Restoring Old-Growth Characteristics

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Definitions

- **Old Growth:** forests never directly impacted by human land-use (logging, agriculture). Structurally complex forests (diversity of tree sizes and ages, large accumulations of dead wood)

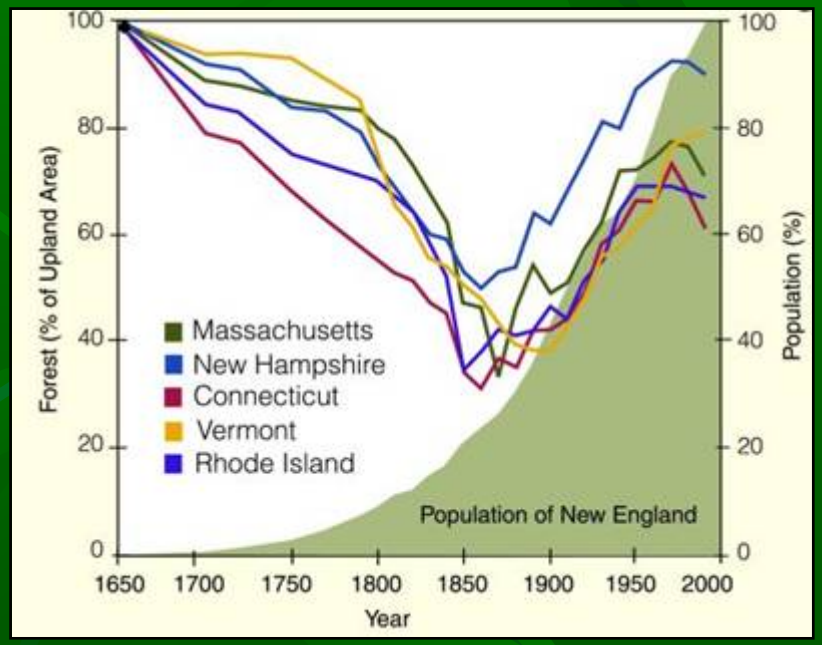
- **Second Growth**: forests that established and grew following human land-use

Old-growth 415 yrs old

Second-growth 100 yrs old

Past Extent of Old-Growth in MA

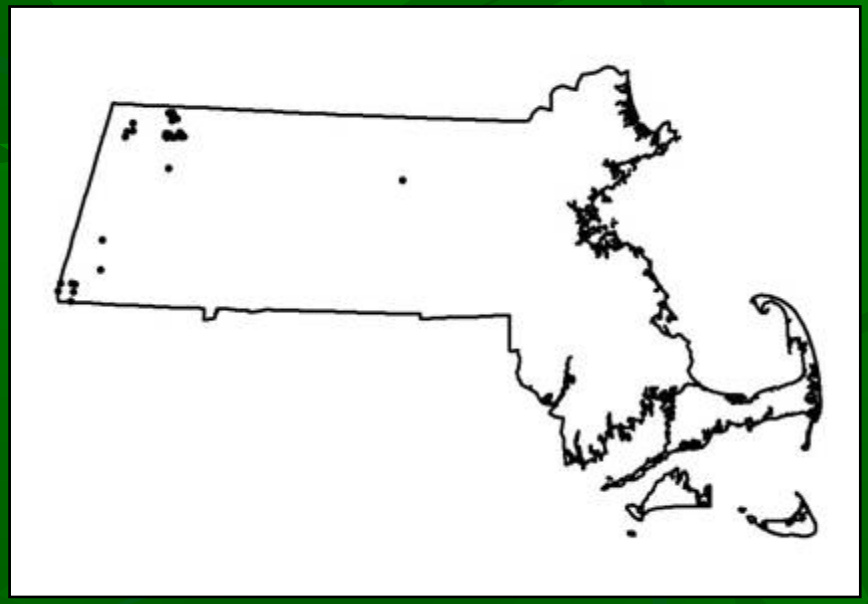
Old-growth forests covered from between 70-90% of the landscape prior to European settlement



Harvard Forest, Fisher Museum

Current Extent of Old-Growth Forests In Massachusetts

- approximately **1,119 acres**
- 80% of these forests occur in the Berkshire Hills and Taconic Mountains
- **0.1%** of the forested land base in MA – Down from 70-90%
- How do we close this gap?



Why is Old Growth Important?

- Forest condition for thousands of years
- Certain Species of fungi and lichens need old growth or old-growth structure
- Source Population
- Resilience to large scale disturbance
- ~10% of Species on Earth are documented

Lobaria

Pileated Woodpecker

Wood Thrush

Blackburnium Warbler

Other Benefits

- Provides an alternative to “traditional forest management” to engage a greater number of private forest landowners.
- Encourages landscape level thinking
- Opportunity to work more closely with conservation organizations.
- Provides an entry point option for town and community forests looking to try active management.

What makes old growth different ?

Old-Growth Structure (or components)

- Diversity of tree sizes and ages, including very large trees (25-30” DBH) and very old trees (200-300 yrs. Old)
- Snags – large standing dead trees
- Large downed logs
- Gaps in the forest canopy

More Dead Wood on the Forest Floor

- **Old-growth forests have from 2- 4 times more dead wood on the forest floor than second-growth forests in MA**

Cords of wood on forest floor per acre

Old-Growth	Second-Growth
15	3.7

More Standing Dead Wood

- **Old-growth forests have from 2-3 times more functional snags per acre than second-growth forests in MA**

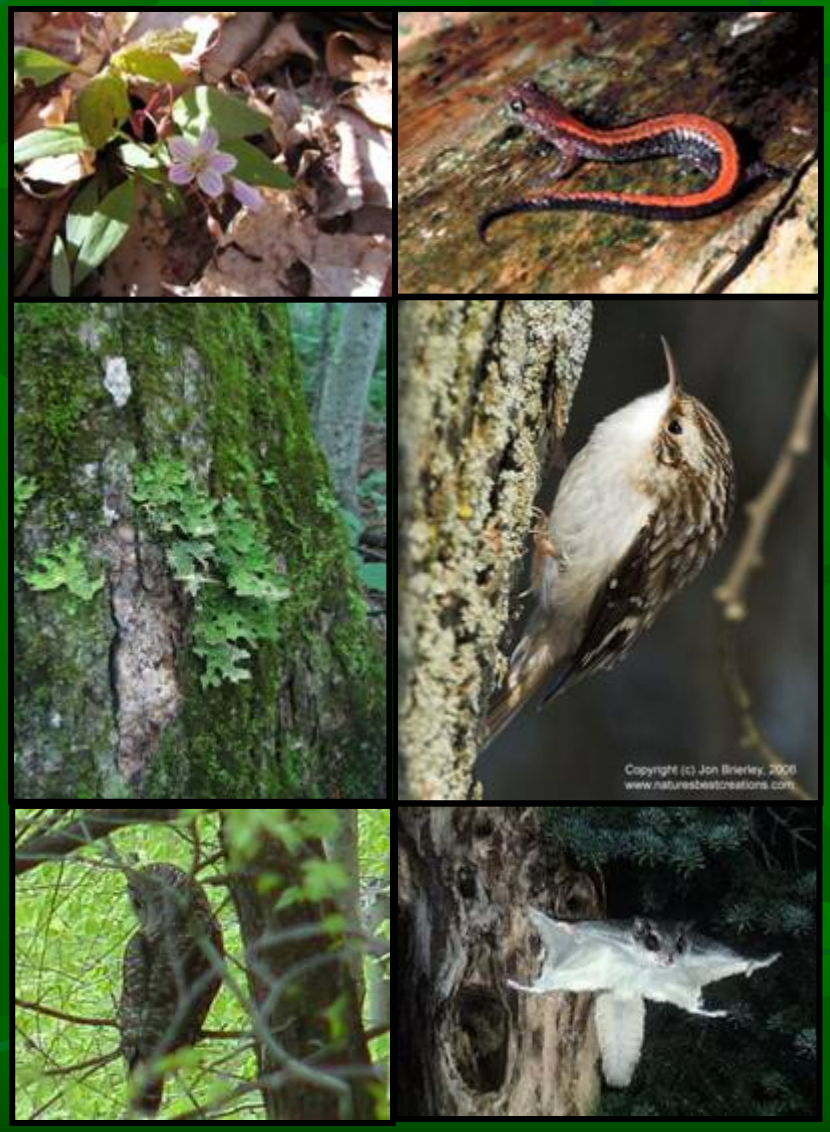
Old-growth trees show their age

Sugar Maple ~ 200 years old

Red Oak 300 yrs. old –Tertiary Bark

Wildlife Habitat Implications

- Diversity of tree diameters provides foraging habitat and cover for a wide range of species
- Diversity of tree heights creates multiple canopy layers – variable env. conditions
- Unique crown architecture and bark morphology on older/larger trees – lichens, perches, foraging
- Large volumes of wood on the forest floor – moist conditions, seedbeds
- High densities of large snags

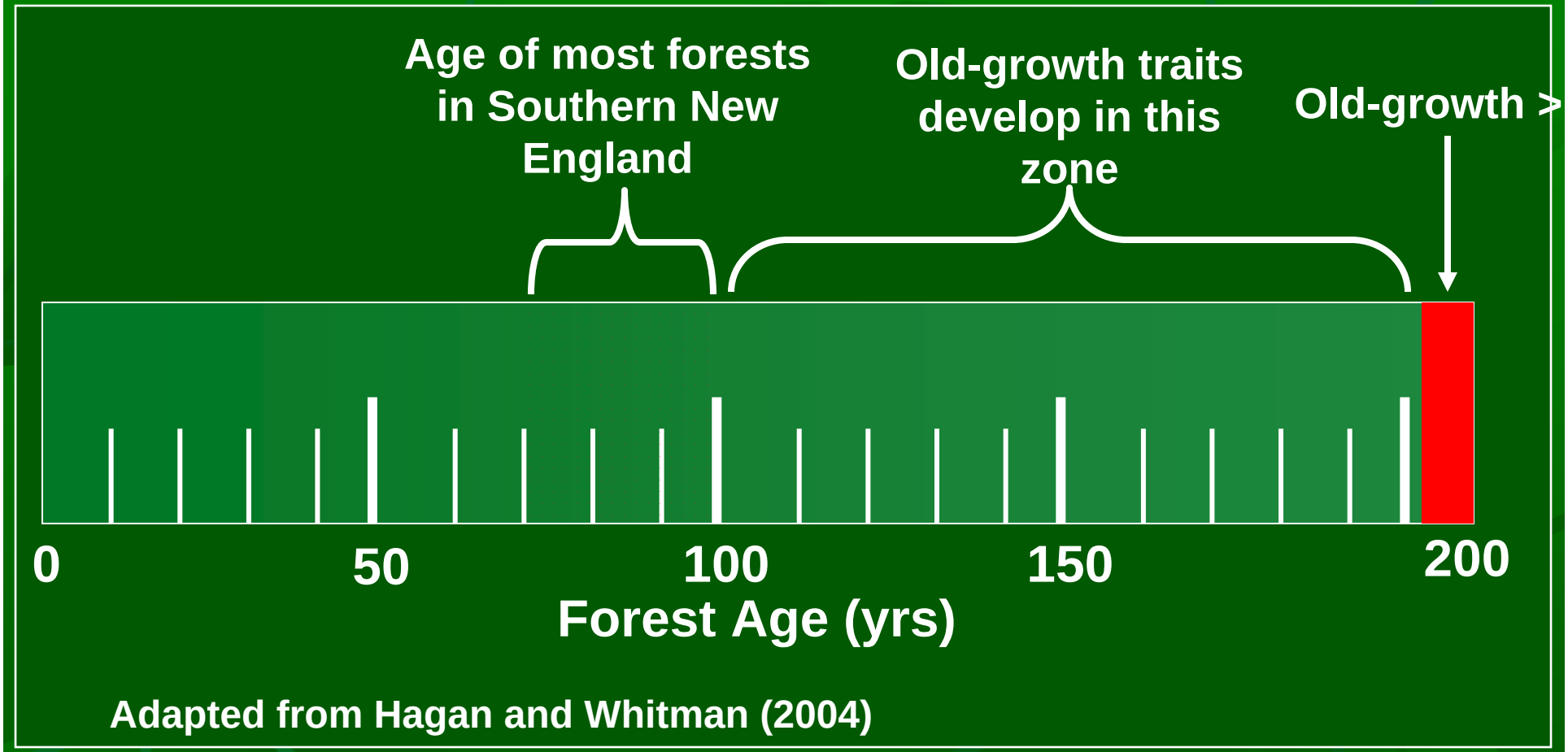


Passive Management

- Let nature take its course
- OG Structure developed through forest growth, natural disturbances (*e.g.*, windstorms, ice and snow storms), insect outbreaks, and disease
- Most natural appearance (*i.e.*, no cut stumps or or skid trails)
- Passive does not mean “do nothing”!!!

Should I Salvage?

- Developing OG means leaving dead and dying trees in the woods.
- While looking “messy”, it is what creates the structure we are missing
- Fire is a minimal concern in New England



Adapted from Hagan and Whitman (2004)

Active Management for OG structures

Table 1 **Old-growth structural characteristics and corresponding management practices for promoting these characteristics.**

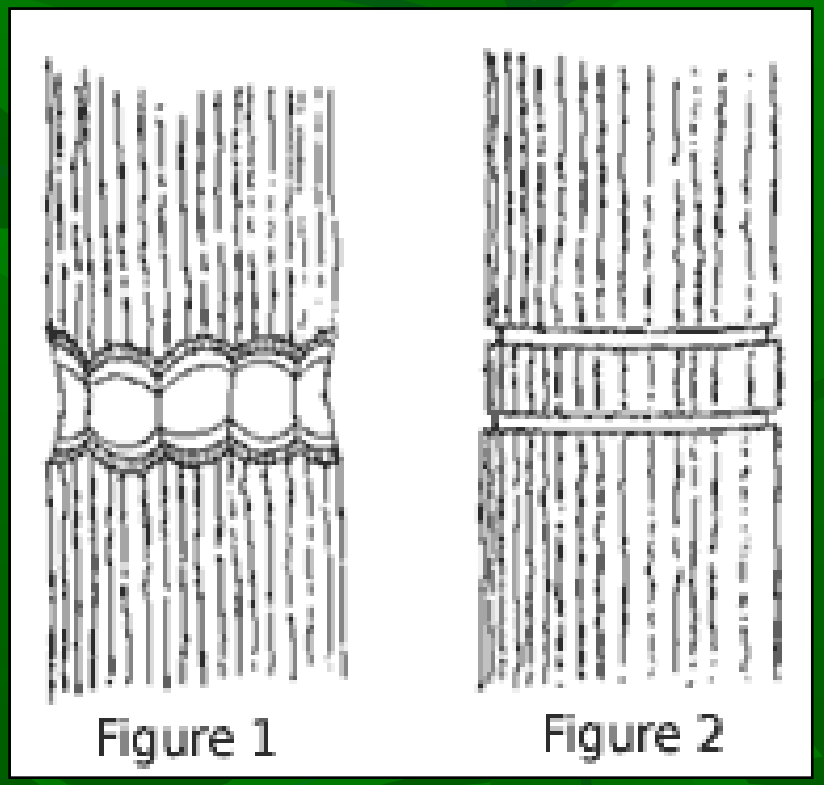
Old-Growth Structural Characteristic	Management Practice
Increase the diversity of tree sizes and ages	Harvest single trees or small groups of trees, creating gaps up to 1/4 acre; repeat to create multi-aged stands
Increase the number of snags—large standing dead trees	Girdle (i.e., cut several rings of bark/cambium around the stem to deliberately kill the tree) selected medium- to large-sized trees, including cull trees
Increase number and volume of downed logs	Fell and leave on the ground selected medium- to large-sized trees, including cull trees, which can improve growth of residual trees
Provide for future snags and downed logs	Reserve permanent "legacy trees" within harvested areas (photo, pg. 8)
Increase number of large living trees	Thin woods by removing competing, low-quality trees adjacent to largest, most vigorous trees

Diversify Tree Sizes and Ages

- Harvest Single Trees or small groups up to ¼ acre – create young trees
- Repeat to create multi-aged forest
- Thin between patches to increase tree sizes

Increase the Number of Snags

- Girdle medium to large sized trees, including poor quality trees



Girdle tree by cutting through bark into cambium

Increase Downed Logs

- Fell and leave on the ground selected medium and large trees - including culls which can increase growth of other nearby trees

Legacy Trees for Future Structure

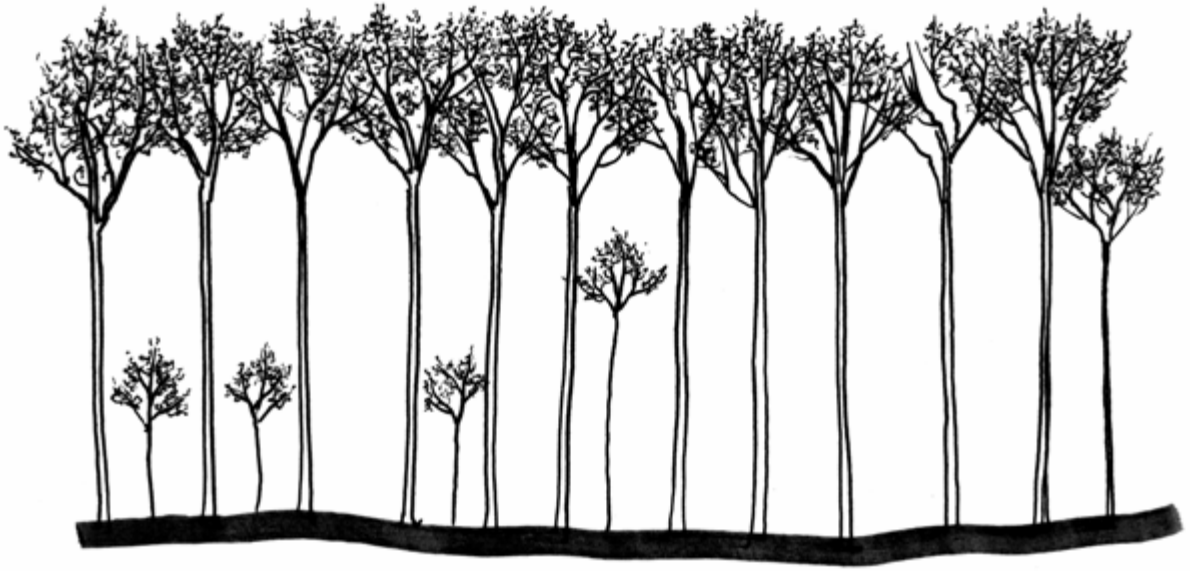
- Leave Legacy Trees to develop old age class
- Legacy trees also provide future cavities and downed dead logs
- Groups of legacy trees are Patch Reserves
- Leave around existing OG Structure
- **Single most important action to create OG structure**

Fox Den WMA – Worthington, MA

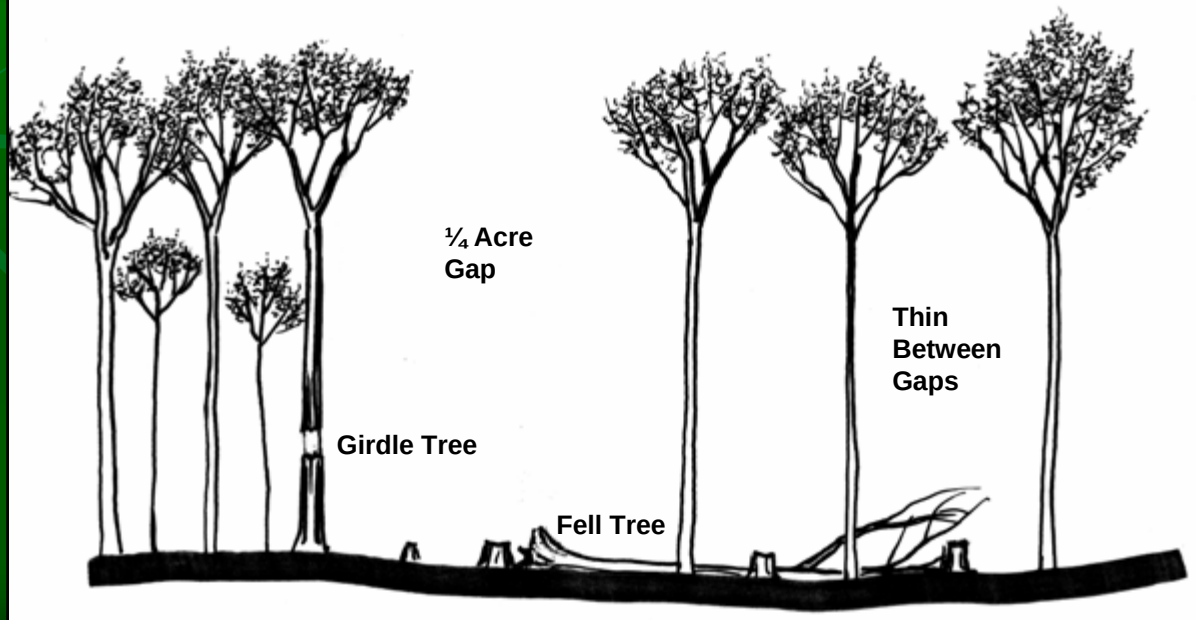
Increase the number of Large Living Trees

- Thin woods by removing competing low-quality trees next to large, vigorous trees

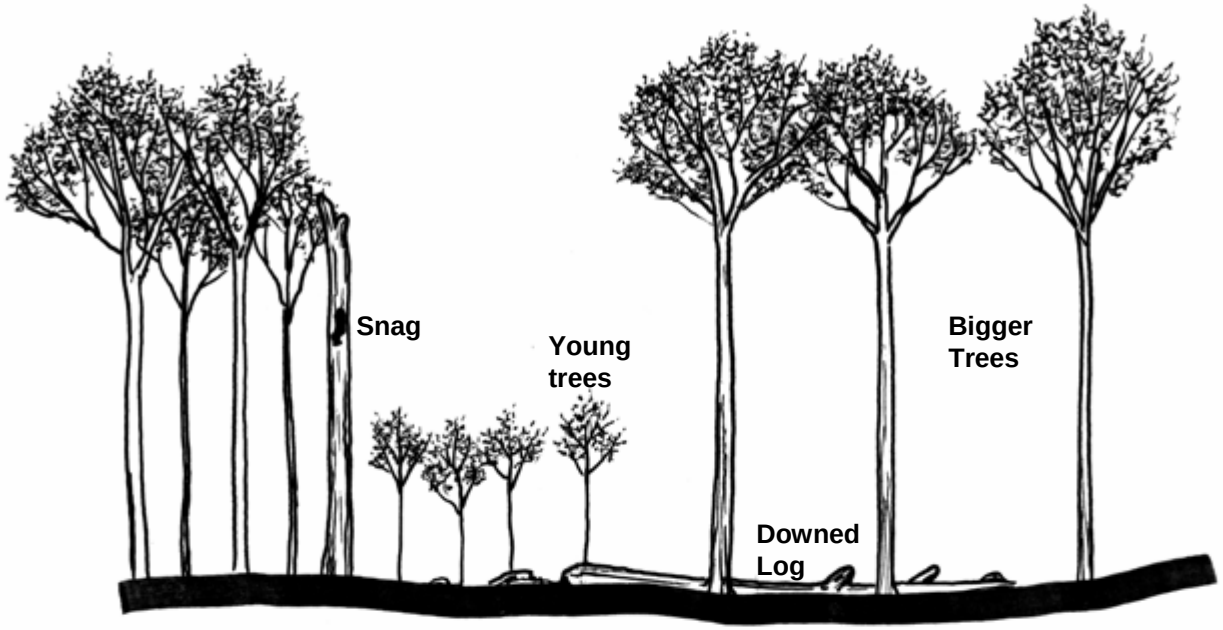
2nd Growth Forest Before Management



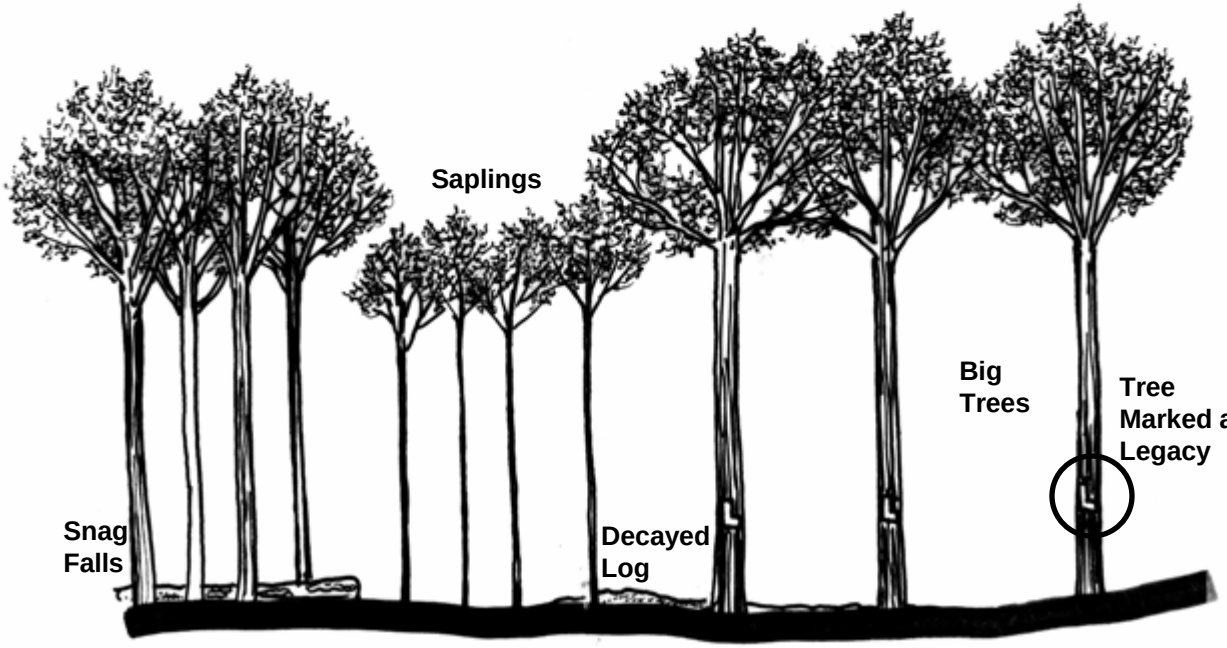
Immediately Following Harvest

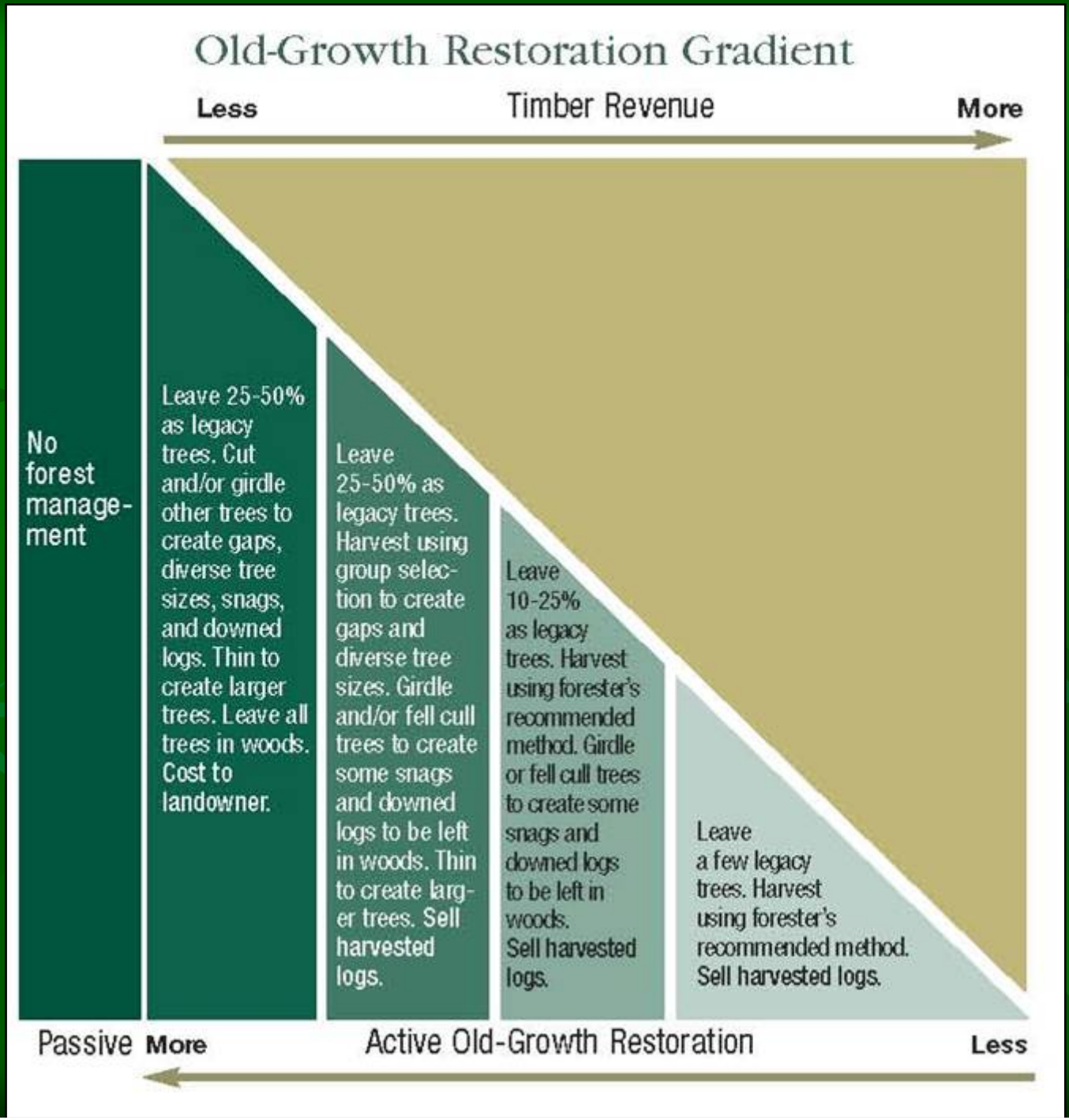


15–years after harvest



30-years after harvest




Old-Growth Restoration Gradient
Less
Timber Revenue
More
No forest manage-ment
Leave 25-50% as legacy trees. Cut and/or girdle other trees to create gaps, diverse tree sizes, snags, and downed logs. Thin to create larger trees. Leave all trees in woods. Cost to landowner.
Leave 25-50% as legacy trees. Harvest using group selec-tion to create gaps and diverse tree sizes. Girdle and/or fell cull trees to create some snags and downed logs to be left in woods. Thin to create larg-er trees. Sell harvested logs.
Leave 10-25% as legacy trees. Harvest using forester's recommended method. Girdle or fell cull trees to create some snags and downed logs to be left in woods. Sell harvested logs.
Leave a few legacy trees. Harvest using forester's recommended method. Sell harvested logs.
Passive
More
Active Old-Growth Restoration
Less

Siting Restoration

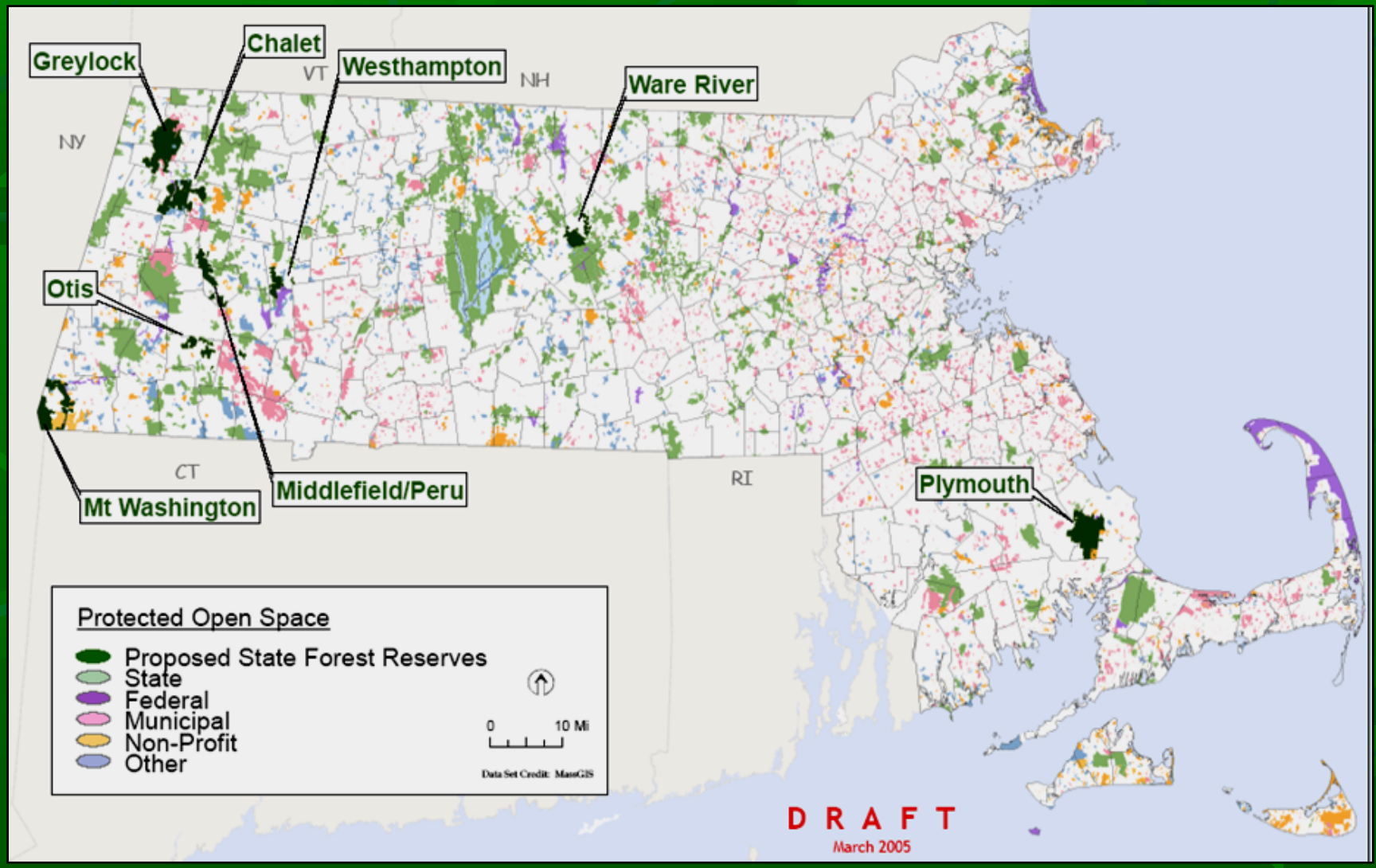
- Find existing old-growth Structure - snags, downed logs, gaps, large trees
- Productive Sites, may compete with timber objectives
- Environmental variation
- Place Legacy Trees and Patch Reserves – groups of legacy trees – in and around these features

Long-Term Planning

- Forest Management Planning – noting areas and treatments to make sure practices are given time to develop undisturbed (*e.g.*, Map, Mgt. Plan)

- Estate Planning using tools such as Conservation Easements. Land needs to stay in forest cover for decades in order to reach create old-growth structure.

Role of Public Lands



Role of Private Lands

- Most forests in the Northeast are privately owned. **Restoring old-growth structure means working with private landowners!**
- The integrity of existing old-growth forests and large forest reserves will depend on management of private forest matrix

Landscape Scale Management

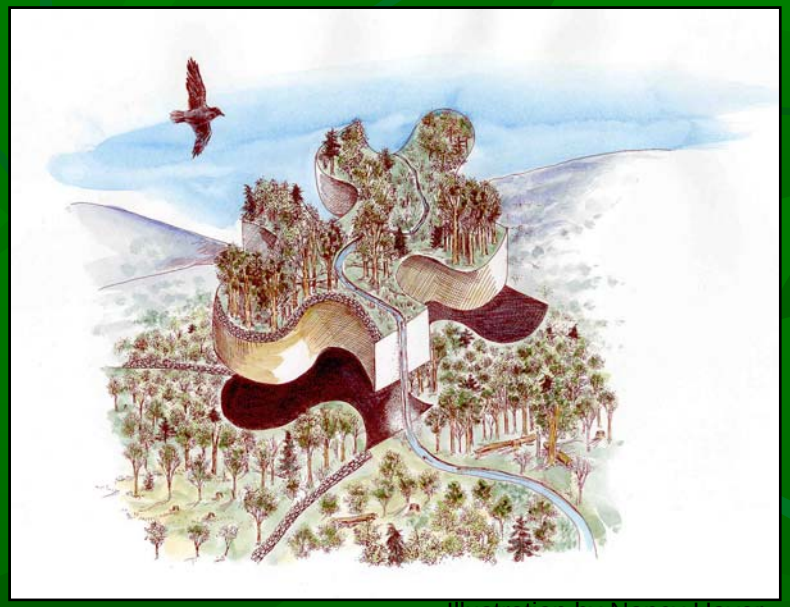
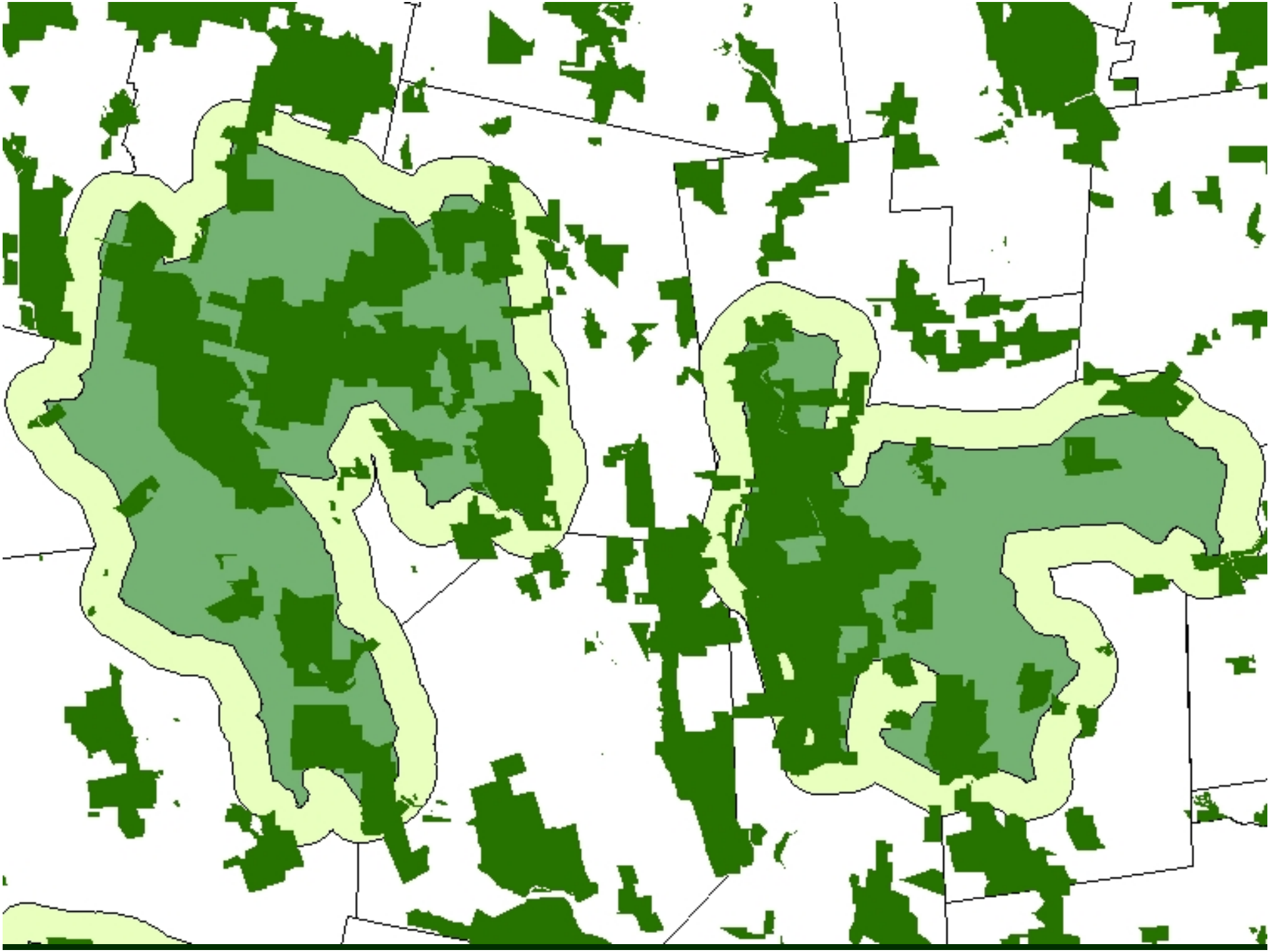
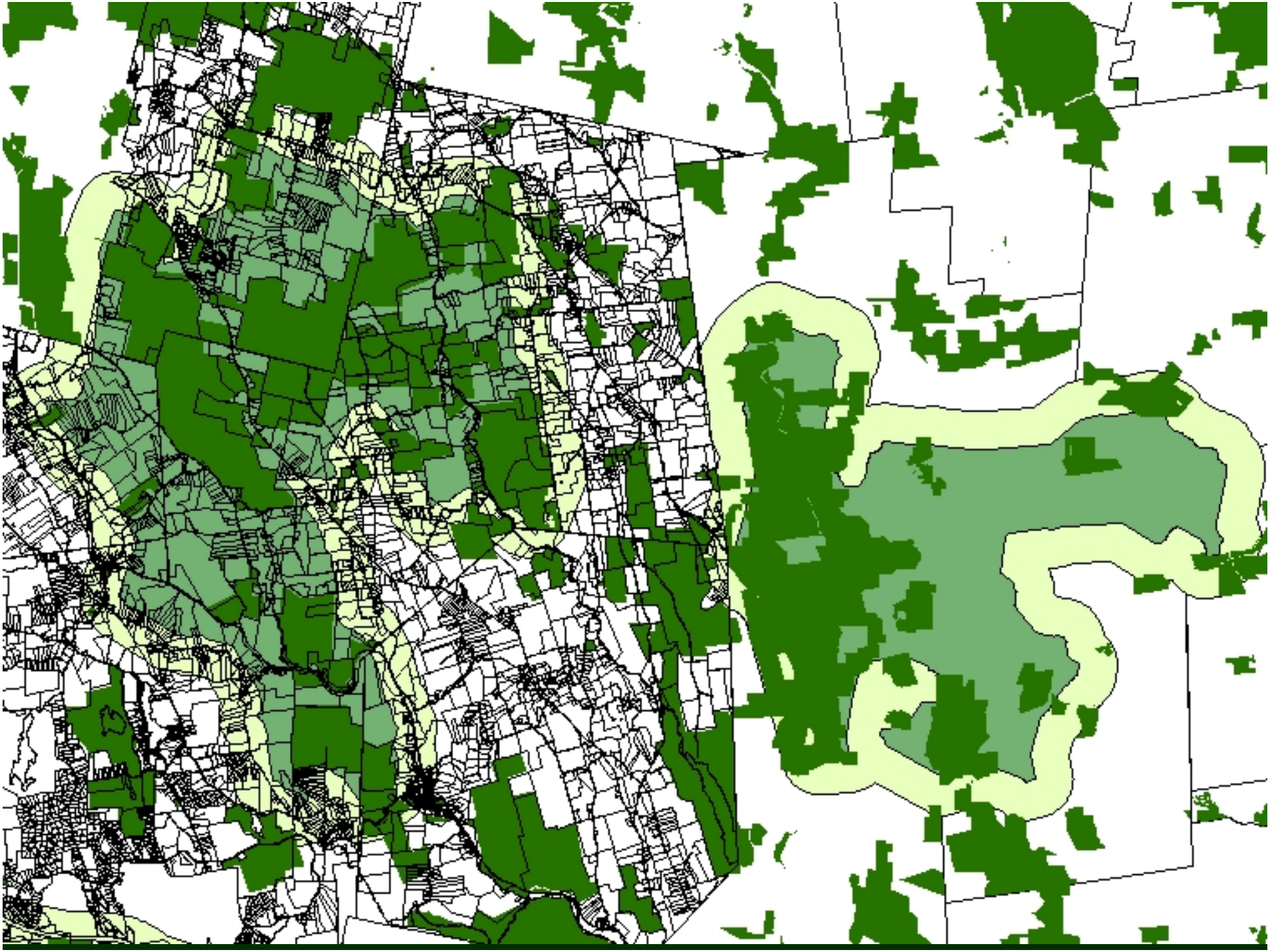
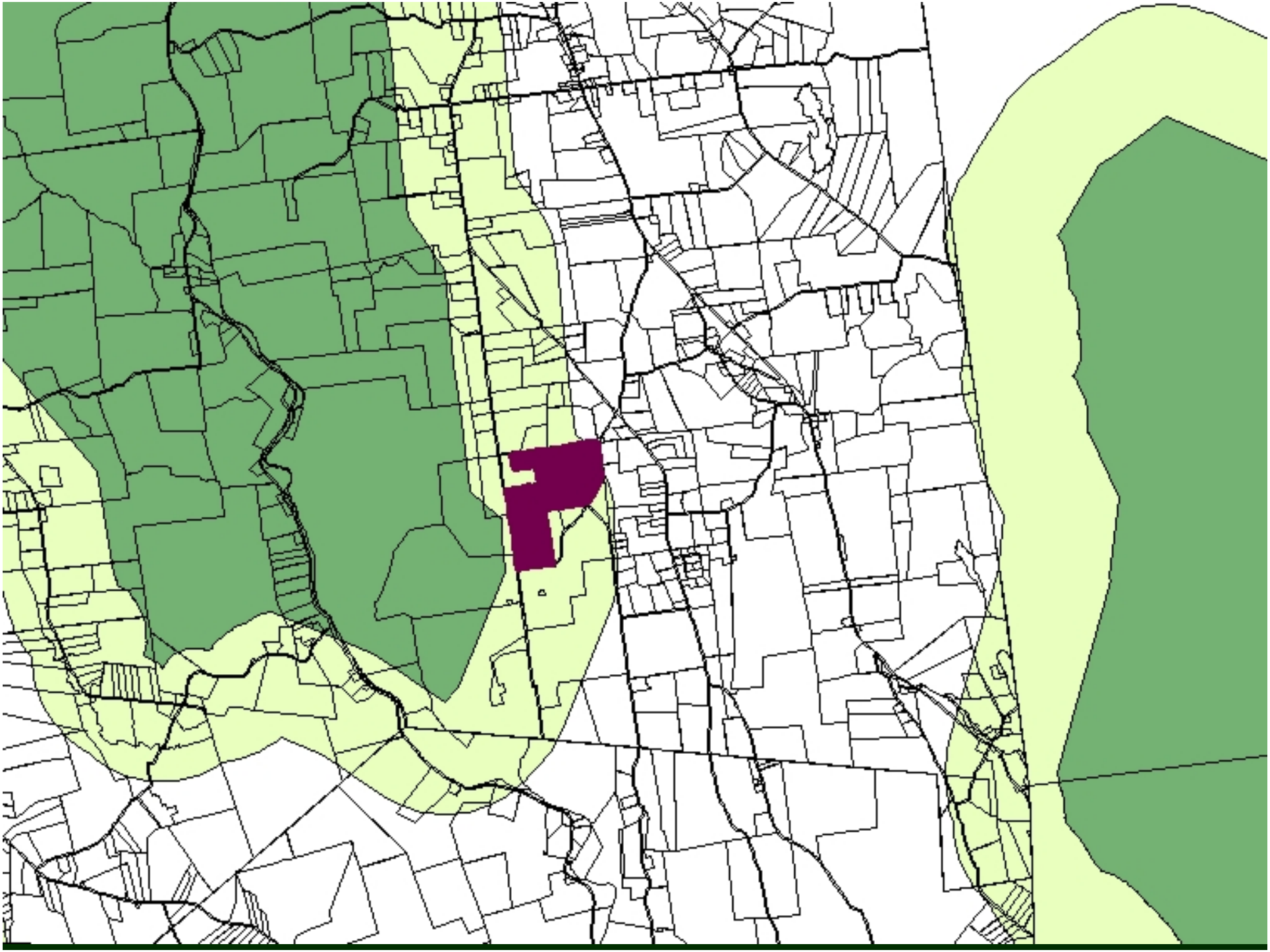


Illustration by Nancy Haver







Implementing on the Ground

1. Decide the % of canopy to be left as legacy trees
2. Choose restoration areas – quicker results on more productive soil (caution: also best timber growing areas)
3. Identify existing OG structure in restoration areas
4. Site Patch Reserves and mgt. around these areas of existing structure
5. Document in the field and at home
6. Plan the future of the land!!!

Getting Started

- Evaluate how developing old-growth structure fits with landowner objectives.
- Work with a forester to evaluate your land, landscape context and options.
- Contact a land trust to find out your estate planning options

http://www.MassWoods.net

Summary

- Old-growth forests are a rare, but historically important forest type.
- Management strategies exists for restoring the many important structures – both passive and active.
- Old-growth restoration can be implemented in a variety of intensities and combinations to fit landowner goals.
- Even a single old-growth restoration treatment will make a considerable difference – legacy trees most important.
- Know how your land fits into the landscape
- Long-term forest and estate planning is essential!


“To Keep Every Cog and Wheel is the First Precaution of Intelligent Tinkering”
- Aldo Leopold

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