Linking Research, Adaptive Management and Outreach for Longleaf Pine Conservation

Ecological Forestry Workshops at the Joseph W. Jones Ecological Research Center
Longleaf Pine Conservation Values and Status

• Less than 3% of historic extent remains
• One of the highest species diversities outside of tropics
• High rates of plant endemism (900+ spp.)
• Numerous TES, diverse herpetofauna
Natural History of Longleaf Pine

- Longest-lived southern pine (400 – 500 yrs.)
- Structured by frequent, low-intensity surface fires
- Open-canopied woodland with species-rich, grass dominated understory
- Episodic masting events ~ 10 yr. intervals
- Primary agent of mortality: lightning, small scale wind – ~ 2.5 trees/ha every 5 yrs.
- Gap phase regeneration, multiple age-class structure
Traditional Management of Longleaf Pine

• Most of historic LLP range now in either short-rotation pine plantations or non-forest land use
• Remaining longleaf typically uses even-aged management e.g. shelterwood
  – Harvest well before biological maturity
  – Limited natural analogues
  – Compromised conservation values
Prevailing Views on Longleaf

- Longleaf pine shade intolerant
- Dominant natural disturbances large scale, stand replacing
- Relatively large canopy gaps are necessary to capture regeneration
Alternative Views and New Perspectives: Stoddard-Neel Approach to Ecological Forestry

- Single tree & small group selection
- Sustaining fine fuels for prescribed fire primary goal
- Management based on long time scales
- Maintains forest cover at stand and landscape scales
- Harvests less than accumulated growth b/t entries
- Incorporates considerations for rare elements
Alternative Views and New Perspectives: Jones Center Research

- Spatial/temporal patterns of mortality (Palik 1996)
- 3 stage regeneration (Mitchell et al. 2006)
- Gap size study (McGuire et al. 2001)
- Rx fire frequency vs. season (Hiers et al. 2000)
- Gradual species conversion (Kirkman et al. 2007)
Closing the Loop in the Adaptive Cycle: Implementing New Perspectives

- Conservation Forestry Network founded 2005
- National Partnership
  - Open Space Institute, Interforest, Manomet Center, Conservation Fund, Jones Ecological Research Center, USFS Northern Research Station, Forest Guild
- Ecological Forestry Workshops
  - Pacific NW, Lake States, New England, Southeastern Coastal Plain, Cumberland Plateau, Central Appalachians
Jones Center Workshops: Ecological Forestry in Longleaf Pine

- Offered 1 – 2 times annually
- 20 participants, 3 days
- 140 participants represent ~ 4.5 million acres of direct management responsibility
Case study: 3-stage regeneration process

- Longleaf traditionally viewed as shade-intolerant species
- Research shows regeneration to be 3 stage process
  - <35% gap fraction = no survival
  - 35 – 60% gap fraction establishes, persists 10 - 20 yrs
  - > 60% gap fraction initiates height growth
- Demonstrates viability of regeneration under single tree selection
Case study: 3-stage regeneration process

• Workshop participants “mark” stand in research plot with individually-mapped trees
• Marking data run through light model
• Light model data illustrates impact of tree removal on stand structure, regeneration
<table>
<thead>
<tr>
<th>PLOT 1</th>
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<tbody>
<tr>
<td>Pre-harvest</td>
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<td>Marked timber</td>
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<td>Post-harvest</td>
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Case study: 3-stage regeneration process

- This research also provides basis for phased conversion of offsite species back to LLP
  - Small gaps harvested in 10 – 20% of slash or loblolly stands
  - Underplanted with LLP seedlings
  - Repeat at 10 year intervals
  - Retains mature forest structure, provides fuel for continued use of Rx fire

- Initial trials at Jones Center, now widely used across SE US