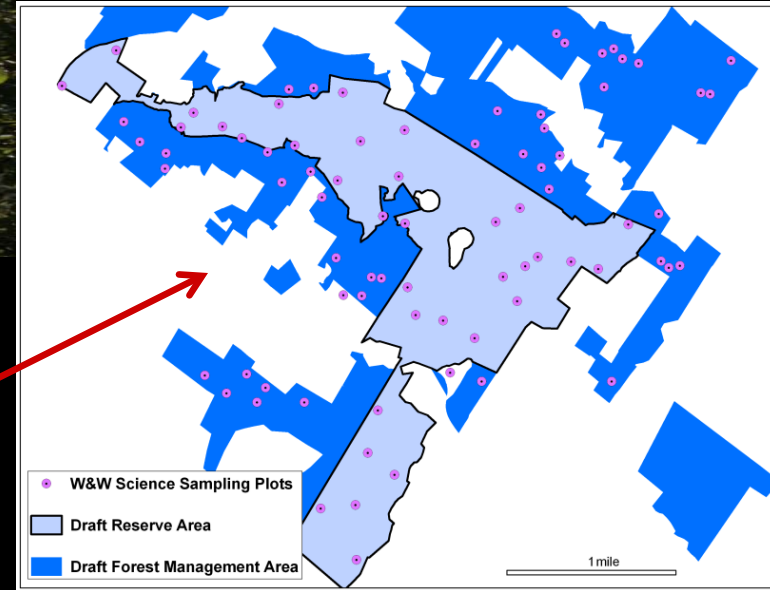
Future Hire

6-8 annually

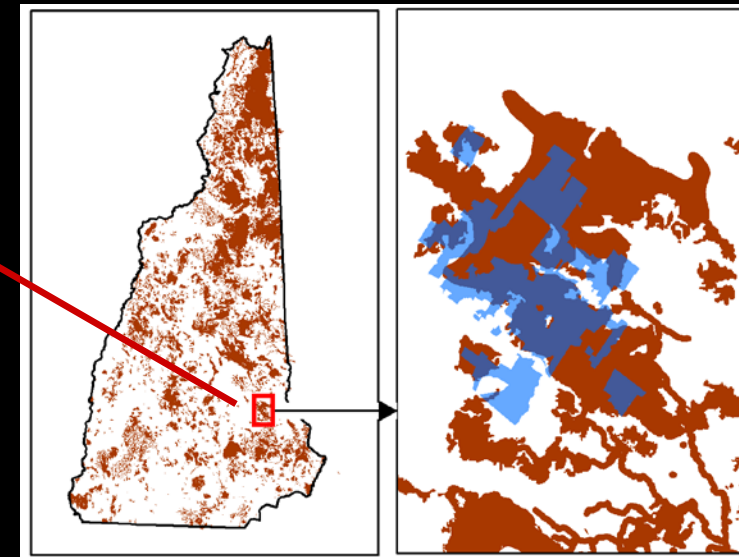
Blue Hills Foundation

Strafford, NH

Draft Reserve Area and Science Plots



Highly-Ranked Wildlife Habitat



- ~ 7,000 acres Private non-profit foundation
- >120 land transactions; Conservation Restrictions with NEFF SPNHF
- Reserve and science infrastructure based on W&W principles
- Advancing research and education with UNH and Harvard University

Regional Conservation Partnerships

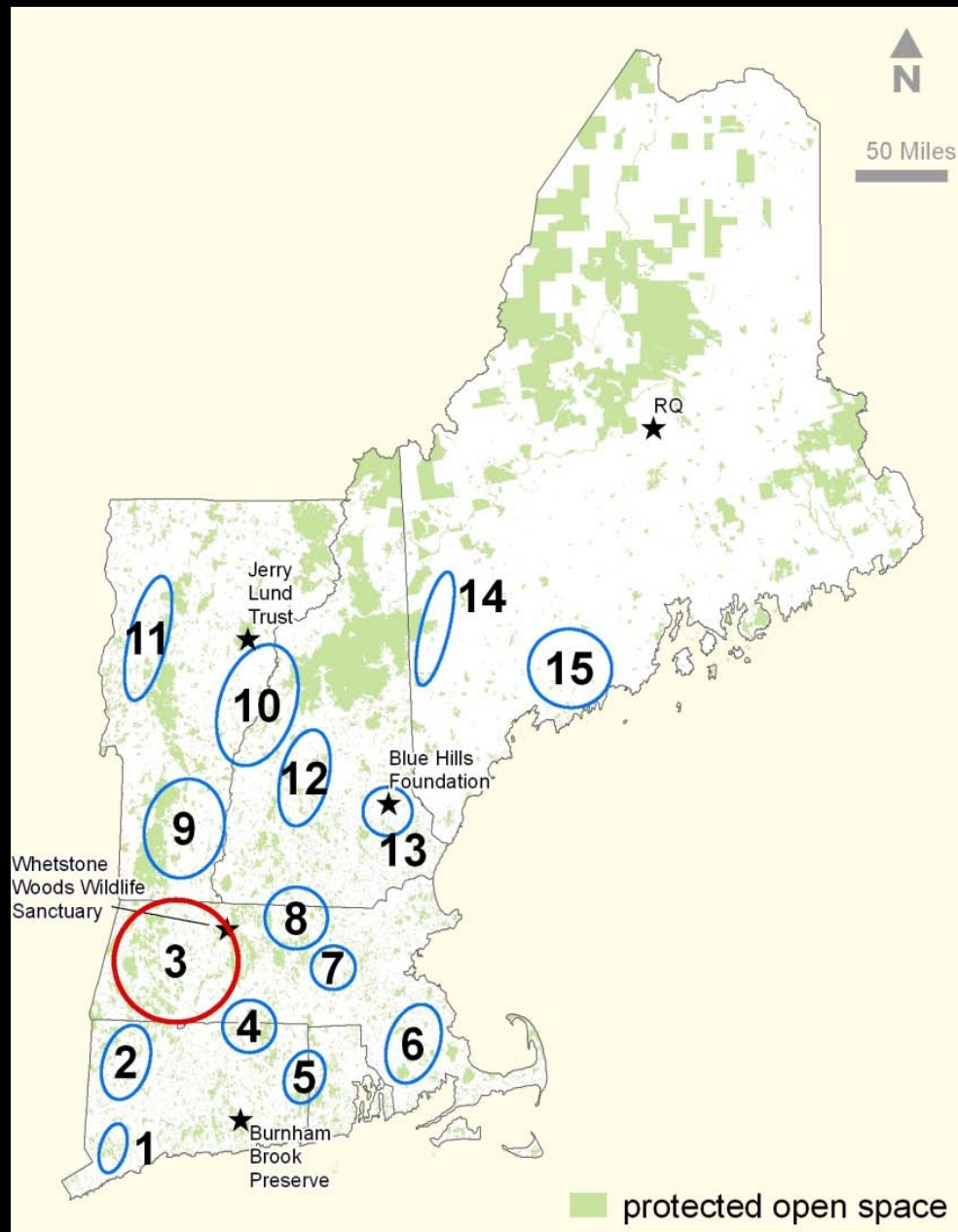


W&W Partnership - more than 60 local and regional organizations and agencies



New England – Wide Conservation Aggregation

Bundling parcels for land protection to
increase efficiency and attract funding



NEW ENGLAND FORESTRY FOUNDATION
CONSERVING FORESTS *for* FUTURE GENERATIONS

LandVest®

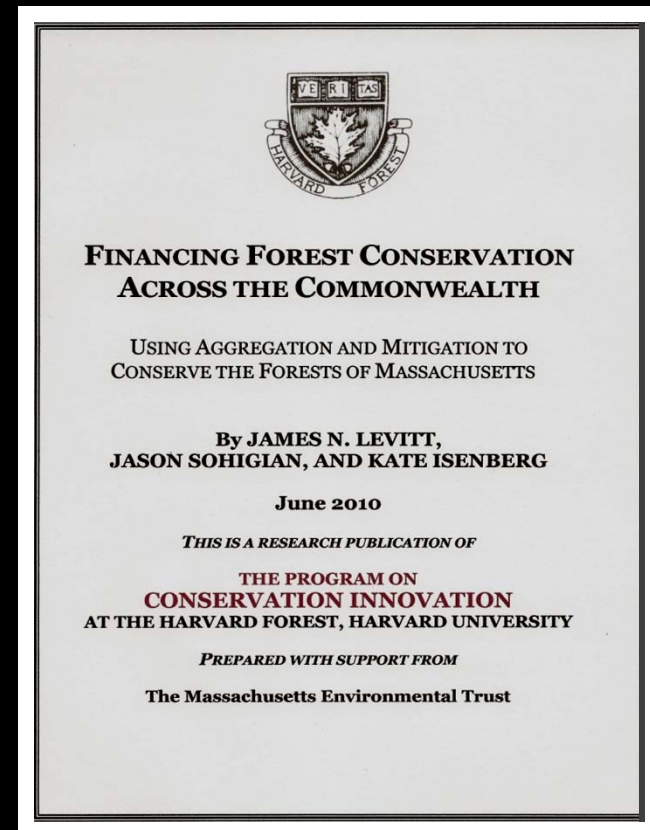
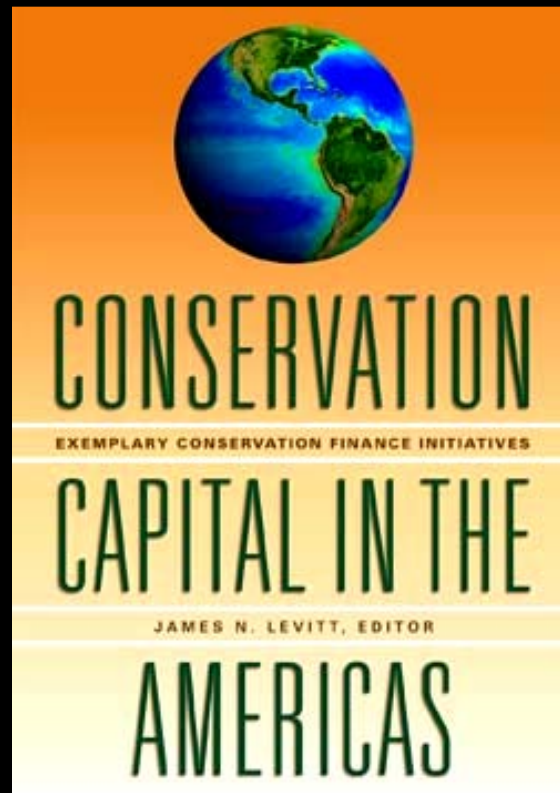
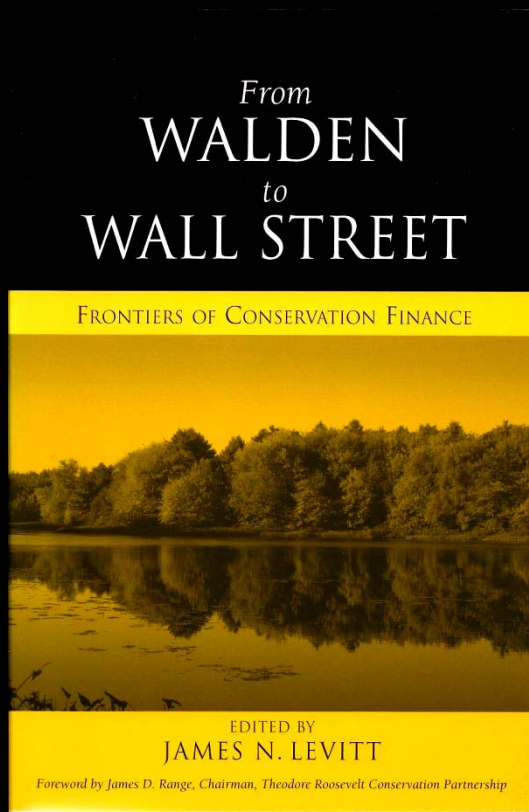
Program on Conservation Innovation

Harvard Forest, Harvard University

Jim Levitt, Director

Conservation Finance Initiatives

Collaborations with Highstead and The Lincoln Institute of Land Policy



Program on Conservation Innovation

Large Landscape-scale Conservation Initiatives

Collaborations with Highstead and The Lincoln Institute of Land Policy



**2011 Lincoln Institute Conservation Leadership Dialogue on
The Future of Large Landscape Conservation in America
Library of Congress, Washington, DC, March 2011**

Forthcoming at the
Harvard Forest in late
September 2011, the
organizational meeting of:

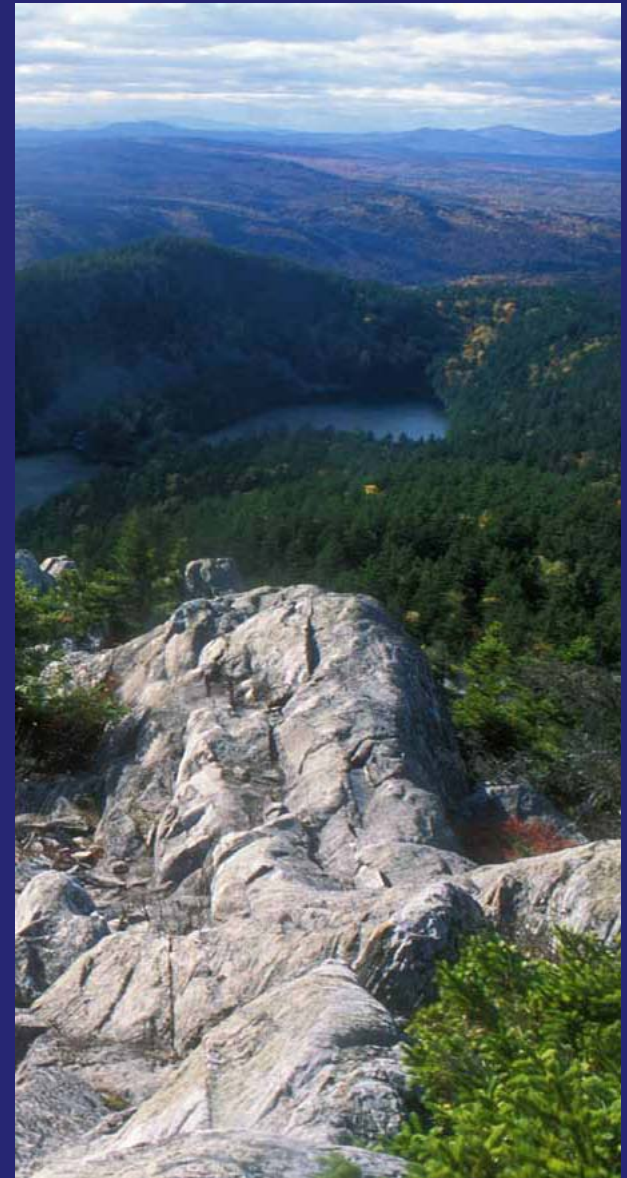
PARCC

(Program on Academic and
Research Institutions as
Conservation Catalysts)

Knowledge to Action



The Science & Policy Integration Project at the
Harvard Forest, Harvard University
Project Director: Kathy Fallon Lambert



If science is to aid in the advance toward a resilient and sustainable society, we must experiment with more effective means of integrating ecological research and decision making.

(Driscoll, Lambert & Weathers 2011 *BioScience*)



Land Use

Future Scenarios of Landscape Change
in the United States

2011



Long-Term Ecological Research and Future Scenarios of Climate and Land-use Change



A Policy Agenda for Conserving
New England's Forests
Priorities for 2012

PARTNERS: 20 scholars, 60
NGOs, Highstead,
Smithsonian Conservation
Biology Institute, LTER sites

Air Pollution



Great Lakes Mercury Connections

The Extent and Effects
of Mercury Pollution
in the Great Lakes Region

A publication of the Biodiversity Research Institute
in partnership with the Great Lakes Commission
and the University of Wisconsin-La Crosse



PARTNERS: Great Lakes
Commission, Biodiversity
Research Institute, Ecological
Society of America

Climate Change



Science Communications

2010

National Science Foundation
Long-Term Ecological Research Network
Communications Strategy



LTER Ad Hoc Communications Committee
Project Consultant – Kathy Fallon Lambert

7/16/2010

Harvard Forest & Wildlands & Woodlands



