Restoration Needs of Forest Ecosystems in Nantahala and Pisgah National Forests
Overview

Background

Desired outcomes

Methods

Overall results

Overview of systems in need of active restoration
Importance of Restoration Needs Analysis

- Spatial representation
- Identifies potential areas for active or passive restoration
- Coincides with the Nantahala and Pisgah Land Management Plan Revision (LMP)
BACKGROUND

- Nantahala and Pisgah National Forests
- Land Management Plan (LMP) Revision
- New 2012 Planning Rule
Desired Outcomes

• Evaluate if the ecological departure analysis appropriately identifies major structural needs in each system
• Collect information on restoration priorities and methods
• Discuss the use of both fire and mechanical treatment appropriate in systems identified as in need of active restoration
• Discuss broad goals for each system in need of active restoration
Key Assumptions

• Structural analysis, not species composition
• Focuses on active restoration
• Focuses on National Forest
Overview of Ecosystems

Forest Ecosystems in All Lands
- Pine-Oak Heath: 24%
- Dry Mesic Oak Hickory: 19%
- Spruce Fir: 1%
- Rich Cove: 7%
- Acidic Cove: 13%
- Mesic Oak-Hickory: 1%
- Dry Oak: 20%
- High Elevation Red Oak: 4%
- Shortleaf Pine-Oak: 4%
- Northern Hardwoods Slope: 1%
- Northern Hardwoods Cove: 3%

Forest Ecosystems in National Forests
- Pine-Oak Heath: 23%
- Dry Mesic Oak Hickory: 10%
- Spruce Fir: 2%
- Rich Cove: 7%
- Acidic Cove: 4%
- Mesic Oak-Hickory: 4%
- Dry Oak: 20%
- High Elevation Red Oak: 19%
- Shortleaf Pine-Oak: 5%
- Northern Hardwoods Slope: 4%
- Northern Hardwoods Cove: 2%
Forest Ecosystems in Nantahala and Pisgah National Forests
Methods

- Evaluated Josh Kelly's ecological departure analysis
- Selected systems as in need of restoration if ~60% departed

<table>
<thead>
<tr>
<th>Ecosystem</th>
<th>National Forest</th>
<th>Other Lands</th>
<th>All Lands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Oak</td>
<td>84</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>POH*</td>
<td>83</td>
<td>74</td>
<td>79</td>
</tr>
<tr>
<td>Shortleaf-Oak*</td>
<td>83</td>
<td>63</td>
<td>71</td>
</tr>
<tr>
<td>DMOH</td>
<td>70</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>Mesic Oak</td>
<td>70</td>
<td>74</td>
<td>72</td>
</tr>
<tr>
<td>HERO</td>
<td>64</td>
<td>75</td>
<td>65</td>
</tr>
<tr>
<td>Acidic Cove</td>
<td>55</td>
<td>57</td>
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</tr>
<tr>
<td>Rich Cove</td>
<td>54</td>
<td>56</td>
<td>56</td>
</tr>
<tr>
<td>Spruce-Fir*</td>
<td>34</td>
<td>43</td>
<td>39</td>
</tr>
<tr>
<td>N Hardwoods*</td>
<td>6</td>
<td>14</td>
<td>10</td>
</tr>
</tbody>
</table>
Methods

- Evaluated each forest stage
- Calculated percentage departure per seral and canopy class
- Selected stages with at least 5% departure for evaluation

<table>
<thead>
<tr>
<th>System</th>
<th>Class and Canopy</th>
<th>% Departed from NRV</th>
<th>Departed Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortleaf Pine-Oak</td>
<td>Early</td>
<td>21.65%</td>
<td>-6227.20</td>
</tr>
<tr>
<td></td>
<td>Mid-Open</td>
<td>29.78%</td>
<td>-8564.20</td>
</tr>
<tr>
<td></td>
<td>Mid-Closed</td>
<td>25.58%</td>
<td>7357.80</td>
</tr>
<tr>
<td></td>
<td>Late-Open</td>
<td>30.96%</td>
<td>-8904.80</td>
</tr>
<tr>
<td></td>
<td>Late-Closed</td>
<td>56.81%</td>
<td>15696.40</td>
</tr>
</tbody>
</table>
Methods

- Classified restoration as active, passive, or active + passive
- Identified donating and receiving classes

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<thead>
<tr>
<th>System</th>
<th>Class and Canopy</th>
<th>% Departed from NRV</th>
<th>Departed Acres</th>
<th>Restoration Type</th>
<th>Receiving or Donating</th>
<th>Acres From or To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortleaf Pine-Oak</td>
<td>Early</td>
<td>21.65%</td>
<td>-6227.20</td>
<td>Maintenance</td>
<td>Receiving</td>
<td>Late-closed</td>
</tr>
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<td>29.78%</td>
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<td>Active</td>
<td>Donating</td>
<td>1) Late-open 2) Early</td>
</tr>
</tbody>
</table>
Results

Six systems identified as having the *greatest* need of active restoration:

- Shortleaf Pine-Oak
- Dry Mesic Oak-Hickory
- Mesic Oak-Hickory
- High Elevation Red Oak
- Dry Oak
- Pine-Oak Heath
Six systems identified as having the *greatest* need of active restoration.
Forest Ecozones Identified as Active Restoration

- Pine Oak/Heath: 51%
- Dry Mesic Oak Hickory: 7%
- Mesic Oak: 10%
- Dry Oak: 5%
- High Elevation Red Oak: 4%
- Shortleaf Pine-Oak: 4%
- Other: 5%

Each ecozone represents a portion of the total active restoration areas.
Shortleaf Pine-Oak Ecosystem in Nantahala and Pisgah National Forests

Seral Class and Canopy Cover
- Early
- Mid Open
- Mid Closed
- Late Open
- Late Closed
- Old Growth Open
- Old Growth Closed

Nantahala and Pisgah National Forests
Shortleaf Pine-Oak Potential Restoration Areas in Nantahala and Pisgah National Forests

- Potential Active Restoration
- Maintenance
- Nantahala and Pisgah National Forests
Shortleaf Pine in National Forests

<table>
<thead>
<tr>
<th>Proportion of the System</th>
<th>Reference Condition</th>
<th>Current Condition</th>
<th>Deficit Conditions</th>
<th>Over-Abundant Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early-seral Open</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Mid-seral Open</td>
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<tr>
<td>Mid-seral Closed</td>
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<td></td>
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<tr>
<td>Late-seral Open</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late-seral Closed</td>
<td></td>
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</tr>
</tbody>
</table>
Dry Mesic Oak Hickory Ecosystem in Nantahala and Pisgah National Forests

Seral Class and Canopy Cover

- Early
- Mid Open
- Mid Closed
- Late Open
- Late Closed
- Old Growth Open
- Old Growth Closed

Nantahala and Pisgah National Forests
Dry Mesic Oak Hickory
Potential Restoration Areas
in Nantahala and Pisgah National Forests

- Blue: Potential Active Restoration
- Yellow: Maintenance
- White: Nantahala and Pisgah National Forests
Dry Mesic Oak Hickory in National Forests

Proportion of the System

Reference Condition
Current Condition
Deficit Conditions
Over-Abundant Condition

Acres

Early-seral
Mid-seral Open
Mid-seral Closed
Late-seral Open
Late-seral Closed
Old Growth-seral Open
Old Growth-seral Closed

-8,000
-16,100
-24,200
-32,200
-40,300
-48,300

10-
20-
30-
40-
50-
60-
70-

Dry Mesic Oak Hickory in National Forests
Mesic Oak-Hickory Ecosystem in Nantahala and Pisgah National Forests

Seral Class and Canopy Cover

- Early
- Mid Open
- Mid Closed
- Late Open
- Late Closed
- Old Growth Open
- Old Growth Closed

Nantahala and Pisgah National Forests
Mesic Oak-Hickory Potential Restoration Areas in Nantahala and Pisgah National Forests
High Elevation Red Oak Ecosystem in Nantahala and Pisgah National Forests

Seral Class and Canopy Cover
- Early
- Mid Open
- Mid Closed
- Late Open
- Late Closed
- Old Growth Open
- Old Growth Closed
- Nantahala and Pisgah National Forests
High Elevation Red Oak Potential Restoration Areas in Nantahala and Pisgah National Forests

- Potential Active Restoration
- Maintenance
- Nantahala and Pisgah National Forests
Early-seral

High Elevation Red Oaks in National Forests

Mid-seral

Open

Mid-seral

Closed

Late-seral

Open

Late-seral

Closed

Old growth-

seral

Open

Old growth-

seral

Closed

Proportion of the System

Reference Condition

Current Condition

Deficit Conditions

Over-Abundant Condition

10-20-30-40-50-60-

Acres

-21,600

-18,000

-14,400

-10,800

-7,200

-3,600
Pine Oak Heath
Potential Restoration Areas
in Nantahala and Pisgah National Forests

- Blue: Potential Active Restoration
- Yellow: Maintenance
- White: Nantahala and Pisgah National Forests

Distance Scale: 0 5 10 20 30 40 Miles

Directional Arrow: North (N)
Pine Oak Heath in National Forests

Proportion of the System

Reference Condition
Current Condition
Deficit Conditions
Over-Abundant Condition

Early-seral
Mid-seral Open
Mid-seral Closed
Late-seral Open
Late-seral Closed

Acres
-38,800
-33,300
-27,700
-22,200
-16,600
-11,000
-5,500

10-
20-
30-
40-
50-
60-
70-
-5,500
-11,000
-16,600
-22,200
-27,700
-33,300
-38,800

-5,500
-11,000
-16,600
-22,200
-27,700
-33,300
-38,800
Acknowledgments

Megan Sutton, Josh Kelly, Margit Bucher, SBR FLN, TNC, and Chris Zanger

Questions?
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Ground Rules for Discussion

• Treat one another with respect and professionalism
• Listen for understanding
• Provide constructive feedback on topic
• Refrain from side conversations
• If there are disagreements, “attack” the problem, not the person
• Work toward collaborative solutions
• Be mindful of the time that we have allotted
Discussion Questions

• Does the ecological departure analysis appropriately identify major structural needs of this system?

• Are both fire and mechanical treatment appropriate in this system? Are there other specialized treatments that need to be considered?

• Of the deficit conditions for this system which ones are most important to address?

• How many acres are desirable to restore/maintain within this system in the next 20 years? What is a realistic goal?