



# Coastal Plain Longleaf Management: An Ecological Forestry Approach

Forest Stewards Guild Meeting  
August 19, 2021  
Kevin McIntyre



# Palustris WMA 10 year management plan

year 1



year 3



year 5



year 7



year 9

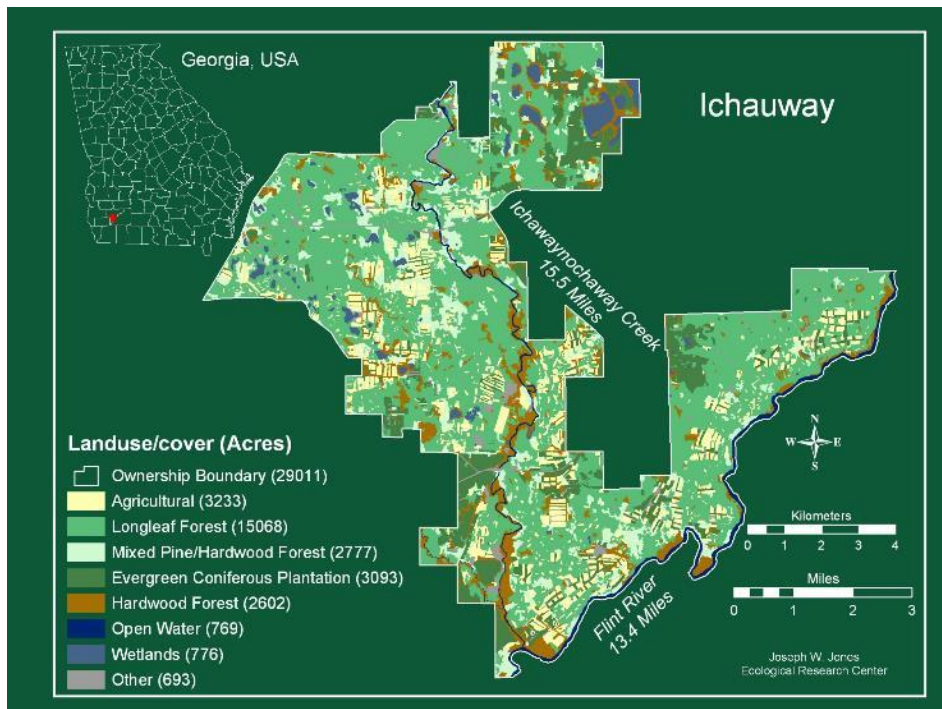


Thin to 50 ft<sup>2</sup> BA,  
Repeat

# Jones Center at Ichauway



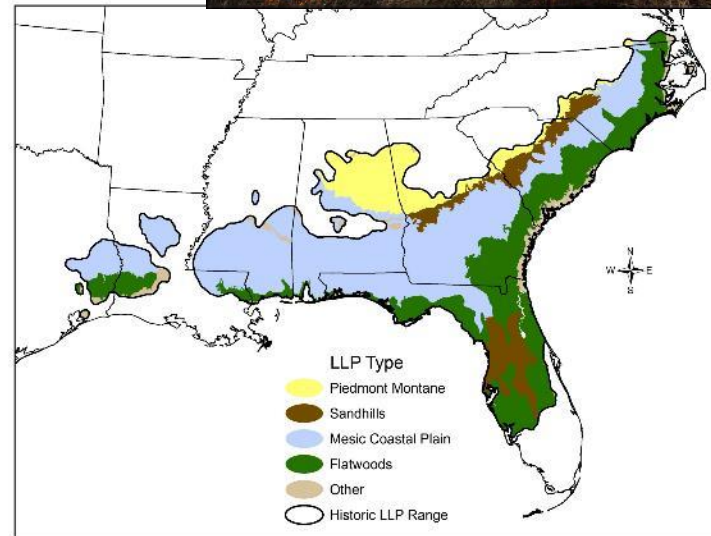
- Ichauway established late 1920s
- Jones Center established 1993



# Longleaf Pine Ecosystem



- ~92 million acres presettlement
- < 5% remains
- Most diverse NA temperate ecosystem
  - 1100 of 3600 GA plants found on Ichauway
- 900 endemic plants rangewide
- 31 Federally-listed T/E spp.
- Fire dependent ecosystem
- Wide range of site types
- Longest-lived southern pine (400+ yrs.)





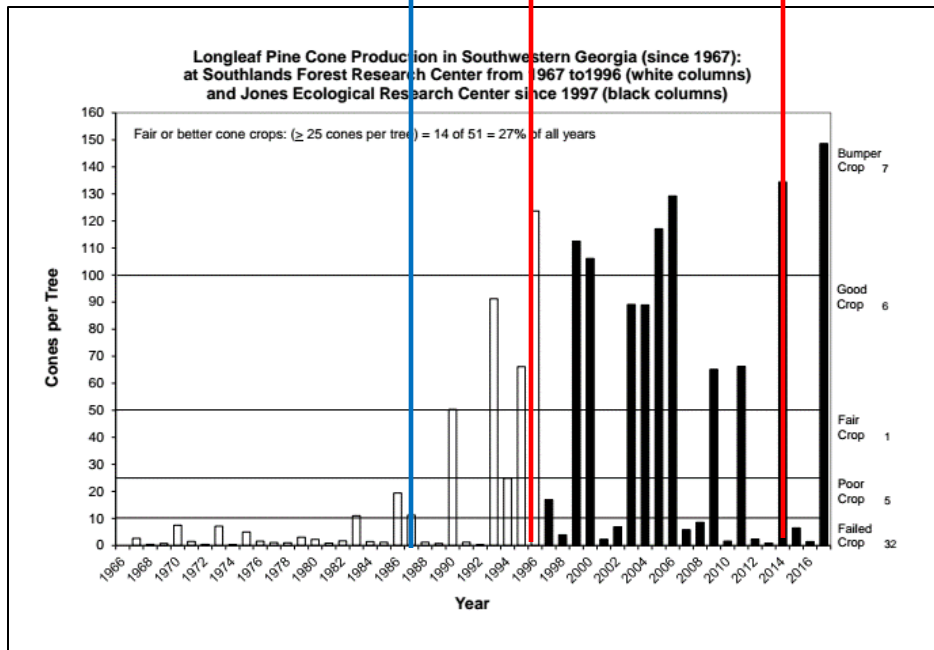
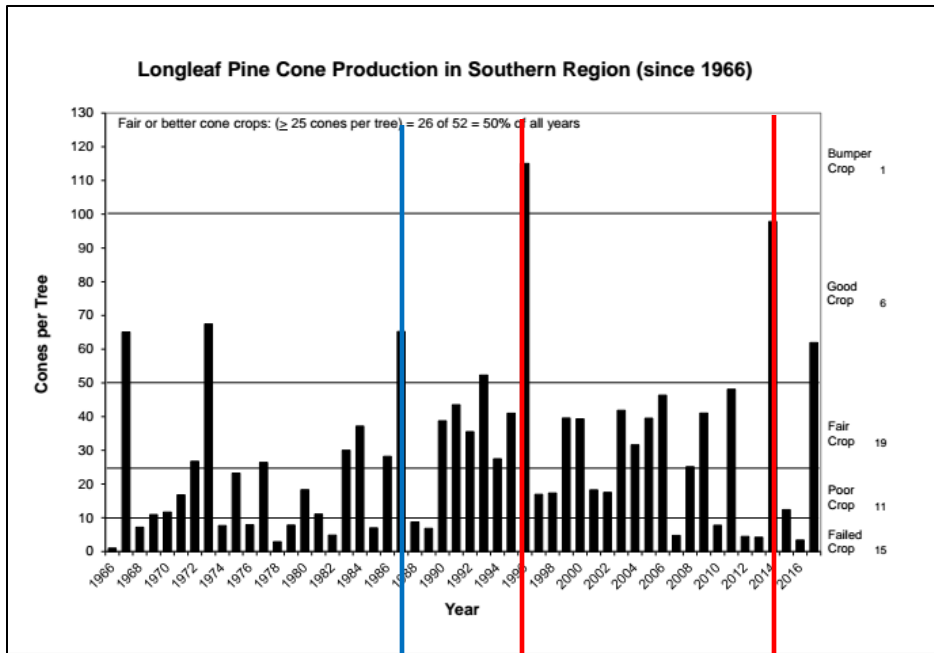
# Presentation Summary

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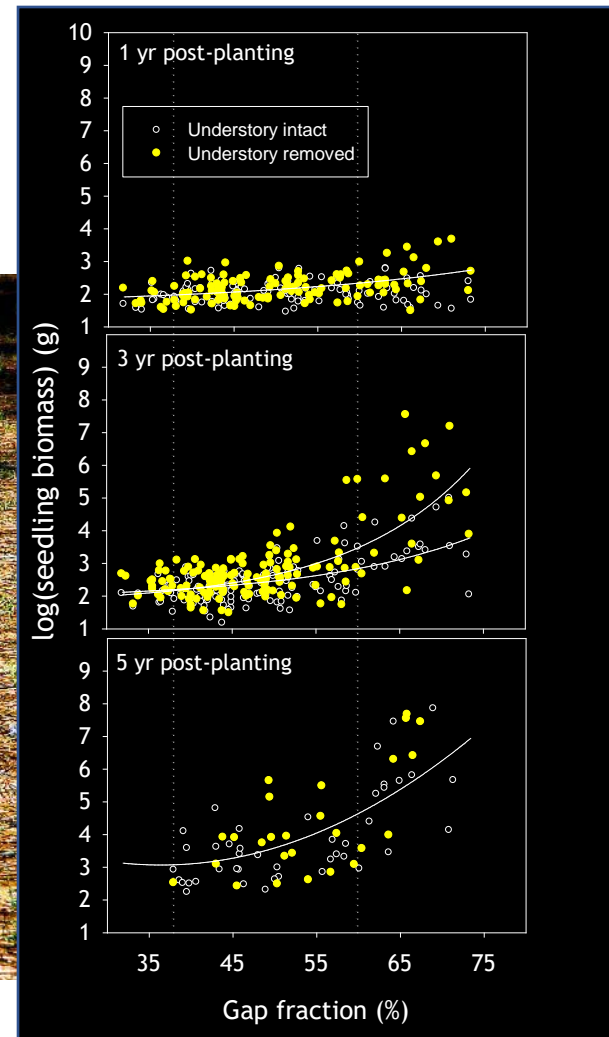


- Maintenance of mature second growth longleaf-dominated stands
- Longleaf restoration scenarios
  - Afforestation/reforestation
  - Mixed hardwood/longleaf stands
  - Established offsite pine stands

# Natural History - Cone Crops (USFS)



# Natural History – Seedling Survival

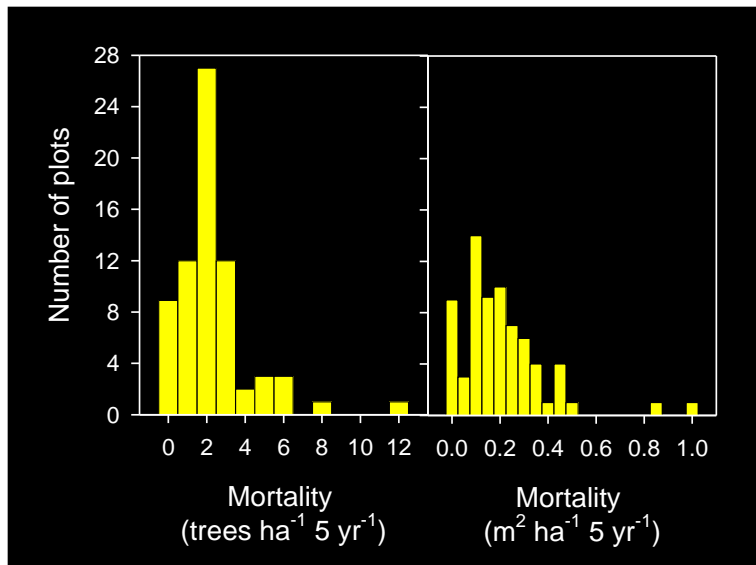


# Natural History - Overstory Disturbance

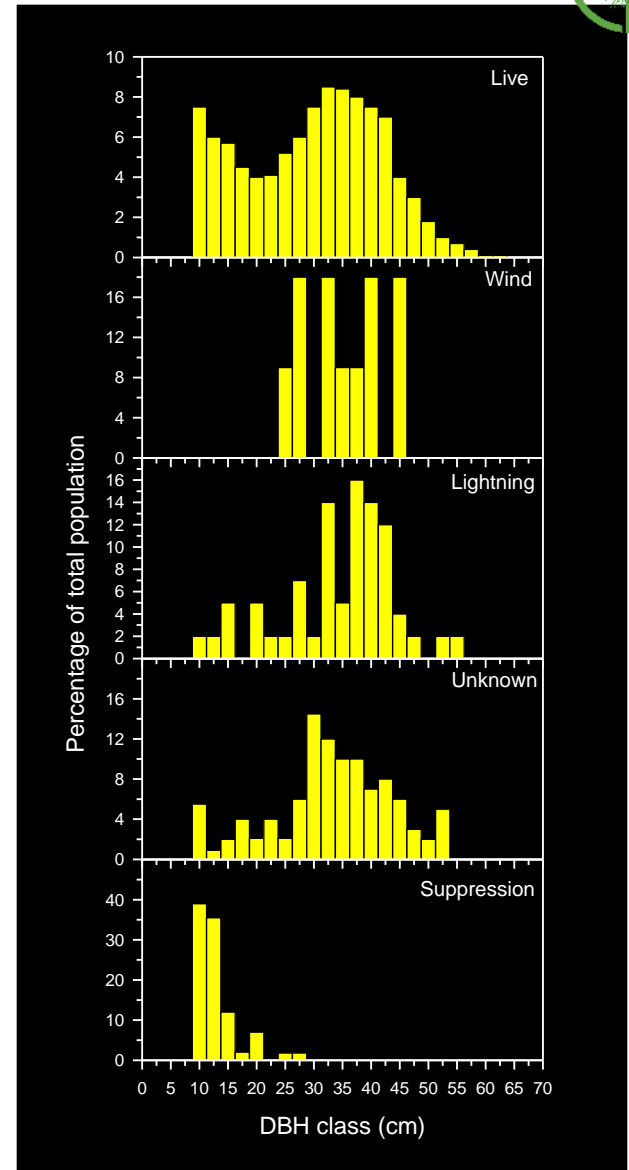


More common sources in longleaf forest result in small scale disturbance

- Lightning (more prevalent on xeric sites)
- Competition (more prevalent on hydric sites)
- Wind (more prevalent on hydric sites)
- Beetles
- Fire



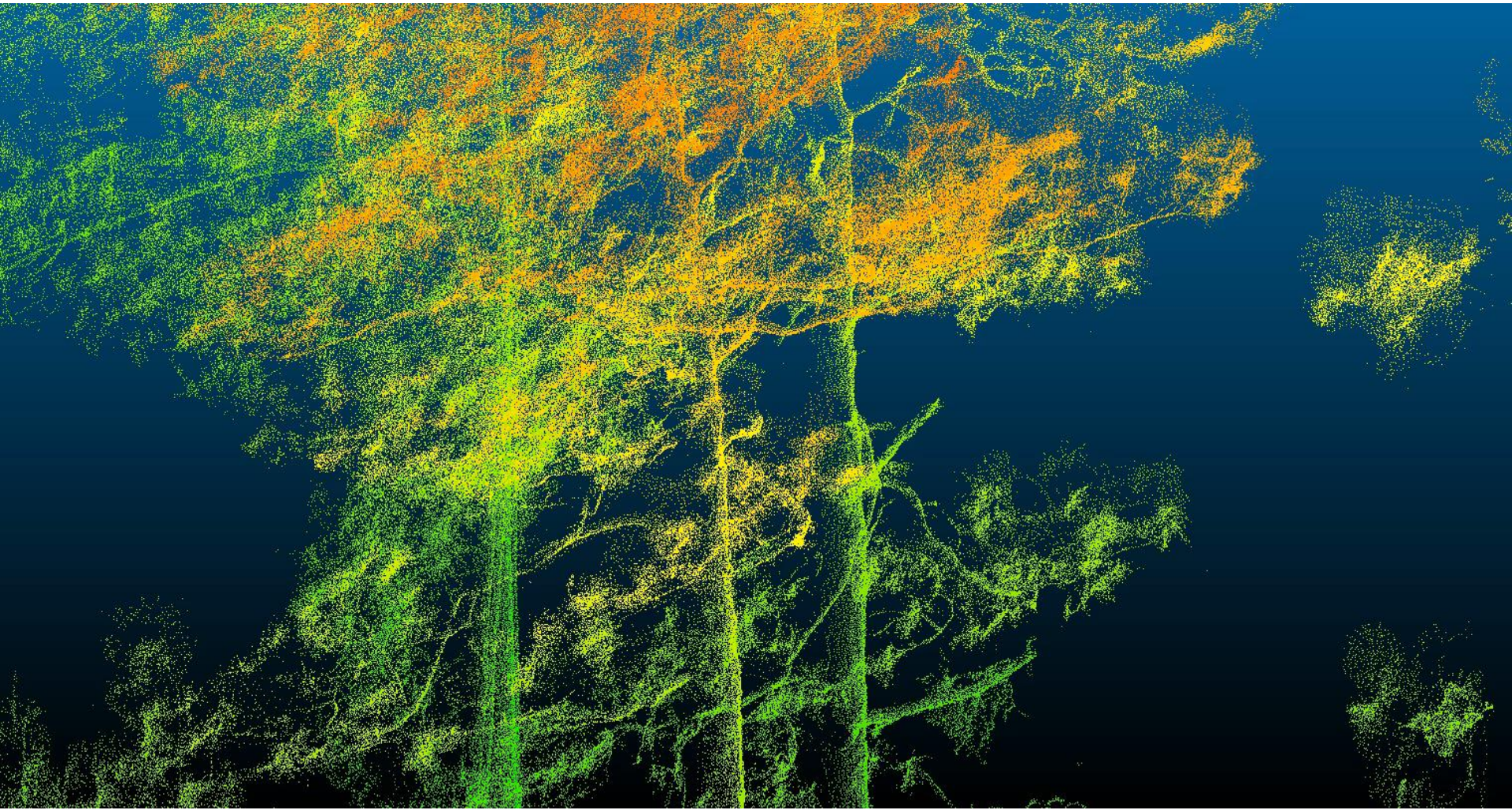
From Palik & Pederson (1996)













# Natural History - Summary

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Natural demographics in longleaf forests result in:

- Perpetual forests with multiple age classes
- Continuous fuels through time and across space – supports fire
- Variable density and spacing (heterogeneity)
- Advance regeneration seedling pools





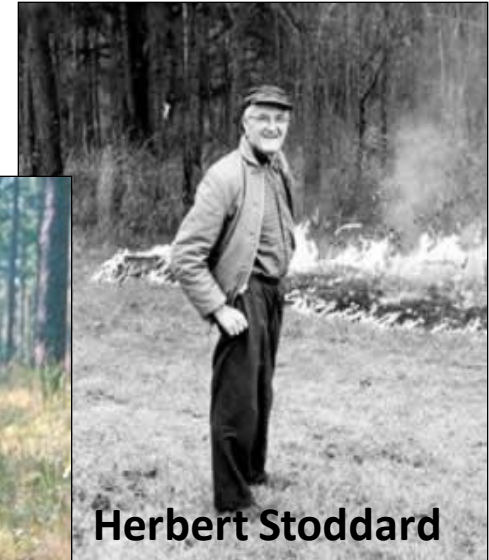
# Stoddard-Neel as a Case Study



- Developed by Herbert Stoddard in 1930-40's
- Refined and adapted by Leon Neel since 1950's
- Developed working on quail hunting preserves in SW GA and N FL
- Designed to meet the objectives of a given place and time
  - Building volume on understocked stands
  - Wildlife habitat
  - Aesthetics



Leon Neel



Herbert Stoddard

# Leopold's Opinion



DANIEL L. NEHARD  
1500 WALNUT STREET, 11 FLOOR  
PHILADELPHIA, PA.

424 University Farm Place  
October 20, 1939

Division of Wildlife Management

October 18, 1939

Mr. Daniel L. Nehard  
1500 Walnut Street Building  
Philadelphia, Pennsylvania  
October 18, 1939

Dear Mr. Nehard:  
Dear Mr. Leopold -

My statement that the policy was intended as a criticism of officers. It seemed pretty close out the question of what it was could pursue a policy without a that the members have really and they wish the club to be. I saidposal before them. Naturally I interested in.

My visits to the club the Ford logging. I have no rec correct. However, I did check u with it. I admit that my sugges was premature in the sense that their work.

I am glad you share my Manville, and he is coming down was selected by Dr. Dice and I h

I have just spent several days with Stoddard and came away with a conviction that he has been too modest about the conservation methods he has worked out for the Southeast. They are commonly regarded as applicable only to game preserves, but in my opinion he has developed principles which are equally applicable to lumber company holdings, national forests, and all other owners of coastal plain longleaf. It is a great satisfaction to me to know of your confidence in Stoddard. I of course am biased, for he is one of my closest personal friends. I am lecturing to my students Monday on the Stoddard method of handling Southeastern pine lands.

As you say, letters are inadequate as a means of talking over these questions. I was awfully sorry not to be able to come up last summer, and so was Stoddard. We both had our hands too full to arrange a date at short notice. You may be assured, however, that I am as anxious as ever to meet you and to thoroughly discuss all these questions.

Yours sincerely,

Aldo Leopold  
Professor of Wildlife Management

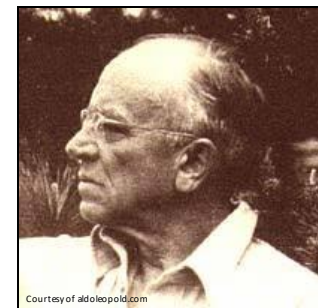
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Courtesy of Tall Timbers Research Station

Herbert Stoddard



Courtesy of aldoleopold.com

Aldo Leopold

# The Stoddard-Neel Approach

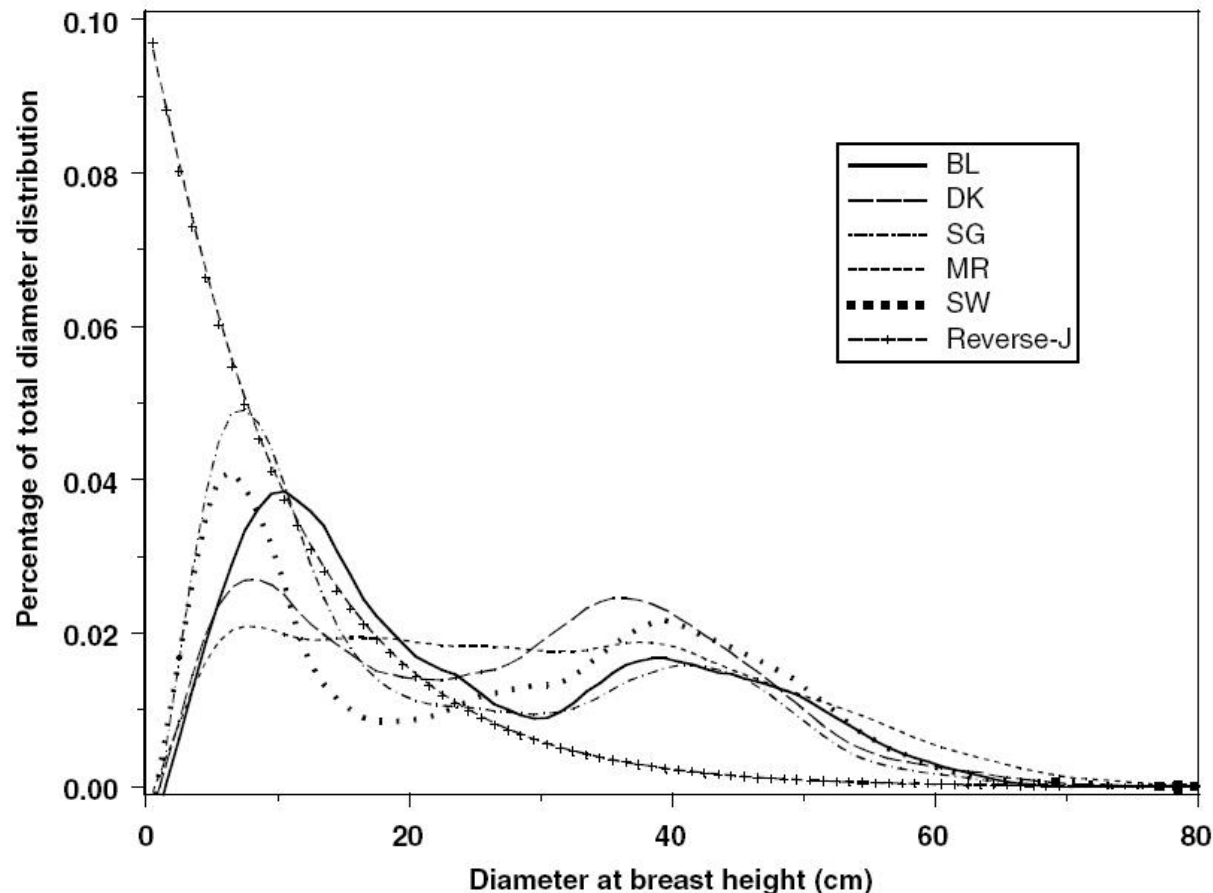
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- Multiple age-class forest structure
- Maintains perpetual canopy through time
- Single tree, small group selection
- Harvest removals are determined through a form of volume regulation – cut a portion of the periodic growth – but no formulas, ,“recipes”, or marking guides
- Uses natural forest demographics as a guide, but does not strictly mimic them
- Leans heavily to the “art” side of silvicultural practice - assumes long tenure in all aspects of managing an individual property
- Always evaluating silvicultural decisions relative to maintaining adequate fuels for prescribed fire



# “Reverse J” compared to Stoddard Neel

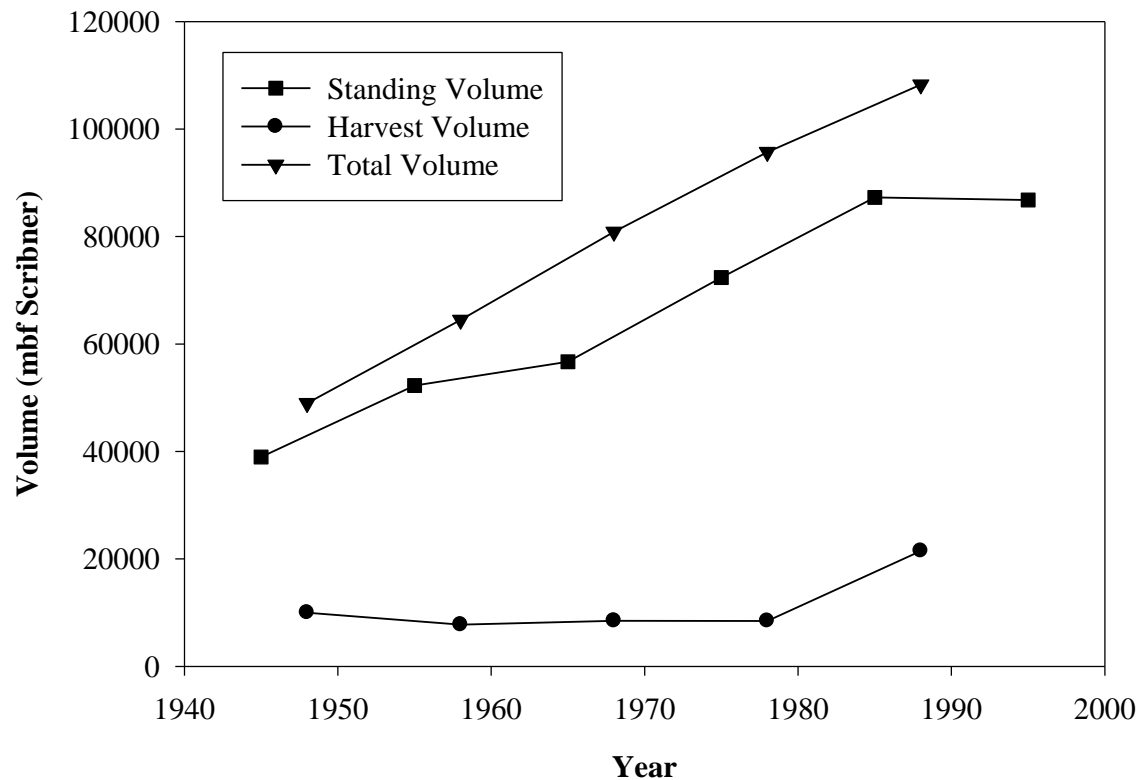


Diameter distribution percentages by plantation, showing the typical Stoddard-Neel structure. Curves were plotted using Friedman super-smoothing (Insightful Corporation, 2001). A theoretical reverse-J shaped curve ( $B = 12 \text{ m}^2 \text{ ha}^{-1}$ ,  $D = 70 \text{ cm}$ ,  $q = 1.1$ , 1 cm diameter classes) is superimposed over the actual plantation-level values. From Moser, W. K., S. M. Jackson, V. Podrazsky, and D. R. Larsen. 2002. Examination of stand structure on quail plantations in the Red Hills region of Georgia and Florida managed by the Stoddard-Neel system: an example for forest managers. *Forestry* 75:443-449.

# Greenwood Case Study

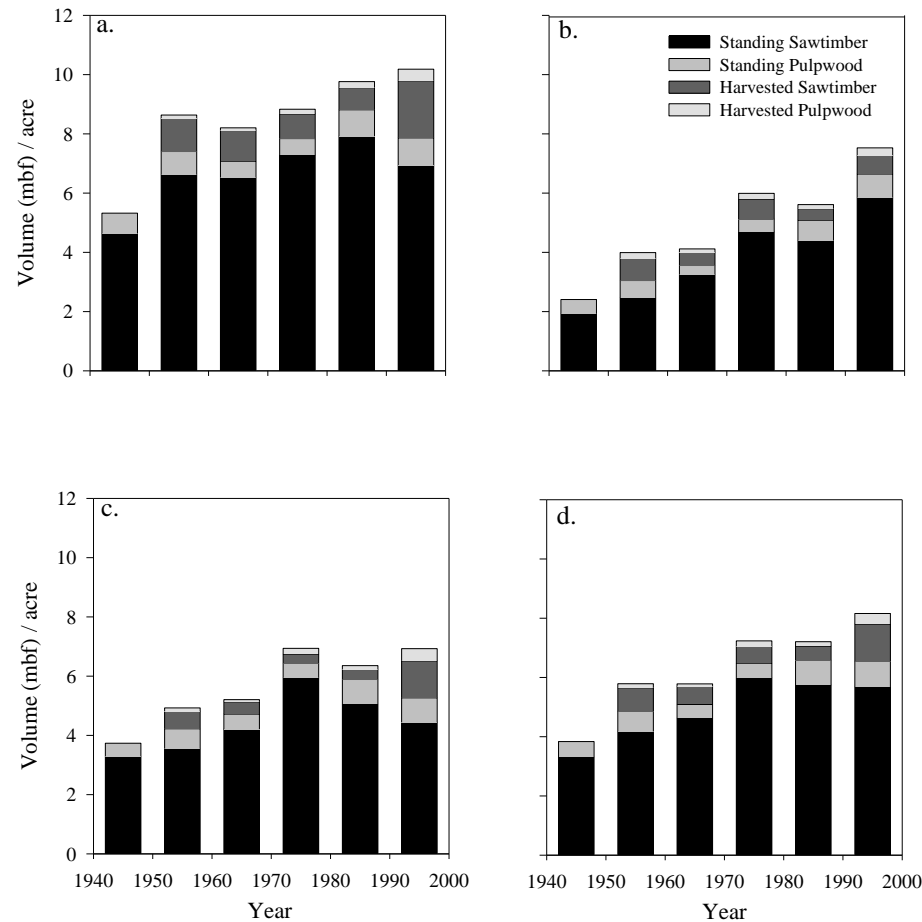


Greenwood Timber Volumes 1945-1995



**Figure 1. Total volume and standing volume accumulation and harvested volume for the Greenwood Plantation. Volumes include all product classes and both pine and hardwoods.**

# Greenwood Case Study



**Figure 4. Standing and cut per acre volumes by decade and product class for (a) Home Place, (b) Boston Farm, (c) Mitchell-Swift tract, and (d) Greenwood as a whole (including Heard's Pond). Volume include pines and hardwoods.**



# Tree Selection

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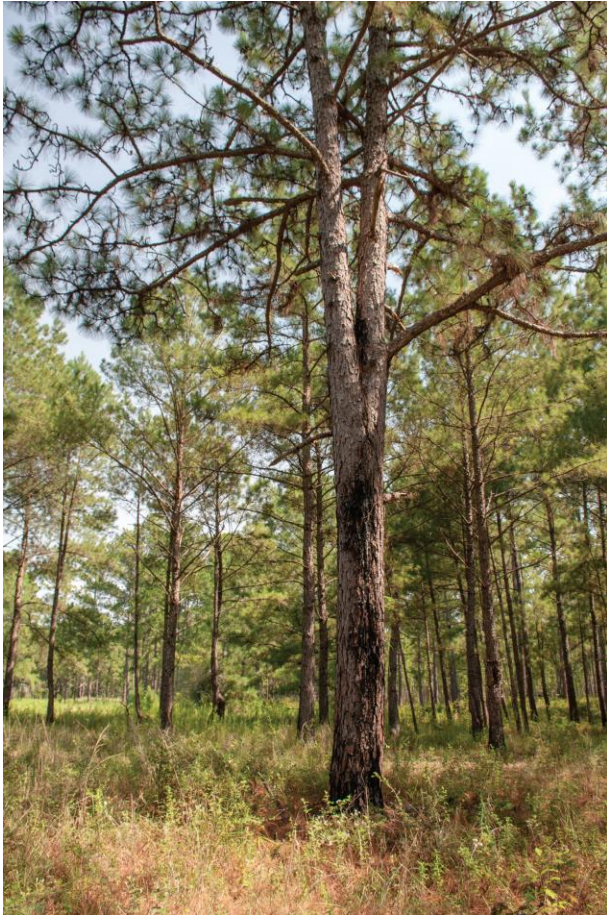


Specific characteristics considered when assessing individual trees are:

- Crown color
- Foliage density
- Crown size and uniformity
- Stem defects (forks, rust galls, fire scars, etc)
- Proximity to other trees
- Tree size and apparent vigor
- Release of nearby established regeneration

# Tree Selection

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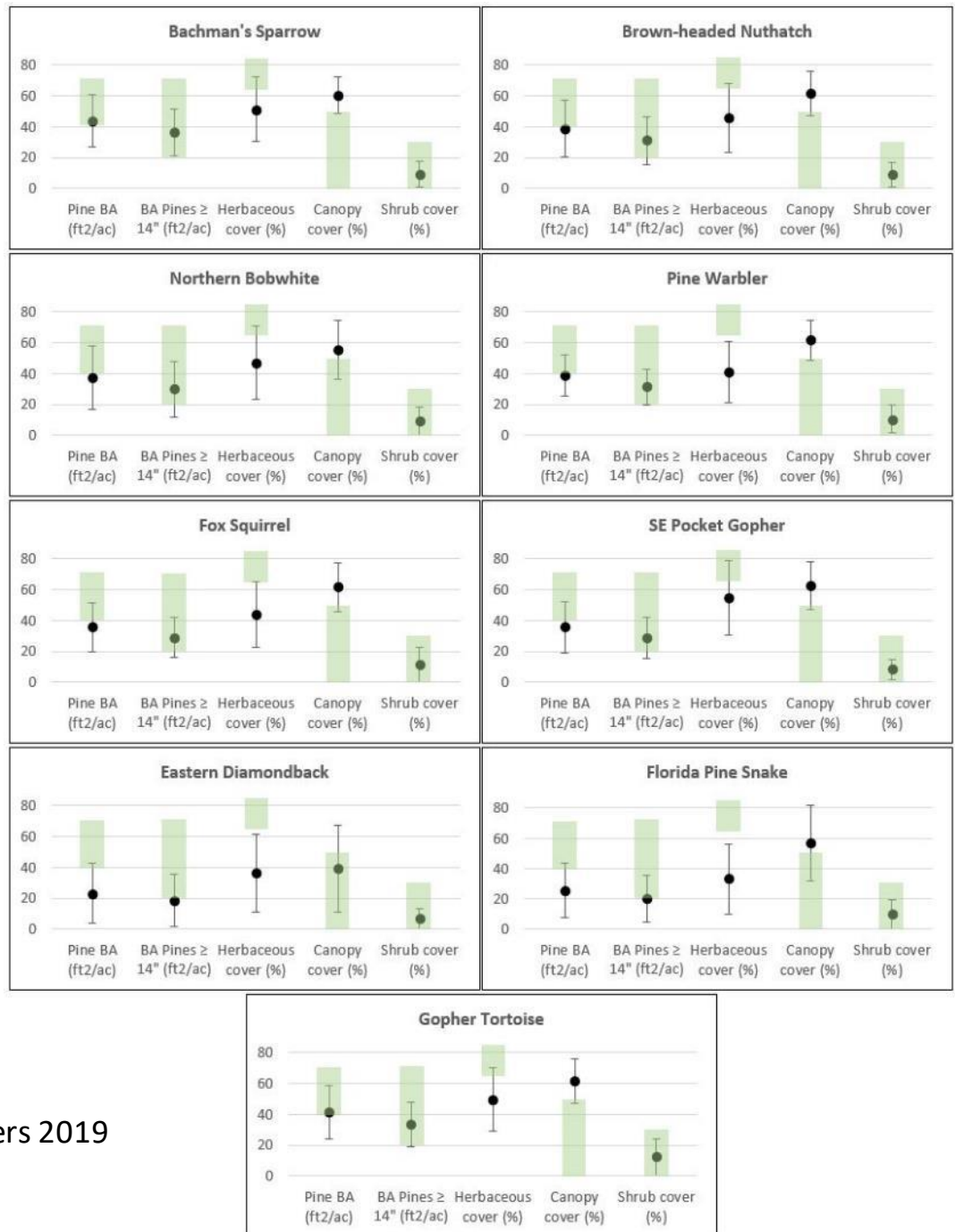








# Wildlife Responses to Vegetative Structure in Mature LLP



From McIntyre, and others 2019

# Prescribed Fire as Intermediate Treatment



Sustaining prescribed fire at  
1-3 year intervals  
uninterrupted in time and  
space

- Maintains open woodland structure, suppresses HW
- Sustains high levels of diversity
- Encourages fine fuels making prescribed burning easier to accomplish
- Limits fuel build up
  - Excessive intensity
  - Excessive emissions

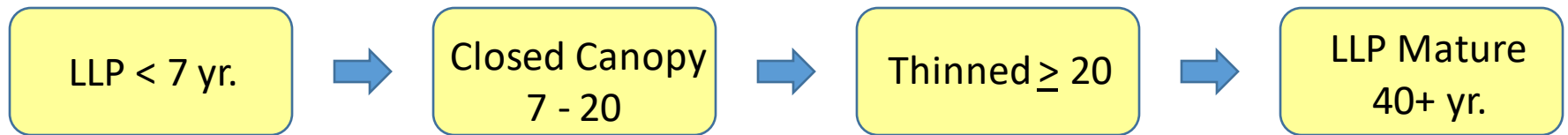




# Reforestation/Afforestation of LLP



- State transition model



# Restoration in HW encroached Stands



## Hardwood Removal Chronosequence

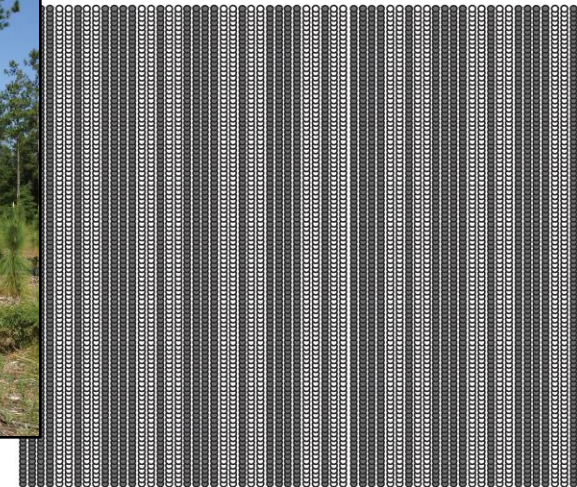




# Offsite Stand Phased Conversion



- Underplanting existing stands of slash/loblolly with LLP
- Maintains
  - Mature forest structure, habitat values
  - Needlecast for fine fuels



# Coastal Plain Longleaf Management: An Ecological Forestry Approach

- The ecosystem comes first; i.e., the primary goal is to maintain and perpetuate all elements (though resource utilization and income are encouraged and expected)
- The forest is never terminated
- Be patient and think long-term – the process cannot be hurried
- Be conservative in marking and harvesting
- Frequent use of prescribed fire is key to management of pine-grassland systems



# Coastal Plain Longleaf Management: An Ecological Forestry Approach

- There is no fixed prescription, “recipe” or rotation age for the approach; marking is conducted in light of particular stand conditions with attention to the larger landscape condition
- Sufficient regeneration will become established over time if fire is properly used, groundcover is in good shape, management takes a long-term view
- Careful harvesting and thorough utilization and merchandizing at the ramp are imperative

# Jones Center Ecological Forestry Team



- Jerry Franklin
- Leon Neel
- Bob Mitchell
- Steve Jack
- Jimmy Atkinson
- Kevin McIntyre







# Ecological Forest Management

JERRY F. FRANKLIN  
K. NORMAN JOHNSON  
DEBORA L. JOHNSON



# Ecological Silviculture

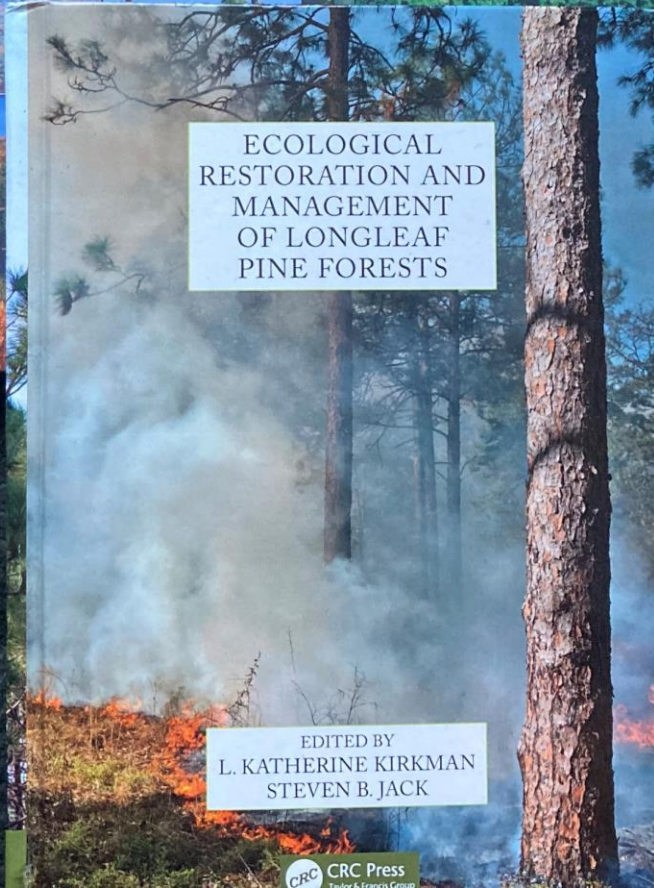
Foundations and Applications

BRIAN J. PALIK  
ANTHONY W. D'AMATO  
JERRY F. FRANKLIN  
K. NORMAN JOHNSON



## ECOLOGICAL RESTORATION AND MANAGEMENT OF LONGLEAF PINE FORESTS

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Questions?

