SLOW CONVERSION

Transition from a Loblolly to Longleaf Pine Forest

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Objectives

What is slow stand conversion?

Begin to grow a new stand of desirable species before removing the older trees.

Landowner Objectives

When a landowner wants to maintain forest structure, for recreation and habitat quality, yet wants a longleaf pine forest.

Preparing the Forest

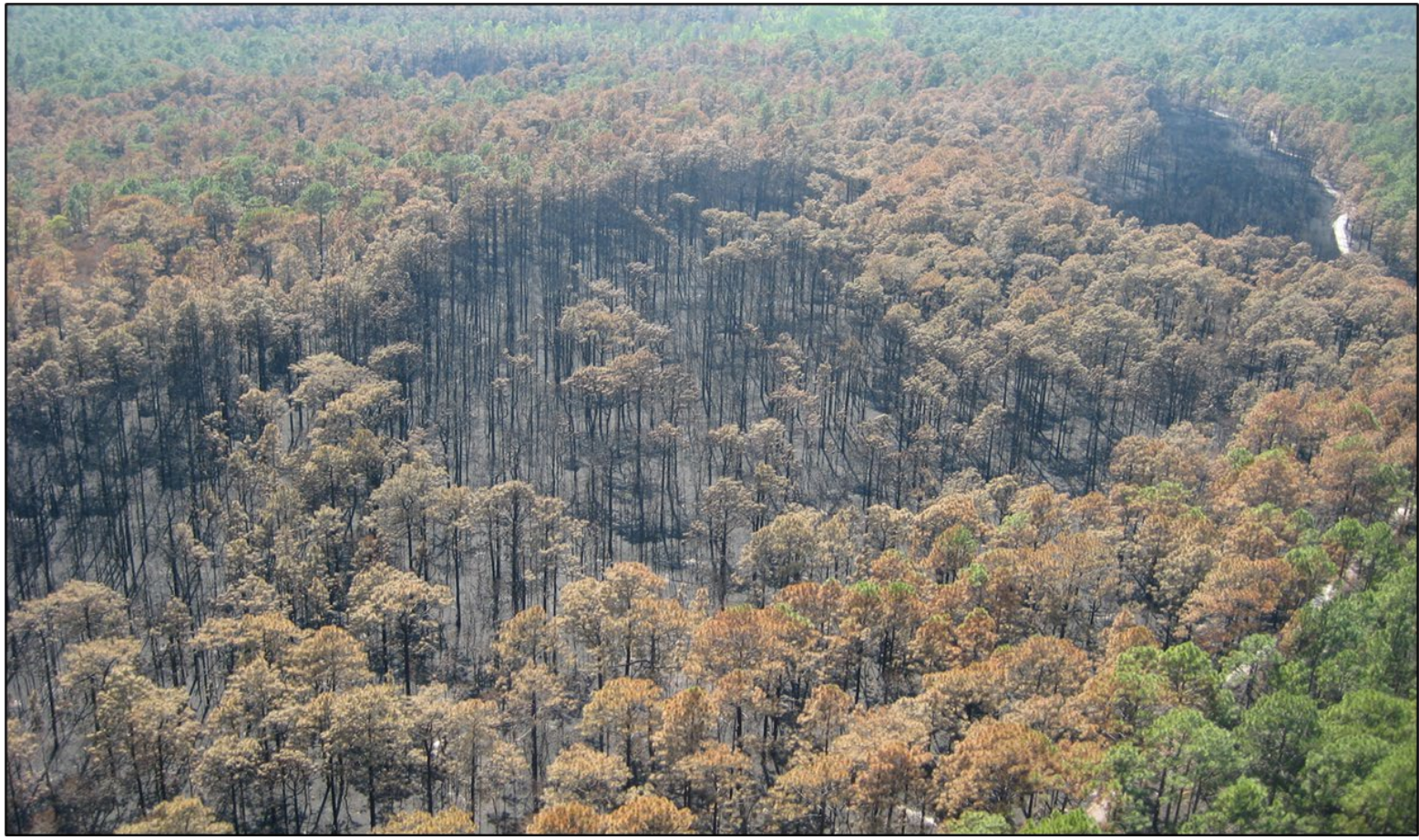
Underplanting

Gap Regeneration

Prescribed Fire

When Opportunities Arise

- Frequent disturbances
- Tornados, wind, hurricanes
- Wildfire
- Insects



Landowner Objectives

Survey of 181 families, owning more than 50 acres, identified these as their reason why their forest is important:

1. Wildlife
2. Legacy
3. Beauty (Aesthetics)
4. Nature
5. Investment
6. Water
7. Timber
8. Privacy
9. Hunting
10. Family
11. Recreation
12. Non-traditional Forest Products
13. Firewood

Sustaining Family Forests Initiative (SFFI)- National Woodland Owners Survey, USFS 2011-2013

Why Slow Conversion?

- Retains appearance of a “forest”
- Not a clearcut
- Retains habitat and species diversity
- Restoration to native/ historical forest type
- Retains high value products
- But economies of scale may be limiting

The Goal

Loblolly Pine Canopy Values

- Aesthetic Value
- Recreation
- Economic
- Wildlife Habitat
- Fuel

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The Secret to Success

Looks good, but lots of work to do!

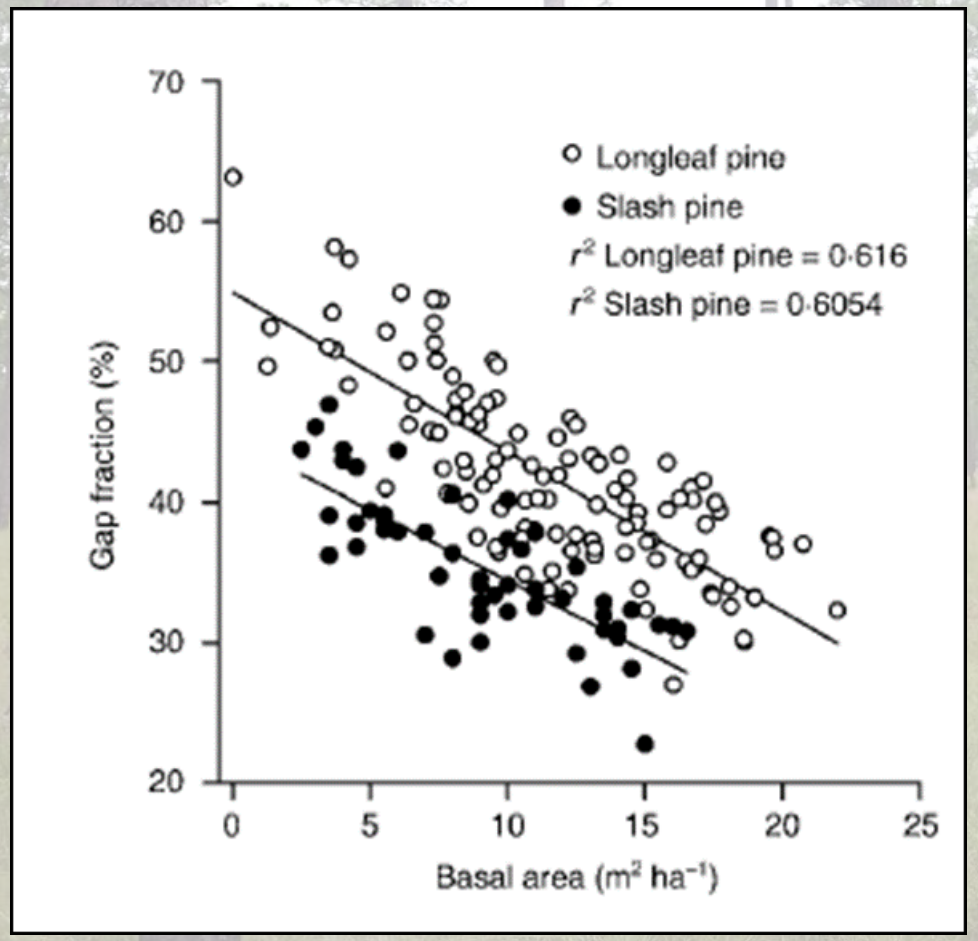
Fire, mulching, and herbicides can help with hardwood/woody competition control.

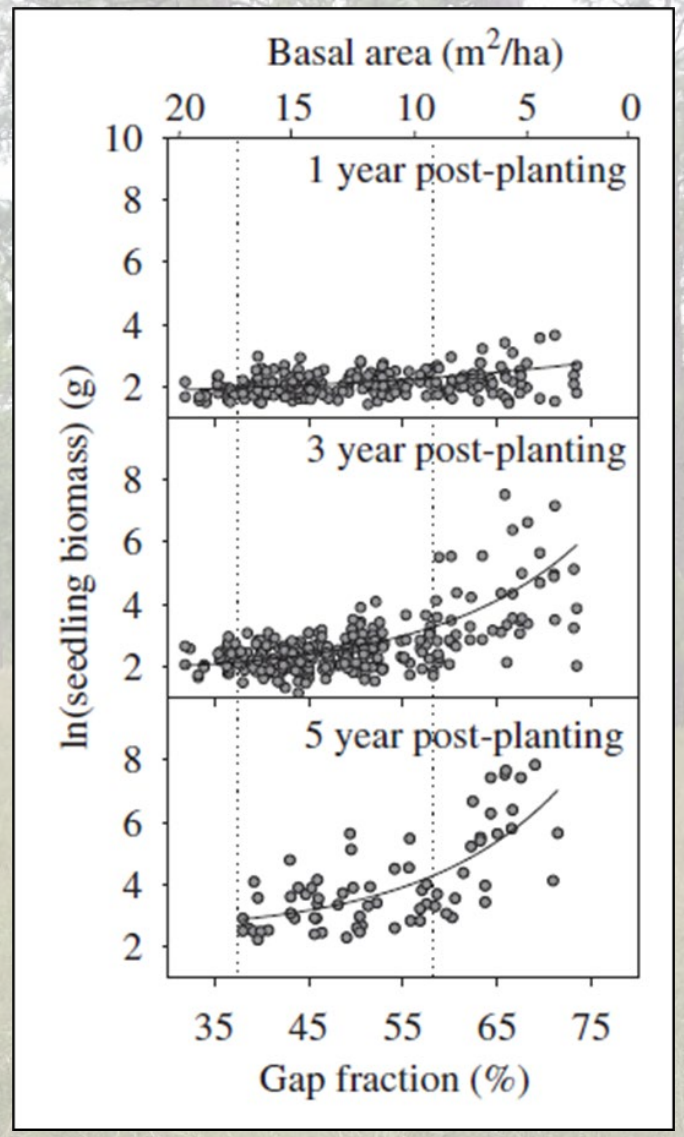
Is it feasible to underplant longleaf?

YES, and it's necessary!
It will take work!
Remember the natural regeneration process of longleaf.

Canopy Density and Seedling Growth

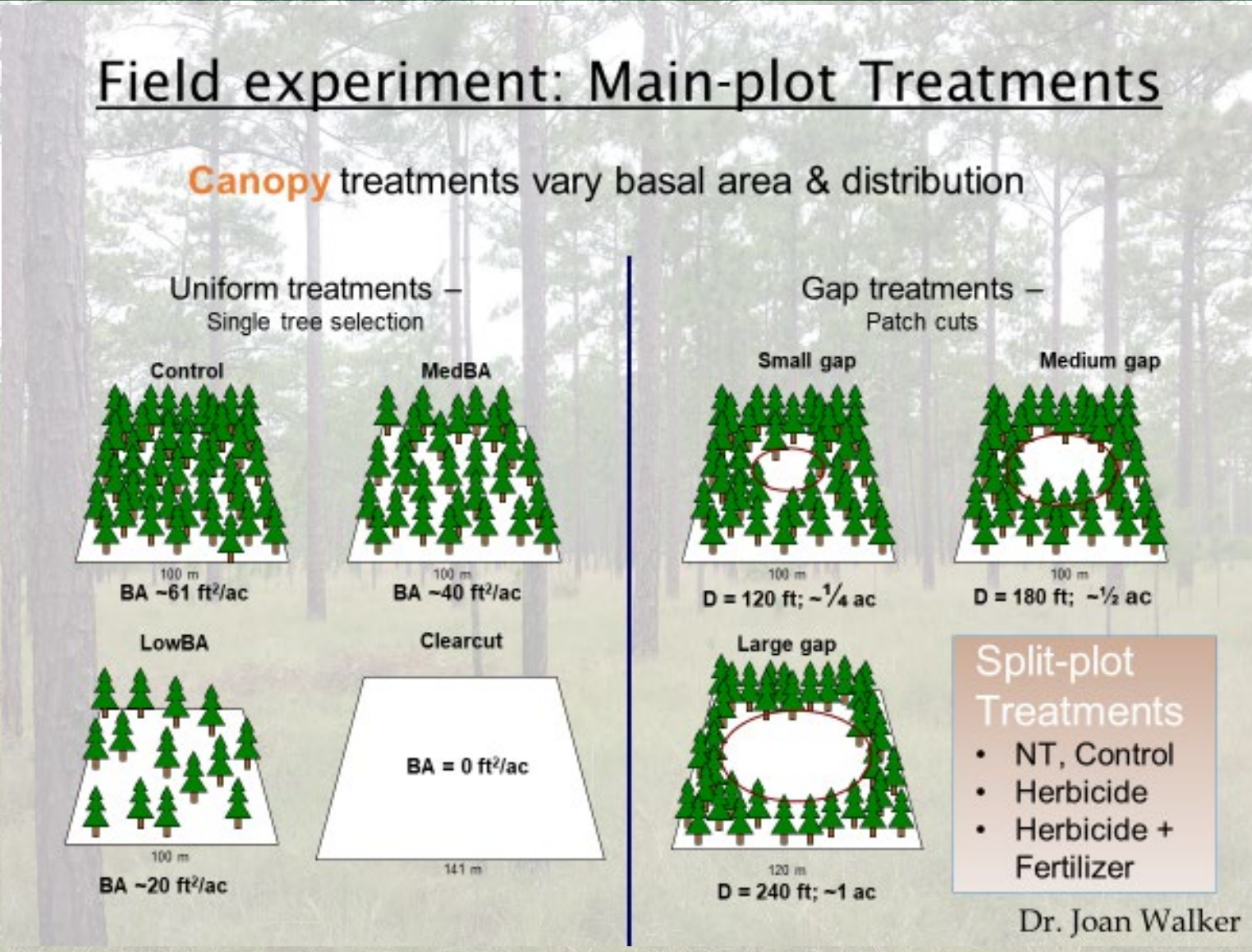
- **Seedling growth increases as light increases**
- **Light decreases as basal area increases**





Research

- Mimic natural process
- Single-tree selection
- Group selection
- Shelterwood
  - Irregular and uniform



Research

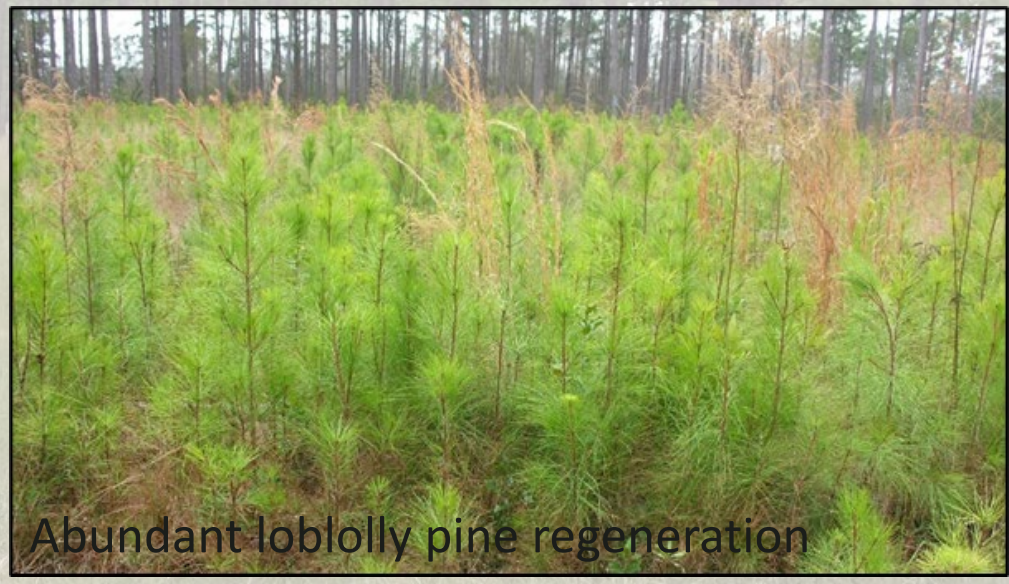
	Canopy treatment			
Response	Clearcut	~ 5 m^2/ha **(~25 ft^2/ac)**	~8 m^2/ha (~**35 ft^2/ac**)	≥ 0.1 ha gap **(0.25 ac)**
% Survival (5 yr)	(40*) ~80	(50*) ~80	60-70	~50
Root collar diameter	35-40 mm	30-32 mm	25-30 mm	30-35 mm
% height growth	~85-60	~60-45	~45-25	~65-40
Probability of individual in height growth	0.8	.8 - .6	.6 - .45	

More light= greater seedling size (both diameter and height)

*Lower values (in parenthesis) represent the high mortality in Year 1 of the project at Fort Benning, likely related to drought conditions the season after planting.

How to Address the Loblolly Regeneration?

- Prescribed fires applied following the second growing season killed 65-70% of loblolly pine seedlings; most <6’ tall.
- Gap clearcuts will increase loblolly pine seedling growth and shorten the window of opportunity for control with prescribed fire.
- Prescribed fire every 2–3 years is vital.



Abundant loblolly pine regeneration

Transmission of Fires

- **Pine needles**
- **Herbaceous Vegetation**
- **Woody Vegetation**

Hess and Tschinkel

Research: Transmission of Fire

- **Slash stands in FL**
  - Thin
    - 33% (Third Row)
    - 50% (Take 2, Leave 2)
  - Gaps
    - ¼ ac
    - ½ ac

- 80% of thinned plots burned
- Fire in gaps were all or nothing (12%)
- Difference due to reduced needle cast in gaps (clear-cuts)
- woody increased, herbaceous decreased

Research: Unburned Gap

Gap Size?

Large gap of longleaf regeneration in slash pine stand

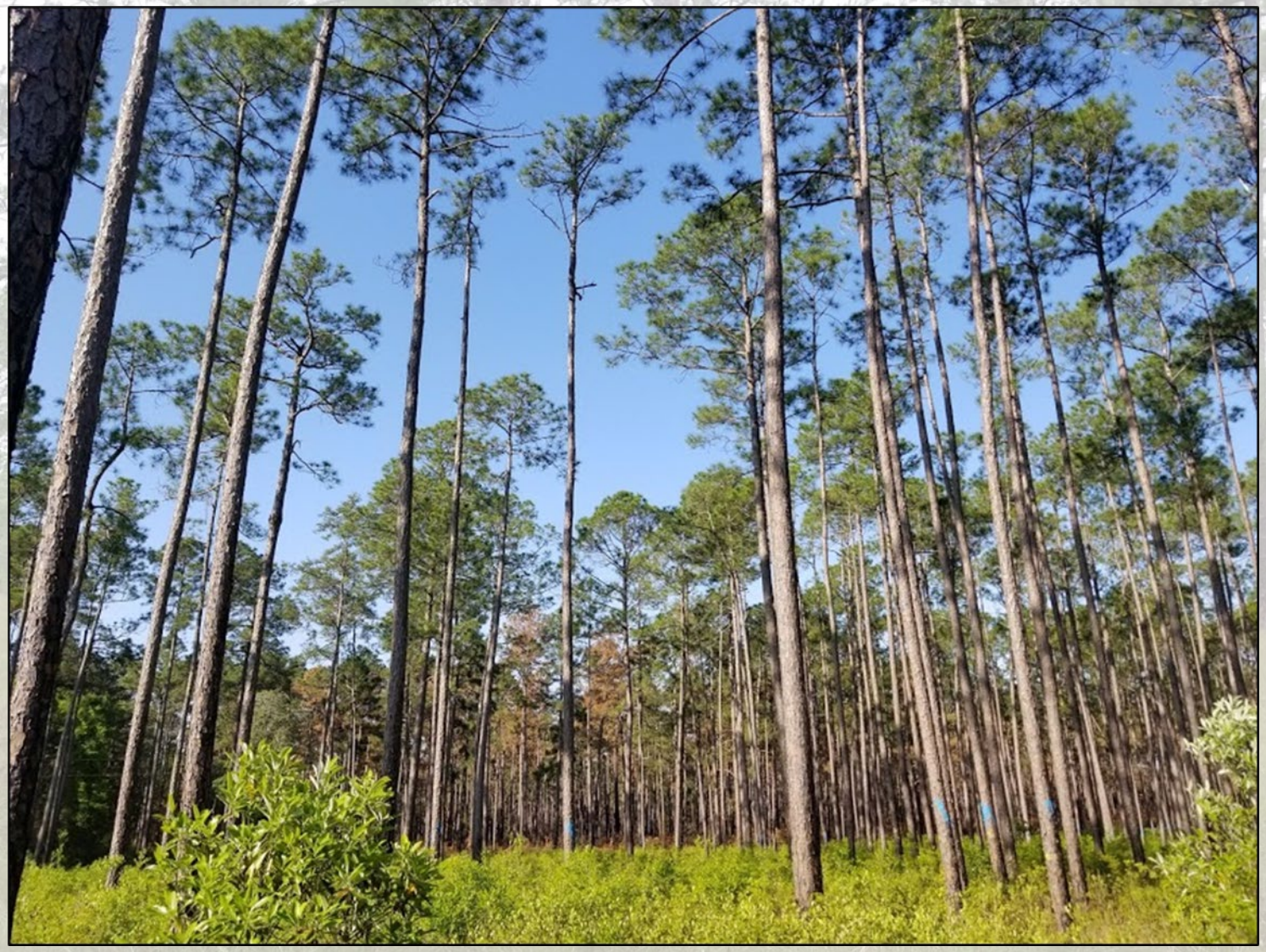
Gap Size

- Gap sizes from 0.25 ac to 2 ac (group-selection)
- Ideally, 0.5 ac w/ 165’ diameter
  - If > 0.5 ac, do not exceeded 165’ wide
- Assortment of sizes

Brockway and Outcalt

Gap Locations

Look for opportunities to expand and shape gaps already present



Loblolly Regeneration

Slash Pine Regeneration

.23ac gap

1.3 ac gap

Management Scenario

- **At age 15, cut 20% of the plantation (10 acres) in patches ranging from ¼ acre to $^{2}/_{3}$ acre in size, with average size being <½ acre (NTE ~165' d).**
- **In the remainder of the stand, selectively thin and remove 40% of the volume, varying stocking.**
- **Target should be 50 to 75 ft^2 BA, averaging 60.**

- Plant gaps at 622 – 726+ seedlings per acre
- Prescribed burn on a two year cycle to keep hardwoods and loblolly seedlings at bay!
- Repeat on 10 year cycle
- Last loblollies should be removed at age 55
- Thin longleaf when it becomes merchantable

Or

- Can be done on 5 year cycle

Or

- Can do two entries
  - 60BA + Gaps
  - <40 BA + More gaps

- Keep in mind re-entry plan when creating gaps

Management Varies by Site

- Vegetation response will depend on initial vegetation conditions and site productivity
- Natural regeneration of loblolly pine will vary with site/stand conditions, variation in seed crop, initial vegetation condition, etc.
- **Rule of 1st thumb: The more favorable a site is for loblolly growth, the harder it will be to convert to longleaf with canopy retention.**
- **Rule of 2nd thumb: If it is not possible to burn every 2-3 years, stand conversion with retention is not a good bet.**

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Management: Canopy

- **Thinning by single tree selection versus patch cutting?**
- **The choice determines arrangement of regeneration relative to canopy trees.**
- **Factors to consider:**
  - **Long-term plans for stand**
  - **Need and capacity to do intermediate treatments**
    - **Burn, canopy removal, hardwood control**

Specific guidelines:

- Retain intermediate basal area (25-35 ft^2/ac)
  - Slight reductions in seedling growth
  - Suppression of mid-story development
- Create small gaps (0.25 ac)
  - Gap center performance similar to clear cut; average performance similar to intermediate basal area retention

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Longleaf Conversion

Slow Conversion

- Does it fit your landowner's objective?
- Underplanting and Gap Regenerations work
- Control woody competition before canopy removal
- If you cannot commit to regular prescribed fire, conversion isn't right for you.
- Burn, Burn, Burn!

Conclusion

Pre-logging

- **Seedling survival – not predictable**
- **Seedling growth was driven by tree basal area, primarily hardwood basal area**
- **Sapling competition, canopy cover and other metrics of competition did not predict seedling growth in our study**
- **Seedling survival became clumped, much like natural longleaf stand dynamics**
- **Basal areas of 40 ft/acre or lower recommended**

During Logging

- **Seedling survival strongly related to seedling height but not logging intensity around the seedling**
- **Seedlings more than 2m tall fared well……80% survival**
- **Seedlings less than 2m tall…….40% survival**

Management recommendations

- **Thin to 30-40, lower basal areas probably won't burn well**
- **Conduct hardwood control, if necessary, conserve grasses**
- **Underplant 15'x15', 194 tpa**
- **Burn on a 2-3 year rotation, include growing season fire**

Nathan Klaus, GADNR

Success

Conversion Success!

Nathan Klaus, GADNR

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