



# **Old-Growth Forests**

***What they are, Why they are  
important, and How to Protect them***

**Liz Thompson**

**House Committee on Environment**

***January 30, 2025***

A photograph of a dense forest with large, moss-covered tree trunks and a person climbing one of them. The scene is misty and green, suggesting a temperate rain forest or similar old-growth environment. The text is overlaid on a semi-transparent grey box in the upper center.

# Old-Growth Forests

- What is Old Growth?
- Do we need Old Growth? Why?
- Managing for Old Growth Characteristics
- Wildlands as Future Old Growth



# Old-Growth Forests

- **What is Old Growth?**
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A diorama of a forest landscape. The foreground is a rocky, uneven ground covered with dry leaves and twigs. Several tall, slender trees with thin trunks stand in the middle ground. In the background, a dense forest of taller trees is visible, with a blueish tint suggesting a distant or hazy view. The lighting is soft, creating a naturalistic scene.

Harvard Forest Dioramas 1700

**Old growth forests were the predominant land cover in our region prior to European settlement, covering approximately 90% of the land area. Less than 0.1% remains today.**



1830



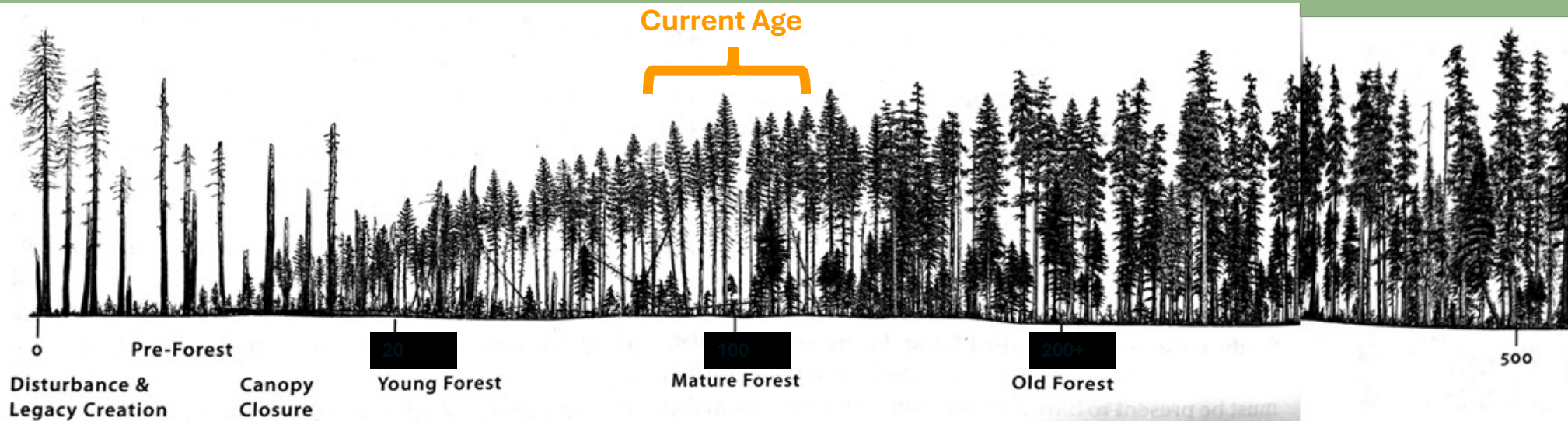
1930



# Current Forest Age

Most of our forests are **ecologically-young**, second growth

# Forest Succession



Adapted from: Franklin, J. F., Johnson, K. N., & Johnson, D. L. (2018). Ecological Forest Management. Waveland Press, Inc.





# WHAT IS OLD-GROWTH FOREST?

*A forest that has operated under natural ecological processes for at least three to four centuries, with only minimal human activity.*



# **OTHER TERMS**

**Primary forest**  
**Original forest**  
**Virgin forest**  
**Forest primeval**  
**Ancient forest**  
**Ancient woodland**

# **WHAT SOME OLD GROWTH FORESTS HAVE**

**Trees of many ages  
Some very large, old trees  
Canopy gaps  
Down wood in all stages of decay  
Standing dead wood  
Tip-up mounds  
Mycorrhizal networks  
Abundant bryophytes, lichens, and  
fungi  
Seeming disarray**

# Trees of many ages



**Some very large, old trees**



# Canopy gaps



**Down wood in all stages of decay**









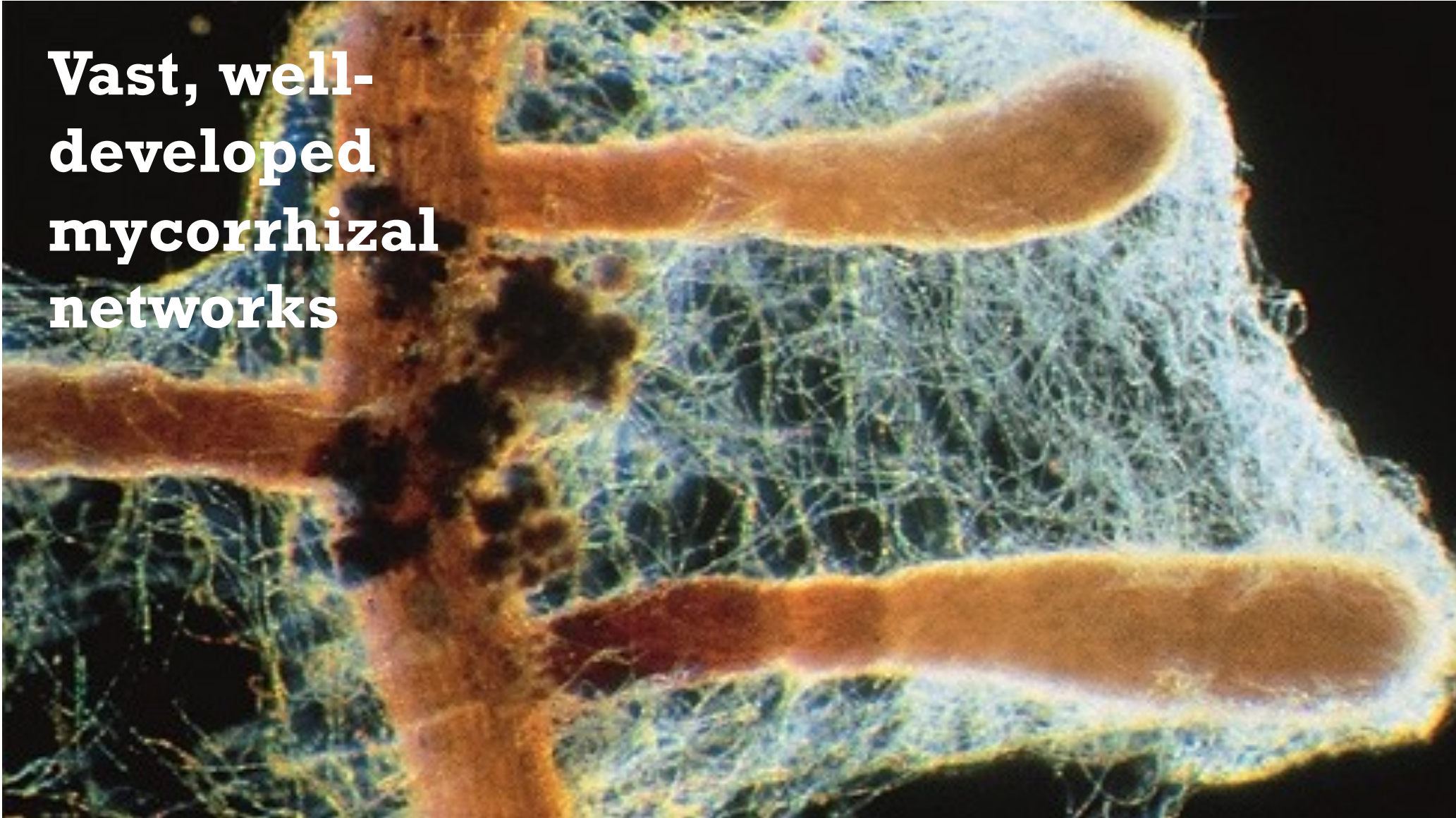
# Standing dead wood (snags)

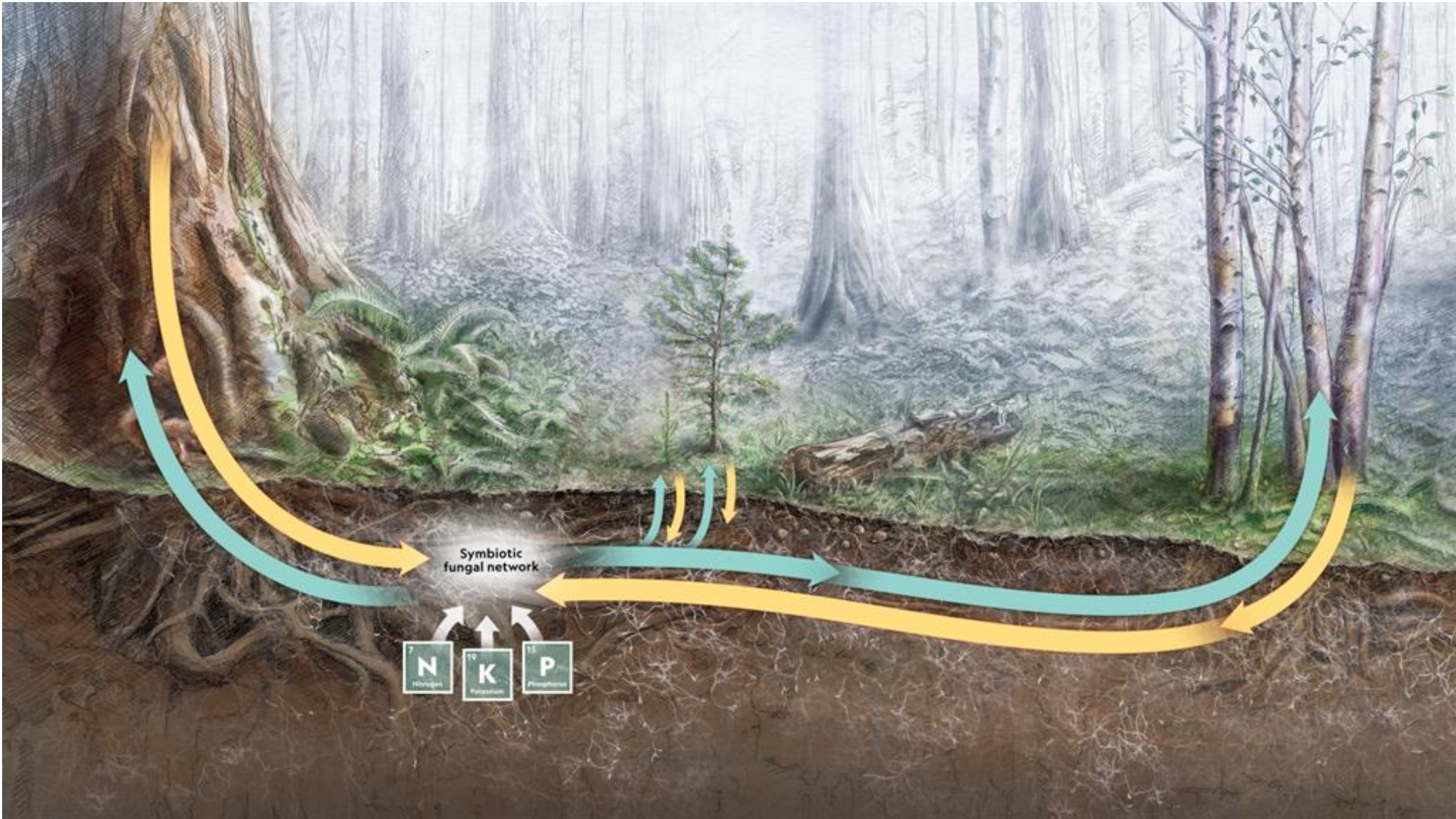



# Tip-up mounds



**Vast, well-  
developed  
mycorrhizal  
networks**







**Abundant  
mosses, lichens,  
and fungi**















**Seeming disarray**

***“Mossy and moosey” – Thoreau***  
**...and messy**

Howland Research Forest, ME. Photo: Shelby Perry



Photo: David Foster



# **OLD FOREST**

**Old forests are biologically mature forests with some characteristics of old growth forests, exhibiting minimal evidence of human-caused disturbance.**



# **OTHER TERMS**

**Overmature forest**

**Decadent forest**

**Middle-aged Forest**



# Old-Growth Forests

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# THE FUTURE IS OLD GROWTH



*The Northeast has few precolonial forests left. Expanding the remaining patches may hold the key to ecological resilience in the centuries to come.*

BY KRISTA LANGLOIS

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ON HIS MISSIONS TO FIND BIG TREES, Erik Danielson comes across humanity's detritus—often rusty cans and broken glass, the occasional old stone wall or chimney, and once a camp chair lodged in a tree miles from the nearest trail or road. But bushwhacking into the Adirondack Mountains of upstate New York on a humid summer morning in 2023, he found no signs that anyone else had been in these woods for a very long time.



MITCH EPSTEIN/COURTESY OF WANCEY RICHARDSON GALLERY





# Why we need Old Forests

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1. Old forests have inherent value, as they were once the predominant land cover in our region but today cover less than 1%.

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2. They provide ideal habitat for many species such as Blackburnian warbler, barred owl, and certain lichens and mosses, among others

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3. Their complexity creates a diversity of habitats which results in greater biological diversity



# Why we need Old Forests

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4. Deep duff layers and abundant down wood help them serve better than younger forests to provide hydrological regulation

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5. Their dynamic nature—fallen trees—can provide protection for regeneration

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6. They store more carbon than younger forests, and much of that carbon is underground



# Why we need Old Forests

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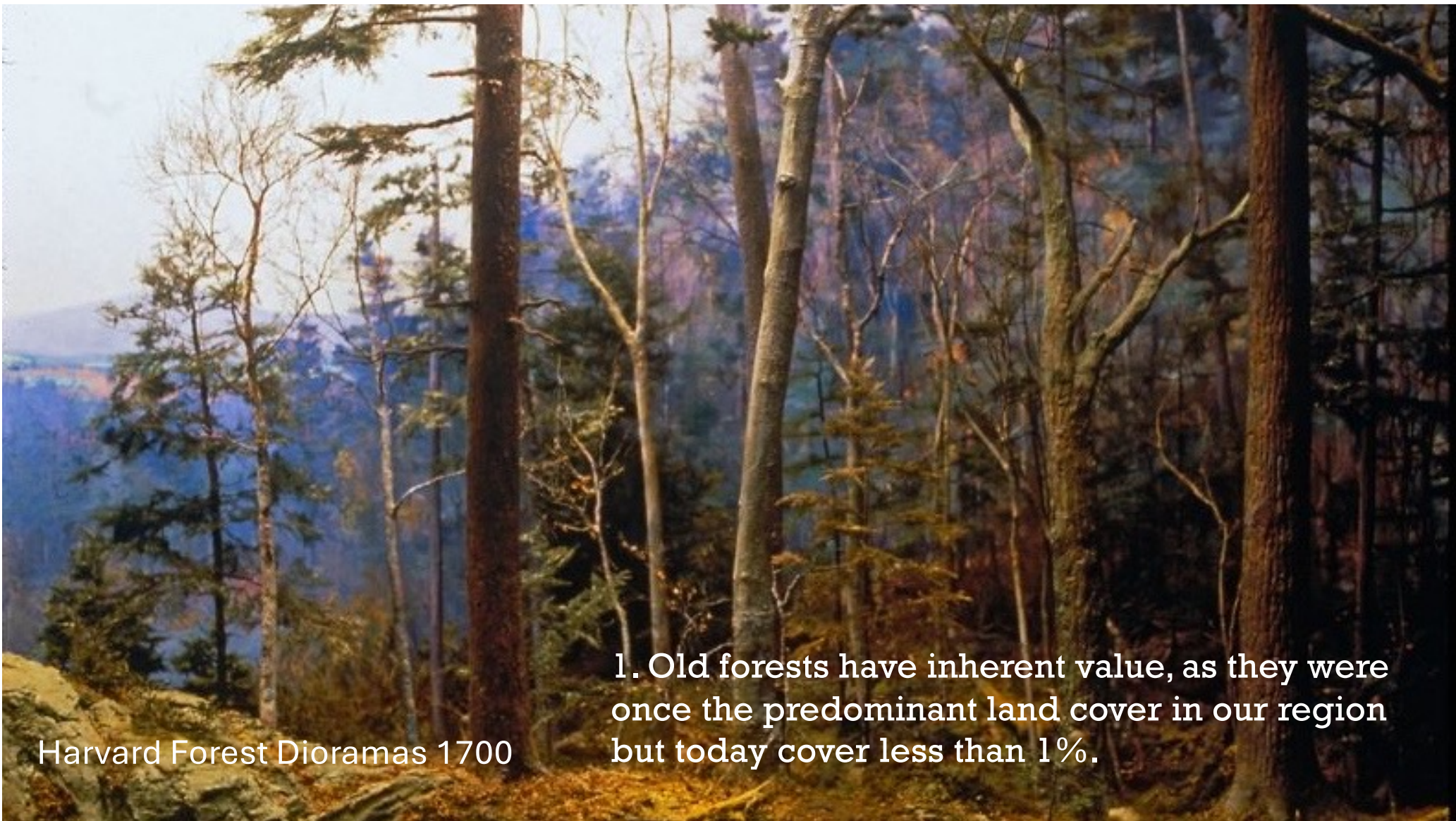
7. With their complex structure, diversity of microhabitats, diversity of species, dense carbon, and healthy aquatic systems, they are in many ways resilient to climate change

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8. They serve as reference sites to help us better understand how forests actually work


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9. They offer humans places of refuge, and mental and physical recharge; they inspire awe and a sense of wonder



Harvard Forest Dioramas 1700

1. Old forests have inherent value, as they were once the predominant land cover in our region but today cover less than 1%.

A close-up photograph of a Blackburnian warbler perched on a thin, brown branch. The bird has a bright yellow body with black streaks on its wings and back. Its head is black with a yellow stripe above the eye. The background is a soft, out-of-focus blue sky.

**2. Old forests provide ideal habitat for many species such as Blackburnian warbler, barred owl, and certain lichens and mosses, among others**

Photo: Bryan Pfeiffer



Photo: Bob Zaino

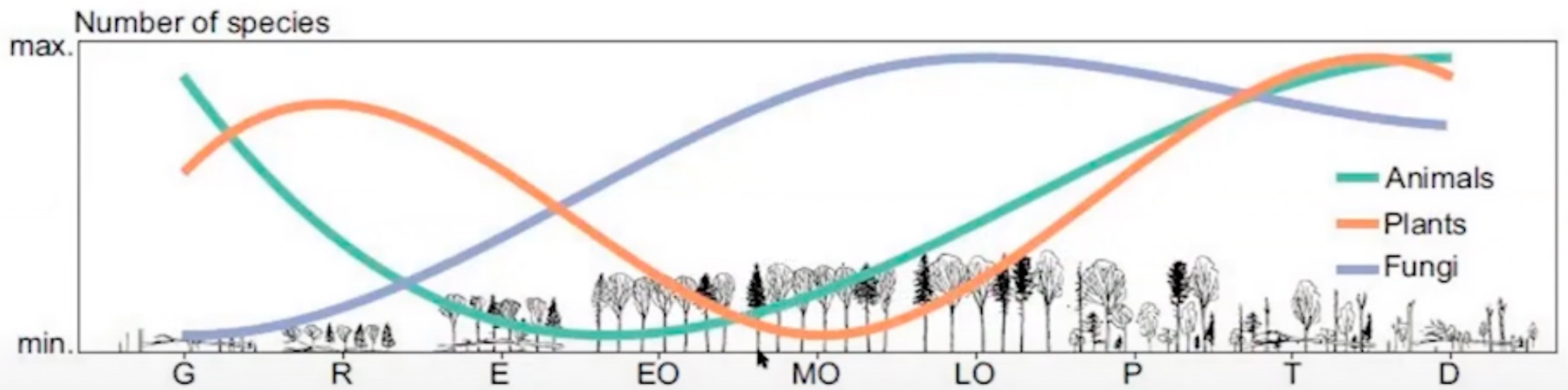




A photograph of an old forest floor. The scene is filled with fallen logs of various sizes, some covered in moss and lichen. The ground is densely populated with green ferns and other low-lying vegetation. In the background, several tall, slender tree trunks stand upright, suggesting a mature forest. The lighting is bright, highlighting the textures of the wood and the vibrant green of the plants.


**3. The complexity of old forests  
creates a diversity of habitats,  
resulting in greater biological  
diversity**

Photo: Shelby Perry



Hilmers et al. 2018



A photograph of a forest stream. In the foreground, a large, moss-covered log lies horizontally across the stream, with water cascading over it to form a small waterfall. To the right, a large pile of fallen logs and branches is stacked up, partially blocking the stream. The background is a dense forest of green trees and foliage. The lighting is soft and natural, suggesting a shaded forest environment.

4. Deep duff layers and abundant down wood help them serve better than younger forests to provide hydrological regulation

Photo: Shelby Perry

6. The dynamic nature of old forests—fallen trees—can provide protection for regeneration

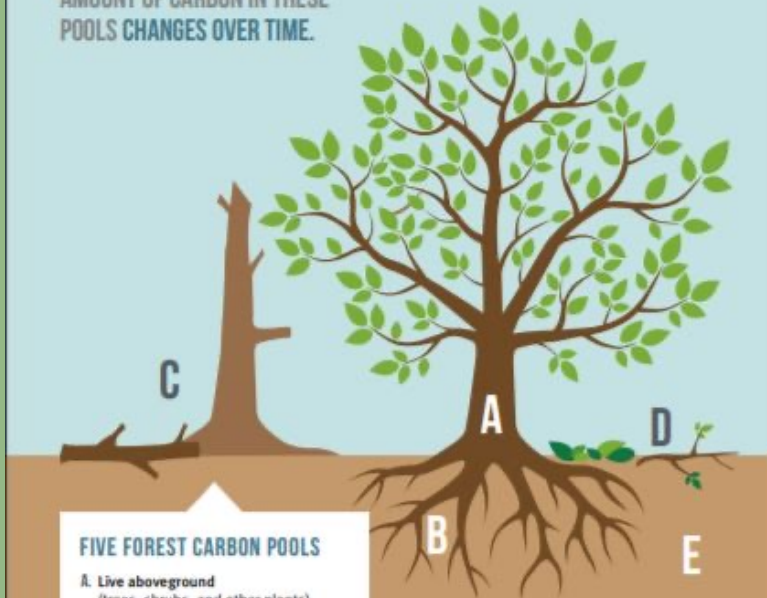


6. Old forests store more carbon than younger forests, and much of that carbon is underground



## WHERE IS CARBON STORED IN A FOREST?

A FOREST STORES CARBON IN DIFFERENT POOLS, AND THE AMOUNT OF CARBON IN THESE POOLS CHANGES OVER TIME.



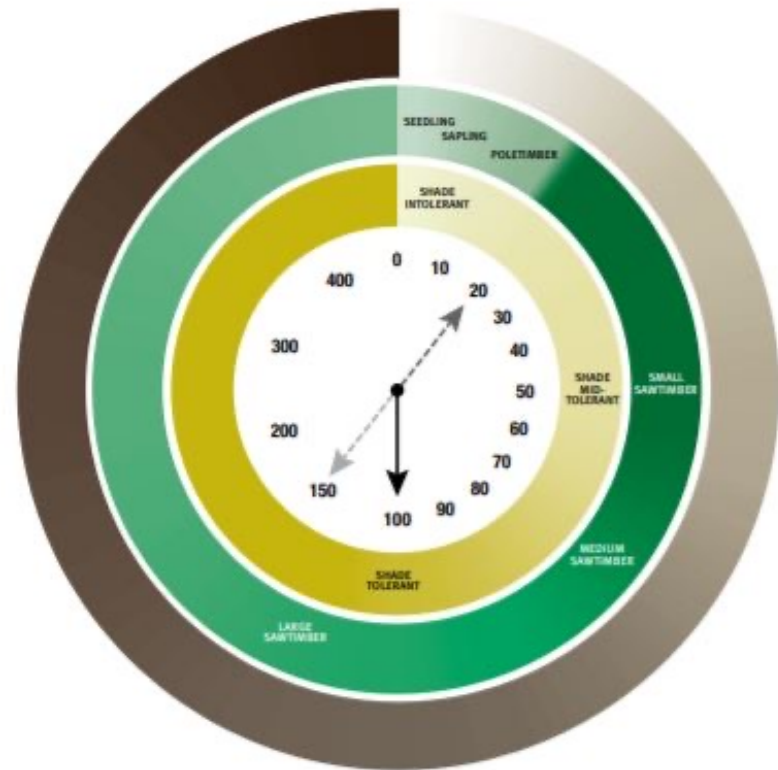
### FIVE FOREST CARBON POOLS

- A. **Live aboveground**  
(trees, shrubs, and other plants)
- B. **Live belowground**  
(roots)
- C. **Deadwood**  
(standing dead trees [snags] and downed logs)
- D. **Litter**  
(leaves, needles, and small branches)
- E. **Soil organic matter**  
(organic material in the soil, such as dead and decayed biomass [e.g., plant material and insects])

Factors that influence the amount and proportion of carbon in each of these pools:

- the age of the forest
- the species of trees making up the forest
- natural and human disturbances
- soil characteristics (e.g., texture and drainage)
- past agricultural land-use history

## FOREST SUCCESSION & DEVELOPMENT CLOCK



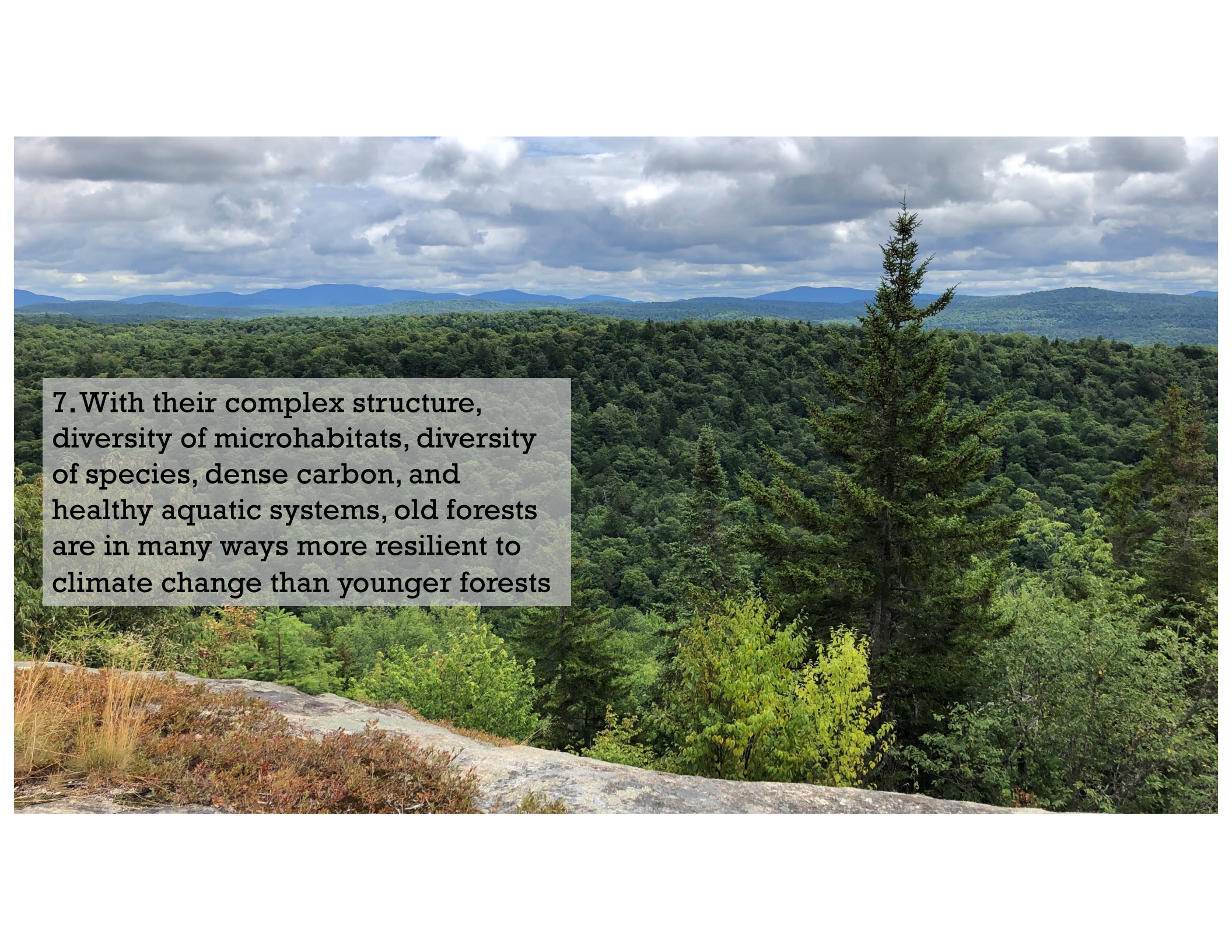
### LEGEND

**0-400** Age of the forest in years

Changes in carbon storage over time. The darker the brown, the more carbon storage.

Changes in carbon sequestration over time. The darker the green, the more forest level carbon sequestration.

Changes in tree species shade tolerance over time. The darker the yellow, the more likely shade-tolerant trees (e.g., hemlock, sugar maple, and beech) are to be competitive.

A landscape photograph showing a vast, dense forest of green trees stretching across rolling hills. In the foreground, a rocky outcrop with some dry, brownish vegetation is visible. The sky is filled with large, grey, dramatic clouds. A single, tall, dark evergreen tree stands prominently on the right side of the frame. A semi-transparent grey box with black text is overlaid on the left side of the image.

**7. With their complex structure, diversity of microhabitats, diversity of species, dense carbon, and healthy aquatic systems, old forests are in many ways more resilient to climate change than younger forests**



8. Old growth forests can serve as reference sites to help us better understand how forests actually work





9. Old forests offer humans places of refuge, and mental and physical recharge; they inspire awe and a sense of wonder

*People need wild places... We need to be able to taste grace and know once again that we desire it*

- Barbara Kingsolver



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# 2022

***Anthony D'Amato - UVM***

***Paul Catanzaro - UMass***

<https://masswoods.org/caring-your-land/restoring-old-growth-characteristics>

*with*

*Liz Thompson, VLT*

*Keith Thompson, VT FPR*

*Ali Kosiba, VT FPR (now UVM)*

*Caitlin Littlefield, CSP*

*David McMath, VLT*



## **RESTORING OLD-GROWTH CHARACTERISTICS**

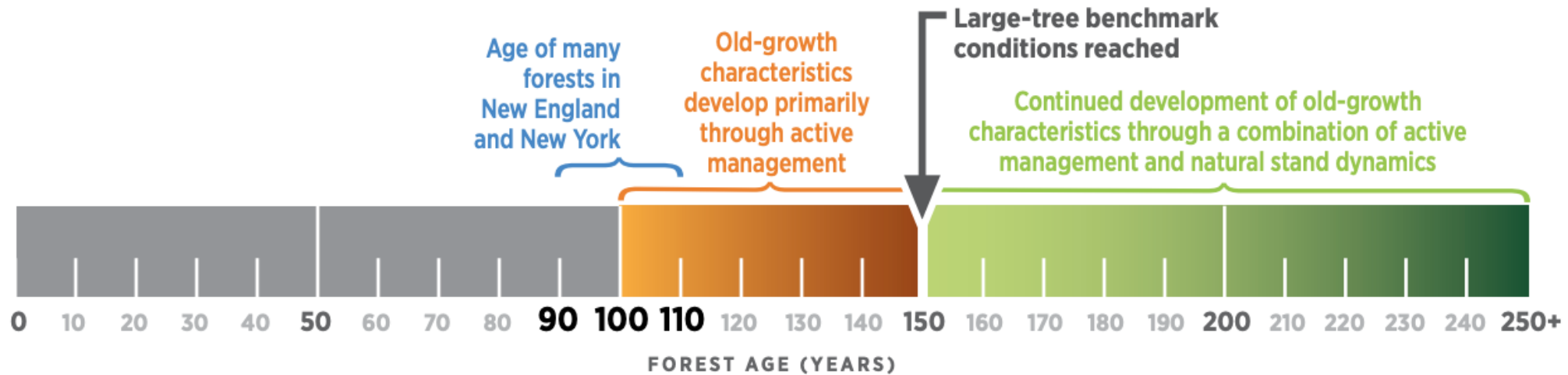
to New England's and New York's Forests



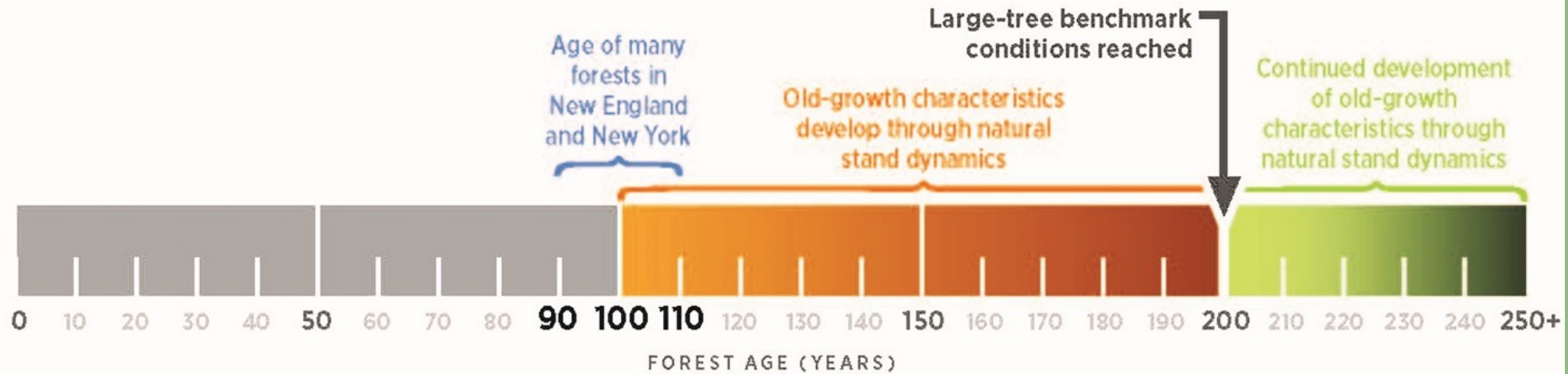
The University of Vermont  
ANTHONY D'AMATO

UMassAmherst  
PAUL CATANZARO

## Active Pathway to Old Forests



## Passive Pathway to Old Forests



Adapted from Hagan and Whitman (2004)

# Active Management

If you *need or want* to manage, you can prioritize areas with:

- Drainage problems: gullies, washouts, etc.
- Plantations of non-native species
- High concentrations of invasive plants
- High deer densities



## But—*Forests Don't Need Us!*

### Passive Management

- Nature is the manager
- Ecological Processes prevail
- Windstorms, ice storms, flooding, insects, disease...







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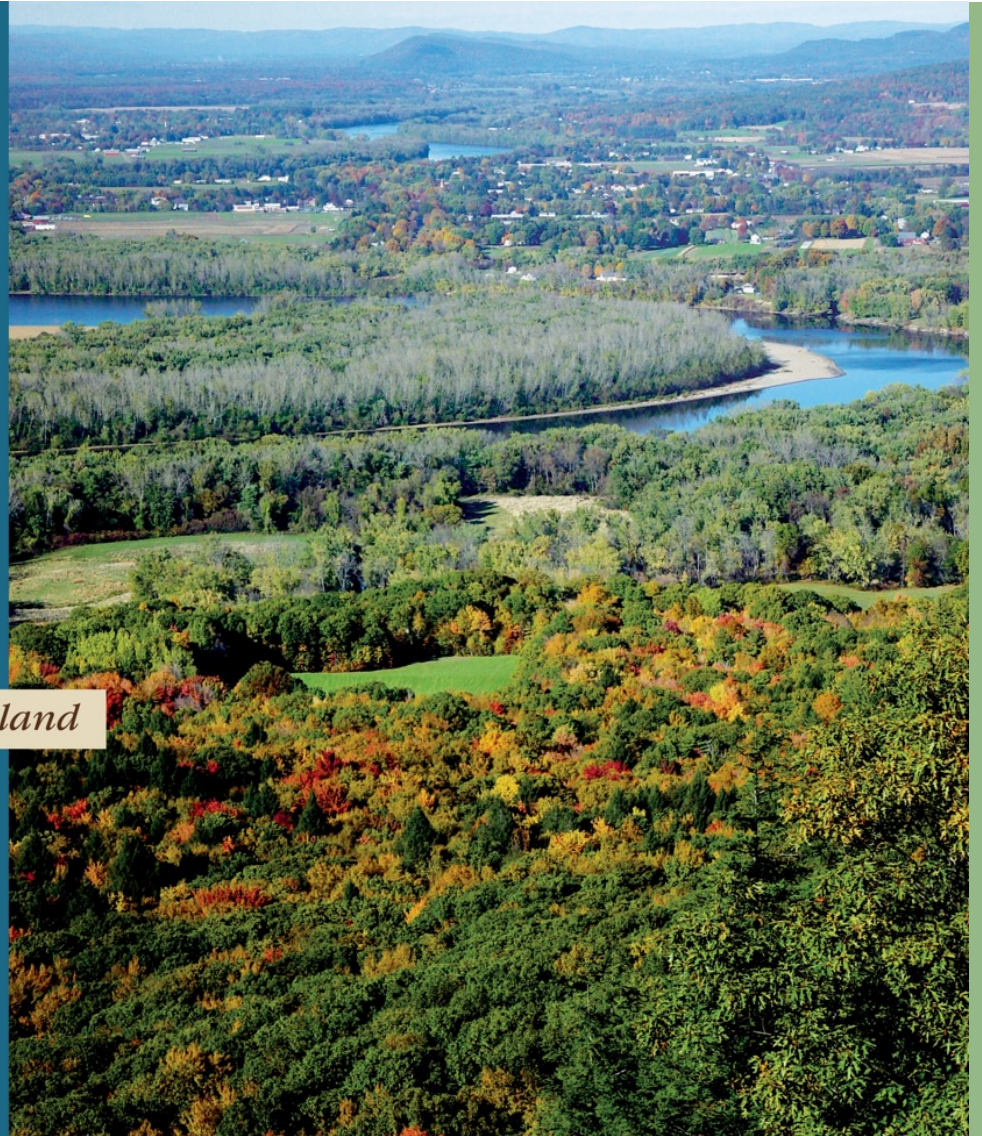
# Wildlands and Woodlands



2017

Farmlands and Communities

*Broadening the Vision for New England*



2024



## BEYOND THE “ILLUSION OF PRESERVATION”

Taking Regional Responsibility by Protecting Forests, Reducing Consumption, and Expanding Ecological Forestry in New England

Caitlin Littlefield | Brian Donahue | Paul Catanzaro | David Foster | Anthony D'Amato | Kenneth Laustsen | Brian Hall

# VERMONT CONSERVATION DESIGN

MAINTAINING AND ENHANCING AN ECOLOGICALLY FUNCTIONAL LANDSCAPE

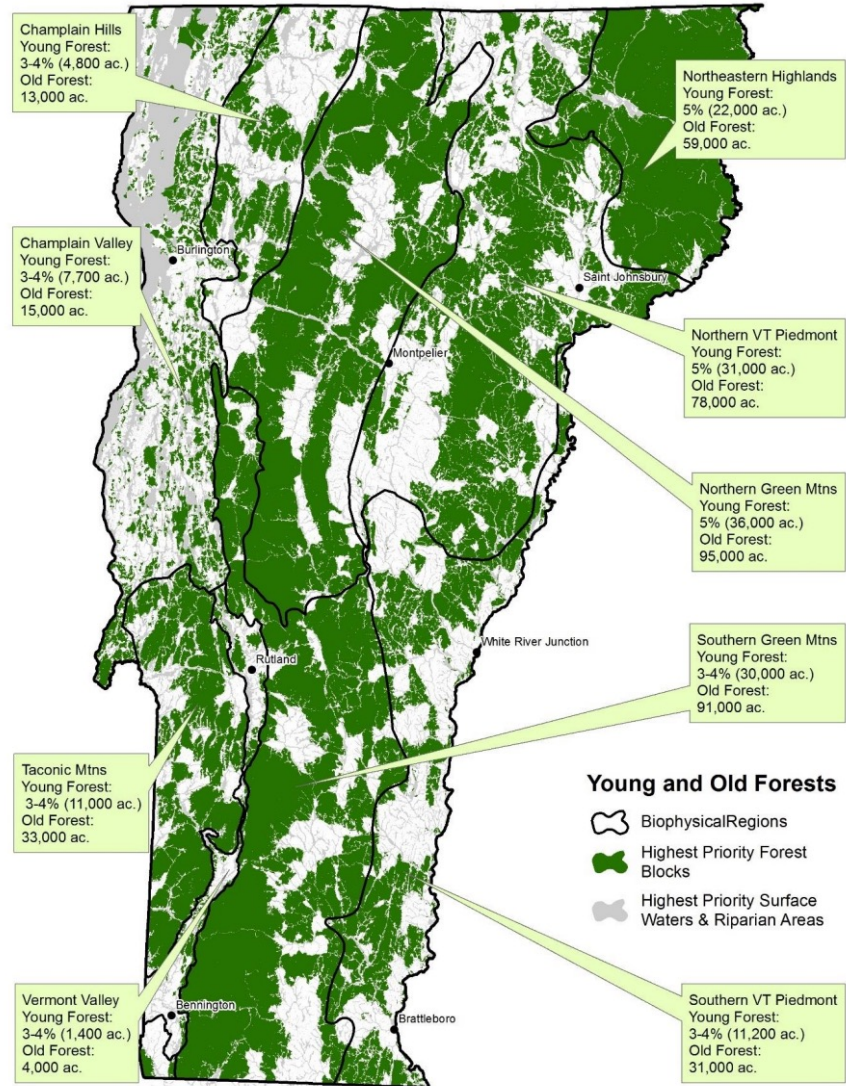


## Summary Report for Landscapes, Natural Communities, Habitats, and Species

February 2018

Eric Sorenson and Robert Zaino

Core Participants:  
 Jens Hilke, Doug Morin – Vermont Fish and Wildlife Department  
 Keith Thompson – Vermont Department of Forests, Parks and Recreation  
 Elizabeth Thompson – Vermont Land Trust



# Wildlands in New England

*Past, Present, and Future*

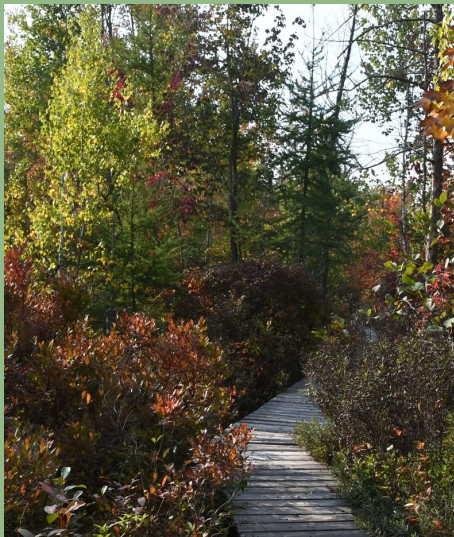


2022



# What are Wildlands?

Wildlands are tracts of any size and current condition, permanently protected from development, in which management is explicitly intended to allow natural processes to prevail with “free will” and minimal human interference. Humans have been part of nature for millennia and can coexist within and with Wildlands without intentionally altering their structure, composition, or function.



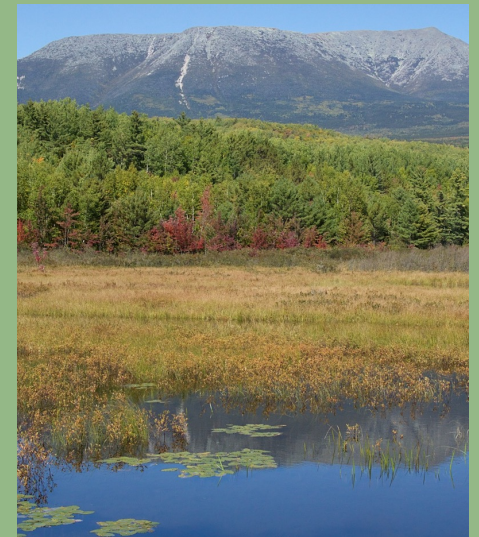
**Colchester Bog, Vermont**



**Monhegan Island, Maine**



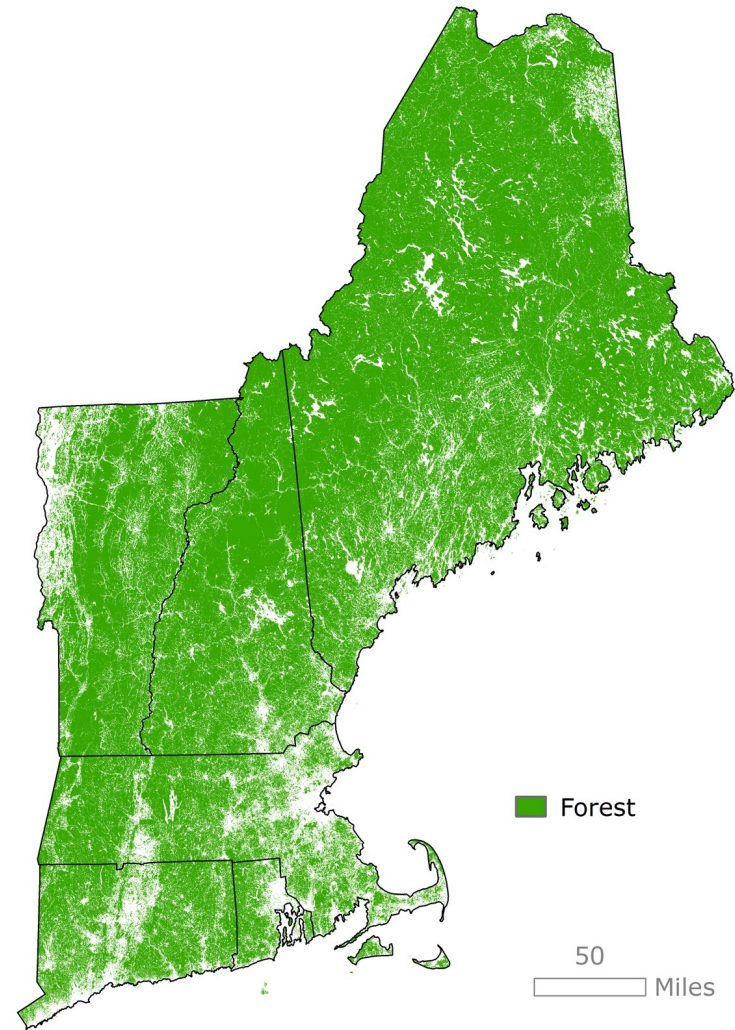
**Muddy Pond, Massachusetts**



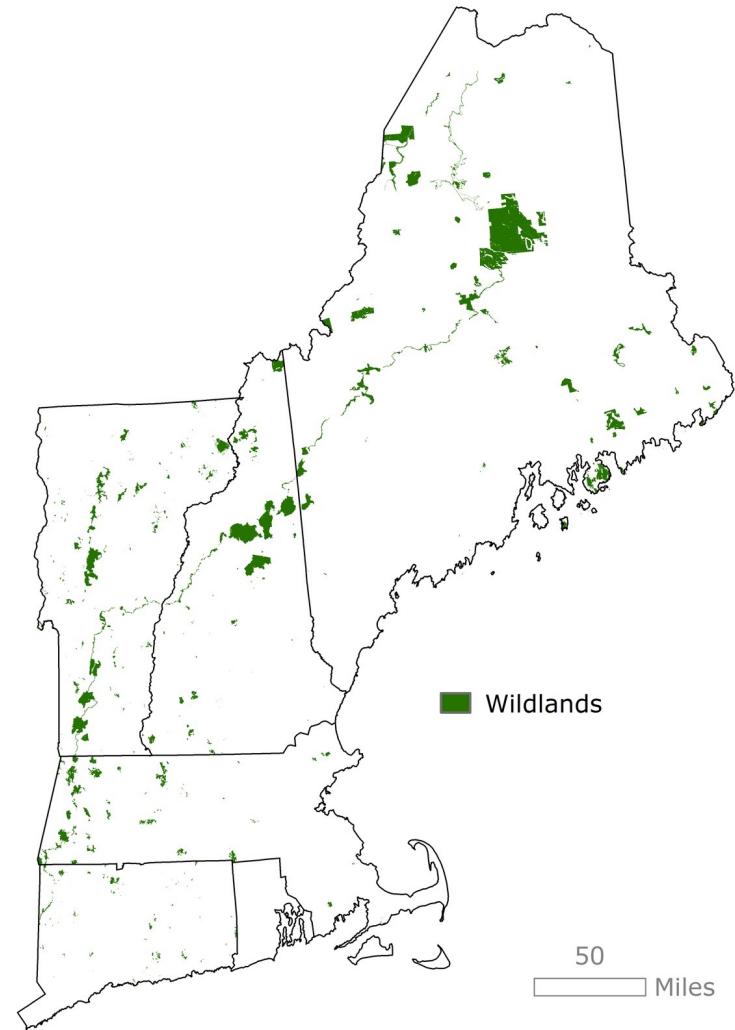
**Baxter State Park, Maine**

**81%**

of New England is forest.



**3.3%**  
is Wildlands.











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# From the Ground Up

[www.fromthegroundupne.org](http://www.fromthegroundupne.org)



A low-angle photograph looking up at a large, textured tree trunk on the left side of the frame. The tree's canopy is filled with leaves in various stages of autumn, showing shades of green, yellow, orange, and red. The background is a clear blue sky with some wispy white clouds. The overall scene is bright and natural.

Questions?