Hardwood Management Options
Tri-County Timber & Landowners Association

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Why Hardwoods?

- Broader range of sites
- Different wildlife values
- Manage for valuable timber
- Aesthetics
Dry Upland Sites

• Little potential to manage for wildlife or timber
Intermediate to Wetter Upland Sites

• Often managed for pine plantations
• Hardwoods management possible
  – Less research & experience available in Western Gulf Coastal Plain
Bottomland, Seasonally Flooded Sites

- Pine plantations inappropriate (Dead Pines!)
- Excellent opportunities for hardwood management

Photo credit
Willow oak flat: Dr. Michael Fountain
Dead pine seedling: Chris Schnepf, University of Idaho, bugwood.org

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Species: White Oaks

• white oak (Q. alba)
• swamp chestnut oak (Q. michauxii)
• overcup oak (Q. lyrata)
• bottomland post (Q. similis)

• High wildlife value
• High timber value
  – Q. alba, Q. michauxii

Photo credits
Acorns: www.geodeforestry.com
White oak tree in summer: © Carmen (boxercab) on Flickr
Species: Red Oaks

- Cherrybark oak (*Q. pagoda*)
- Shumard oak (*Q. shumardii*)
- Nuttall oak (*Q. texana*)
- Water oak (*Q. nigra*)
- Willow oak (*Q. phellos*)
- Laurel oak (*Q. laurifolia*)

- High wildlife value
- High timber value
  - *Q. pagoda*
  - *Q. texana*
  - *Q. shumardii*

Photo credit:
Laurel oak & dwarf palmetto: Dr. Michael Fountain
Nuttall oak bole: Dr. Michael Fountain

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Species: Hickories

- pecan (*C. illinoinensis*)
- water hickory (*C. aquatica*)
- shagbark (*C. ovata*)
- black hickory (*C. texana*)
- bitternut hickory (*C. cordiformis*)
- mockernut hickory (*C. alba*)

- **High wildlife value**
  - pecan, water hickory

- **Medium timber value**
Species: Misc. Higher Timber Value

- green ash (*F. pennsylvanica*)
- baldcypress (*T. distichum*)
- cottonwood (*P. deltoides*)
- sweetgum (*L. styraciflua*)
- sugarberry (*C. laevigata*)
- blackgum (*N. sylvatica*)
Species: Misc. Higher Wildlife Value

- hawthorn (*Crataegus* spp.)
- persimmon (*D. virginiana*)
- red mulberry (*M. rubra*)
- honeylocust (*G. triacanthos*)
Sites – Species Relationships

Source: Hodges & Switzer 1979

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Right Species on the Right Site

Source: Kolka et al. 1998

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Management

• Know the what: **Species**
• Know the where: **Site**
• Now the How: **Management**
Artifical vs. Natural Regen

Artificial Regeneration
- Planting stock expensive
- Site prep necessary
- Excellent control over composition
- Improved stock some species
- Requires expertise

Natural Regeneration
- No planting costs
- Minimal site prep
- Less control over composition
- No improved stock
- Requires expertise

Photo credit: Acorns: Norbert Frank, University of West Hungary, bugwood.org
## Planting Bottomland Hardwoods

<table>
<thead>
<tr>
<th>Species</th>
<th>Timber</th>
<th>Wildlife</th>
<th>$/1000</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>cottonwood* (<em>Populus deltoides</em>)</td>
<td>X</td>
<td>X</td>
<td>300</td>
<td>AG, LA DAF</td>
</tr>
<tr>
<td>bald cypress (<em>Taxodium distichum</em>)</td>
<td>X</td>
<td>X</td>
<td>215-250</td>
<td>AG, LA DAF, WH</td>
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<tr>
<td>shagbark hickory (<em>Carya ovata</em>)</td>
<td>X</td>
<td>X</td>
<td>450</td>
<td>AG</td>
</tr>
<tr>
<td>water hickory (<em>Carya aquatica</em>)</td>
<td>X</td>
<td>X</td>
<td>215-250</td>
<td>AG, LA DAF</td>
</tr>
<tr>
<td>pecan (<em>Carya illinoinensis</em>)</td>
<td>X</td>
<td>X</td>
<td>215-250</td>
<td>AG, LA DAF, WH</td>
</tr>
<tr>
<td>blackgum (<em>Nyssa sylvatica</em>)</td>
<td>X</td>
<td>X</td>
<td>215-250</td>
<td>AG, LA DAF</td>
</tr>
<tr>
<td>cherrybark oak (<em>Quercus pagoda</em>)</td>
<td>X</td>
<td>X</td>
<td>215-240</td>
<td>LA DAF, WH</td>
</tr>
<tr>
<td>white oak (<em>Quercus alba</em>)</td>
<td>X</td>
<td>X</td>
<td>215</td>
<td>LA DAF</td>
</tr>
<tr>
<td>Nuttall oak (<em>Quercus texana</em>)</td>
<td>X</td>
<td>X</td>
<td>215-240</td>
<td>LA DAF, WH</td>
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<tr>
<td>Shumard oak (<em>Quercus shumardii</em>)</td>
<td>X</td>
<td>X</td>
<td>215-240</td>
<td>LA DAF, WH</td>
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<tr>
<td>overcup oak (<em>Quercus lyrata</em>)</td>
<td>X</td>
<td></td>
<td>215-240</td>
<td>LA DAF, WH</td>
</tr>
<tr>
<td>green ash (<em>Fraxinus pennsylvanica</em>)</td>
<td>X</td>
<td></td>
<td>215-240</td>
<td>LA DAF, WH</td>
</tr>
</tbody>
</table>

*Improved  AG = Arbogen  LA DAF = Louisiana Department of Agriculture & Forestry  WH = Weyerhauser

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Eastern Cottonwood Plantations

- Among fastest growing
- Improved planting stock
- Some industrial plantations 60’s, 70’s, 80’s
- Requires intensive culture
  - Well-drained, fertile sites
  - Site prep (disking)
  - Competition control 1-2 years
  - Protection from deer
Eastern Cottonwood Plantations

• Currently forest service is planting
  – 300 cottonwood per acre
  – 300 other bottomland hardwoods per acre

• Using cottonwood as nurse tree
  – Promotes growth of straight branch free boles on higher value species
Sweetgum – Cherrybark Oak Plantation

• Some experimental work in Mississippi
• Marginal terrace site in MS (SI$_{50}$ = 75 ft CBO)
• Spacing 8 x 8 ft
• Each cherrybark oak surrounded by sweetgum
• 105 cherrybark & 575 sweetgum per acre
  – Replanted mortality & mowed for 2 years

**Source:** Lockhart et al. 2006

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Sweetgum – Cherrybark Oak Plantation

• Cherrybark Oak at age 20:
  – Survival: 89%
  – Dbh: 6-8 inches
  – Height: 52 feet
  – 75% dominant or codominant

Source: Lockhart et al. 2006

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Direct Seeding

- 2-3x cheaper
- Usually only viable with heavy mast species
- Larger openings (>2 ac) necessary to prevent rodent predation
- Works best on higher quality sites

Source: Bullard et al. 1992
Right Species on the Right Site

Survival (%)

Planted
Unplanted

Depth To Water Table (inches)

Source: Kolka et al. 1998

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Hardwood Plantation Options...

• Possible
• Significant costs carried over life of plantation
  – Possible to defer with subsidies (NRCS EQIP)
• Higher risk than pine
  – Less experience, research, etc.
• More practical for larger or corporate landowners

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Managing with Natural Regen

• More practical for smaller landowners
• No planting costs
• More research, experience, etc.
• Still requires significant expertise
Process Managing for Natural Regen

1. Classify your site (Baker & Broadfoot)
2. Classify your trees (Meadows et al.)
3. Decide to thin or harvest (Goelz). Thin:
   A. Improve growth rates in favorable trees
   B. Allow light in to grow your advanced regeneration
4. Survey your regen (Hart et al.)
5. Cleancut
Site Classification

Source: Baker & Broadfoot 1979

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Tree Quality & Classification: Meadow Revision of Putnam System

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Photo credit
White oak photos: Dr. Tom Fox
Thinning Considerations

- If stand under-stocked
- Wait
- Clearcut & start over if species are undesirable and quality is low
- May be due to past highgrading

Source: Goelz 1995
Thinning Considerations

- If stand well-stocked with high-quality trees
- Thin (60-70% sunlight)
- Remove low-quality trees, undesirable species
- Advanced regeneration

Source: Goelz 1995
Regen Surveys

Oak Regeneration Potential

- Acorn
- Small seedlings
- Large seedlings and saplings
- Trees less than 8 inches tall and 6 years old

 Unable to achieve excellent status

Stringer 2004

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Photo credit
Cherrybark oak stand: Brian Lockhart, USDA FS, bugwood.org
Cleancutting

Photo credit: Cleancut: Brian Lockhart, USDA FS, bugwood.org
The Bottom Line...

• The right species on the right site is CRITICAL
• Hardwood plantations can work
  – But they carry more risk to a small landowner
• Managing for natural regen and hardwoods
  – Requires expertise to be done right
  – Carries far less risk since you are only paying for treatments when you are receiving income
• Find a consulting forester with hardwood experience if you are interested

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Questions?

• Slides will be available online at:
  http://forestry.sfasu.edu/faculty/jstovall/home/index.php/outreach
• Email: stovalljp@sfasu.edu
• Phone: (936) 468-2127
Sources

Baker & Broadfoot 1979: http://www.treeresearch.fs.fed.us/pubs/865


Hart et al. 1995: http://books.google.com/books?id=ISU3_gcLsUC&lpg=PA434&ots=bMxH1JoF1s&lr&pg=PA434#v=onepage&q&f=false

Kolka et al. 1998: http://www.treeresearch.fs.fed.us/pubs/2317

Lockhart et al. 2006: http://www.treeresearch.fs.fed.us/pubs/21701

Meadows et al. 2008: http://www.treeresearch.fs.fed.us/pubs/30338