

Forestry, Wildlife, and Fisheries Graduate Seminar

Two-Aged Development of a Hickory and Yellow-Poplar Stand at Chuck Swan State Forest- Preliminary Results



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Introduction

- Two-aged systems maintain two distinct age classes
- Two-aged system is a viable method for managing hardwood stands with longer-lived species (Stringer)
- May be maintained through deferment harvests

Introduction and Justification

- Two-aged stand dominated by hickory and yellow-poplar
- Determine what events led to this composition since is species mixture rarely occurs
- How was this 2-age stand created?

Hypotheses

- H1: Hickories established and then the yellow-poplar entered after a disturbance.

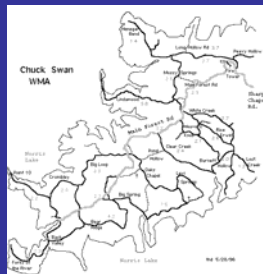
Research Objective

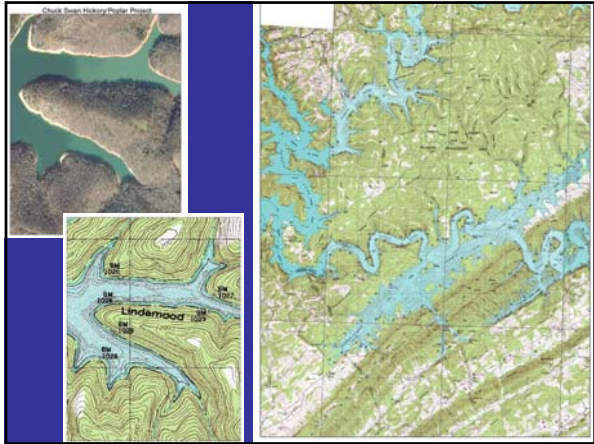
- The objective of this project was to determine the history of a particular stand through stem analysis, stand dynamics as well as aerial photos.



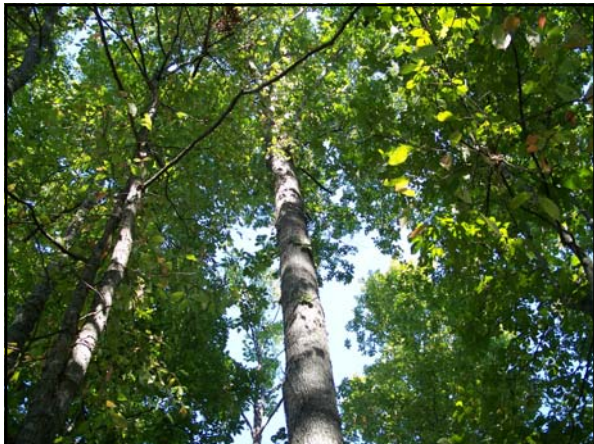
Study Area

- Chuck Swan WMA- 24,444 acres
- 40-acre peninsula bordered by Norris Lake
- Elevation: 1080 ft to 1280 ft.
- Inventory: Dec 2006
- Data Collection: Dec 2006- April 2007
- Lab work: April- May 2007












Study Area Stand History

- Rural, privately owned farm land
- Purchased by TVA 1934
- Donated to State in 1952



Study Area Stand Description

- Overstory:
 - Dominant canopy species are yellow-poplar and hickory
 - BA 60 sq.ft/ac
- Midstory:
 - (*Cornus florida*), (*Oxydendrum arboreum*), and (*Sassafras albidium*)
 - 30 sq. ft/acre
- Closed canopy with little understory
- Numerous wolf trees present alongside old roads and fence lines.
- Rock walls and possible old homesites are also found in the stand,
- Minimal down woody debris

Methods

- Inventory
- Data Collection
- Lab Techniques
- Data Analysis
- Aerial Photos



Methods Inventory

- 2 Transects along contour
- Variable Radius Plot every 3 chains using 10 BAF prism.
 - 35 plots

Methods Data Collection



- Trees cut near base using chainsaw
- Disk cut out every 4 ft (base to tip of main leader)
- 6 Yellow-poplar
- 5 Hickory





Methods Lab Techniques

- Disks sanded using belt sander
- Tree rings counted using ocular observation
- Age at heights determined



Methods Data

- Determine importance values
- Determine difference in ages
- Evaluate growth curves

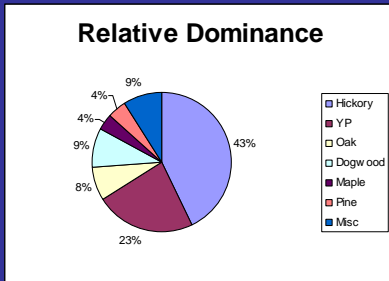
Methods

Aerial Photos and Interviews

- Photos obtained from:
 - National Archives
 - TVA
- Discussed forest history
 - CSWMA foresters/employees
 - Ted Dailey (TDF)

Results

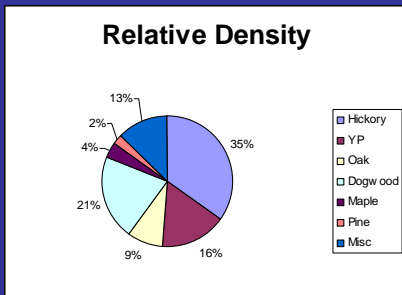
Relative Dominance



The Hickories had a relative dominance of 43% while Yellow-poplar had a relative dominance of 23%

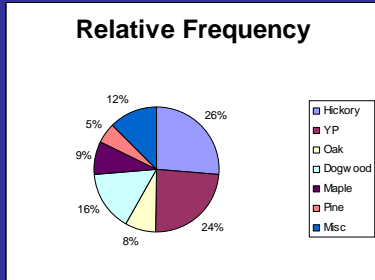
Results

Relative Density



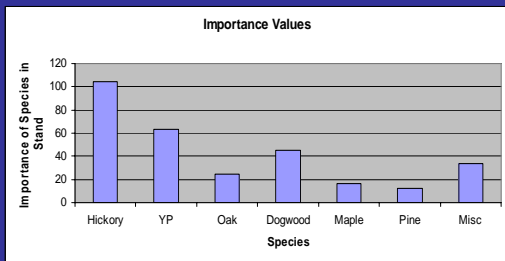
Hickories comprised 35% of the stems on the plots while Yellow-Poplar comprised 16% of the stems

Results



Hickories occurred in 26% of the plots while Yellow-poplar occurred in 24%

Results

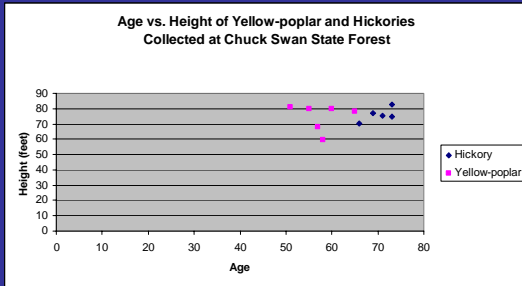


The Importance Value is the sum of three values: the relative dominance, the relative frequency, and the relative density of a plant.

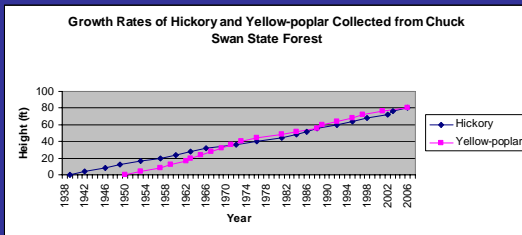
Results – Stem Analysis

Species	Hickory	Yellow-poplar
Average Age	70.40	57.67
Standard Height	76.10	74.40
N	5	6

Results



Results



Discussion

- Hickory and Yellow-poplar make up 50% of the stand
- Hickories were, on average, 13 years older than the Yellow-poplars.
- Waiting on aerial photos from the National Archives for photo interpretation to determine land use histories.

Discussion

- *H1: Hickories established and then the yellow-poplar entered after a disturbance*
- At this time, two possibilities are being considered:
 - Hickories are older
 - ❖ Yellow-poplar planted
 - ❖ Yellow-poplar came in after a distance

Management Implications

- Would it be possible to release the Yellow-poplar?
- It is important to understand the history of a stand when considering various management techniques.
- Not every forest is “textbook”

Acknowledgements

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