Summary of Ecological Departure Analysis of Nantahala-Pisgah National Forest by the Western North Carolina Alliance

Goals

- Identify age class and structure imbalances in the major ecosystems of the study area
- Rank ecosystems by restoration need and provide a basis to prioritize restoration activities
- Provide context for "Need for Change" in the management of Nantahala-Pisgah National Forest

Methods

- Study area included over 844,000 acres of National Forest and 1,760,000 acres of total forest in the overlap between Phase III NC LiDAR data and the National Forest Proclamation Boundary
- Used eCAP methodology for calculating ecological departure of 11 Ecosystems (Low et al. 2010)
- Used 2011 Ecozone mapping by Steve Simon to approximate ecosystem boundaries
- Used NC GAP data to exclude developed & agricultural lands from analysis
- Used 2005 NC LiDAR data to identify tree age classes based on height, canopy cover greater and less than 60%, and shrub density greater and less than 50% in each ecosystem
- Used Fusion Software (USDA Forest Service) to process LiDAR canopy height, canopy cover, and shrub density models
- Used LANDFIRE Biophysical Setting models as reference condition in each ecosystem

Results

- Ecosystems with a historical fire return interval of < 20 years prior to fire suppression/exclusion comprised the six most departed ecosystems - *ecological departure is correlated with lack of fire*
- Dry Oak Forest and Pine-Oak/Heath Forest were two of the most departed ecosystems and share a combination of frequent historical fire and low timber value
- The major drivers of departure for the most departed ecosystems were a general rarity of open-canopy forest, a general rarity of the old-growth age class, and an over-abundance of forest 70-100 years old
- Shortleaf Pine-Oak Forest, Dry Oak Forest, and Pine-Oak/Heath Forest lack young forest
- Cove Forests are more disturbed than their reference models
- Northern Hardwoods and Spruce Forest are the least departed from reference, but lack of species composition information obscures problems in the Spruce Forest ecosystem
- The lack of species composition data also obscures species composition issues in other ecosystems, particularly in Shortleaf Pine-Oak Forest
- Current levels of logging on Nantahala-Pisgah National Forest are not contributing to ecological departure, but tend to neglect ecosystems in the greatest need of restoration
- Increasing the amount of open canopy forest in oak and pine ecosystems could occur through a combination of fire management and timber harvest

Ecological Departure of Ecosystems in the Study Area by Ownership

Ecosystem	National Forest	Other Lands	All Lands	Drivers of Departure
Dry Oak Forest	84%	80%	80%	Too much closed canopy, lacks old-growth, lacks early seral
Pine-Oak/Heath*	83%	74%	79%	Too much closed canopy, too much late-seral, lacks early seral
Shortleaf Pine-Oak*	83%	63%	71%	Too much closed canopy, too much late-seral, lacks early-seral
Dry Mesic Oak-Hickory	70%	71%	71%	Too much closed canopy, lacks old-growth
Mesic Oak-Hickory	70%	74%	72%	Too much closed canopy, lacks old-growth
High Elevation Red Oak Forest	63%	75%	65%	Too much closed canopy, lacks old-growth
Rich Cove Forest	54%	56%	55%	Lacks old-growth
Acid Cove Forest	55%	57%	56%	Lacks old-growth
Spruce-Fir Forest*	34%	43%	39%	Too much mid-seral, too little late-seral; questions about species composition
Northern Hardwoods Cove*	6%	14%	10%	No significant departure, but old-growth not modeled
Northern Hardwoods Slope*	3%	7%	4%	No significant departure, but old-growth not modeled

* Old-Growth S-classes not included in these models

Webinar of early draft:
https://nethope.webex.com/nethope/lsr.php?AT=pb&SP=MC&rID=67037897&rKey=02d57cfd6f3f0e0b

Low, Greg, Provencher, and Abele. 2010. Enhanced Conservation Action Planning: Assessing Landscape Condition and Predicting Benefits of Conservation Strategies. *Journal of Conservation Planning* Vol. 6 (2010) 36—60