

Introduction to Silviculture



Jim Finley

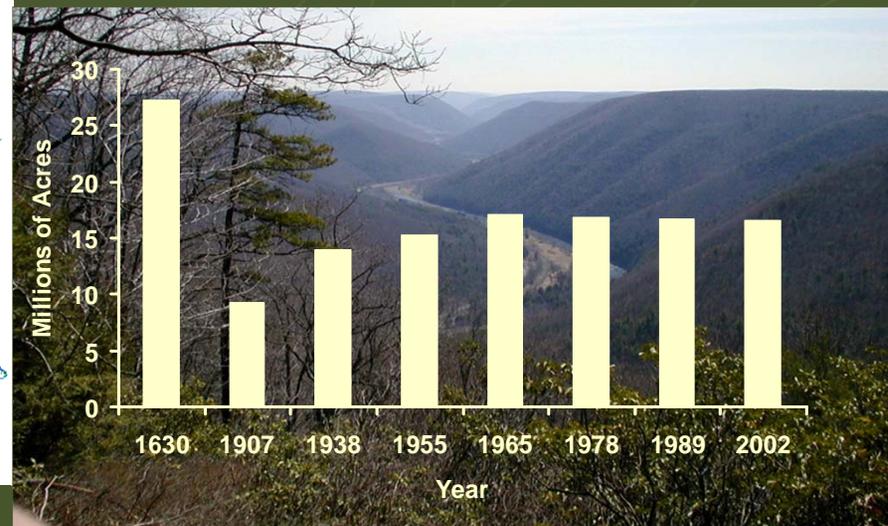
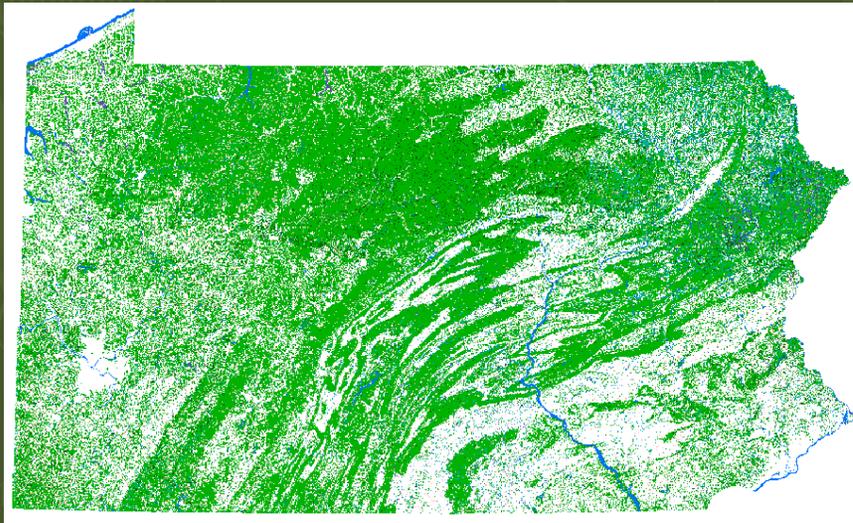
PENNSTATE

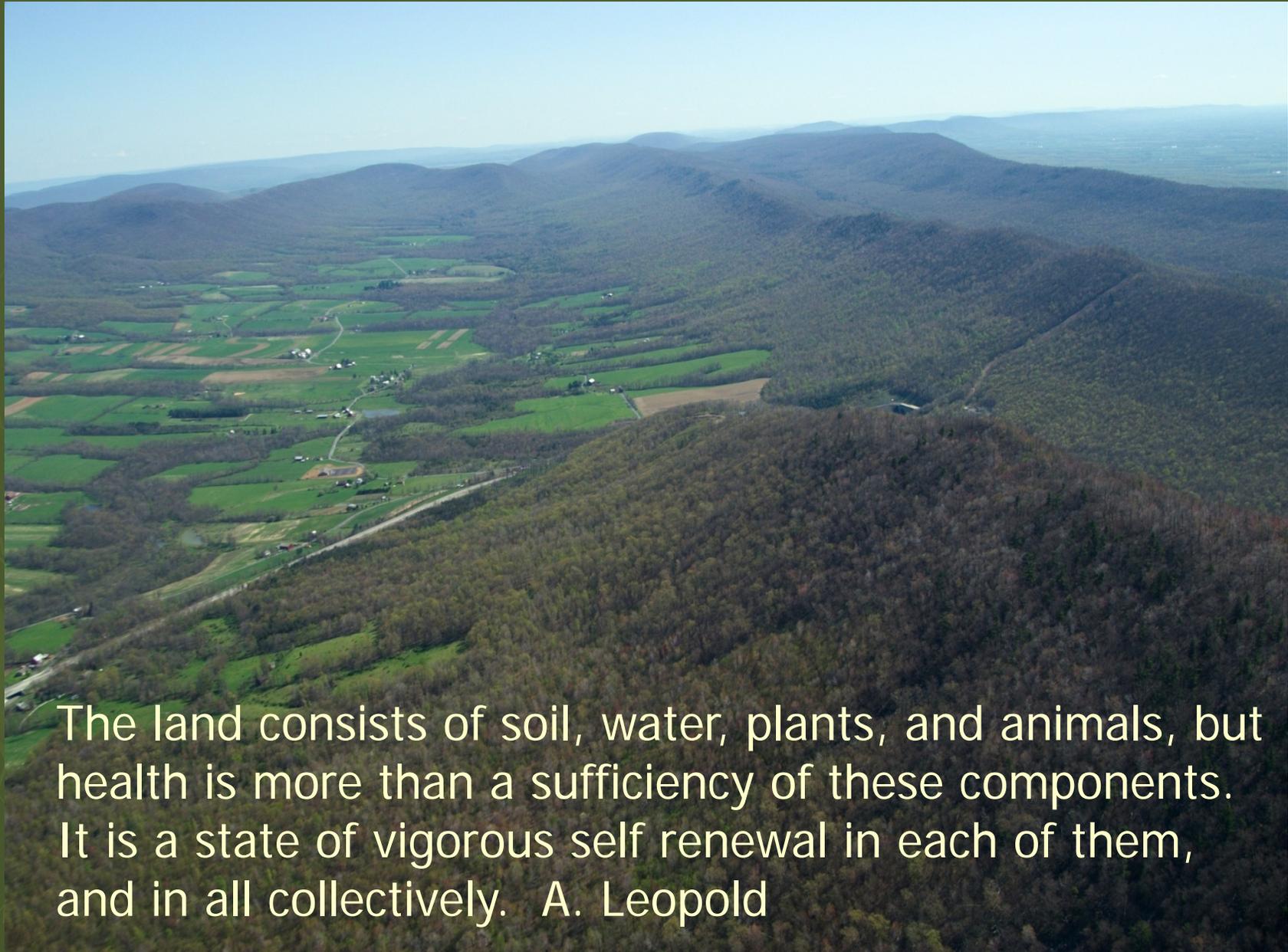


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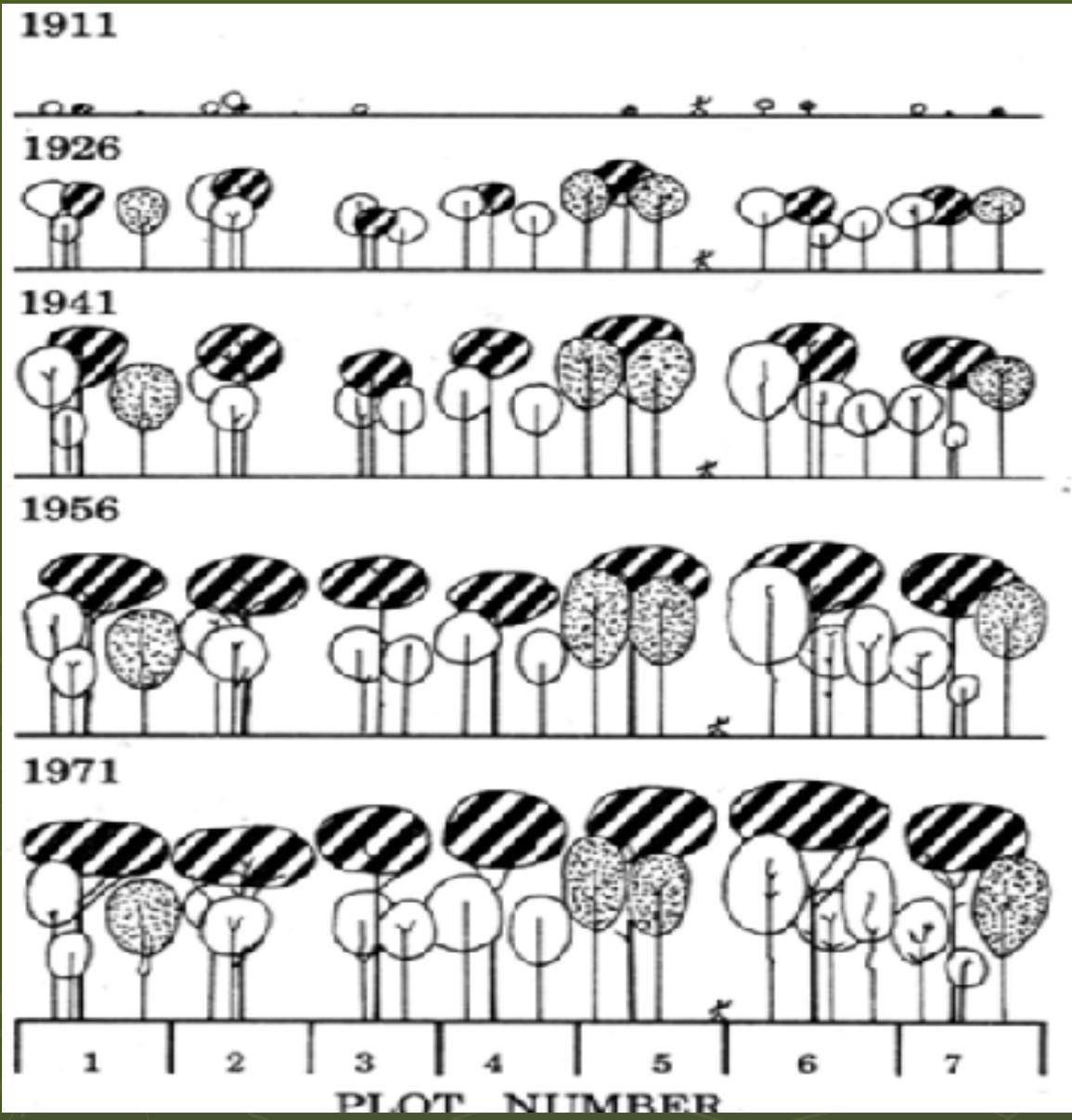
Pennsylvania's Forests

- ▶ 16.6 million acres of forest (58% of the state)
- ▶ More forest today than in the last 150 years
- ▶ World-class quality hardwoods
- ▶ Suite of uses and values
- ▶ Vital to our economy and quality of life





The land consists of soil, water, plants, and animals, but health is more than a sufficiency of these components. It is a state of vigorous self renewal in each of them, and in all collectively. A. Leopold



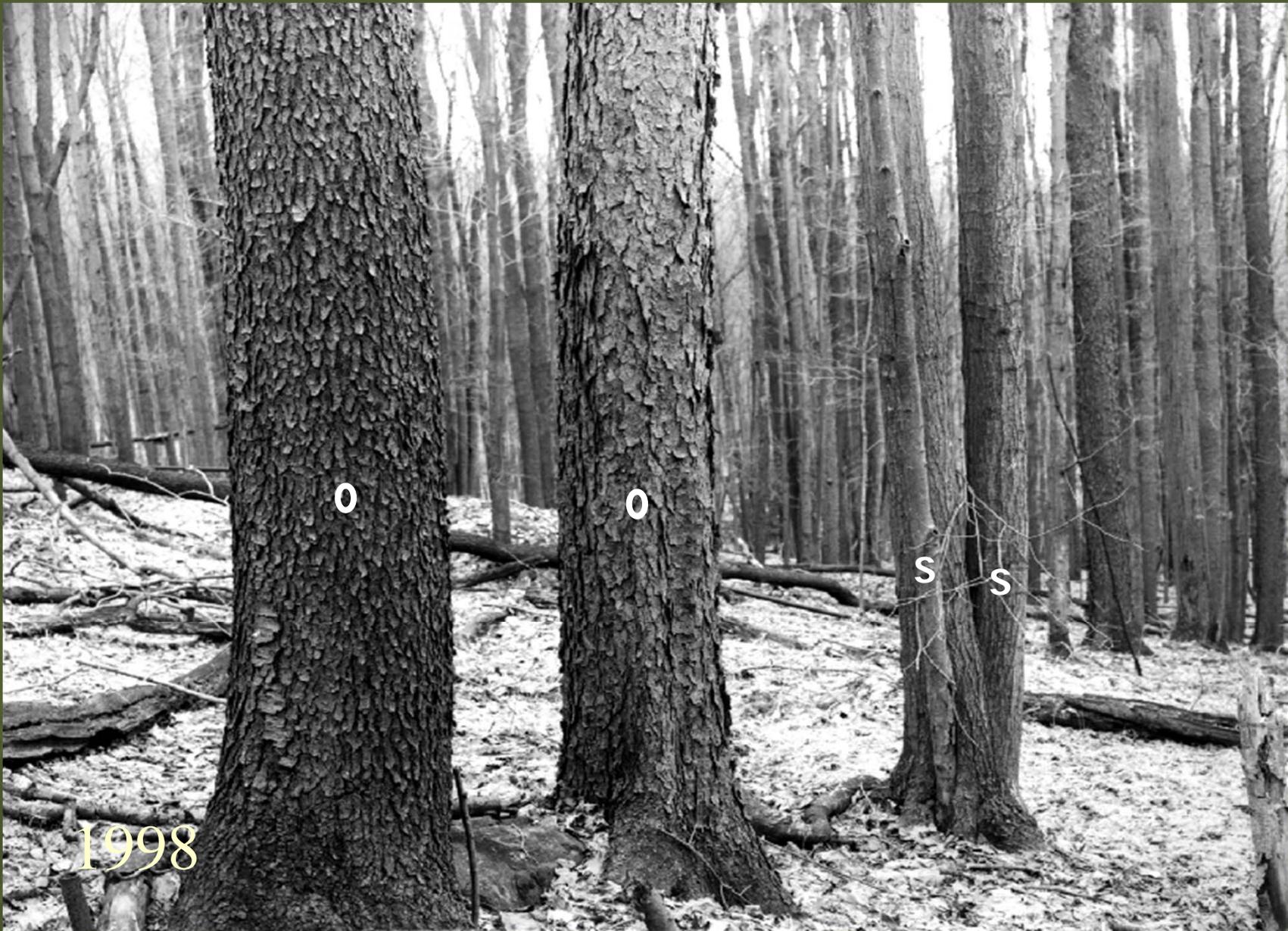
Stand Development

Shade Tolerance

- White – Tolerant
- Dotted – Intermediate
- Striped – Intolerant



1928



1998

Forestry in Action: Sustainable Forest Management



Introduction to Silviculture





Objectives
Options
Opportunities

Silviculture

The theory (science) and practice (art) of controlling forest establishment, composition, structure, and growth



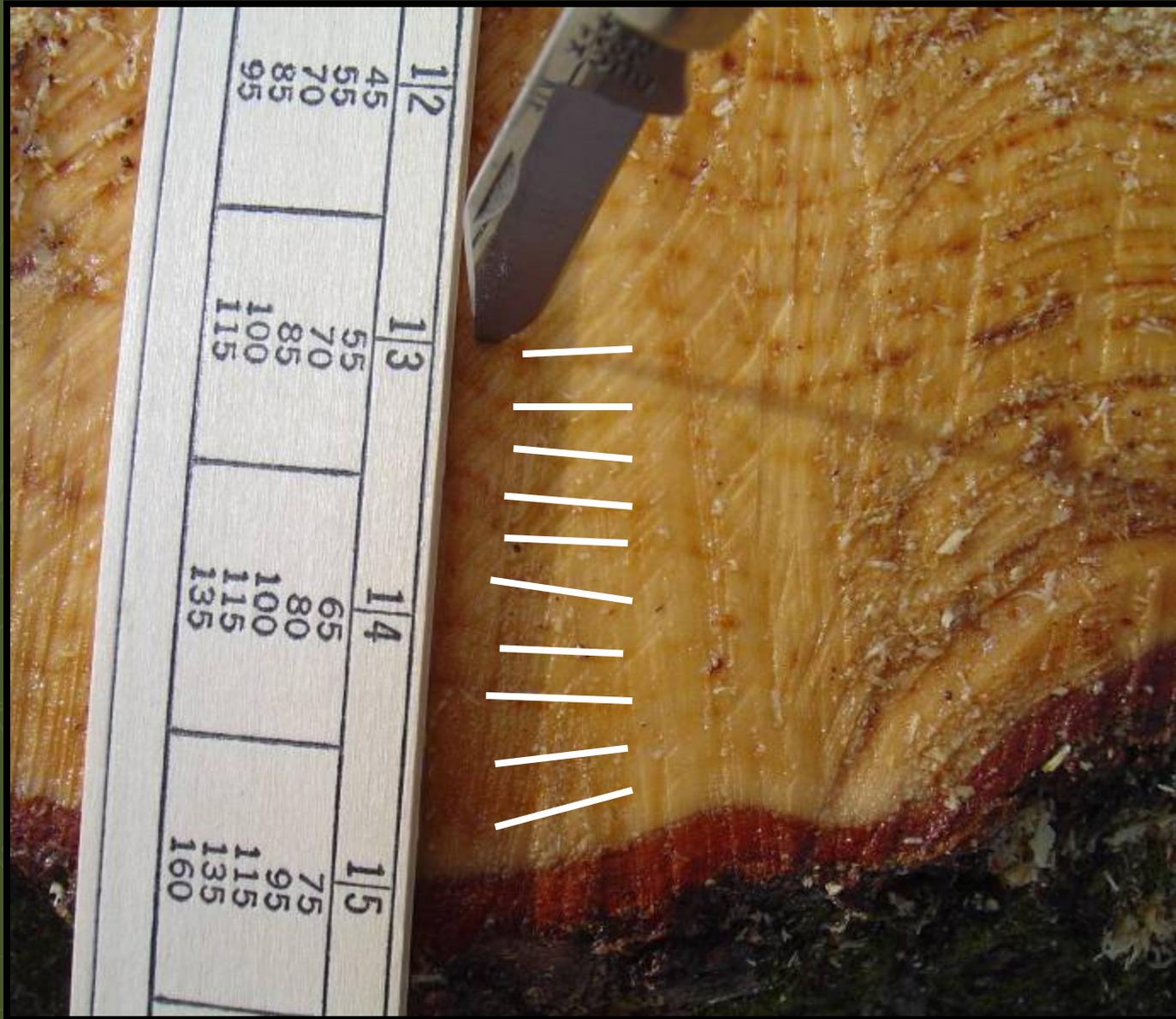
Establishment



Composition



Growth



Quality



Simply Silviculture Is:

- ▶ What you leave
The Residual
- ▶ What you establish
The Regeneration



Getting from Point A to Point B





Forests Function as Systems

Stand:

A management unit with trees of similar age, size, and species





Intermediate Treatments



The Role of Timber Harvesting in Forest Stewardship

- ▶ Why Harvest?
 - Meeting Objectives
 - Establishing Desired Conditions
- ▶ Forest Stewardship and Sustainability
 - Retaining Options
 - Planning or Happenstance

Cutting:

- ▶ Removes Competition
- ▶ Controls Light
- ▶ Redistributes Growth
- ▶ Controls Species Composition
- ▶ Meets Objectives
- ▶ Produces Income (\$ and other values)

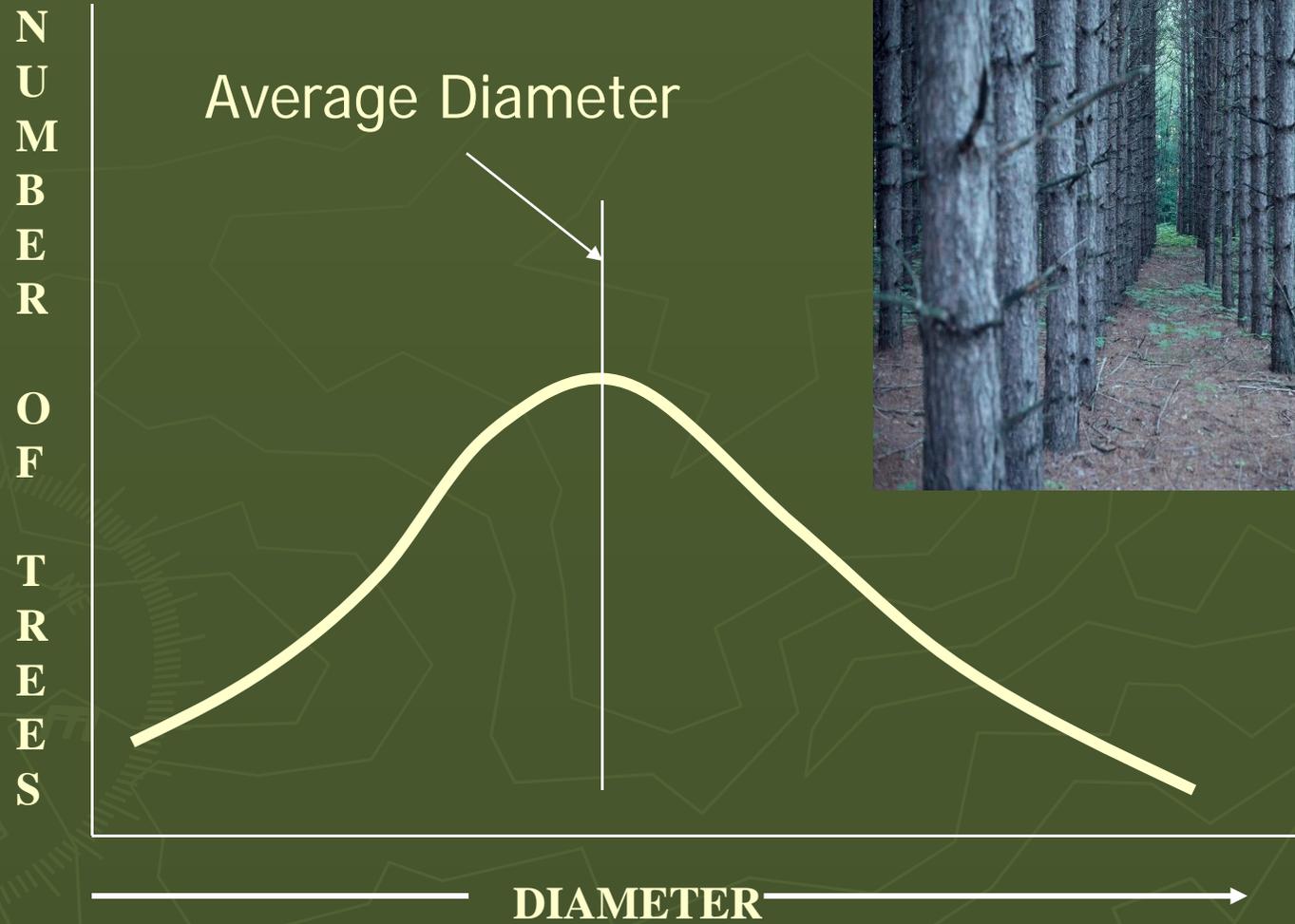
The Timber Harvest Paradox

- ▶ The harvest represents the most opportune time to have a positive impact on the forest.
- ▶ The harvest, without forethought, can have long-term significant negative impacts on the forest

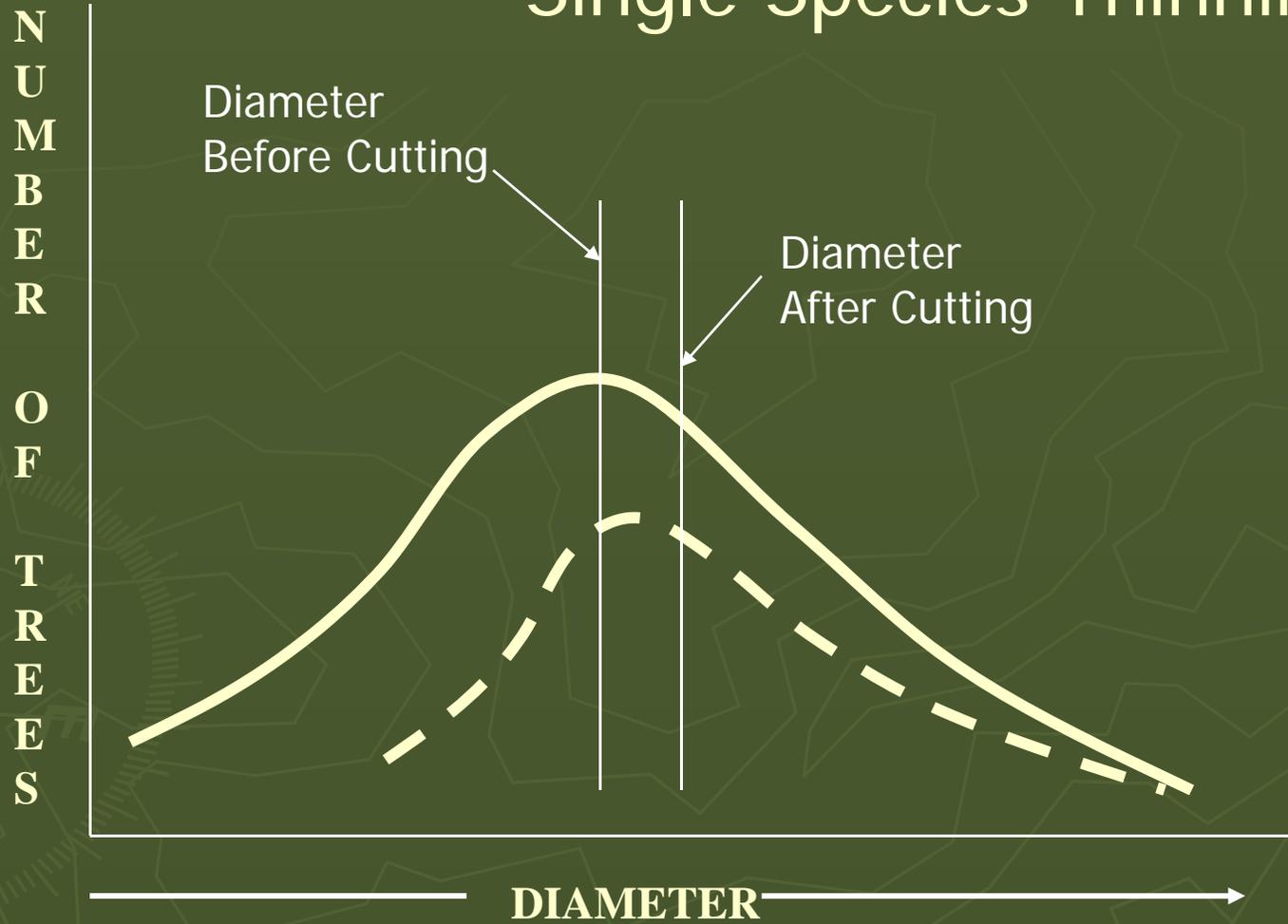
Diameter and Age

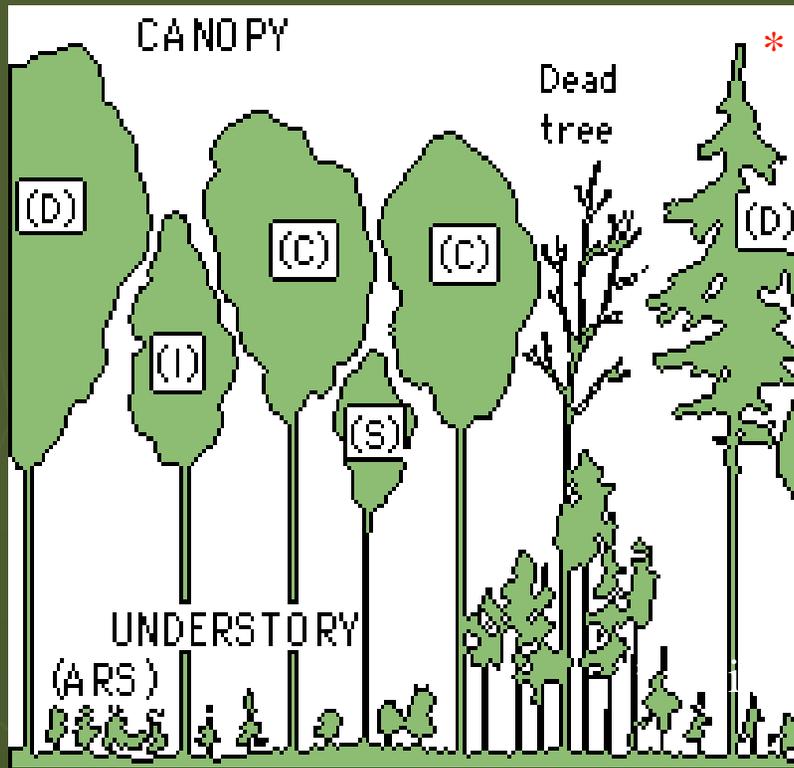


Single Species Stand Structure



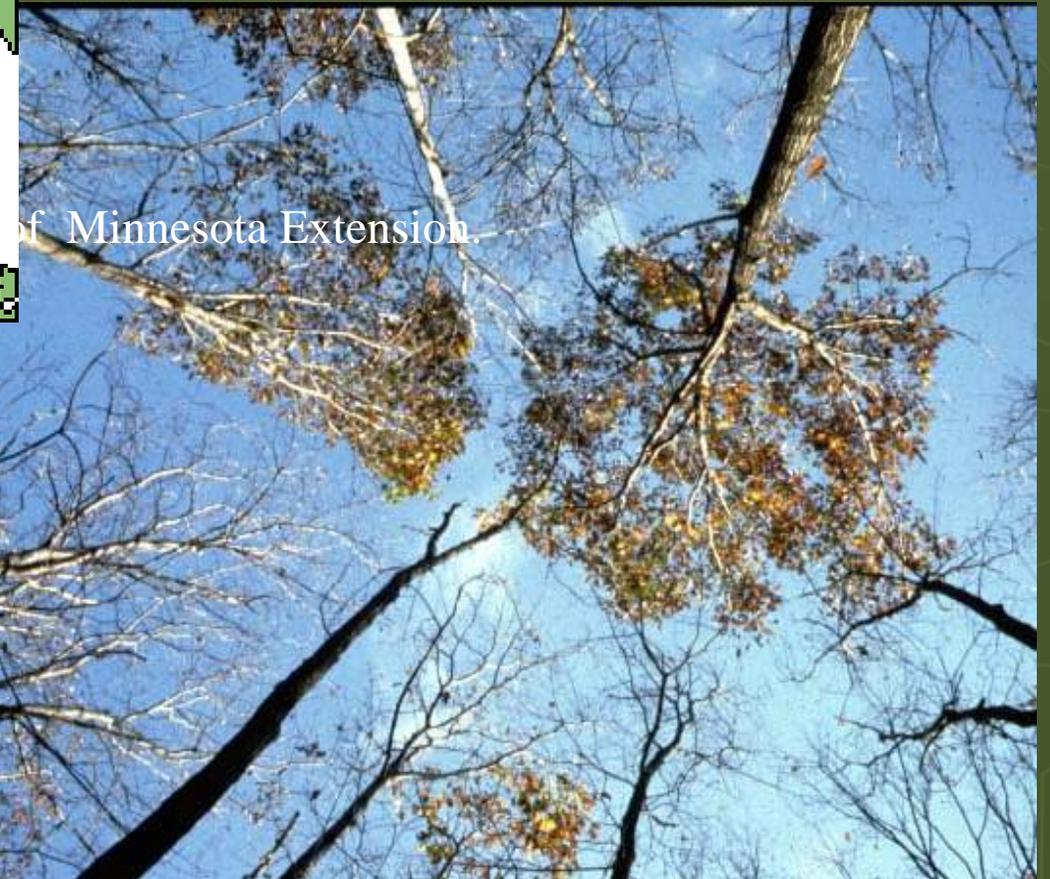
Single Species Thinning





Crown Placement

- Condition
- Species

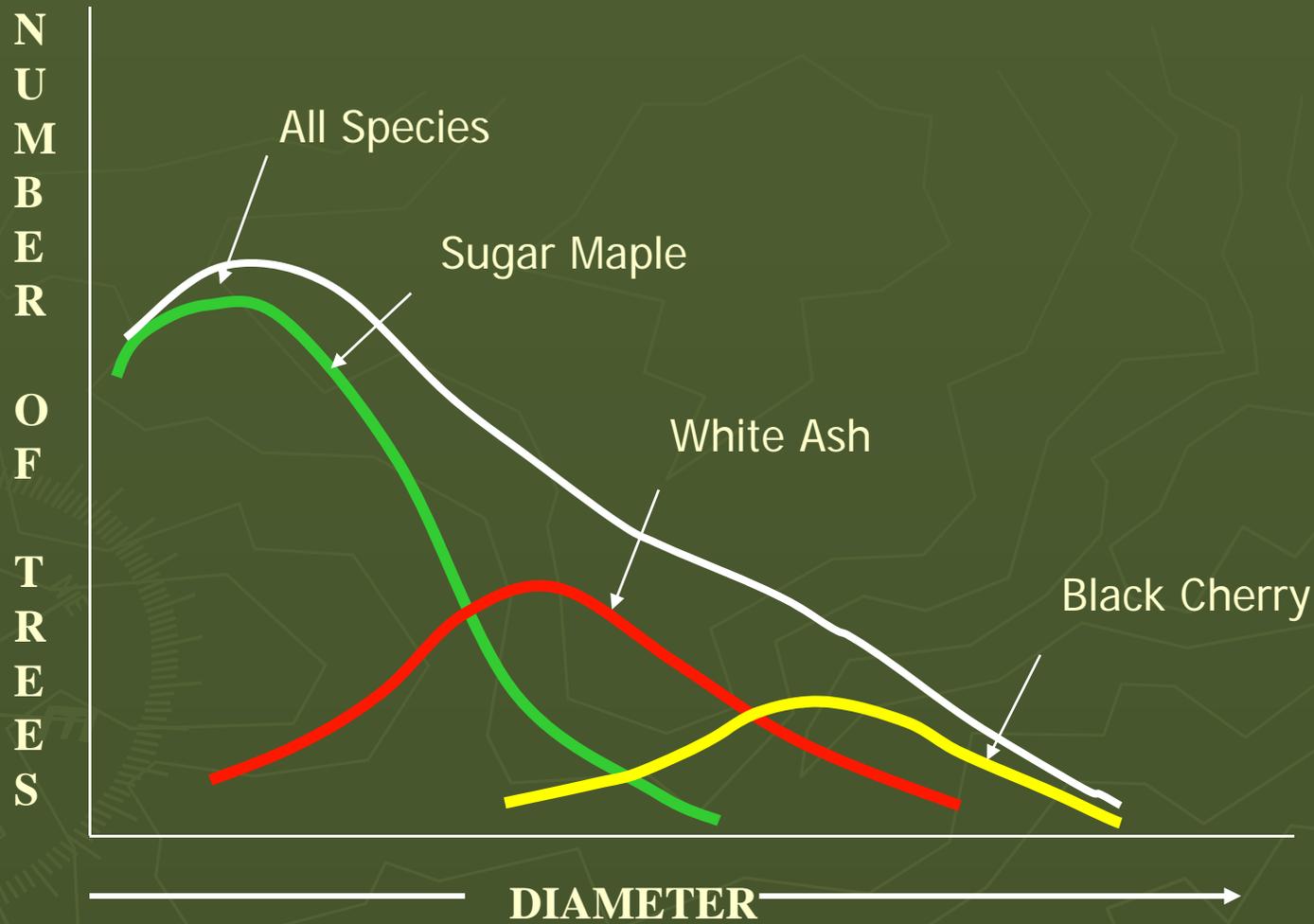


of Minnesota Extension.

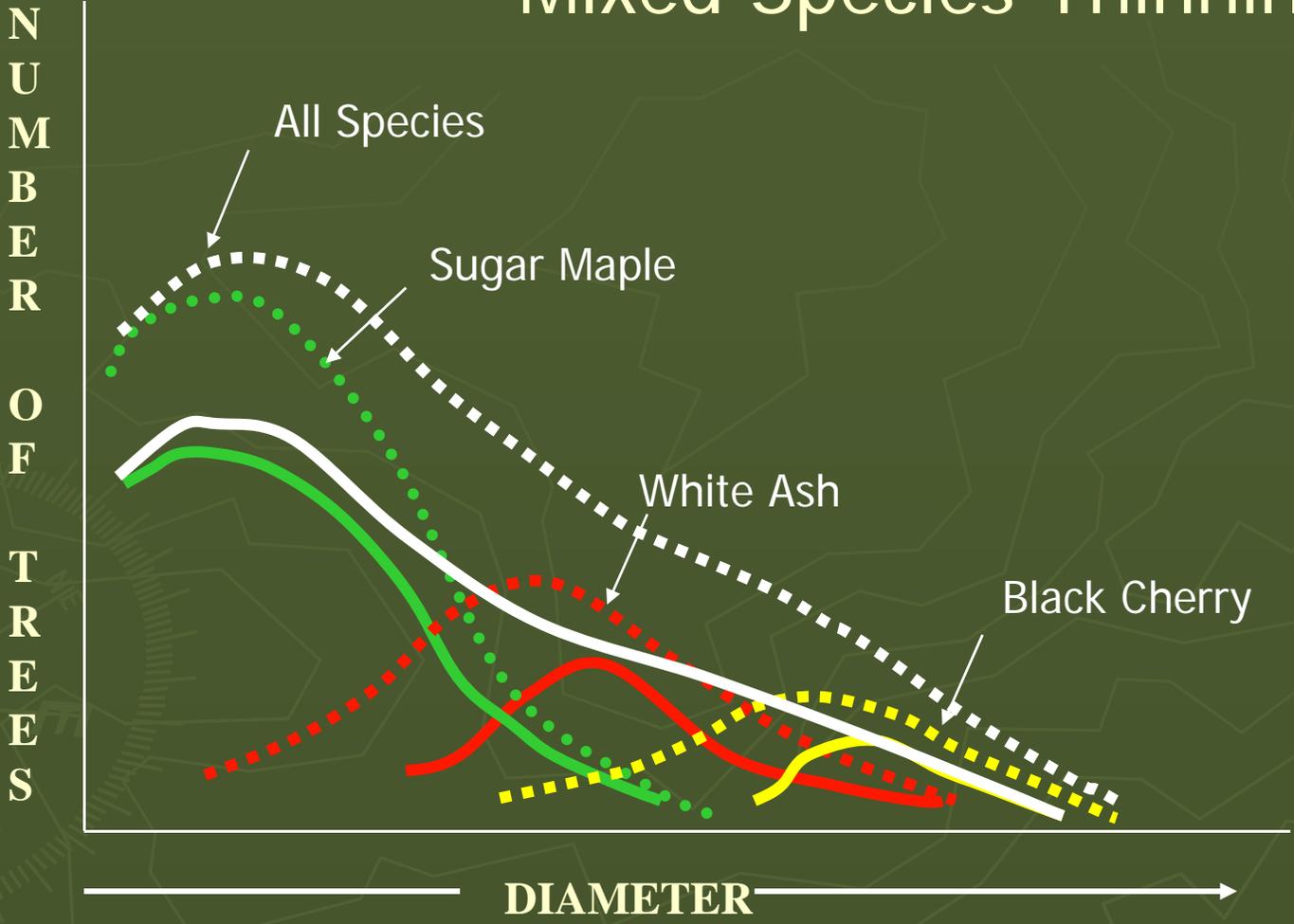
Shade Tolerance

- ▶ Tolerance varies by species
- ▶ Shade intolerants more generally more valuable
- ▶ Even-aged forests dominated by intolerants
- ▶ Stands differentiate by species by size

Mixed Species Stand Structure



Mixed Species Thinning



Growing Quality – Focus on Retention

- ▶ Species
 - Site
 - Diversity
 - Markets
- ▶ Condition
 - Quality
 - Crown
- ▶ Competition
- ▶ Risks





Improve Tree Growth







Regeneration Treatments







Advanced Regeneration





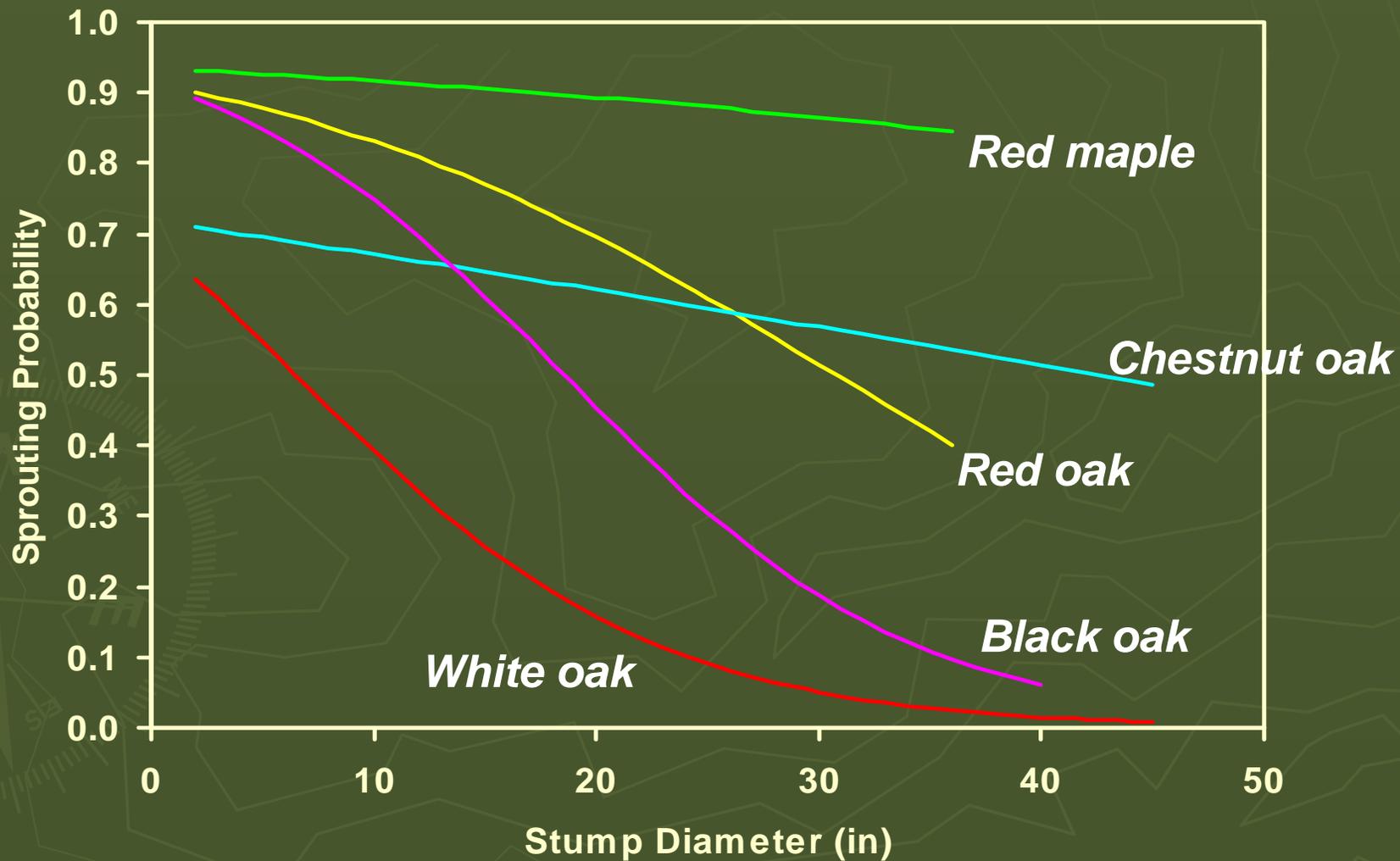


Caring for Deer and Forests

<http://www.deerandforests.org/home>



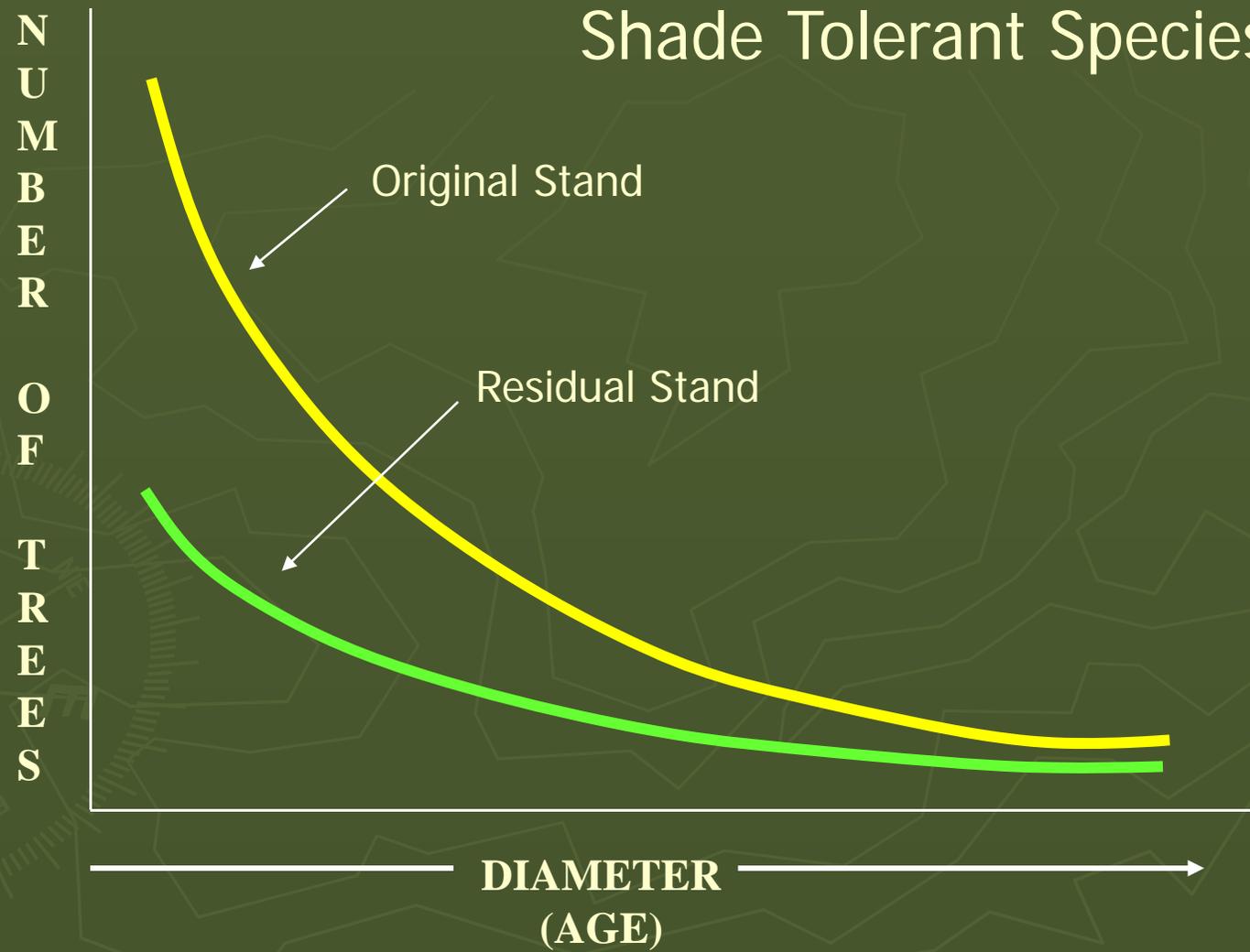
Development of stump sprouts - sprouting probability



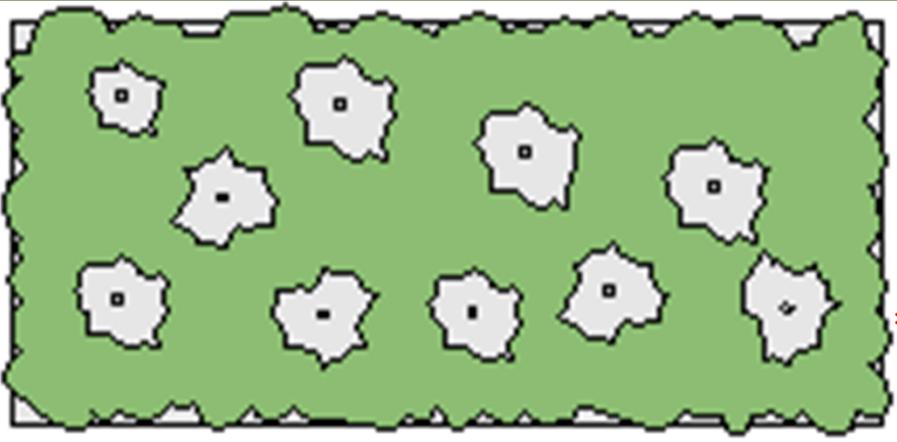
Regeneration Systems

- ▶ Uneven-aged
 - Single Tree Selection
 - Group Selection
- ▶ Even-aged
 - Seed Tree
 - Shelterwood
 - Clearcut

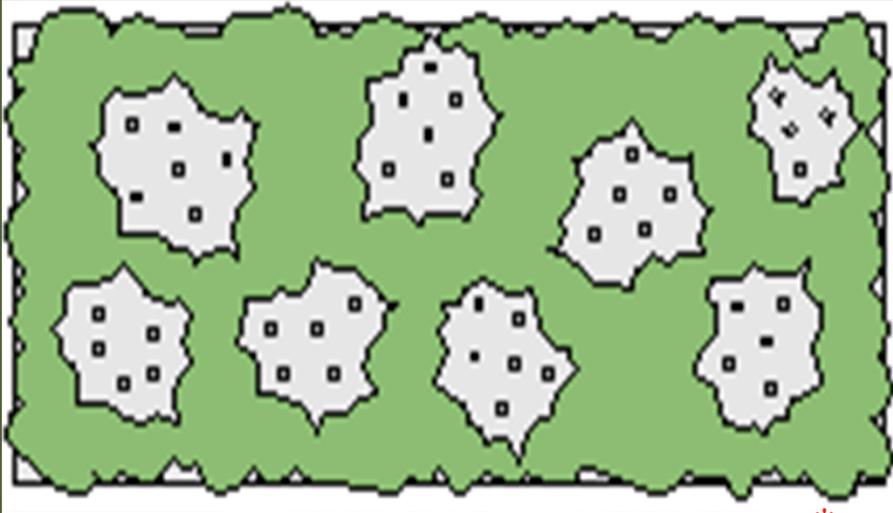
Uneven-aged Stand Structure Shade Tolerant Species



Single Tree Selection (Uneven-aged)



Group Selection (Uneven-aged)



Regeneration Systems

▶ Uneven-aged

- Single Tree Selection
- Group Selection

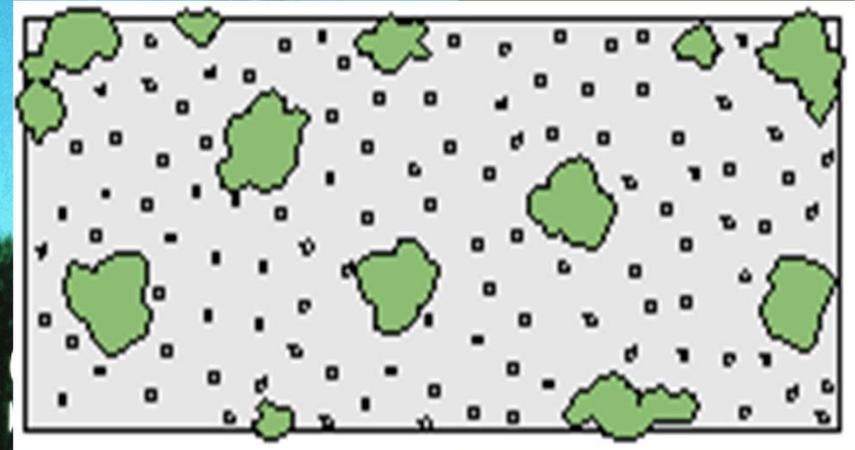
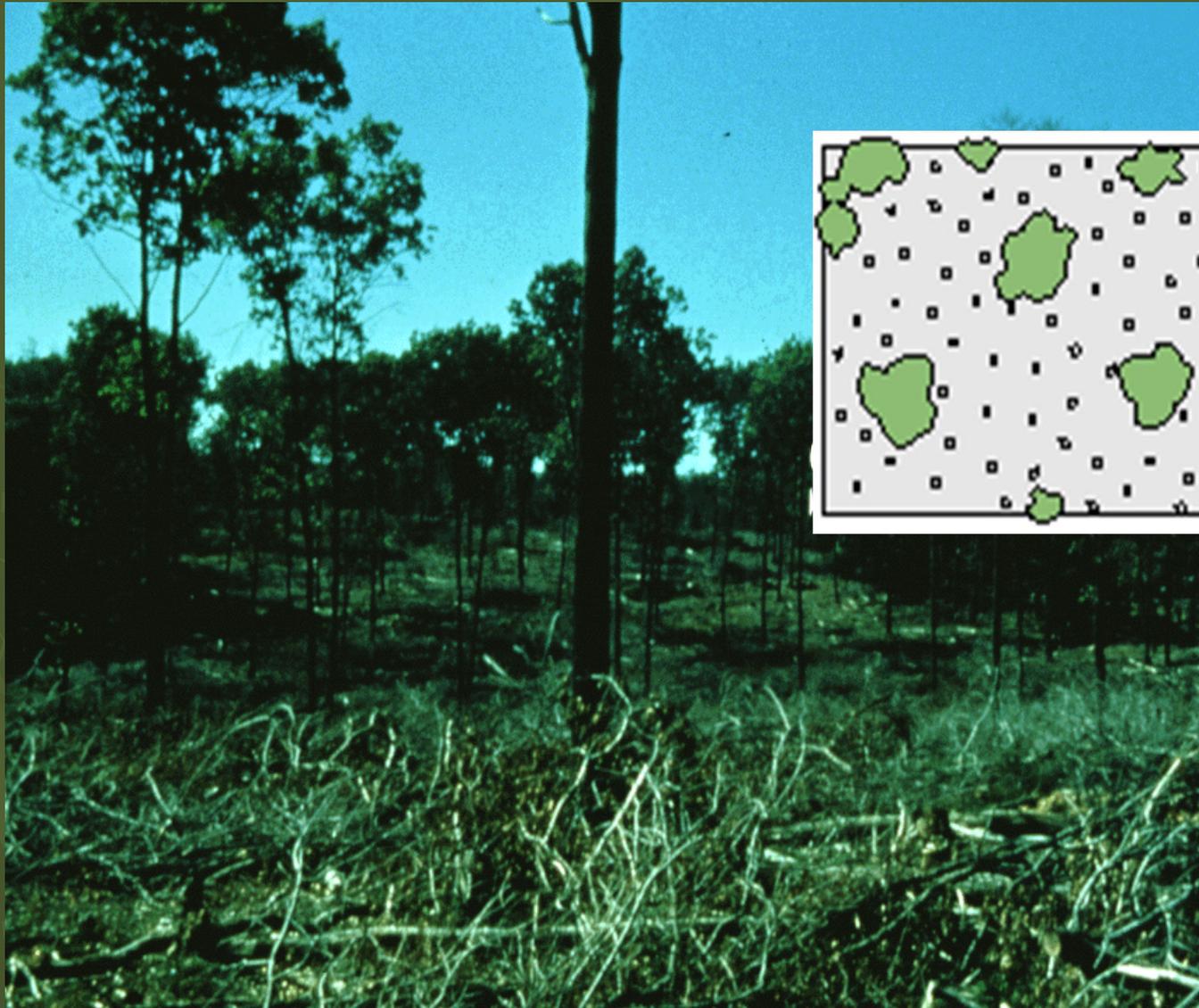
▶ Even-aged

- Seed Tree
- Shelterwood
- Clearcut

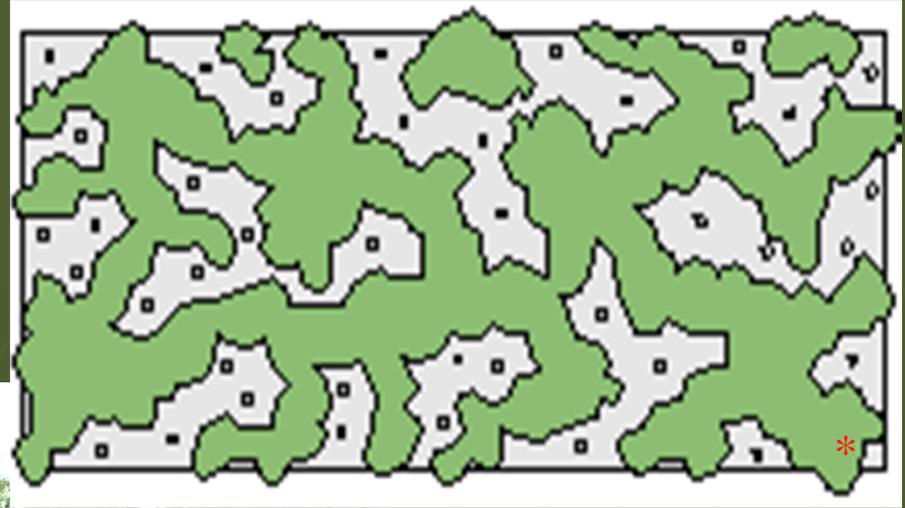
Even-aged Forests



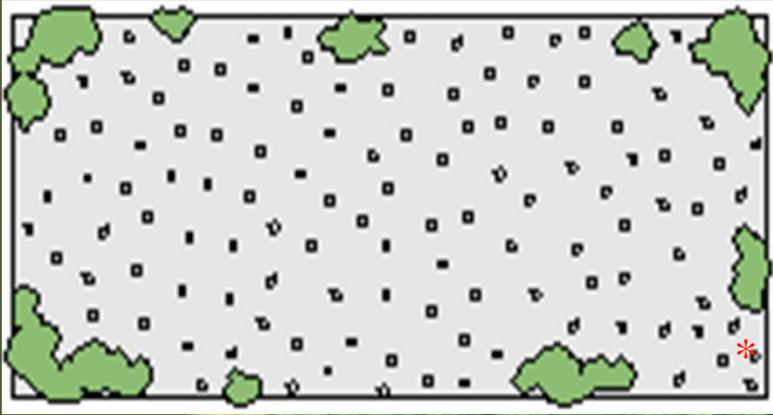
Seed Tree (Even Aged)



Shelterwood (Even Aged)



Clearcut (Even Aged)



Enhance Wildlife Habitat



Protect Water Quality



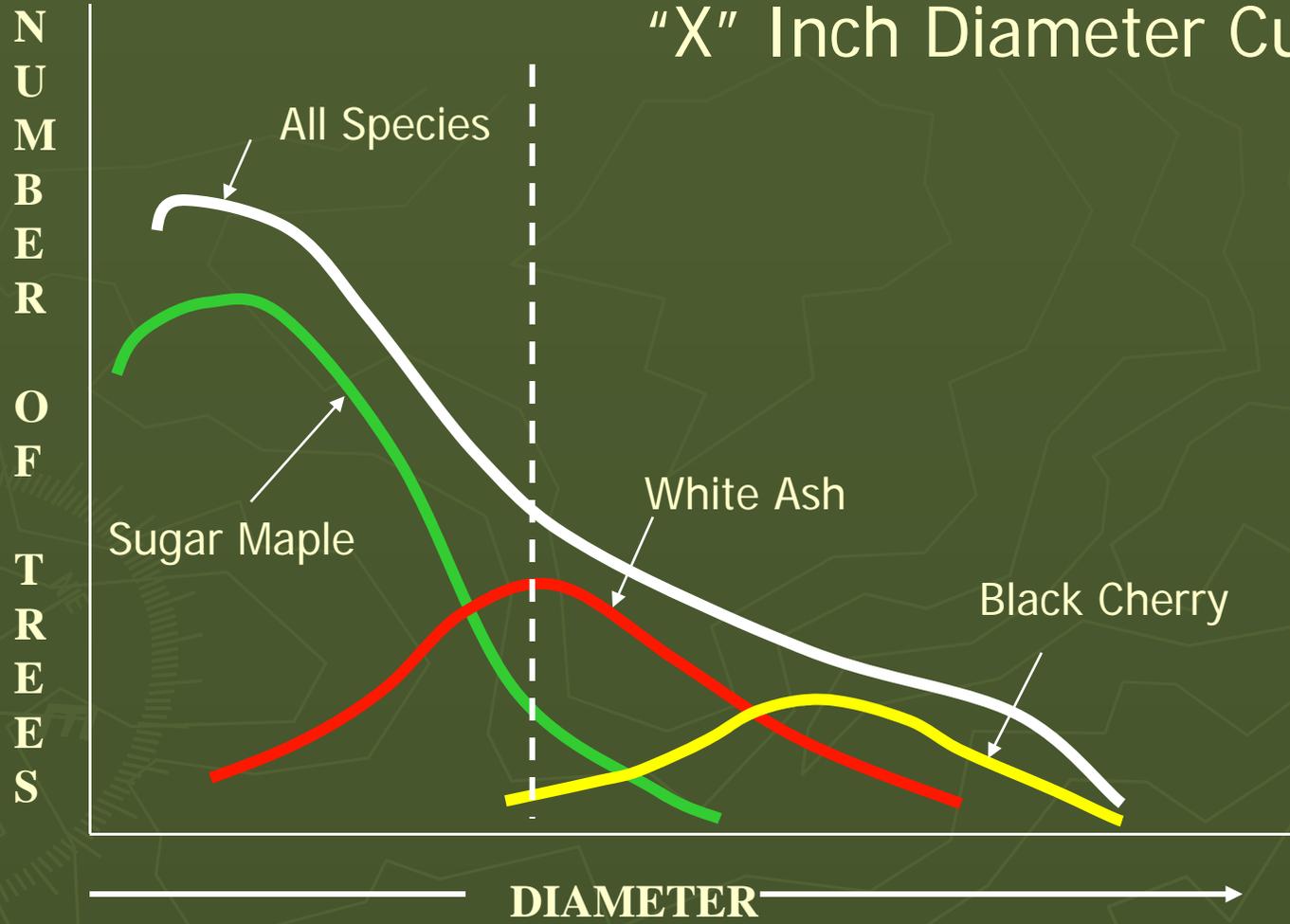
Aesthetics and Leisure



Not Silviculture



"X" Inch Diameter Cut







X X

X







Photo from C. Nowak

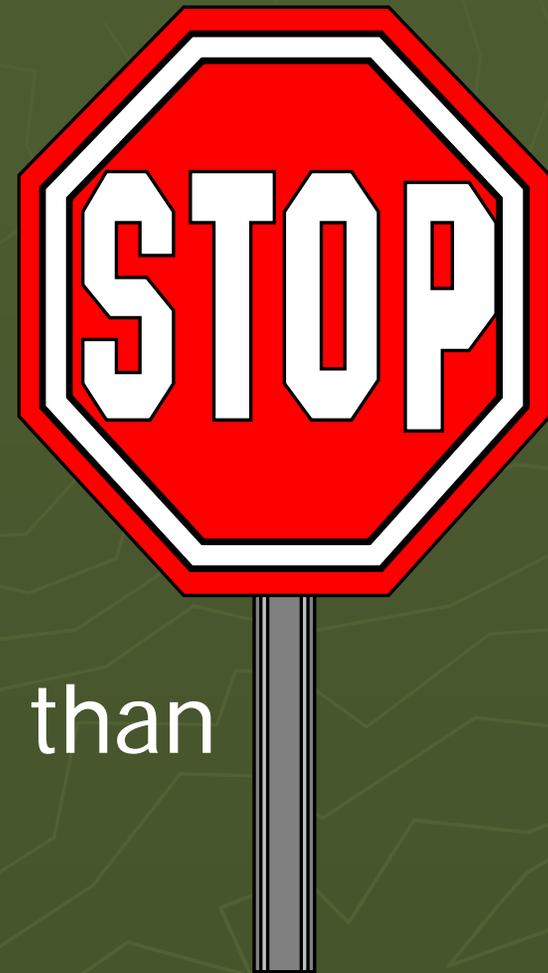
Negative Consequences to the Ecosystem

- ▶ Reduced diversity
- ▶ Reduced food sources
- ▶ Increased disease & insect, risk to storm damage
- ▶ Reduced volume, stocking, and quality
- ▶ Slower growth
- ▶ Extended time to next harvest of equal volume
- ▶ Future options constrained
- ▶ Reduced \$ value per acre



High Grading:

- ▶ Select cut
- ▶ Selective cut
- ▶ Selectively cut
- ▶ Diameter cut
- ▶ All trees bigger than _____ inches



Simply Silviculture Is:

- ▶ What you leave
The Residual
- ▶ What you establish
The Regeneration



Your woodlot is in fact, a historical document which faithfully records your personal philosophy. Let it tell a story of tolerance toward living things, and of skill in the greatest arts: how to use the earth without making it ugly.



Aldo Leopold
A Fierce Green Fire

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Questions?