Evaluating Your Forest

Neil Clark - Extension Agent, ANR

READING YOUR LAND

WOODLAND OPTIONS for LANDOWNERS

VIRGINIA FOREST LANDOWNER EDUCATION

WORKSHEET 2.1

Date: ____________________ Completed by: ____

SECTION 1. *INSTRUCTIONS.*

1. *Suggested equipment:* camera and tree identification guide (get in the habit of carrying your camera and tree ID guide with you every time you walk in the woods).
2. Take a walk about your property (forest and open land). As you walk, look for evidence of human land use (structures and disturbances) and natural disturbances. Describe each land use or disturbance in Section 2 by identifying the: general cause (human or natural); specific cause (use check boxes); approximate date when use or disturbance occured or began; and size (e.g., acreage). Use the line provided for notes, to reflect on short and long term impact and whether some type of action is required.
3. Use the back of this sheet to make a rough map of your property. Record each disturbance (using the observation number from Section 2) on your map where the observation is located on your property. Note water bodies, roads, and other significant land features on the map. Also, you may want to make a few copies of this sheet to carry in the field. When you are done, you will have a rough timeline of how your property has been influenced by human use and natural disturbance.

SECTION 2. *PAST LAND USE AND DISTURBANCE INVENTORY.* Complete for each observation of past land use or natural disturbance.

general cause		human use/disturbance																				natural disturbance																						
specific cause		structures					agriculture						forestry					other				insect/disease							hurricane/wind						fire			ice		flood	wildlife			
no.	date (year that use or disturbance began or occured)	Building/foundation	Dam/pond	Fence/wall/rock pile	Road	Utility (e.g. gas line)	Contour strips	Drainage ditch	Farming (current)	Gullies/soil erosion	Orchard	Streambank erosion	Cut/pruned limbs	Logging road/trail	Planted trees (rows)	Scars on bark	Stumps	Cemetery	Dump/landfill	Earthworks	Mining/gravel pit	Damaged leaves	Insects present	Needle/leaf decline	Peeling/flaking bark	Pitch tubes	Tree decline/death	Wood exposed/rotten	Broken tree limbs	Broken tree tops	Blown-over trees	Crooked tree trunk	Rootmats exposed	Tree decline/death	Charred bark/limbs	Lightning-stripped	Tree decline/death	Broken tree limbs	Tree decline/death	Tree decline/death near water bodies	Beaver dams/ponds	Heavy deer browse	Nests/dens	size (of use or disturbance (e.g., acreage, single tree etc.))
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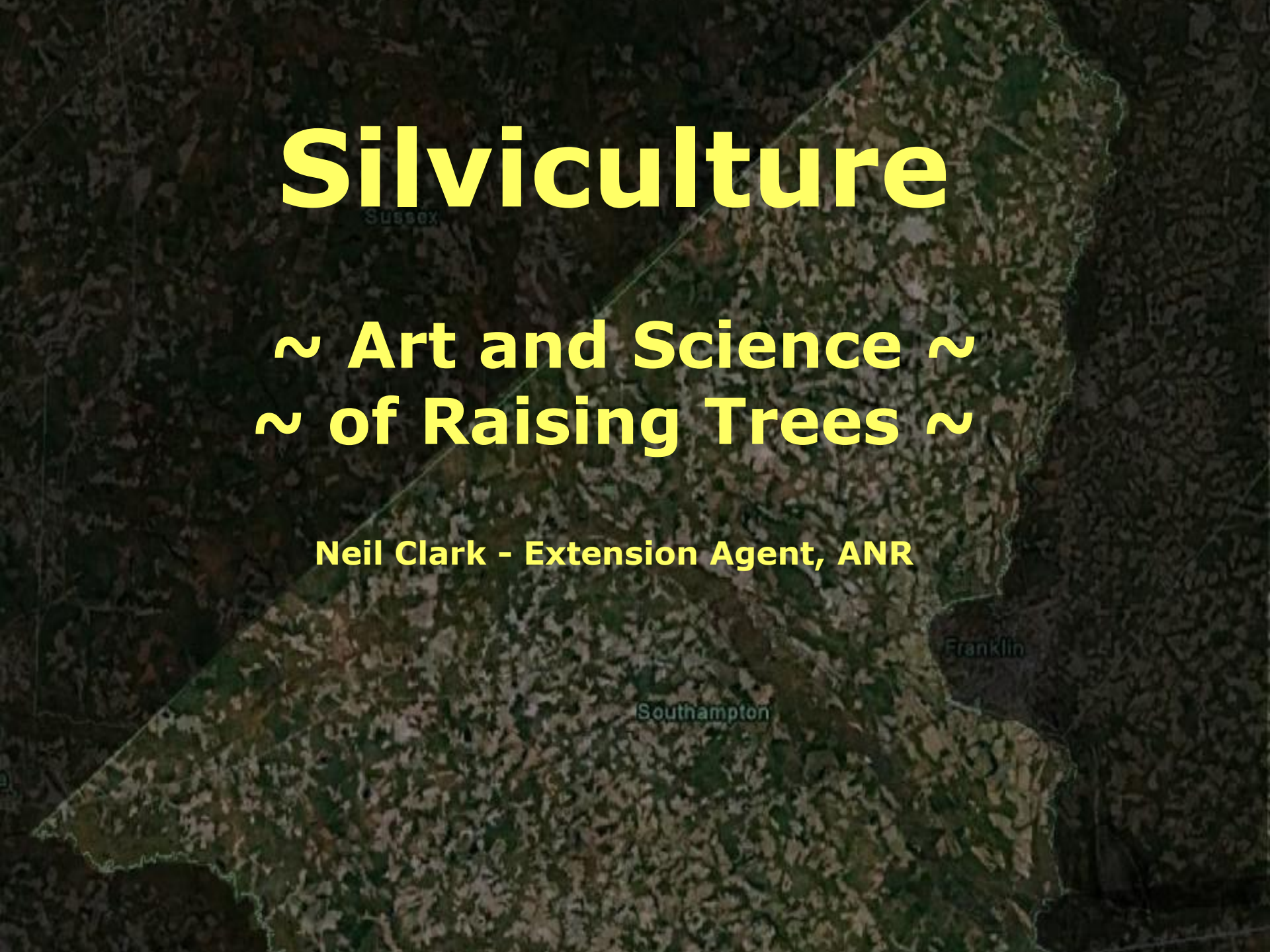
JANUARY 2002



Silviculture

~ Art and Science ~
~ of Raising Trees ~

Neil Clark - Extension Agent, ANR

What do you have?

How to get what you want?

Size / Age

Species

Amount (vol ---- acreage)

Accessibility – boundaries / hydrology

Neighbors – BMPs / ordinances

How do we know what you want?

Goals & Objectives

Recreation

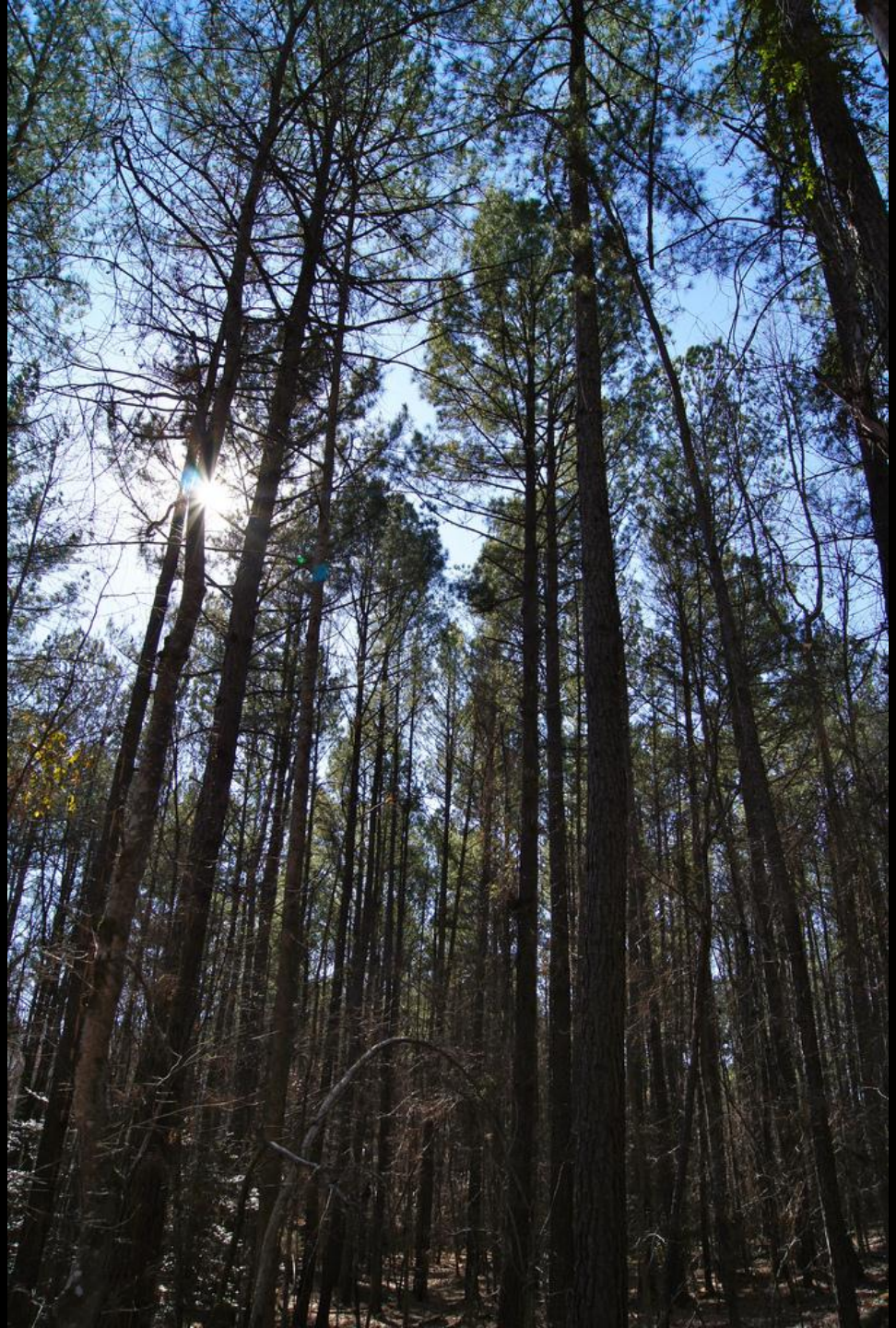
Wildlife

Income (or at least increase in value)

What do you have?

Do your woods look like this....

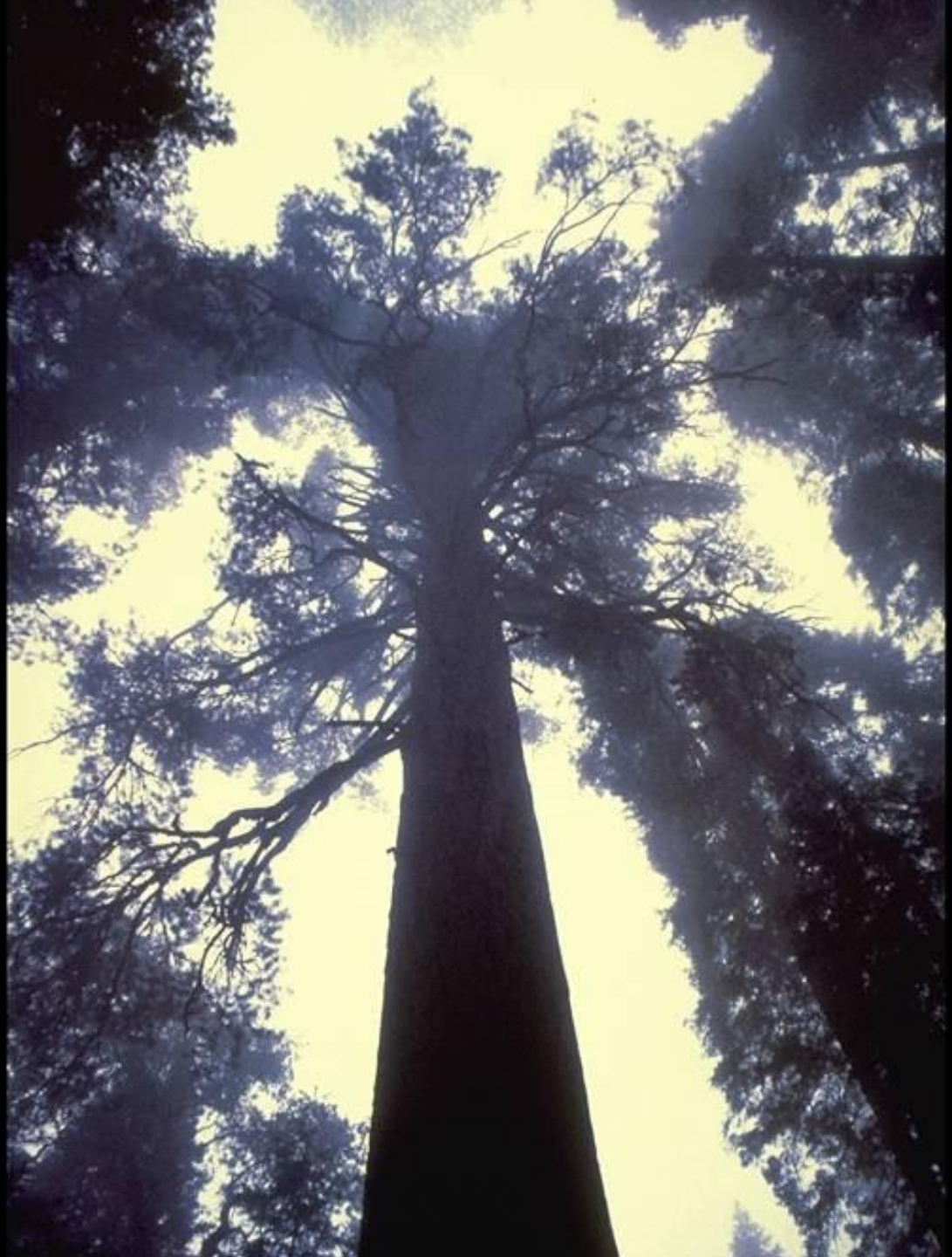
or like this?

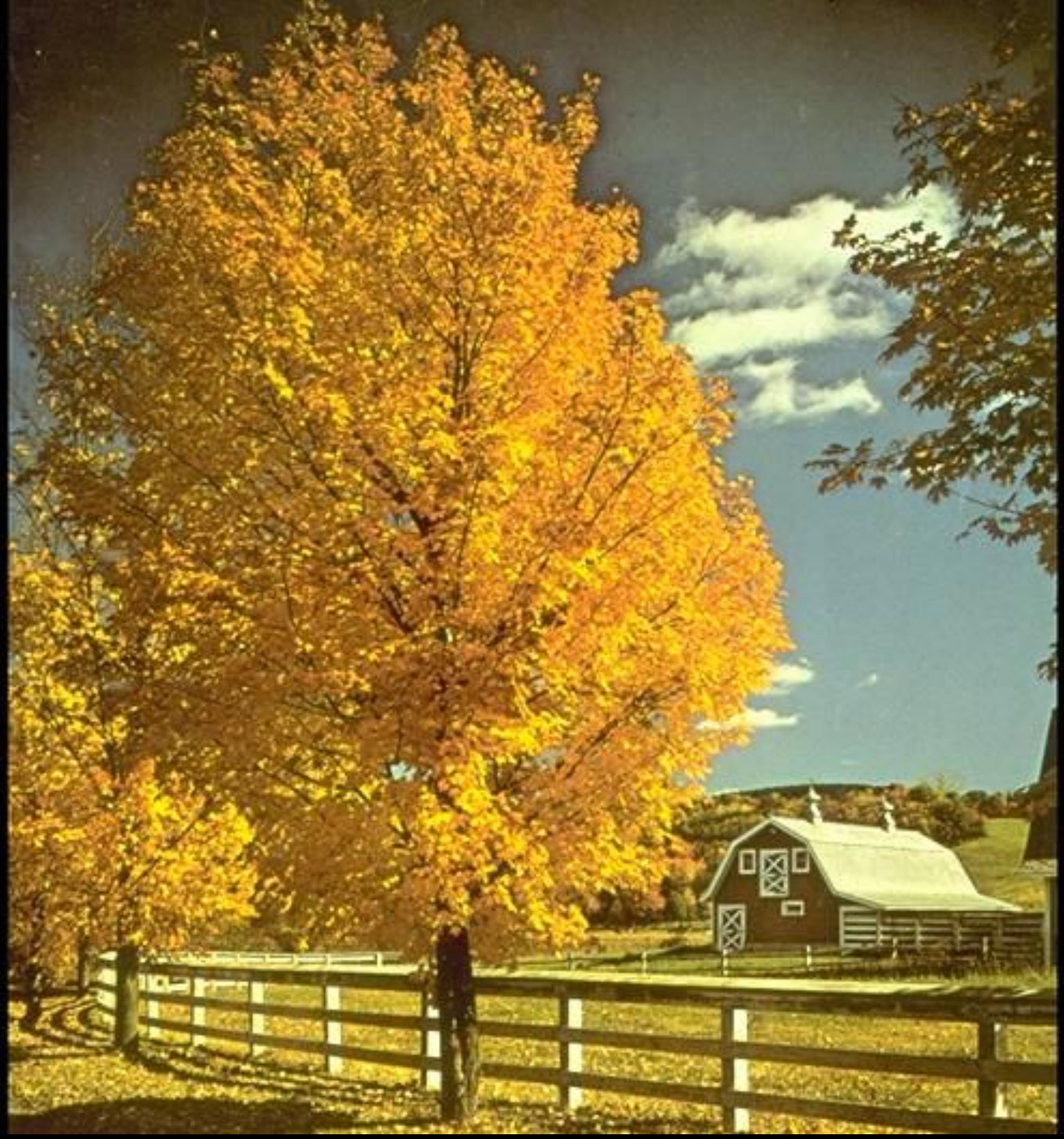


Woodlands generally have healthy soils

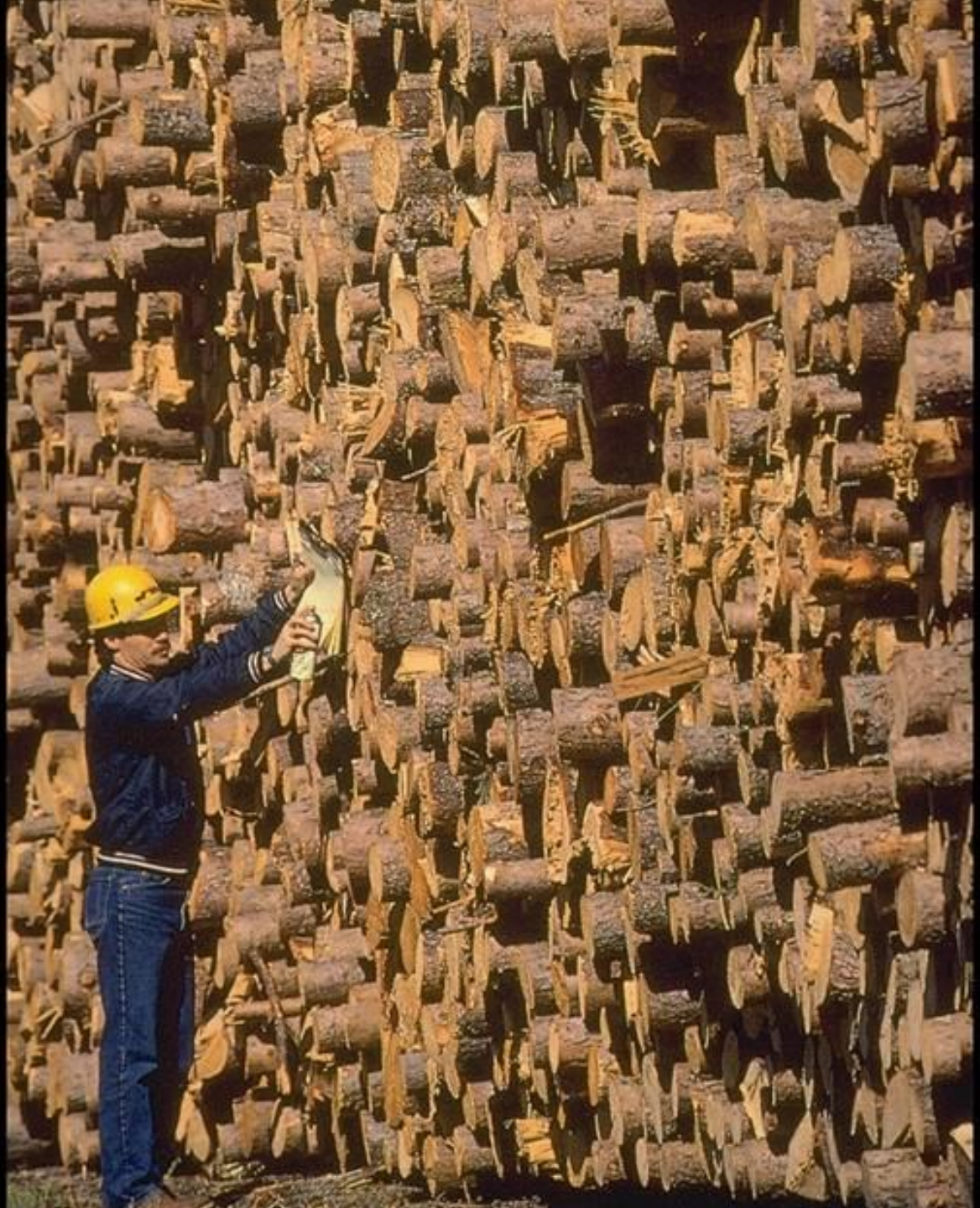
Ecologic limitations include...

- Site productivity (site index)
- Aspect
- Topography
- Climate

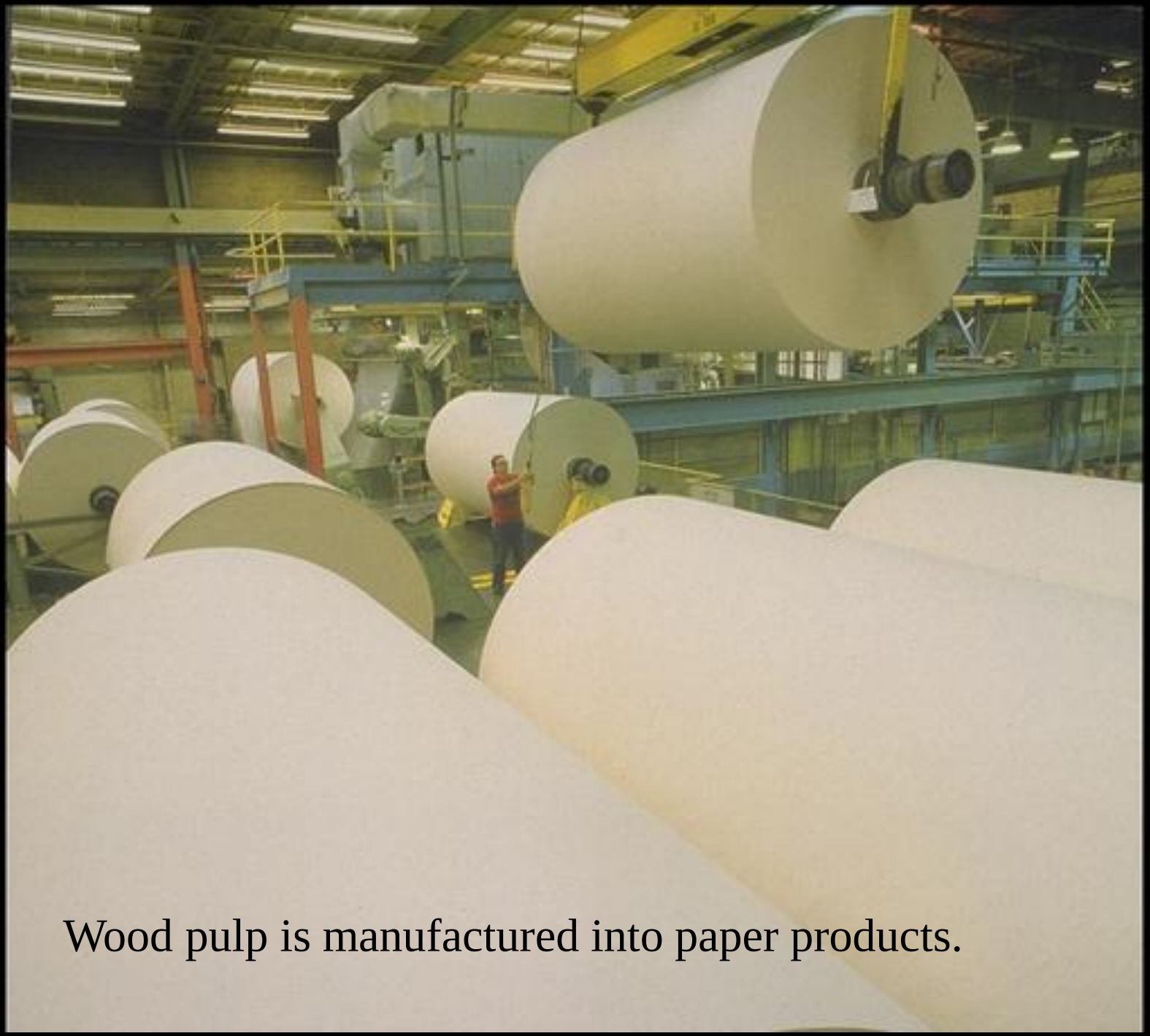




Products



Pulpwood

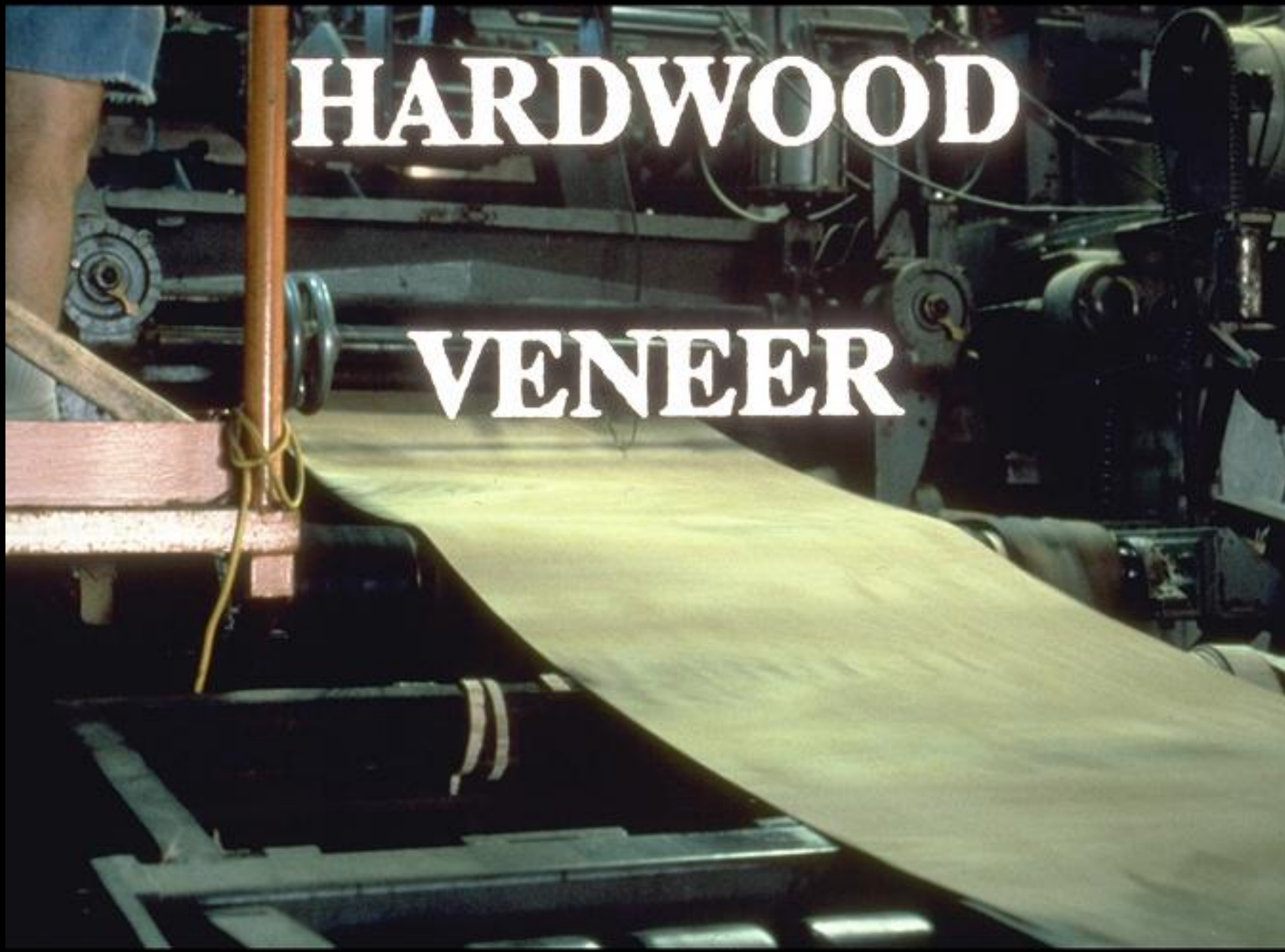


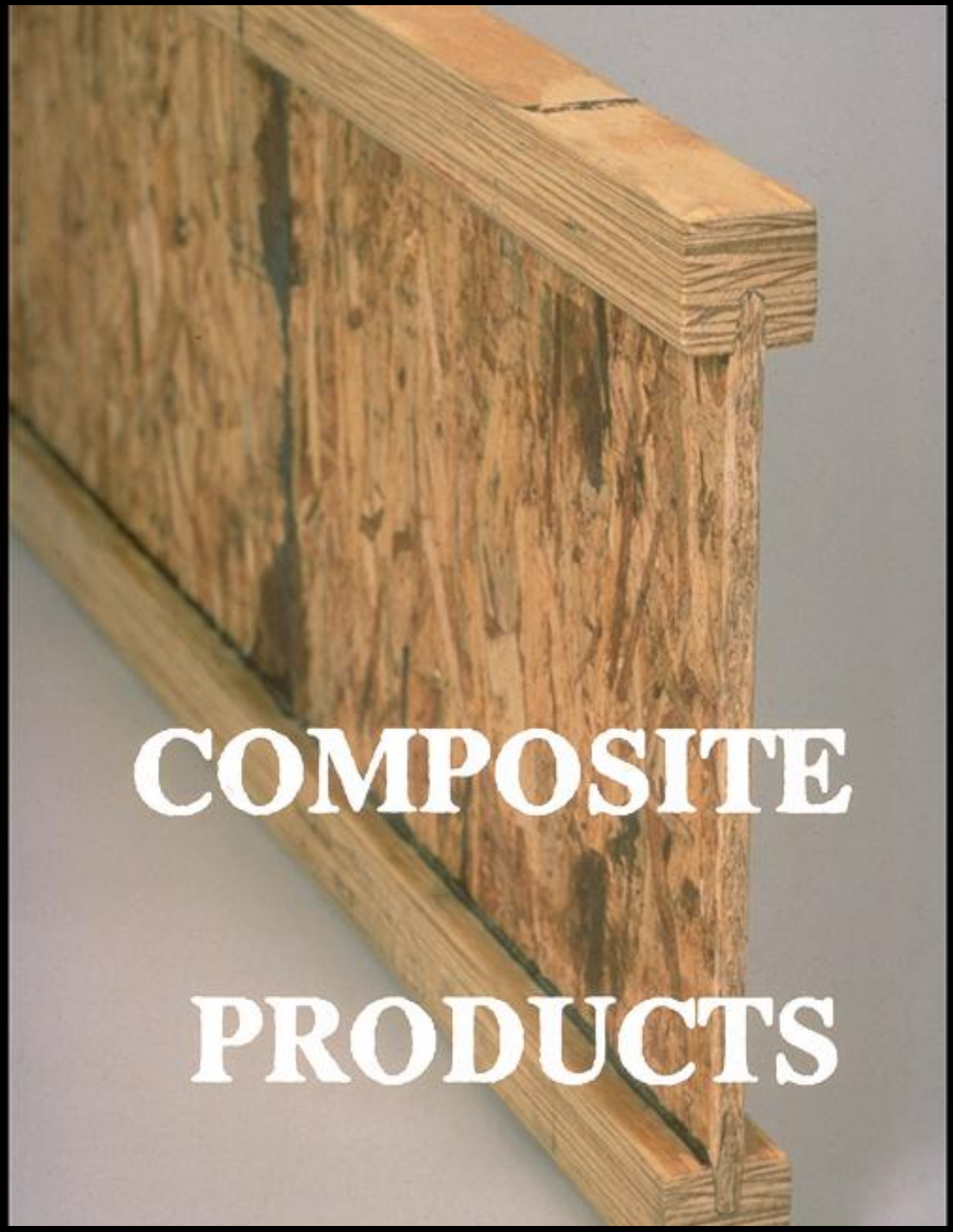
Wood pulp is manufactured into paper products.

Plywood

Lumber

Veneer


HARDWOOD
VENEER

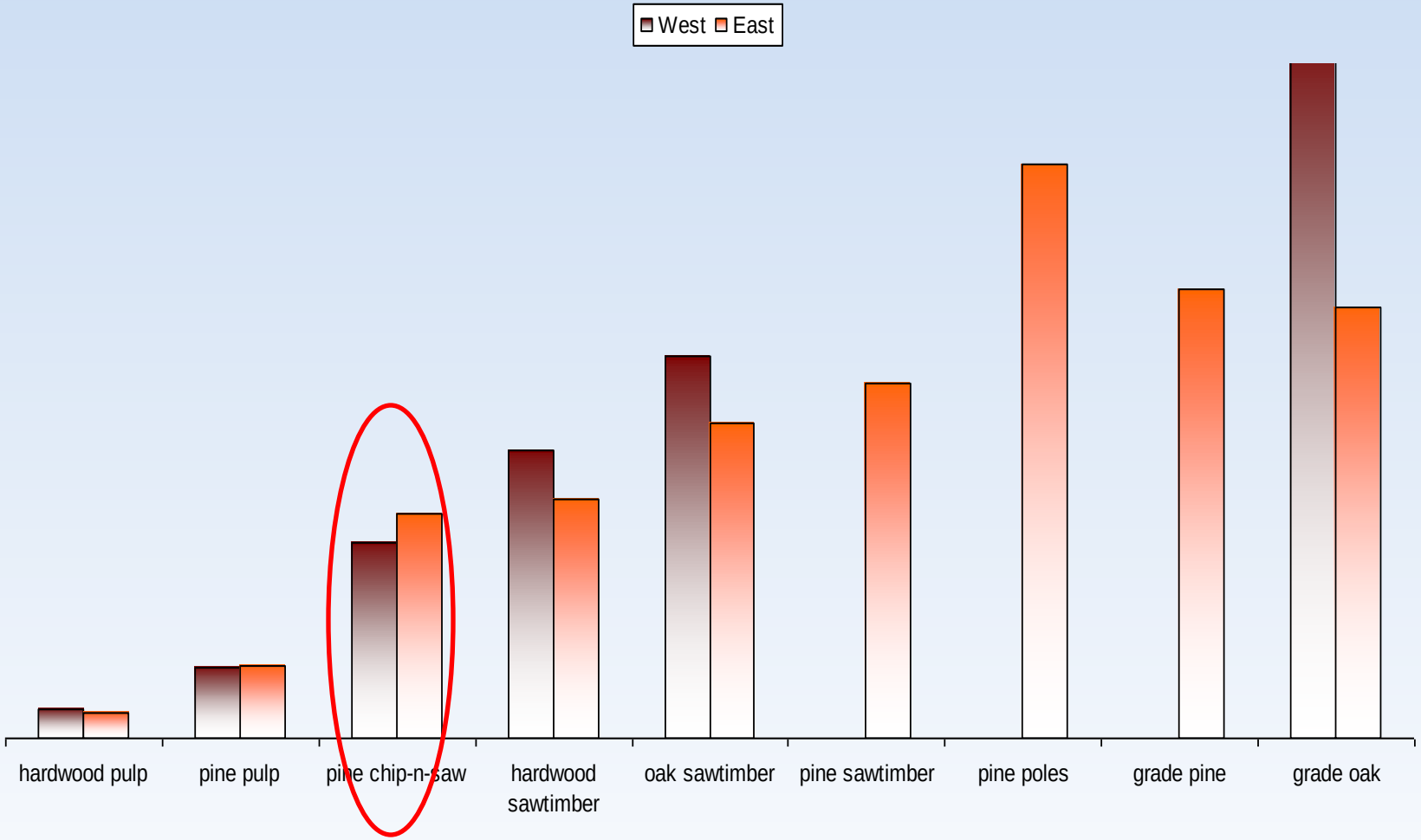

COMPOSITE
PRODUCTS

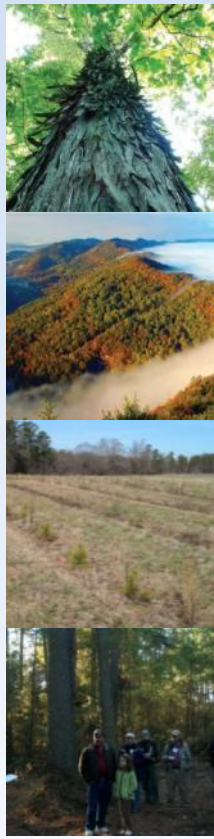

LOG
EXPORTS

Railroad Ties

Pallets

Relative pricing for typical product markets of eastern and western Virginia.





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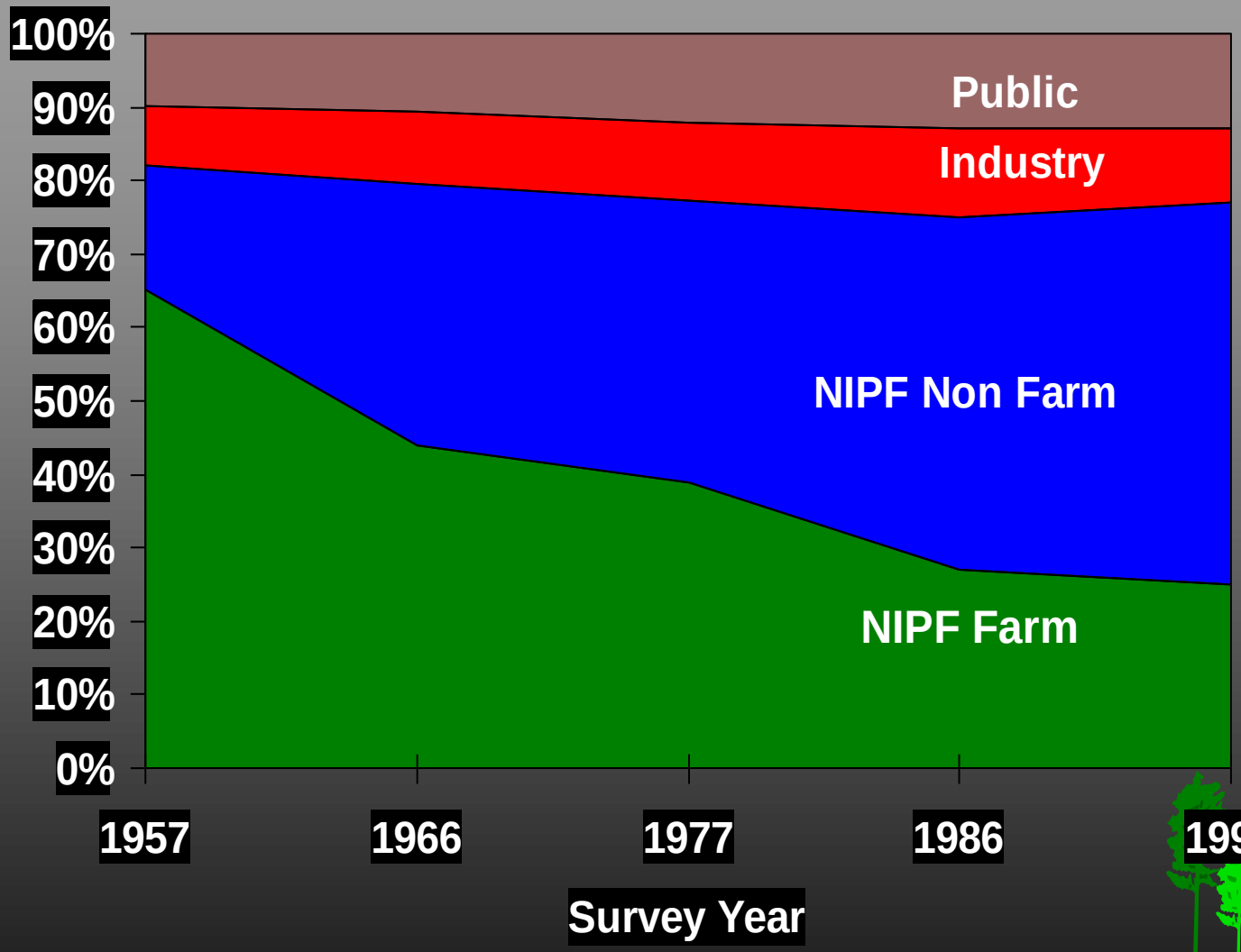
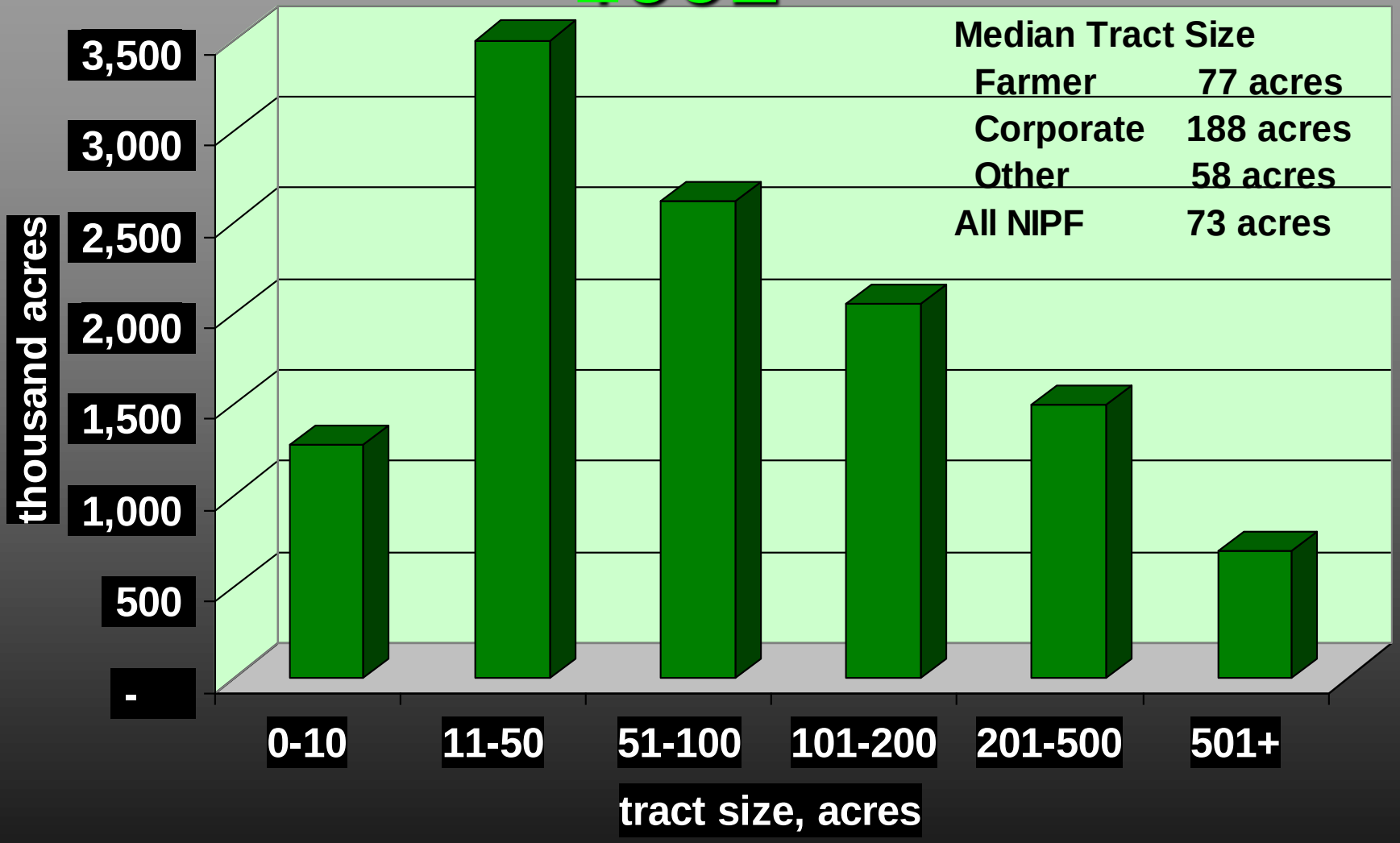
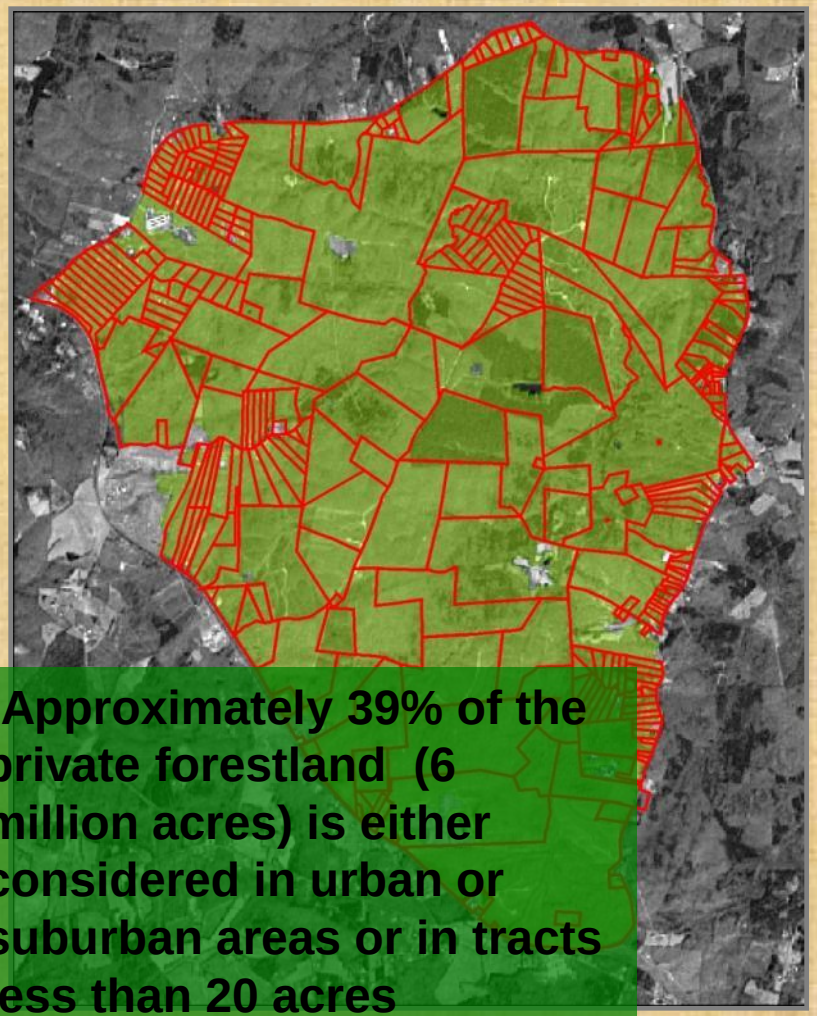
Forest Ownership, Virginia, 1957-1992



Forested Tract Size, Virginia, 1992



land units getting smaller, while equipment keeps getting bigger



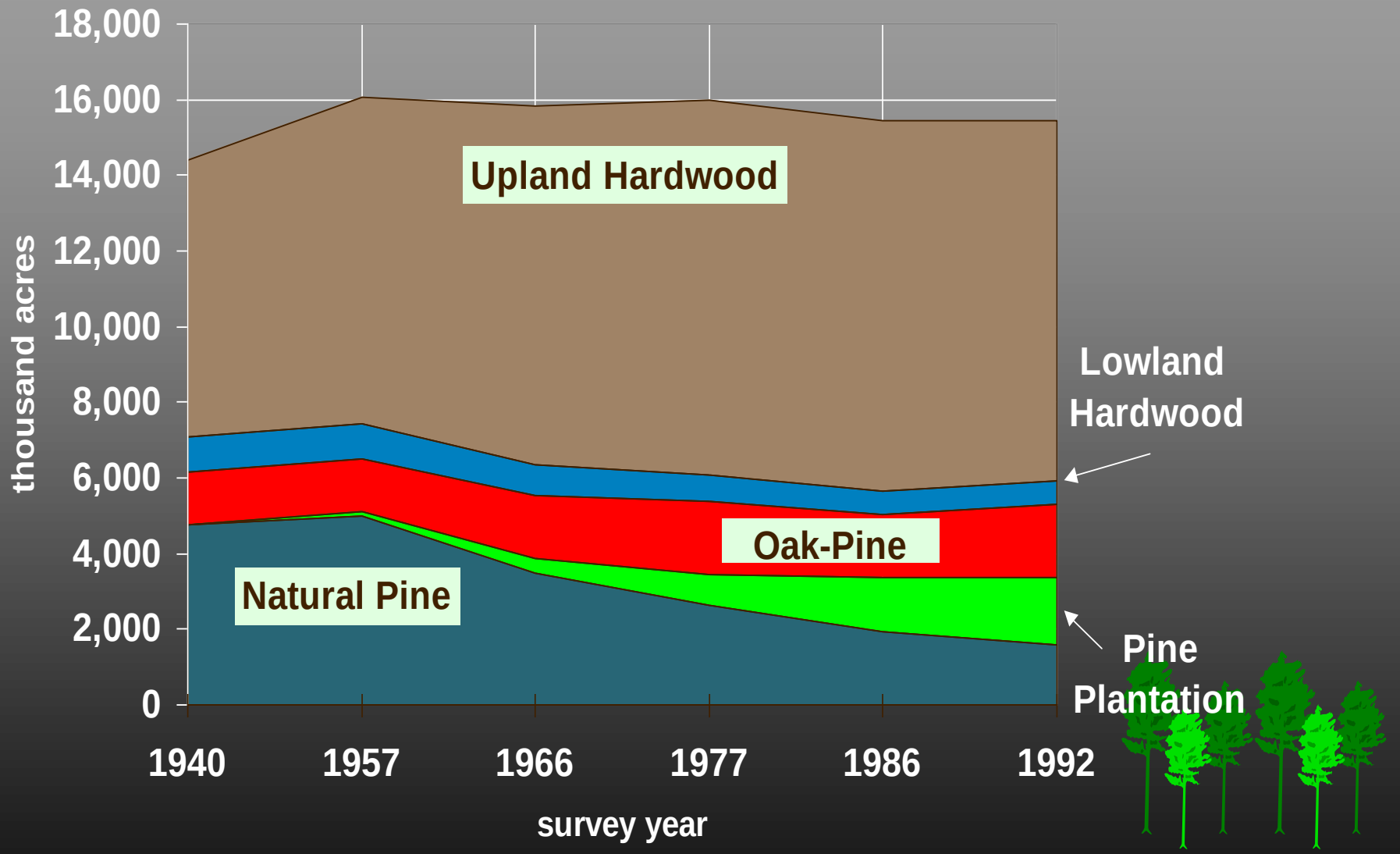
•**Approximately 39% of the private forestland (6 million acres) is either considered in urban or suburban areas or in tracts less than 20 acres**

Why?

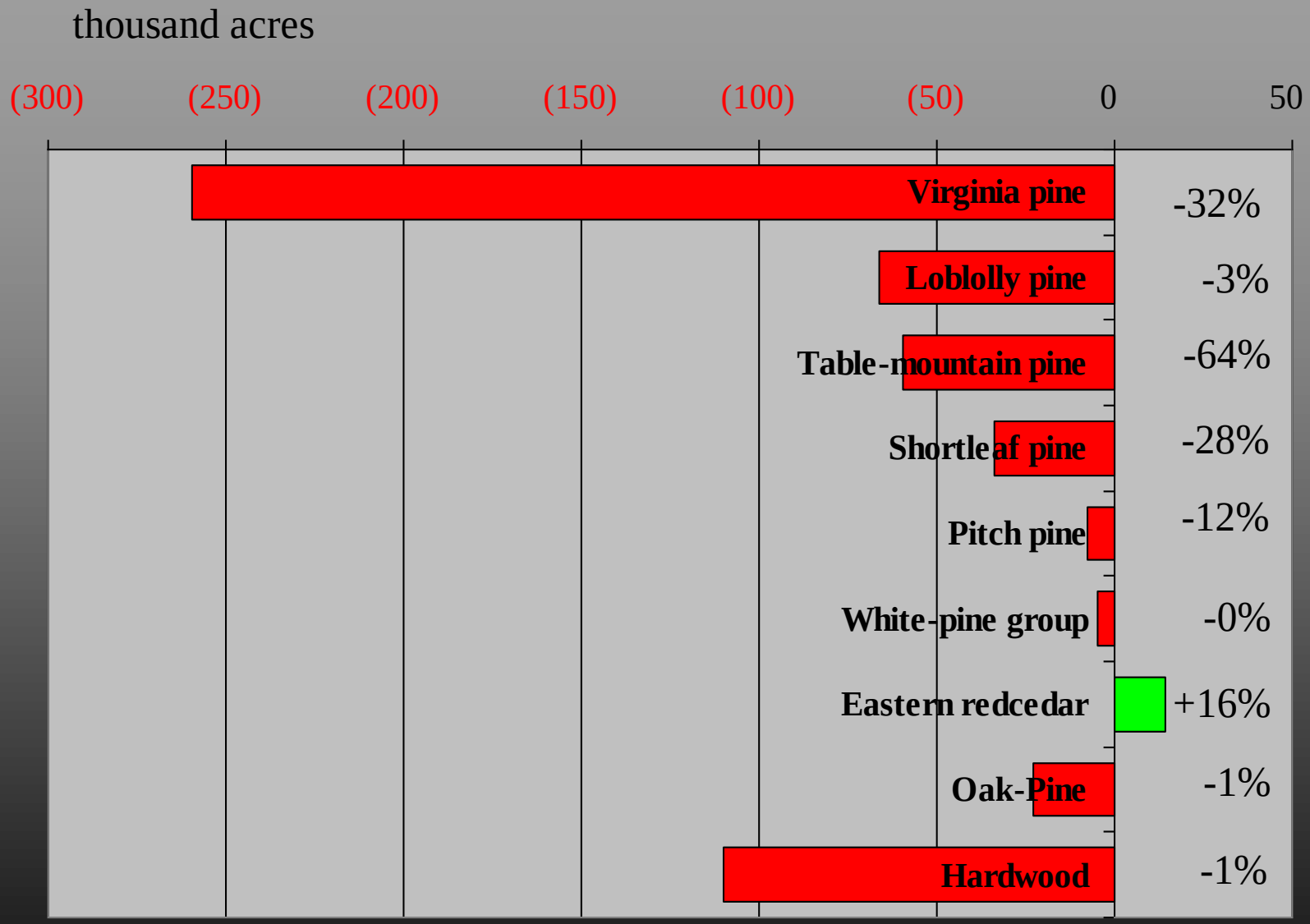
-same as farming, more acres / bushels / head / sheaves / lbs / etc. needed to equal a “living wage”

-insurance: hard for any business over time to keep up with medical industry / logging inherently dangerous / make safe /get loggers off of the ground (Shaffer study)

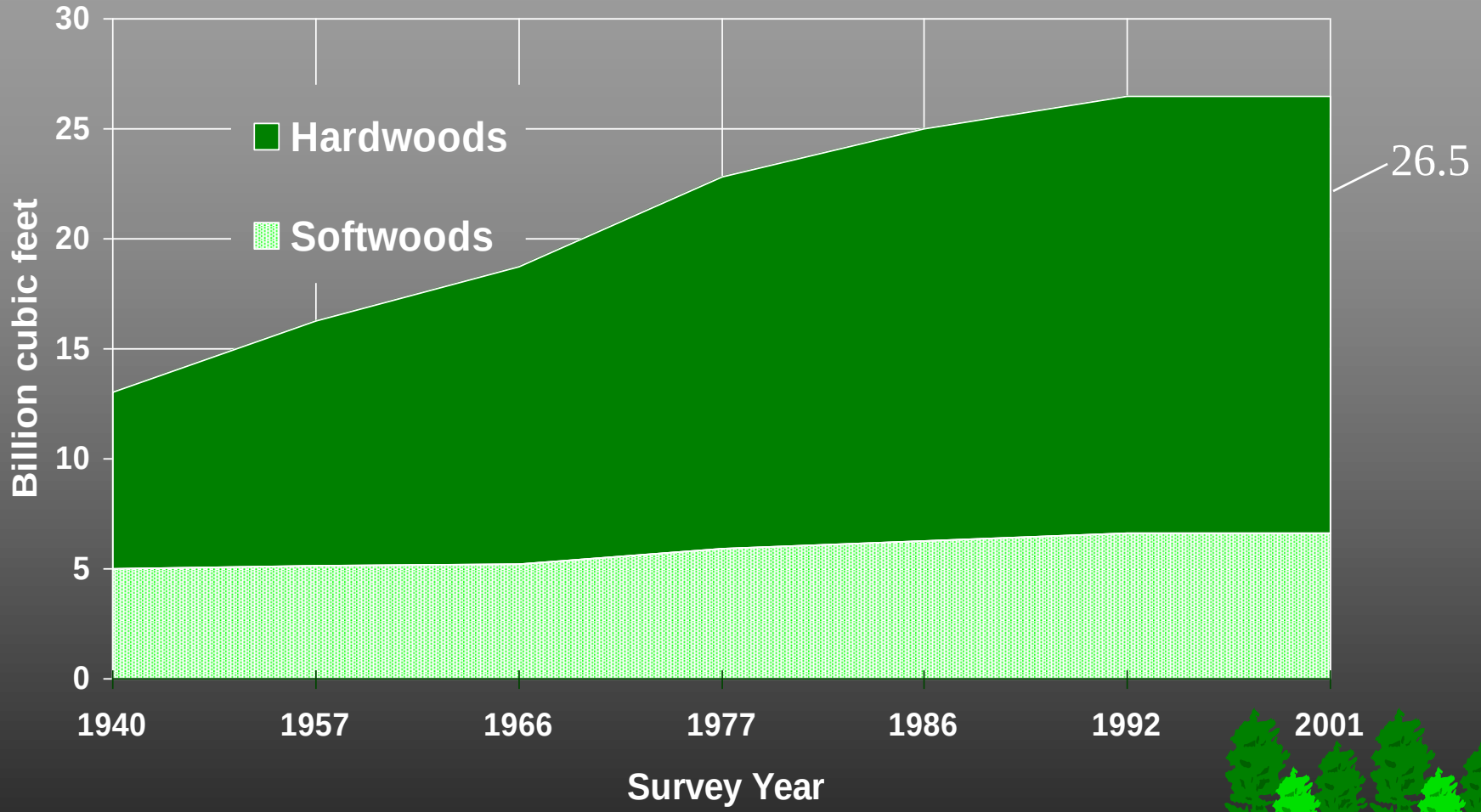
Forest Types, 1940-92



Loss of Forest Acreage, by Forest Type



Growing Stock Inventory, 1940-2001



What do you have?

How to get what you want?

Size / Age

Species

Amount (vol ---- acreage)

Accessibility – boundaries / hydrology

Neighbors – BMPs / ordinances

Why does species matter?

Markets Exist ?

- Paulownia – red cedar -

Is site suitable?

- fir – sugar maple – longleaf
- E vs. W VA veneer

Biology 101 - a review

- All plants need:
  - space (to occupy & grow)
  - sunlight (to make food)
  - air (to make food)
  - soil (for nutrients, support, water)
  - water (to support, transport)
- As managers, we can manipulate some of these needs.

Regulating the amount of light is the most significant action managers can take to achieve and sustain the desired forest composition and stand structure. The amount and character of the sunlight influences the variety of vegetative habitats (Aune 1991).

Shade-tolerance

Tolerance is the ability of a species to survive and grow under limited light conditions

- Tolerant
  - Eastern hemlock, dogwood, maples, beech
- Intolerant
  - Most pines, black locust, black cherry, yellow poplar, black walnut
- Intermediate
  - White pine, most oaks, white ash, hickories

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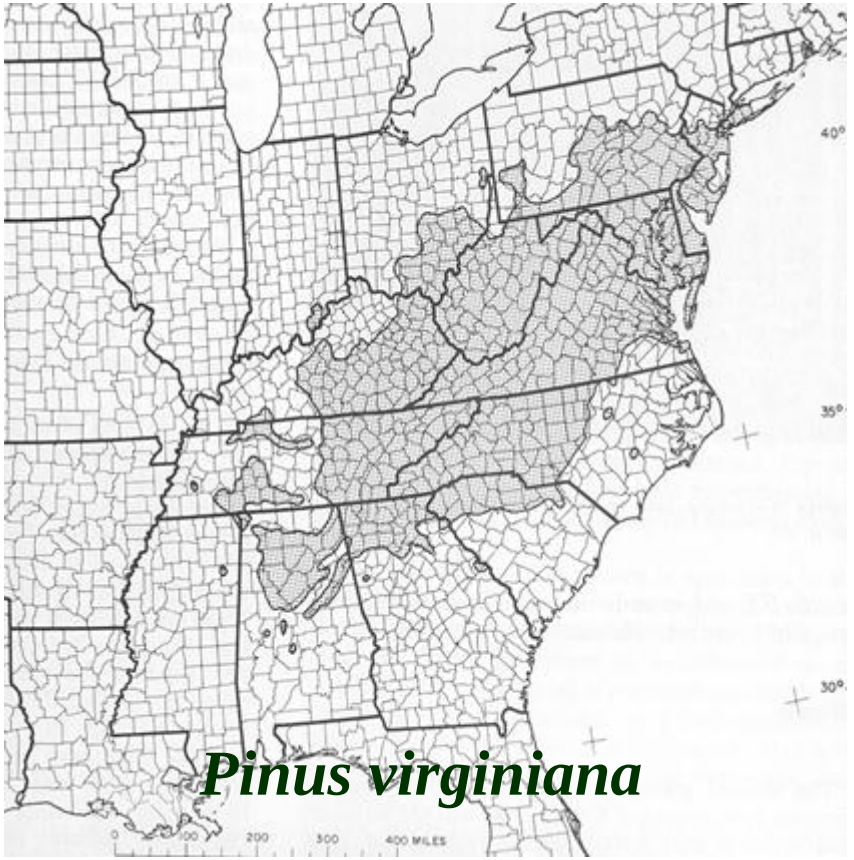
Ecology & Silvics

Silvics are the biological characteristics of individual trees, such as…

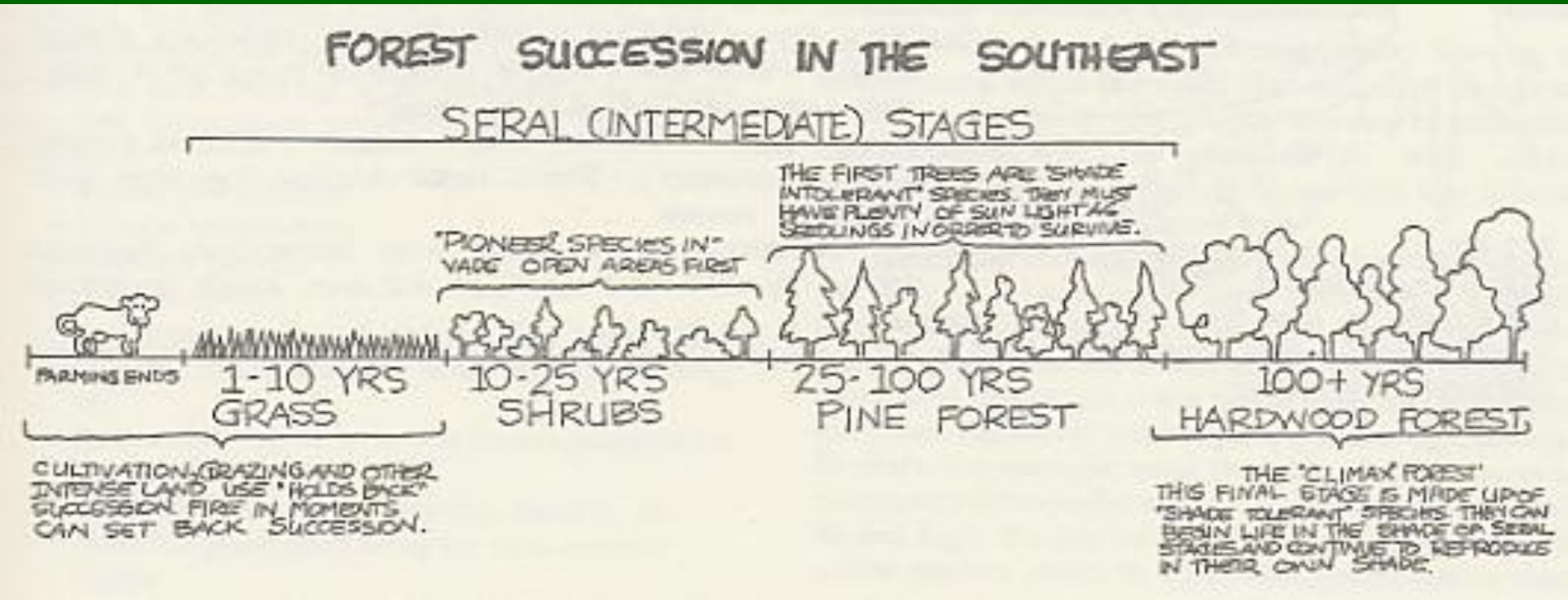
- Natural range
- Shade tolerance
- Place in succession
- Regeneration characteristics
  - seedbed requirements
  - seed dispersal
  - germination requirements
- Growth form
- Longevity



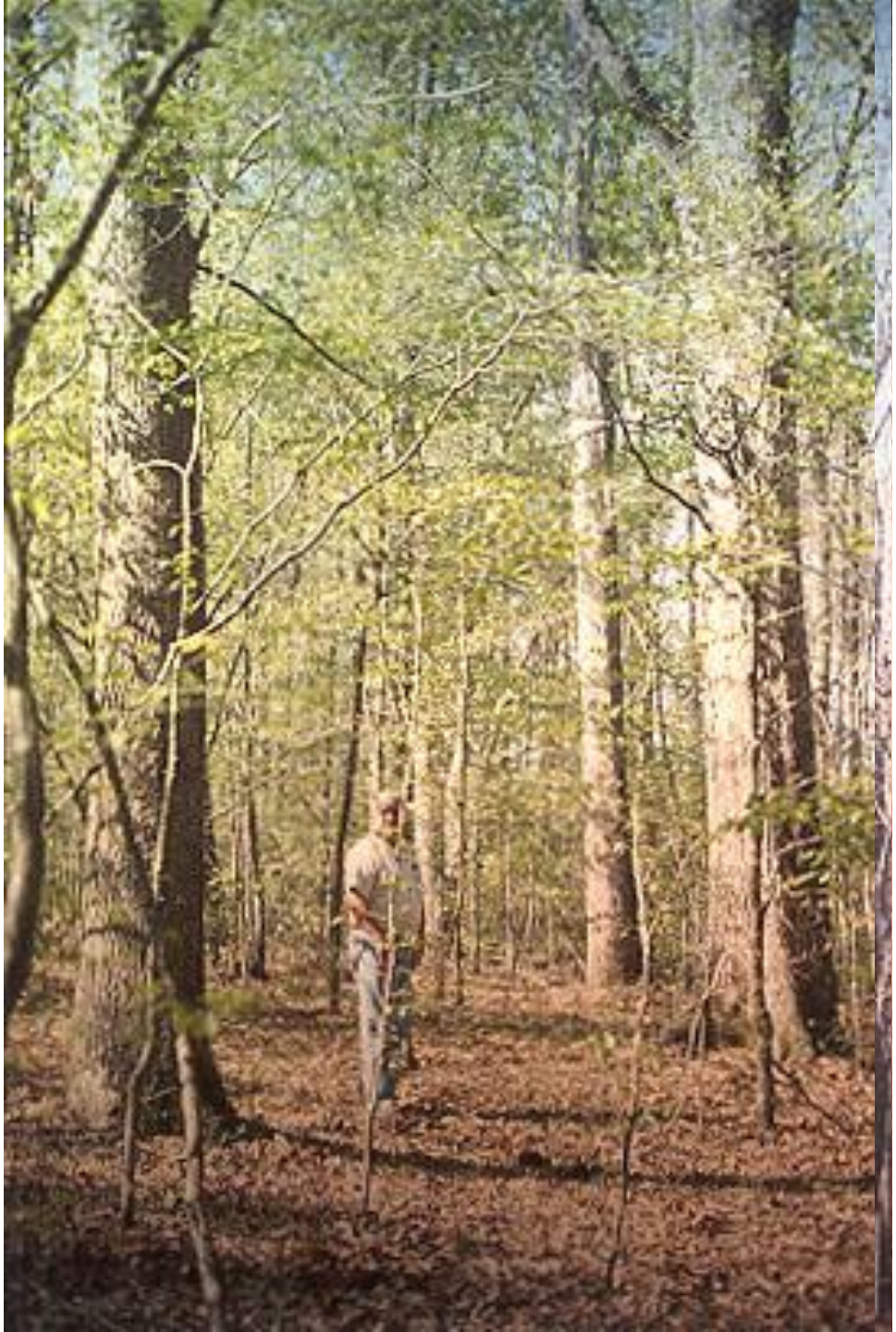
Pinus virginiana

Succession

- Succession is the gradual process of one plant community replacing another one over time



- Example : disappearing Virginia Pine



Mama, Where do Trees come from?

Natural Regen

- 99.9 % hardwoods
- stump sprouts
- supressed saplings

- seed bed in pine country – control hdwds

Artificial Regen

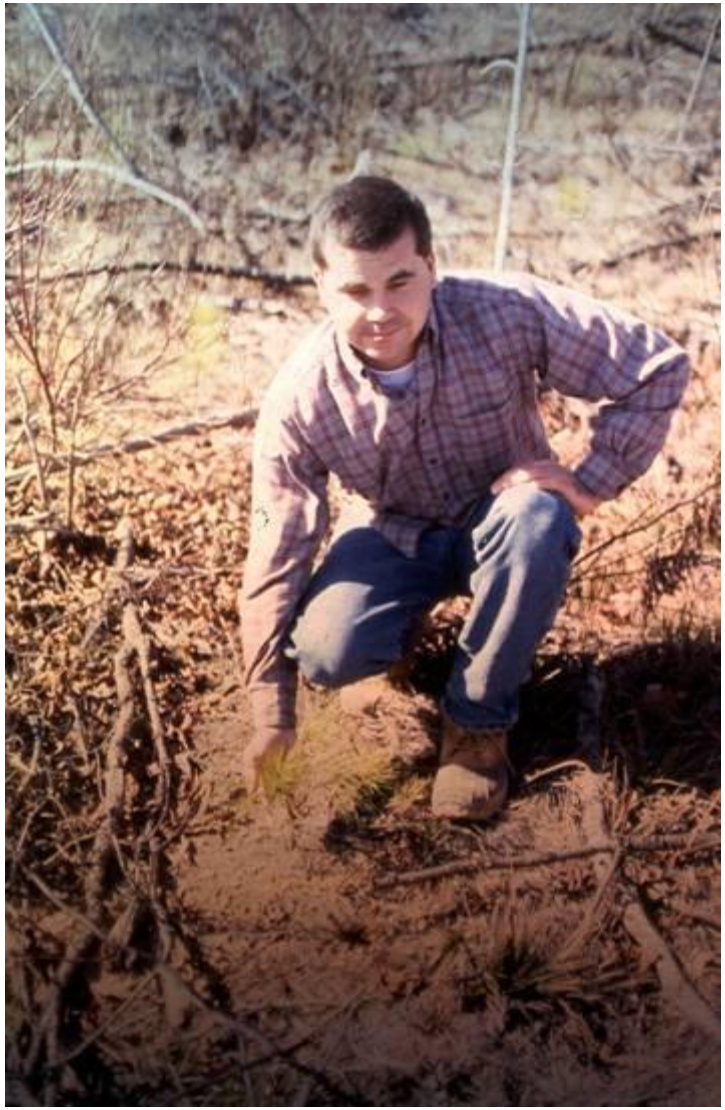
- vast majority of pine mgmnt

- very, very difficult w/ hdwds

Natural Regeneration

- New trees develop from sprouts, seed and root suckers.
- Often results in dense stands that require early treatment to avoid stagnation.
- Less expensive to apply.
- Results in species that are well-adapted to the site.

Artificial Regeneration



- New trees are established by planting or seeding.
- More expensive to implement.
- Provides direct control of genetics, species and placement of trees in the stand.
- Results in complete control of time of establishment.

Silvicultural Systems

Is Clearcutting a Sustainable Forestry Practice?

Disturbance

- Large-scale
  - Set back succession to regeneration stage
  - Occur infrequently
  - Changes are drastic & immediate
  - Stand-replacing
    - Hurricanes
    - Ice storms
    - Wildfires
    - Clear cuts
    - Insects/diseases

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Uneven-aged Systems

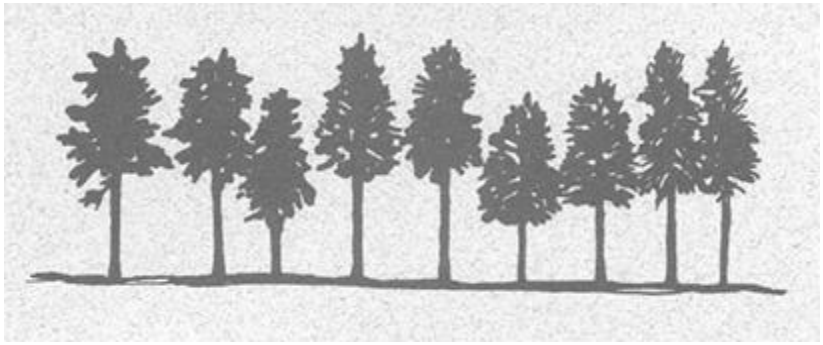
- Contain at least three--and sometimes many more--age classes.
- Trees are harvested singly or in groups, resulting in continuous forest canopy cover.
- The most effective way to regenerate shade-tolerant species.
- Examples include single-tree selection and group selection.
- Very difficult – rarely done -- firewood -- historic properties

Management

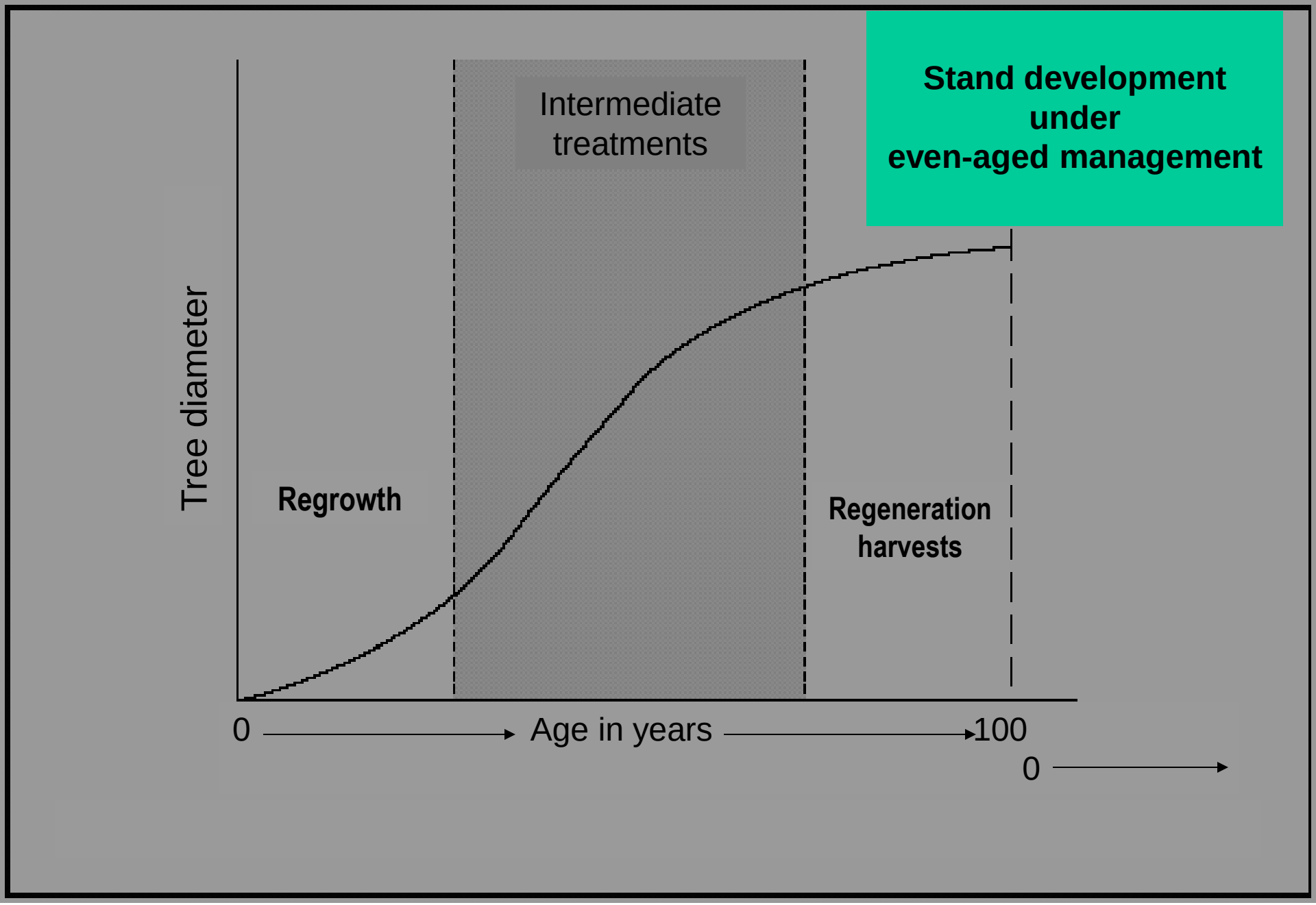
- Valid silvicultural systems include:
  - Shelterwood (and irregular shelterwood)
  - Seedtree
  - Clearcut
  - Selection (group & single tree)
  - **A select(ive) cut is NOT a valid silvicultural system – it is high-grading!**
- Visual Guide to Timber Harvesting
  - **www.forestandrange.org**

Is Clearcutting a Sustainable Forestry Practice?

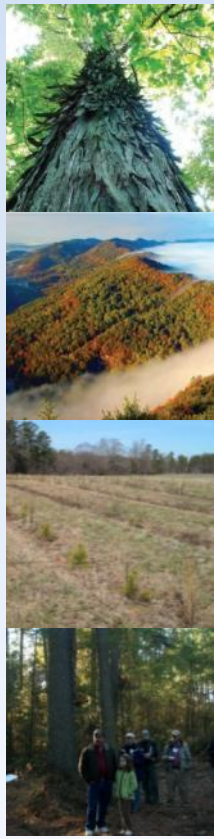
Even-aged Management



- Create stands with trees of similar age.
- All (almost!) trees are harvested at the same time.
- The most effective way to regenerate shade-intolerant species.
- There are three established even-aged methods: clearcutting, seed-tree, and shelterwood.



Source: Pennsylvania Forest Stewardship Bulletin # 7. *Timber Harvesting: An Essential Management Tool.* Penn State Cooperative Extension.



Stand prior to harvest in 1927

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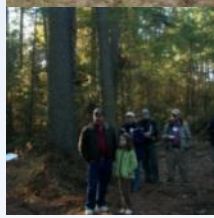

Merchantable sawtimber removed during Winter 1927

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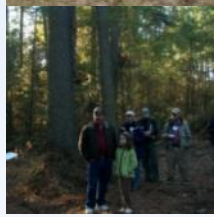

Remaining trees harvested for chemical wood soon after…

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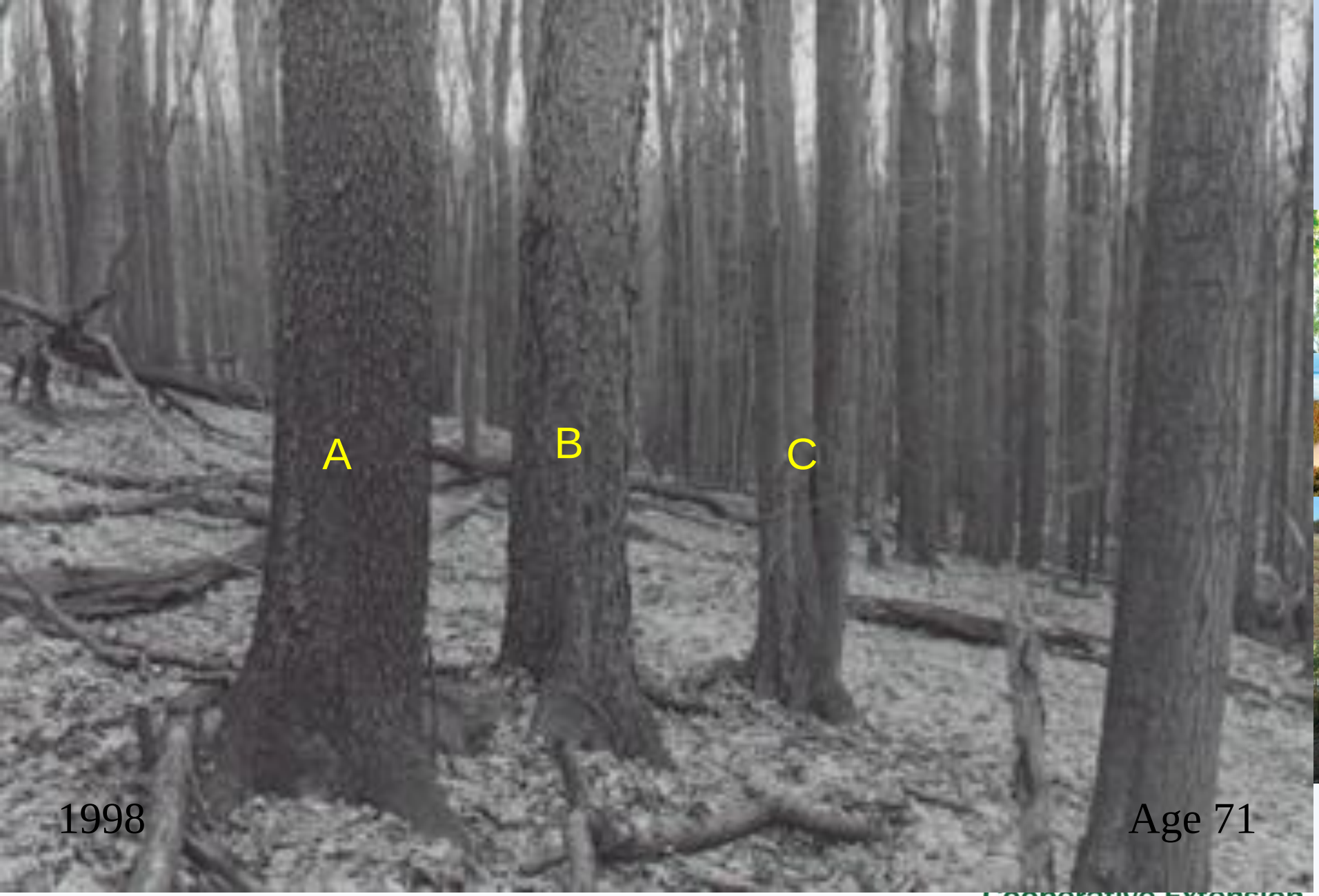
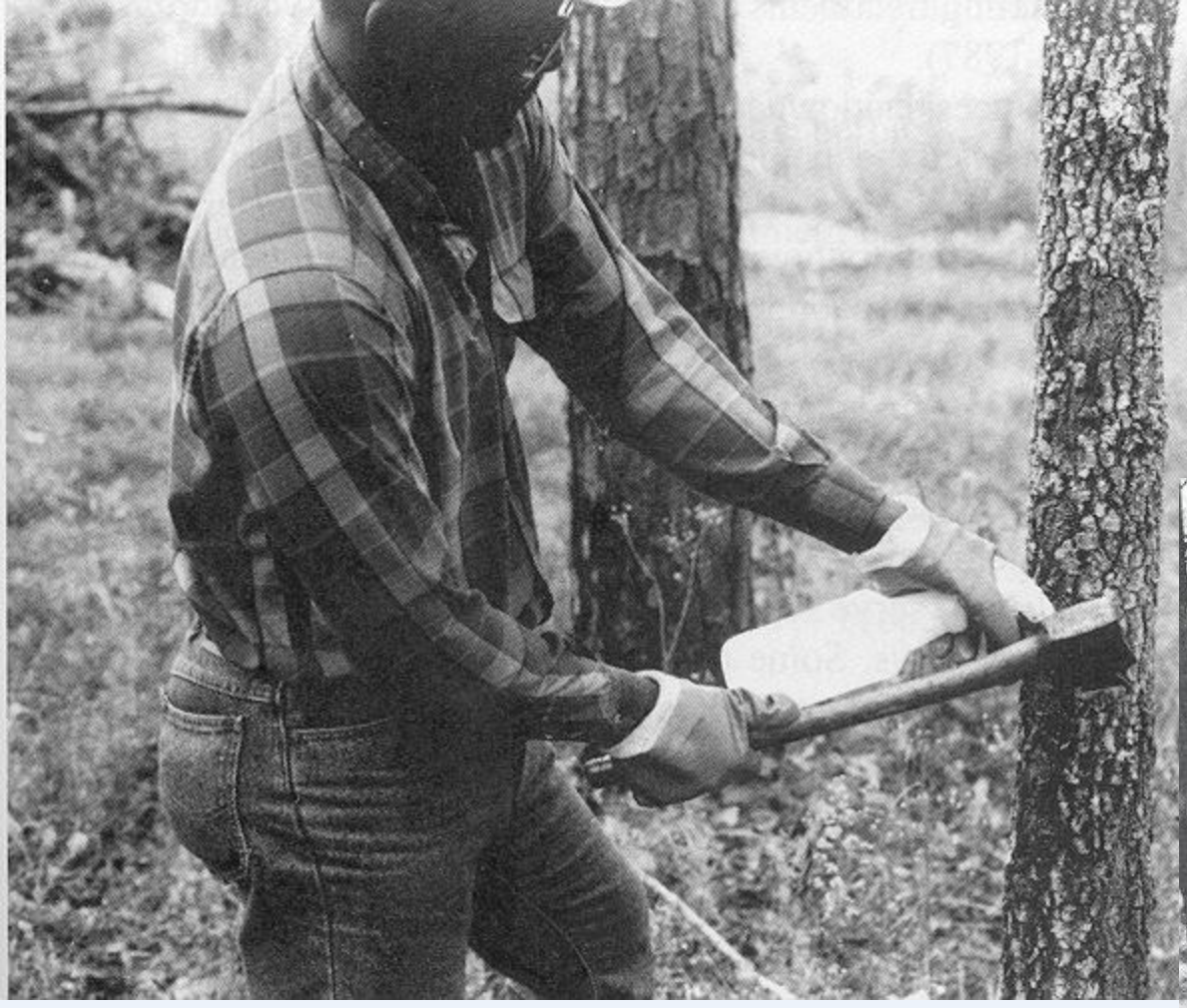
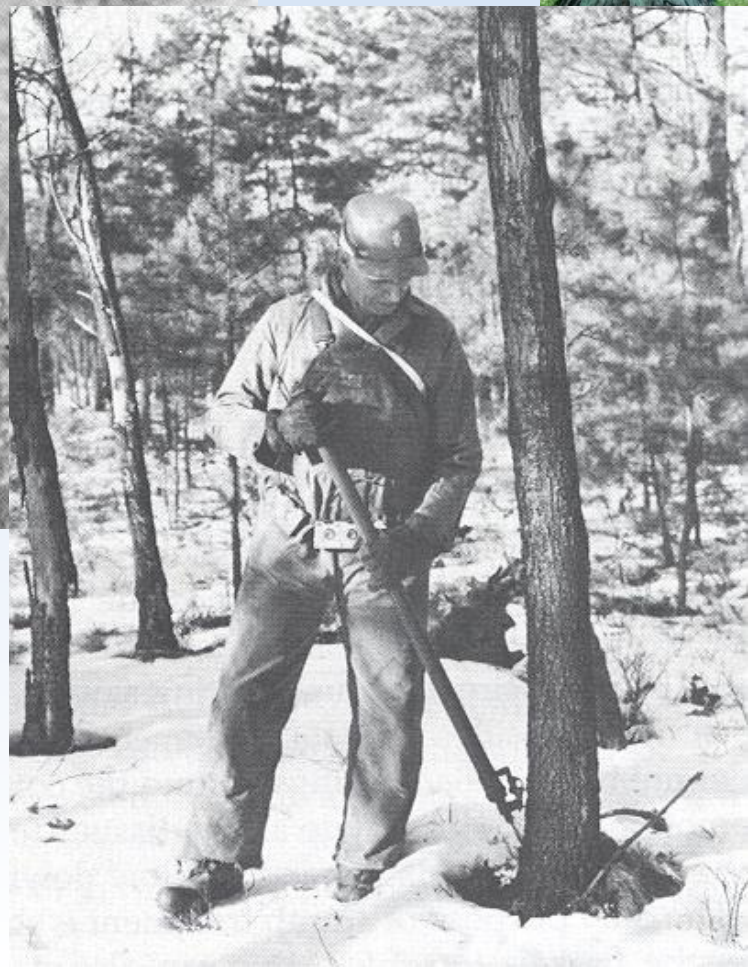
A
B
C
1937
Age 10

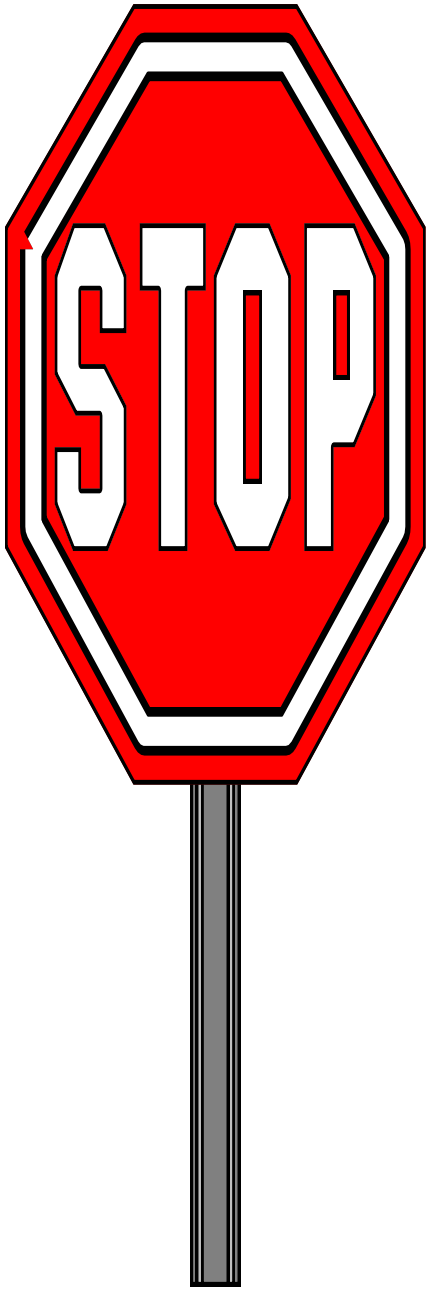


Intermediate Operations

- Competition control
- Crop tree release
- Fertilization
- Timber stand improvement/thinning
- Prescribed fire
- Do nothing



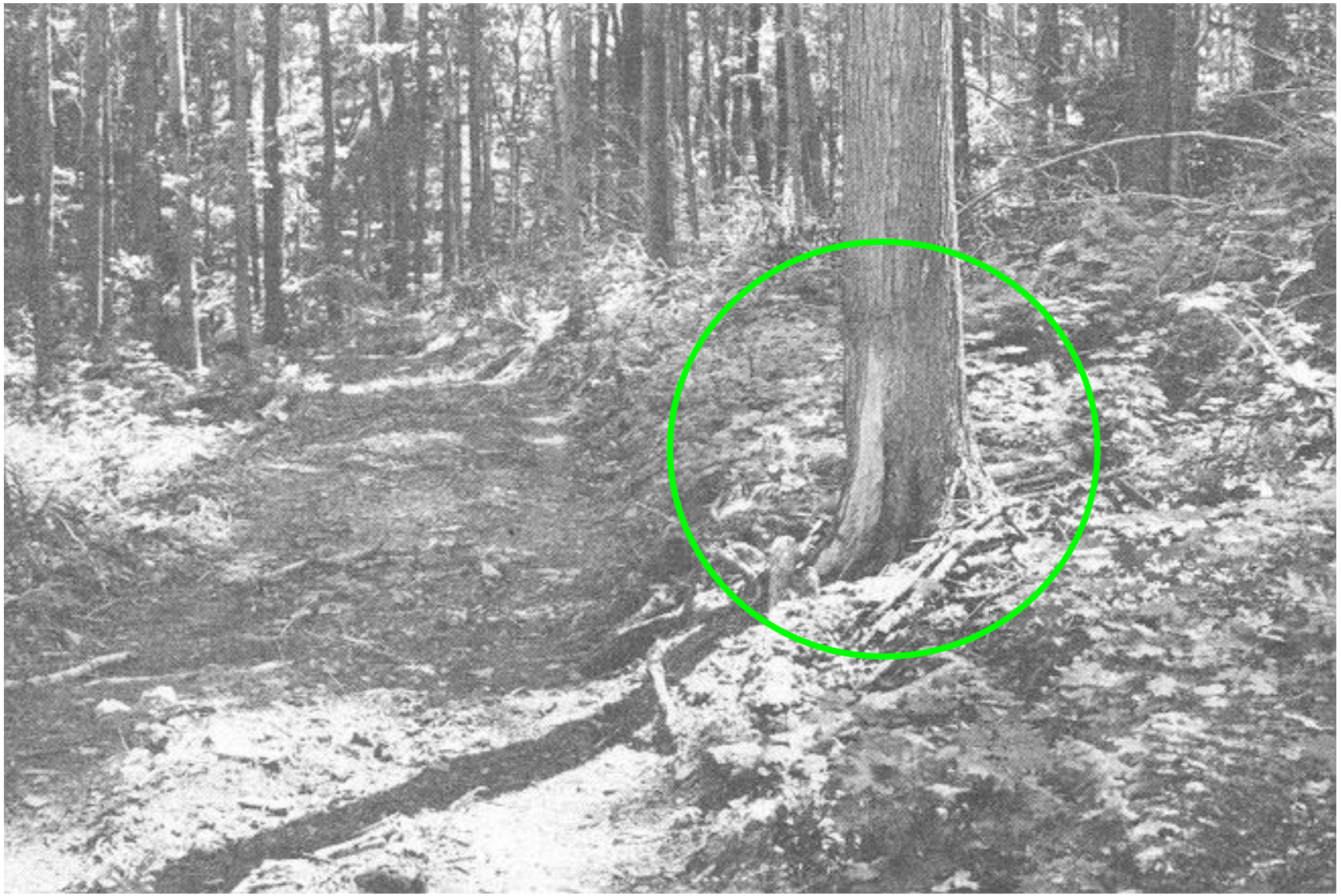




Selective Cutting Alert

Also called diameter-limit cutting and high-grading, select cutting…

- removes the best competitors.
- removes the fastest growing individuals.
- removes the most valuable species.
- with no regard for spacing or stocking.
- with no tending of smaller diameter classes.
- with no consideration given to regenerating the future stand.
- with no consideration given to wildlife.



Questions ??

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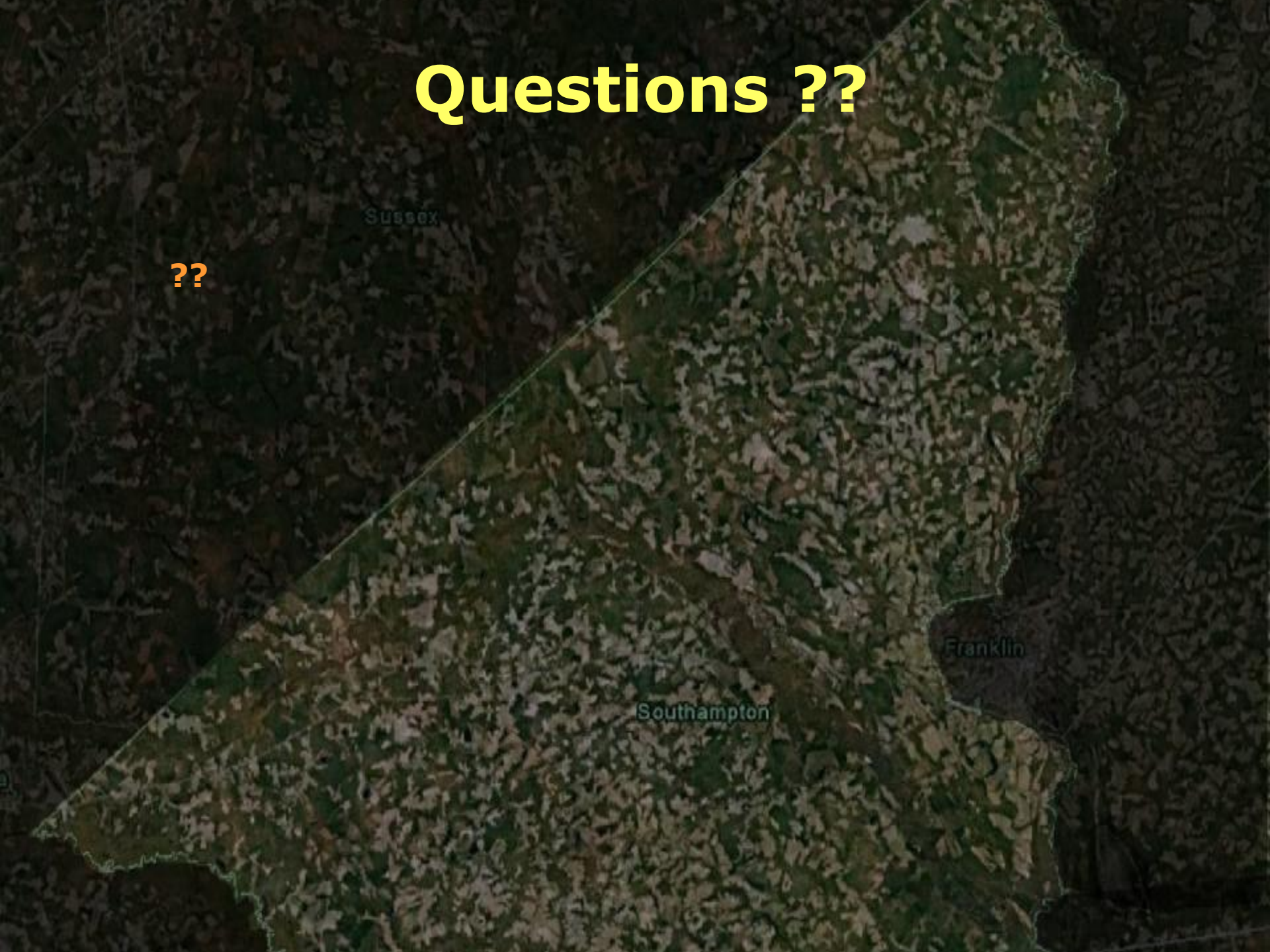
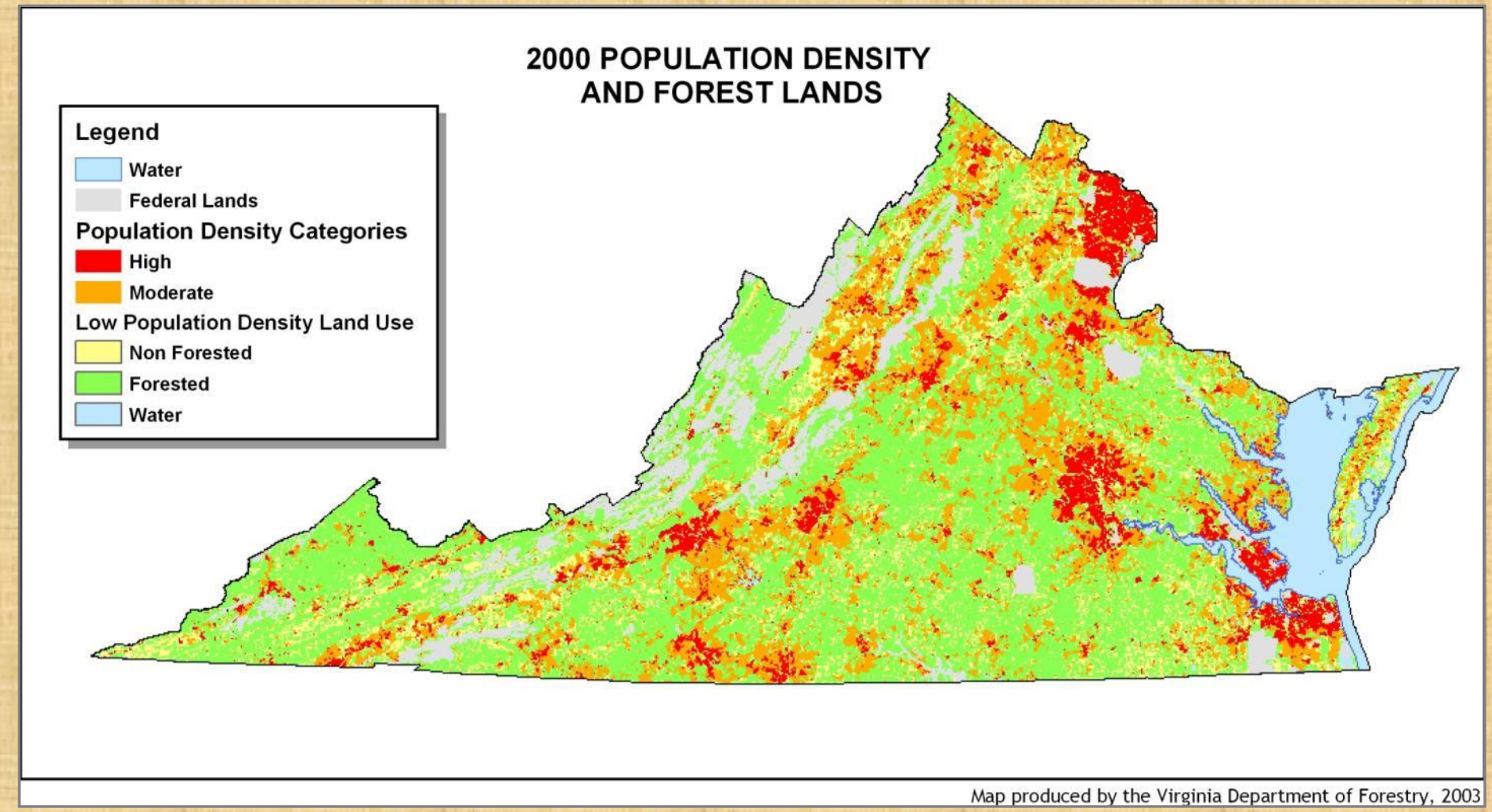


Forest Resource Assessment



Virginia's Forest Owners

Size Class (Acres)	No. of Owners	Percentage
1 – 9	295,000	63
10 – 19	50,800	11
20 – 49	57,400	12
50 – 99	35,000	7
100 – 199	14,600	3
200 – 499	13,100	3
500 – 999	2,200	<0.5
1000 – 4999	600	<0.5
5000 +	100	<0.5
Total	**468,800**	**100**

Markets:
Where could your wood go?
Pulp and paper / housing / pallets / furniture (export) / specialty

Pulp and paper
Massive volumes / massive producers / low cost per unit / supply outweighs demand

Housing : structural lumber must be inspected / stamped
nothing too special needed here (Chip-N-Saw)

Pallets :
low quality material – supply usually outweighs demand

Furniture : this is becoming an export market

Specialty : craftsmen, turners,
Internet / Ebay, UT study says no

So if markets don't exist, why do I need to care about forest management?

Trees will be harvested to:

- as a forest product
- improve forest health
- mitigate a hazard situation
- improve aesthetics

Hardwoods:
Wolf trees (large poor form, decaying, occupying a lot of space with no future benefit except maybe wildlife habitat, unique look
Unfavorable species: Black gum, hickory, red maple, sweet gum, beech

Pines:
This is more crucial due to known problems with Southern Pine Beetle which will cause widespread mortality in a short period of time.

In a storm in SE VA:
Hardwoods topple / Pines snap

Contract ??

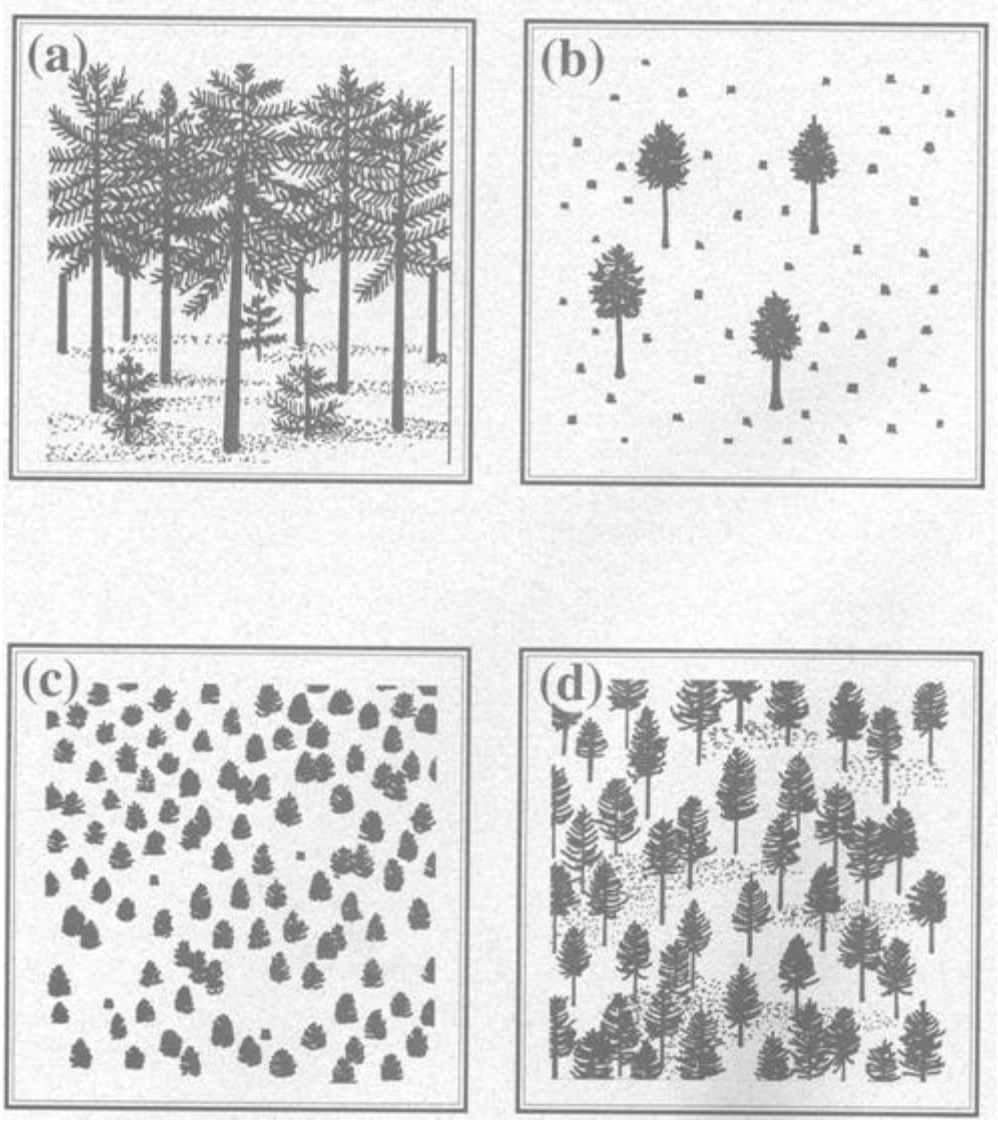
-With large jobs (>40 Mbf), definitely
-Always helps to have things spelled out and agreed upon to minimize miscommunication

-Main Items
    -worst first
    -Best Management Practices (BMPs) and full compliance with Water Quality Laws
    -minimize damage to residual
    -minimize damage to soil or improvements / neighbors

    Payment Terms – Fee for services, buying wood, lump-sum or pay-as-cut

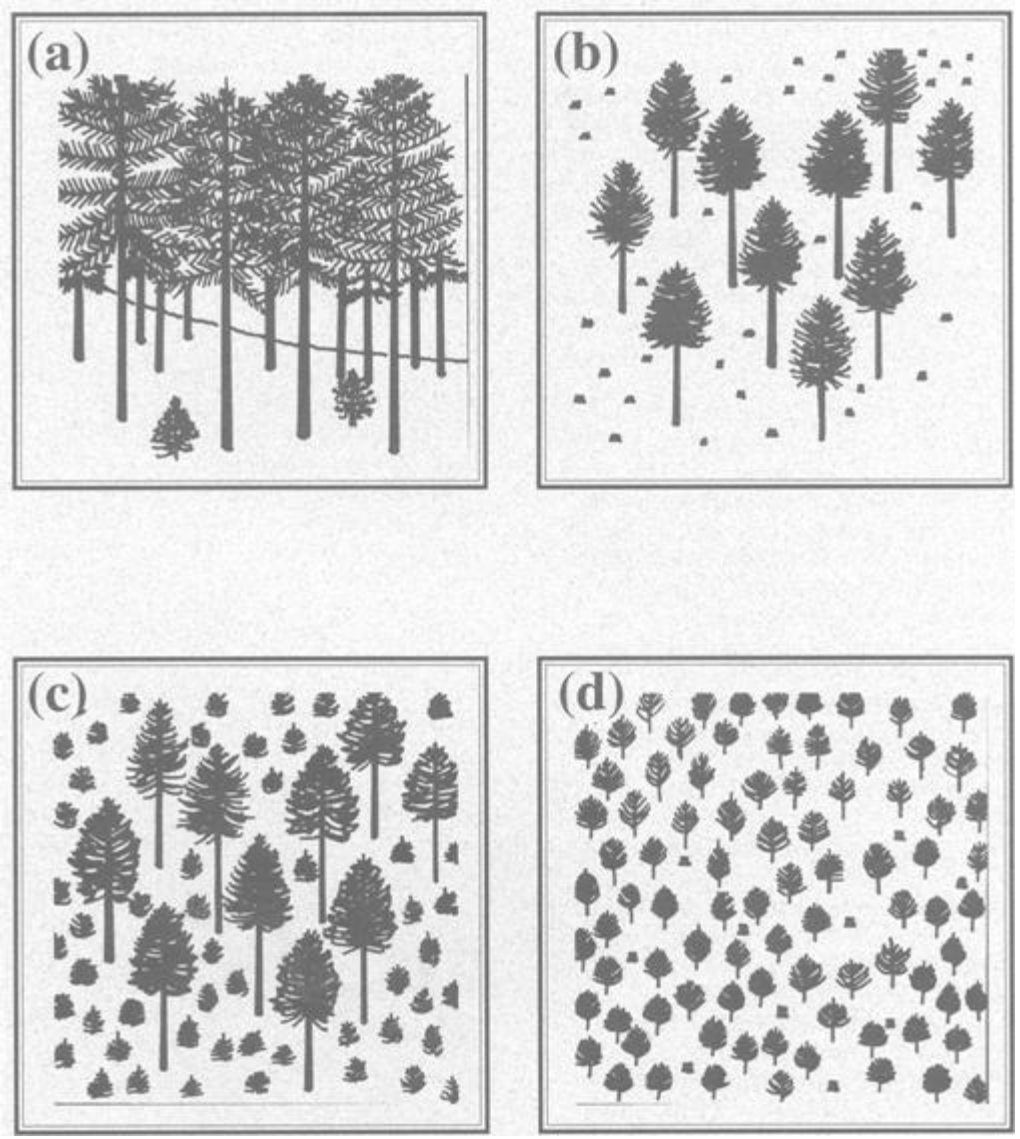
Seed Tree Method

- Number of seed trees left depends on tree height, seed characteristics, wind direction.
- Usually from 3 to 15 seed trees per acre are left behind.
- Seed trees should be the best trees in the stand.

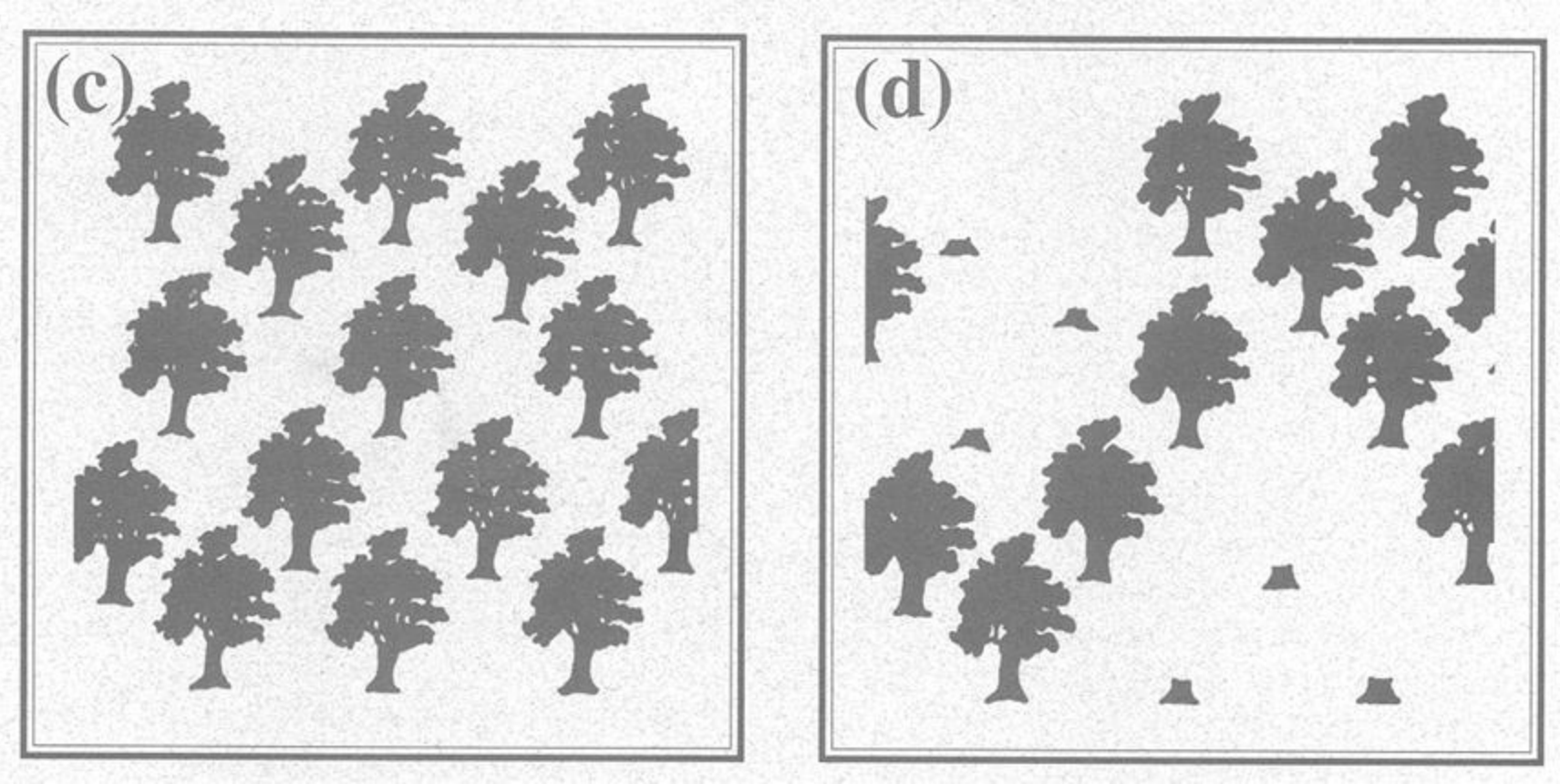


Shelterwood Method

- Purpose is to obtain reproduction under the protection offered by partial cover.
- Overstory is removed in two or three stages over a 10 to 20 year period.
- Overstory trees left in place should be the best trees in the stand.



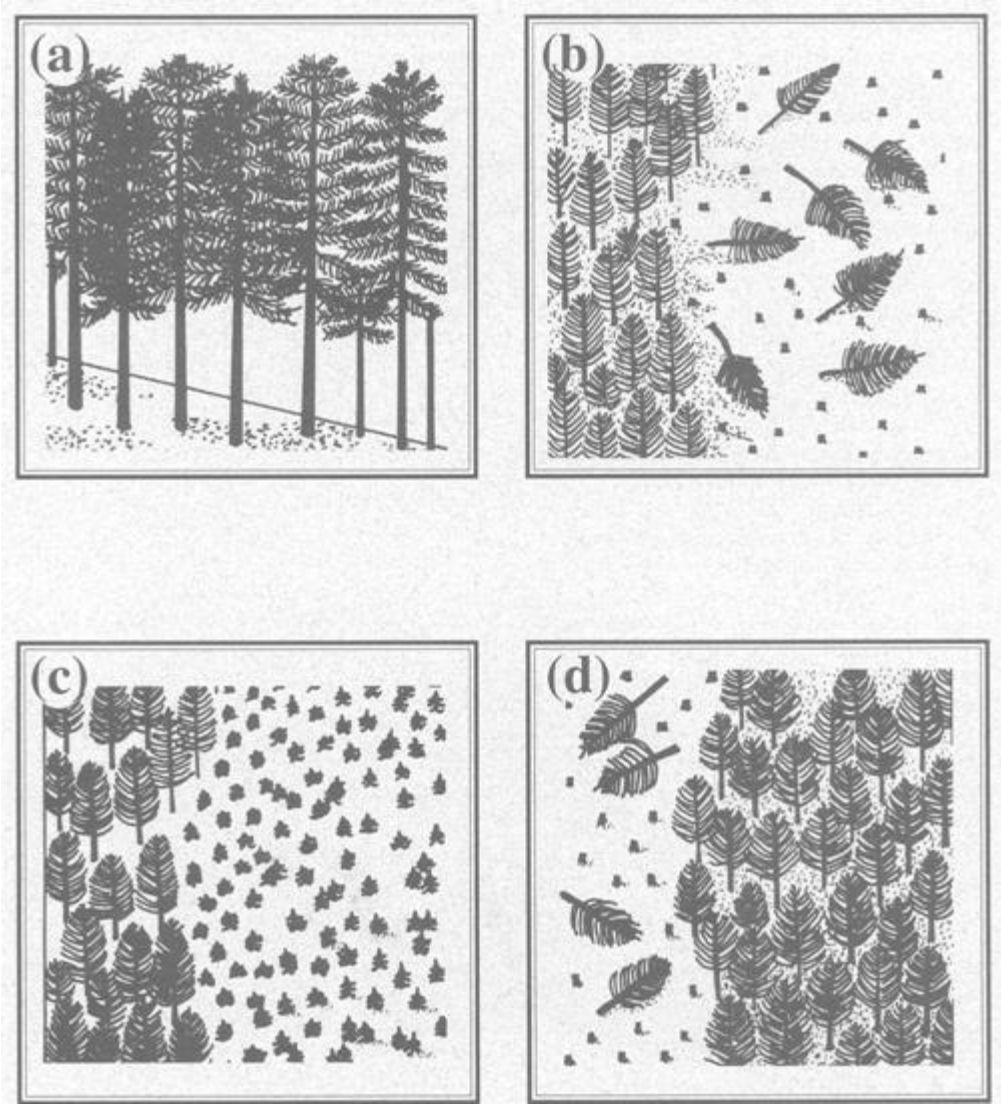
Group Selection Method



- Harvest groups of trees, creating openings no larger than 1 to 2 times the height of surrounding trees.

Clearcutting Method

- Removes all trees in a stand down to 2” in diameter regardless of size and species.
- Used to regenerate a forest either naturally or artificially.
- Used in both hardwood and pine stands.
- Most economical method to harvest timber.



Intermediate Treatments

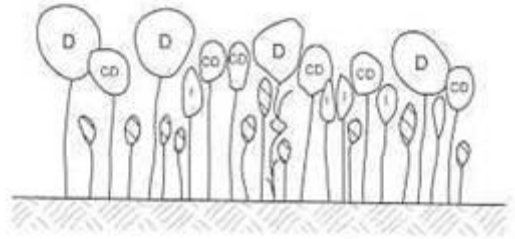
Release

- To *release* a young tree means to kill or cut undesirable trees or other vegetation that overtops it.

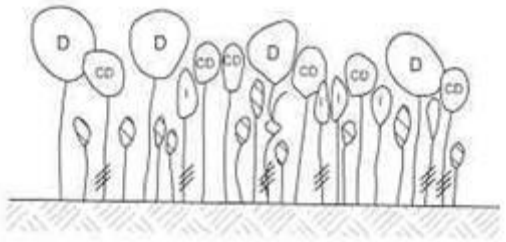
- Crop tree release - cutting or deadening trees in a young hardwood stand to focus growth on better growing trees of desired species and canopy position.

Crop Tree Release

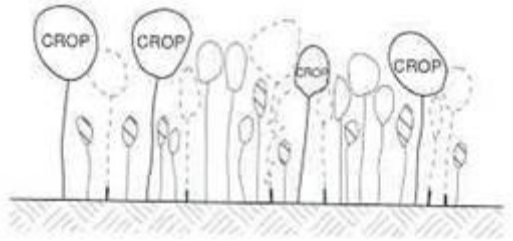
- Cutting or deadening trees in a young stand to focus growth on better growing trees of desired species and canopy position.
- Results in a faster-growing, healthier woodland composed of a greater percentage of the more acceptable trees.
- Deaden all trees with crowns that touch the crown of the crop tree.
- Used with hardwoods between age 15 and 30 after trees have begun to express dominance.



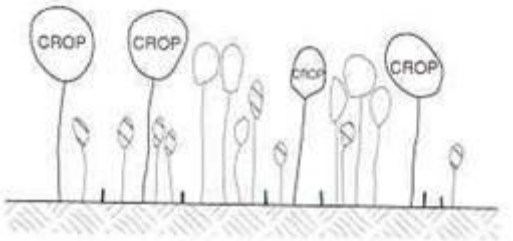
Unthinned



Unthinned
(Marked trees indicated by ///)



Free thinning
(Crop trees released)



Residual stand after free thinning
(Crop tree release)

Thinning

- Pre-commercial vs. commercial
- Removal of merchantable trees during the rotation.
  - *To capture the value in trees that would otherwise die.*
  - To concentrate the growth on fewer trees so they become bigger faster.
  - To maintain high stand vigor, thereby reducing susceptibility to insects and disease.
  - To insure a good seed sources for the next rotation.

Timber Stand Improvement

- Removes trees of less desirable species, poor form, and poor condition from the main canopy to favor better trees and improve stand quality and composition.
- A first step for improving degraded stands. Used primarily in hardwood stands.

FIGURE 22-1
Improvement cutting removes trees damaged by natural agents like wind and ice, or injured during logging, freeing adjacent good quality trees in the upper canopy for better growth and development.