Forest Stewardship at Connestee Falls



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EcoForesters' Mission

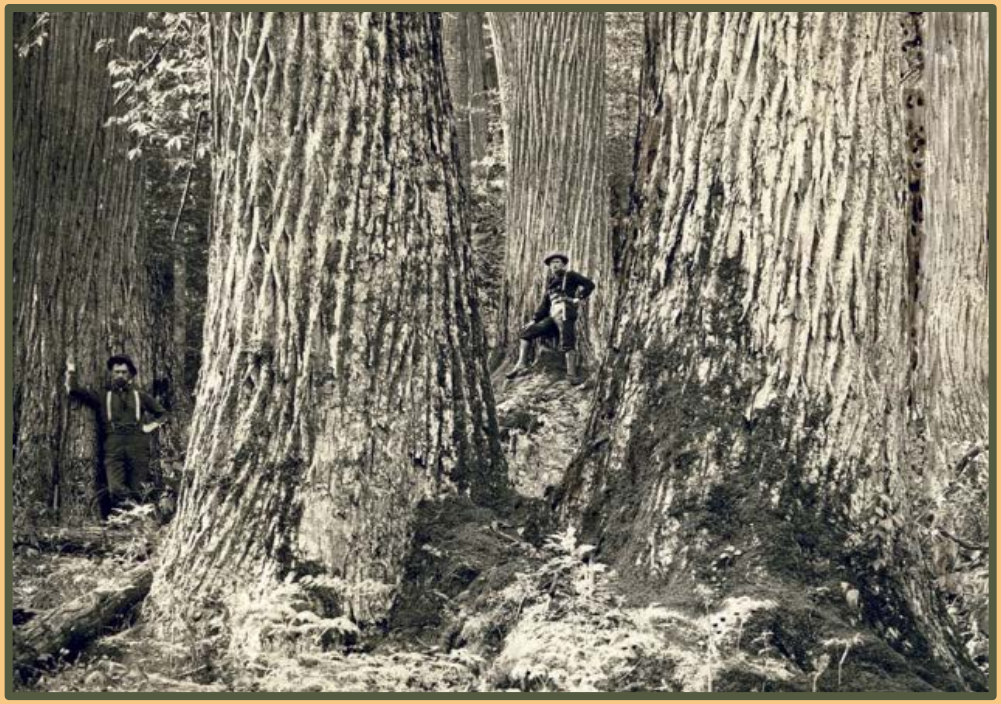
EcoForesters is 501c3 non-profit professional forestry organization dedicated to conserving and restoring our Appalachian forests through stewardship and education.



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A Brief History of Southern Appalachian Forests



Southern Appalachian Forests were more diverse and of higher quality historically than they are *now*

~1870's-1930's "The Big Cut"

85% of Appalachians Clear Cut





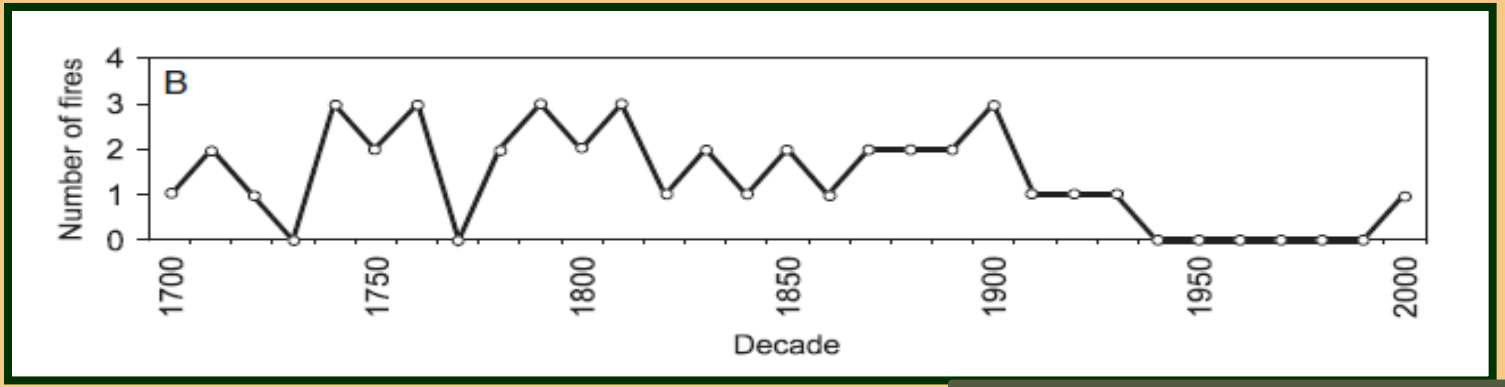
“High Grading”
“Select Cut”
“Diameter Limit Cut”

Harvesting only **the** biggest and **best** trees, **leave the rest**

- “Removal of the fittest”
- Degrades the forest







Number of fires per decade in 4 montane-pine oak stands in the central Appalachians dating back to the early 1700's (from Aldrich et al, 2010)



Fire Suppression



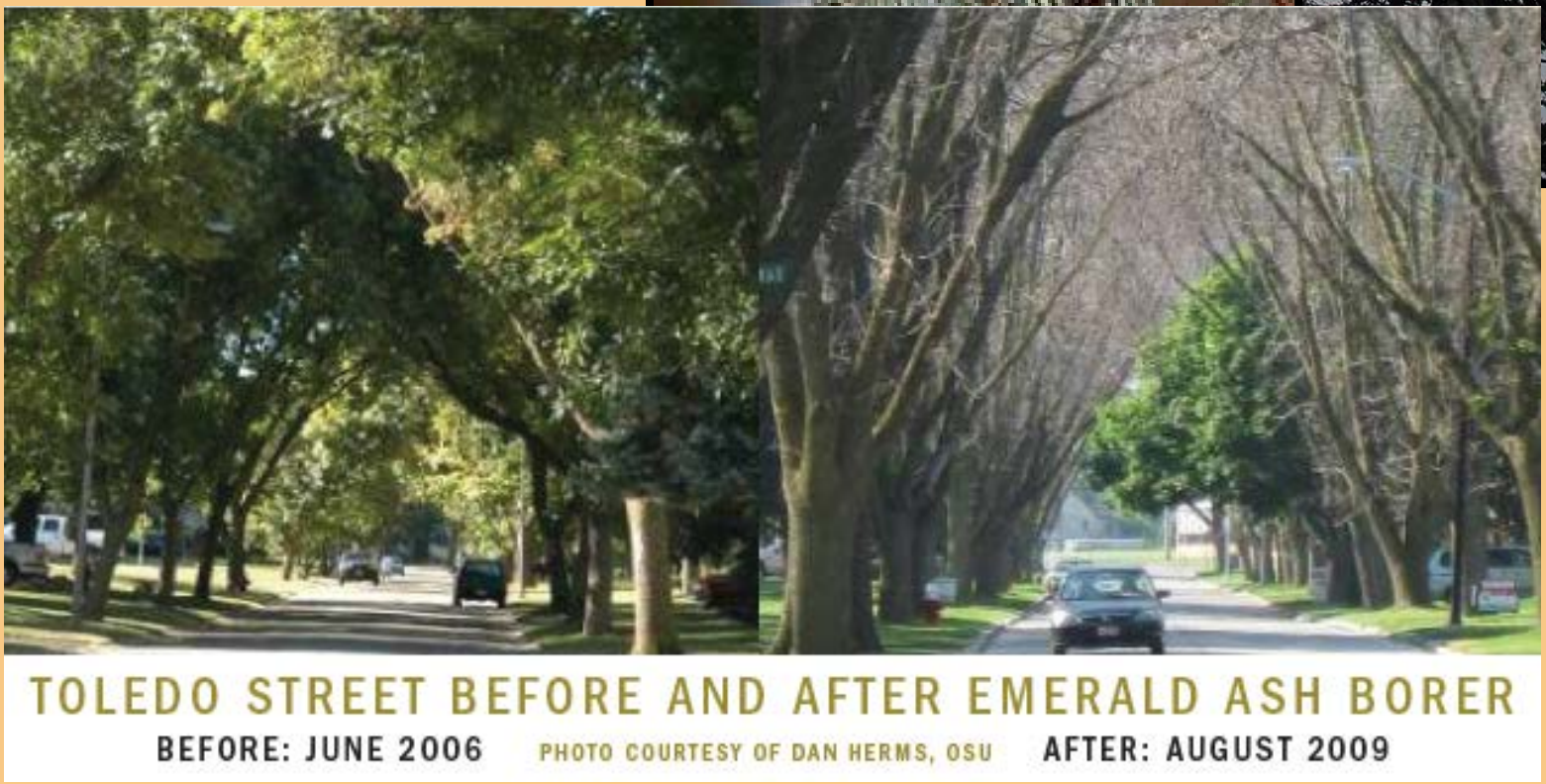
Green River Gamelands, NC

Non-native insects, diseases, and plants

- 1930-40's: Chestnut blight & Dutch Elm Disease
- 1990's-:Hemlock wooly adelgid
- 2000s: Emerald Ash Borer
- Coming:
  - Beech Leaf Disease
  - Spongy "Gypsy" Moth



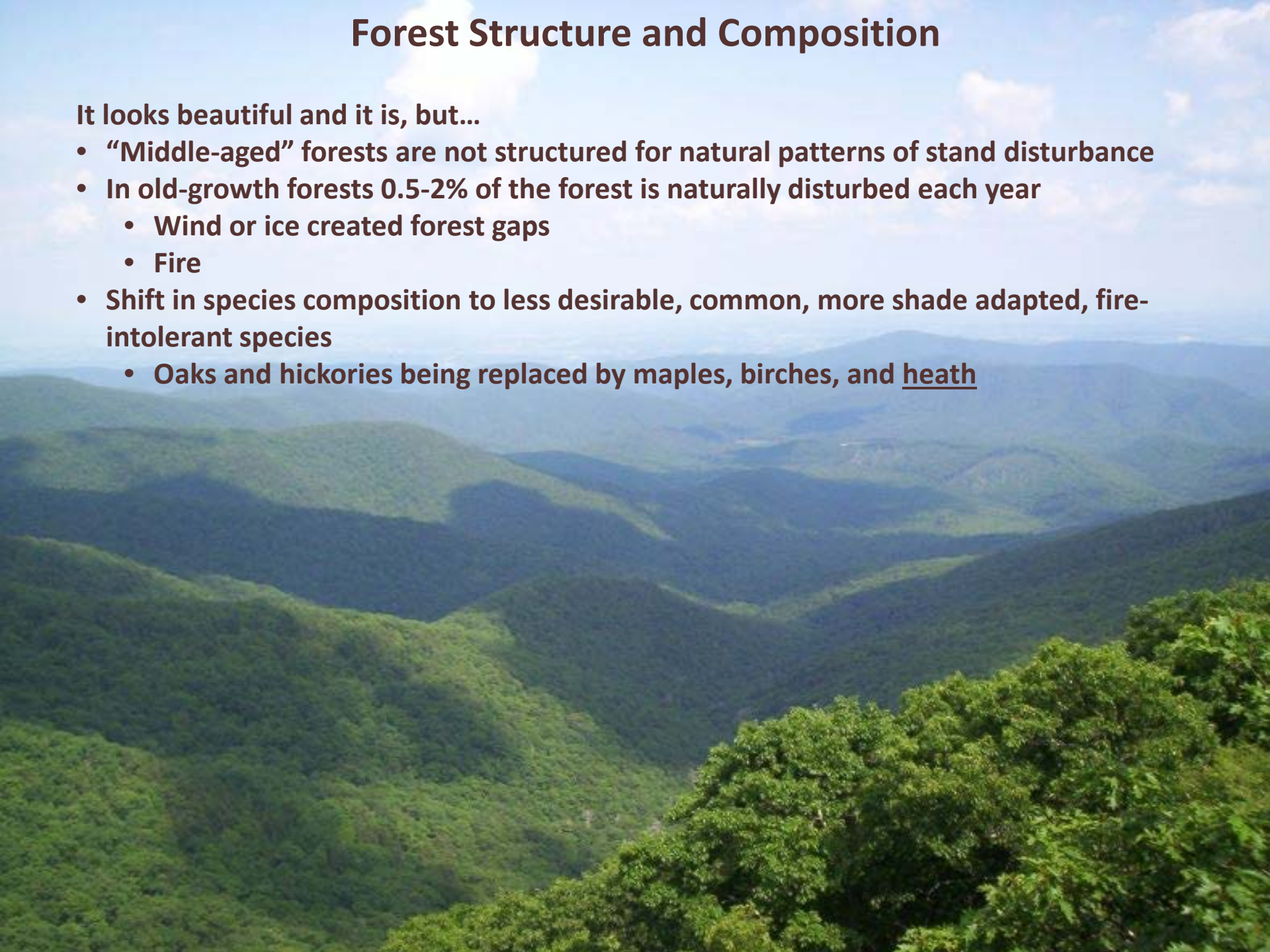




TOLEDO STREET BEFORE AND AFTER EMERALD ASH BORER

BEFORE: JUNE 2006 PHOTO COURTESY OF DAN HERMS, OSU AFTER: AUGUST 2009

Forest Structure and Composition



It looks beautiful and it is, but…

- "Middle-aged" forests are not structured for natural patterns of stand disturbance
- In old-growth forests 0.5-2% of the forest is naturally disturbed each year
  - Wind or ice created forest gaps
  - Fire
- Shift in species composition to less desirable, common, more shade adapted, fire-intolerant species
  - Oaks and hickories being replaced by maples, birches, and heath

Why are oaks so important?

- Best tree for wildlife
  - Acorns= food going into winter
  - Supports the Most Insects Species (~500+) = Essential protein for birds
- Well adapted to Climate Change: Drought/Heat/Fire-Tolerant or Adapted
- Long Lived (up to 600 years)
- Very valuable Timber
- White Oak is most desirable, but all are good
- However, oaks are failing to regenerate





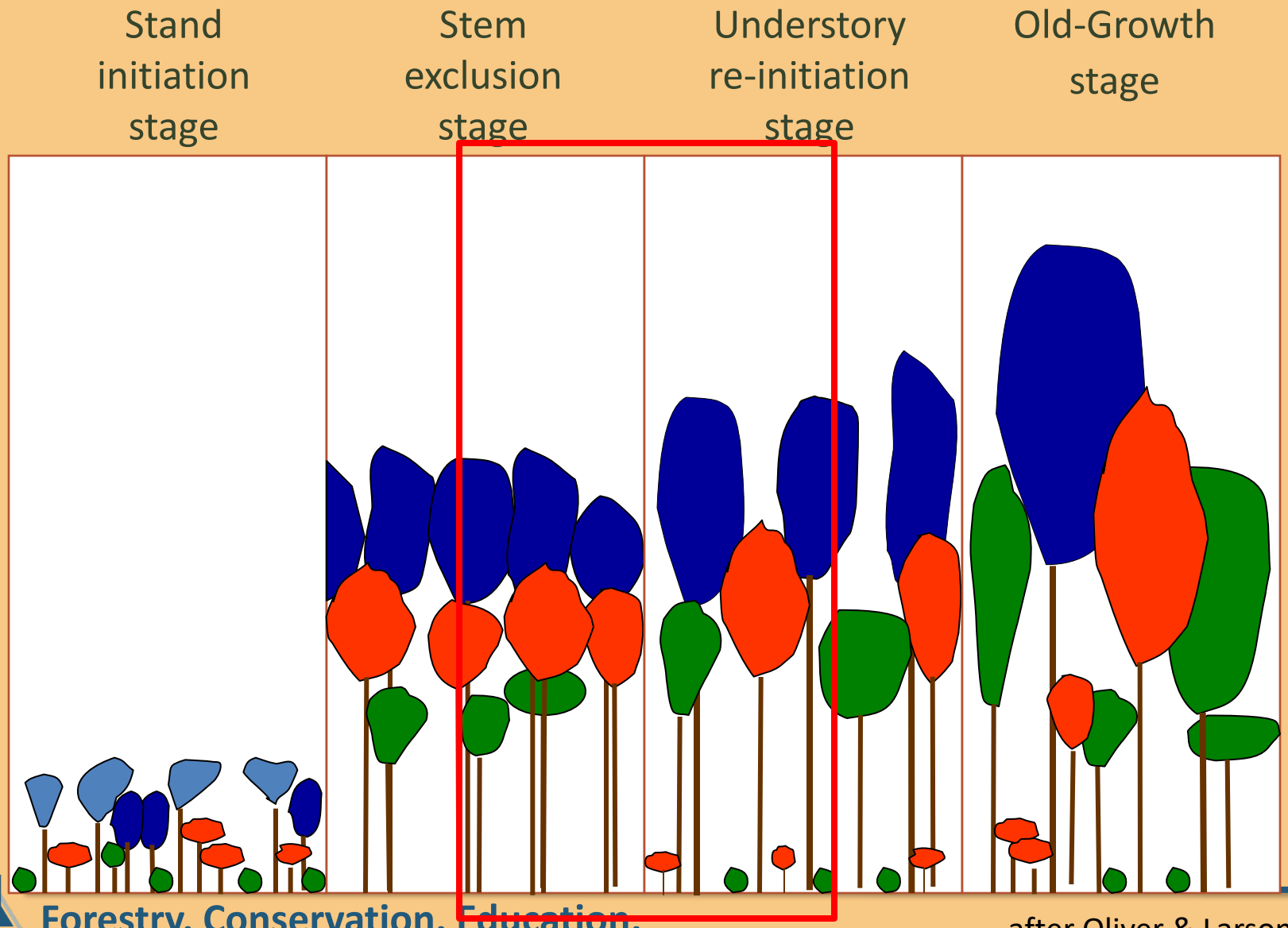
Common Challenges to Forest Stewardship in WNC

- Impact of non-native invasive species
- Fire Suppression
- Climate change and its effects/stress on forests
- Past Mis-management
  - Lower species *and* structural diversity (very few age classes)
  - Low economic, and ecological, value of many stands due to past high-grading and other factors
- **Education**
- **Funding $**



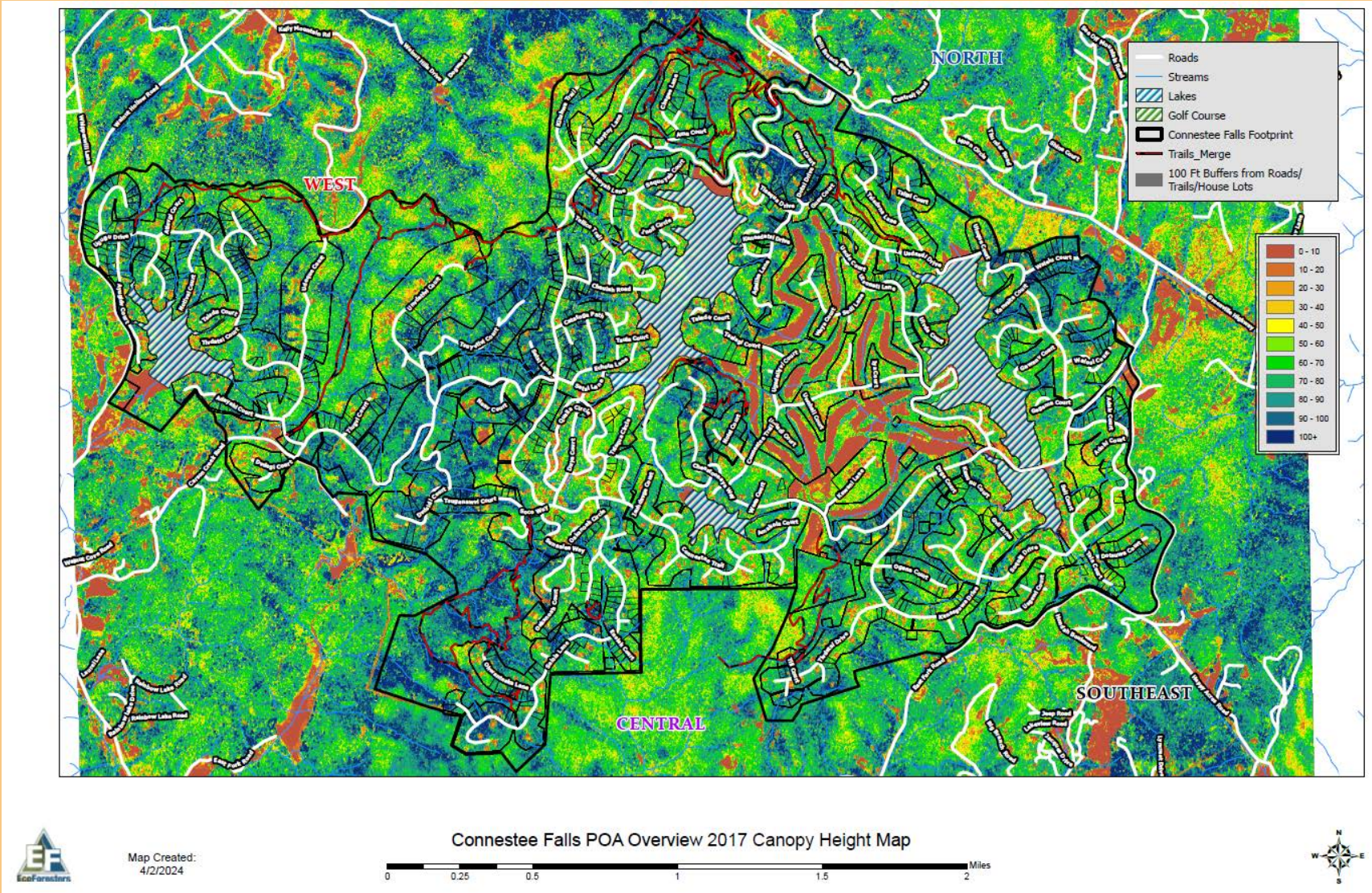


Stand Successional Stages



after Oliver & Larson 1996

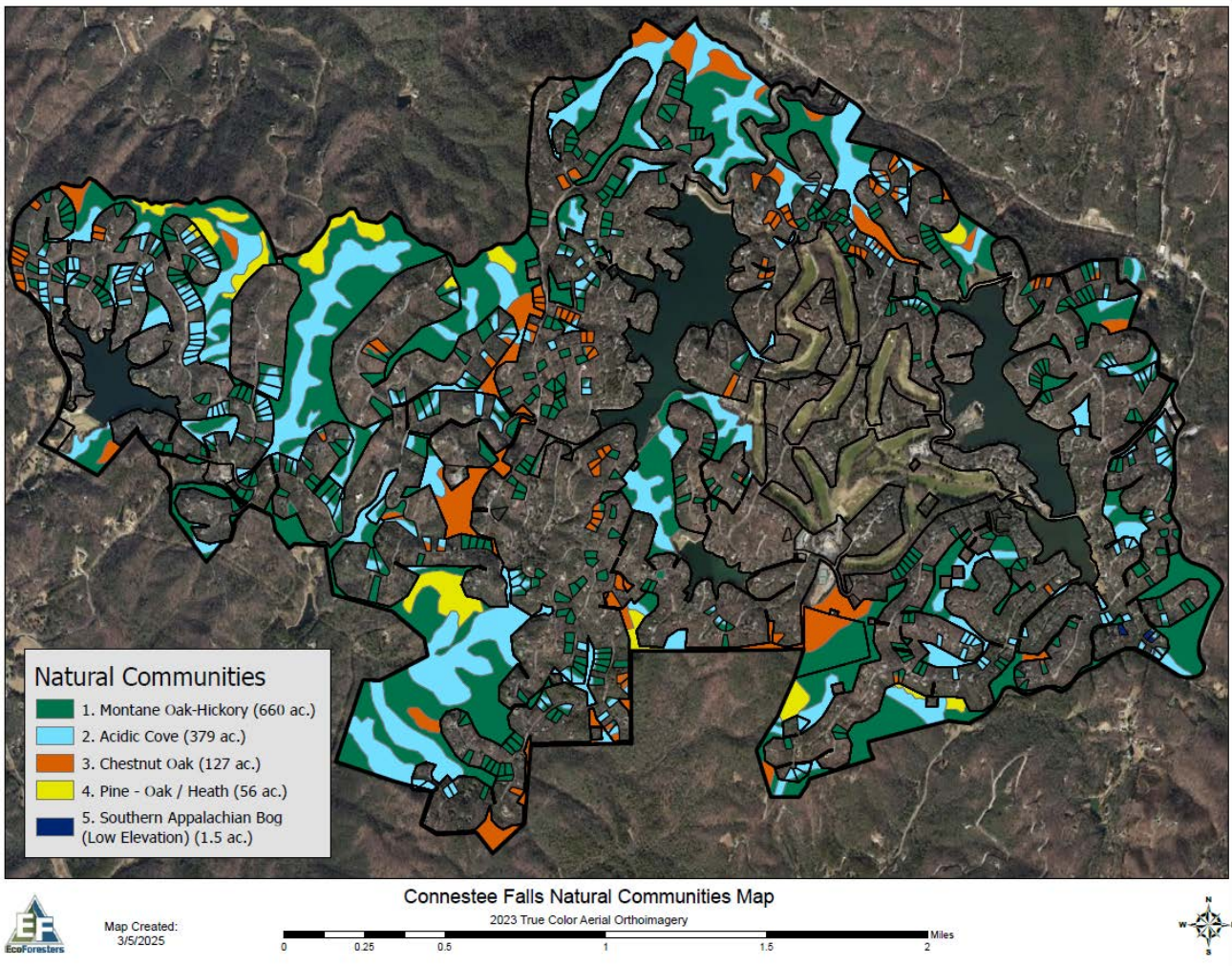
Canopy Height of CF (2017)



Diversity of Natural Community Types

Growing conditions vary due to:

- Elevation
- Aspect
- Landform
- Slope Position
- Soil Moisture
- Soil Type



Acidic Cove Forest (379-acres)

Overstory

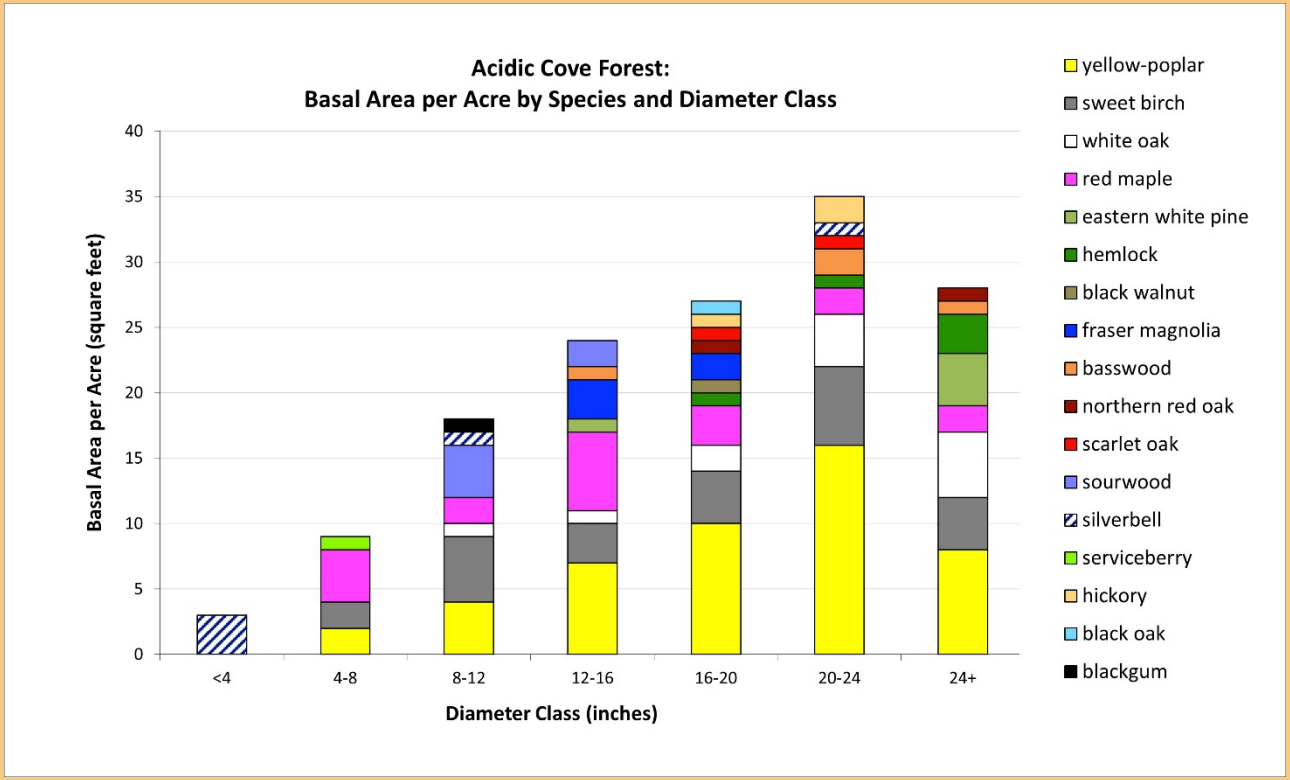
- Yellow-poplar, sweet birch, red maple, white pine, hemlock, oak sp.

Midstory

- Similar to overstory, plus
- Silverbell, sourwood, serviceberry

Tree Regeneration

- Sparse: Silverbell, birch, red maple, white pine, yellow-poplar



Acidic Cove Forest



- Dense rhododendron and doghobble limits understory growth
- Treated hemlocks – where accessible

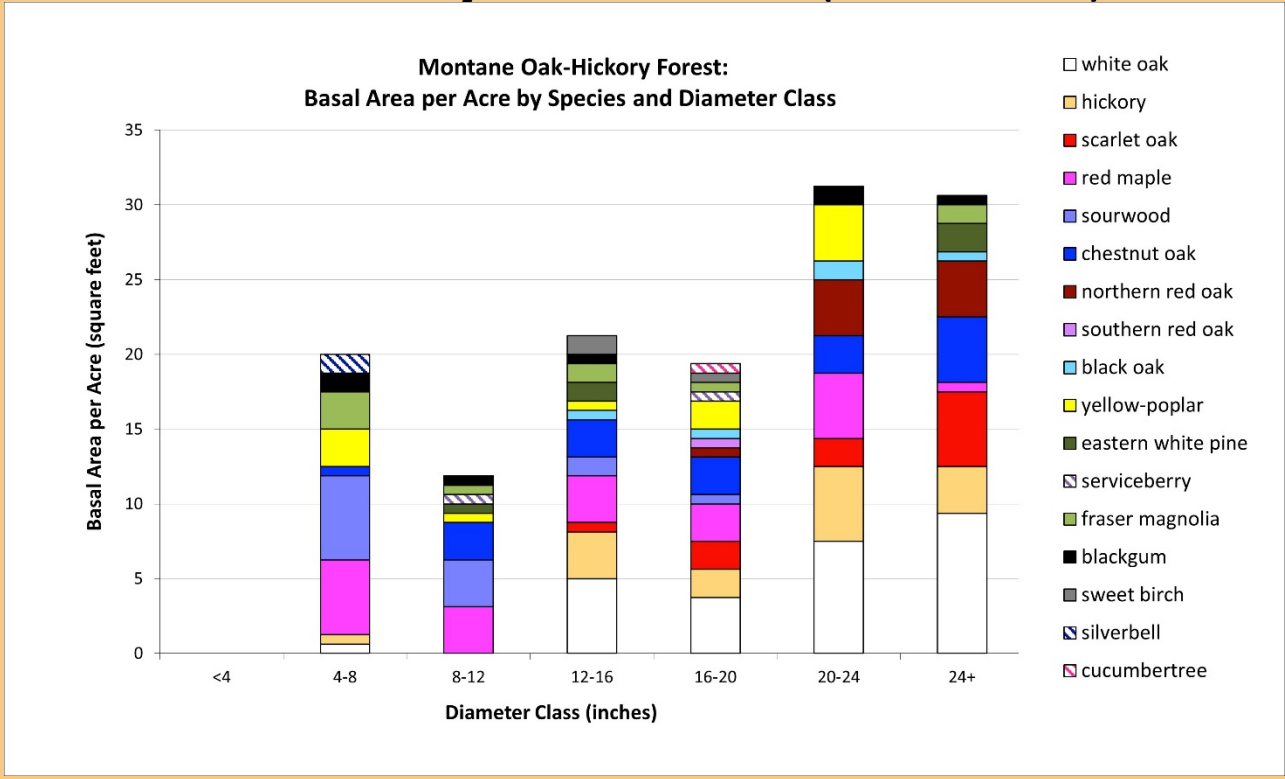
Montane Oak-Hickory Forest (660-acres)

Overstory

- White oak, hickory, ‘red’ oaks, red maple…

Midstory

- Reduced oak component
- Red maple, sourwood dominant, other mesophytic sp.



Montane Oak-Hickory Forest (660-acres)

Tree Regeneration

- Sparse – dense understory
- Occasional – open understory
  - Red maple, sourwood, sweet birch, white pine, Fraser magnolia, silverbell
  - Oak and hickory species seldom
- Often large thickets of mountain laurel and/or rhododendron



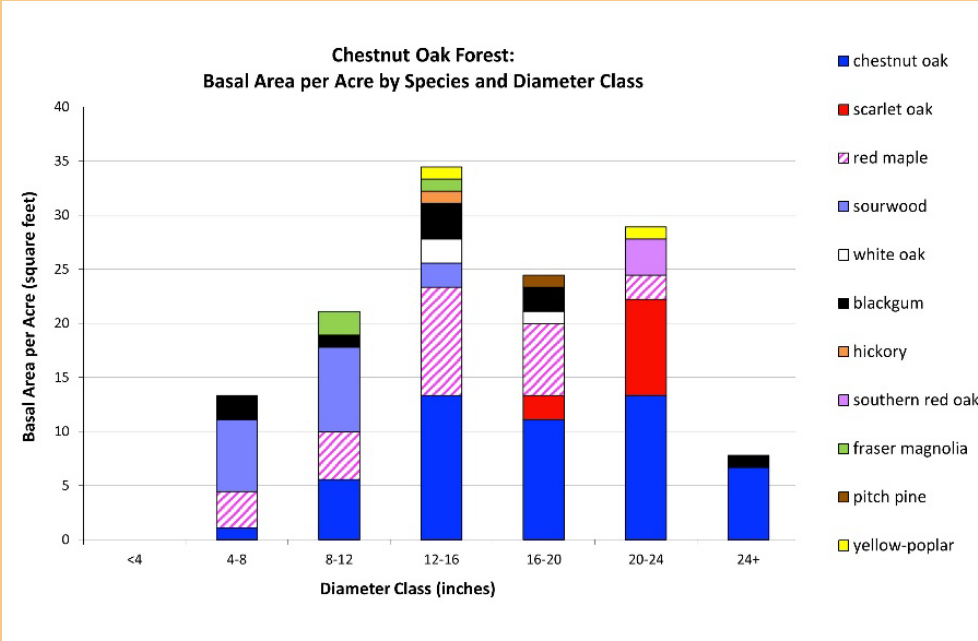
Montane Oak-Hickory Forest (660-acres)



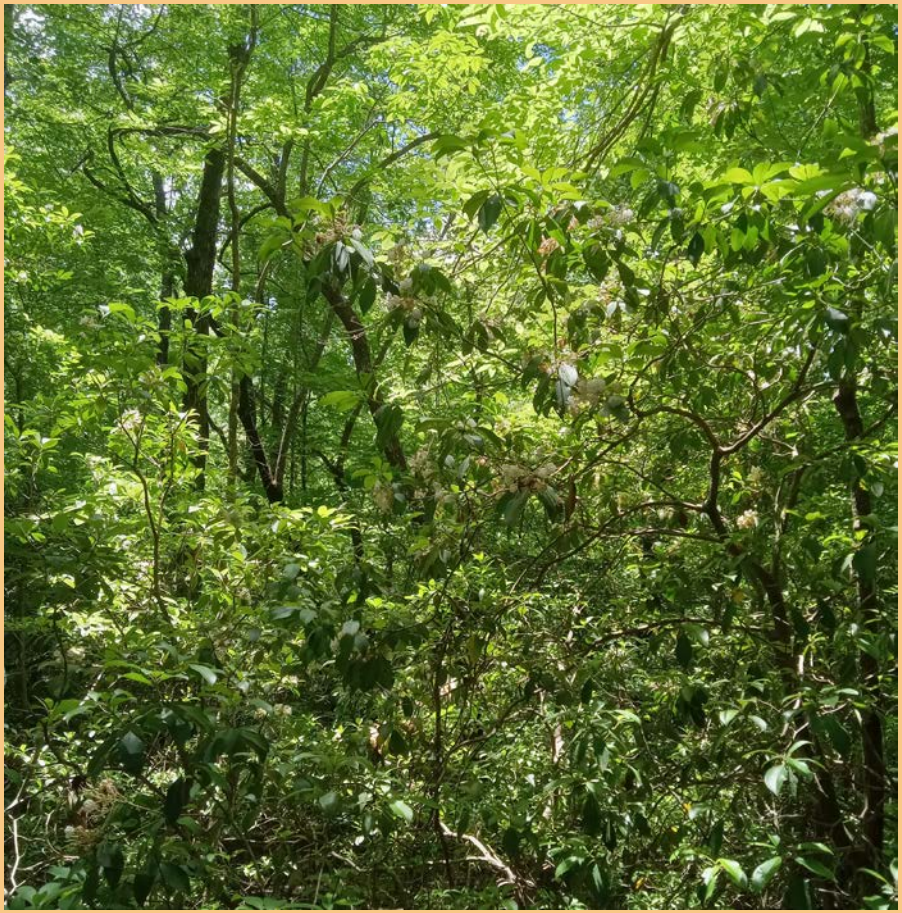


Chestnut Oak Forest (127-acres)

- Overstory
  - Chestnut oak, red maple, other oak sp.
- Midstory
  - Red maple, sourwood dominant, blackgum, other mesophytic sp.
- Understory
  - Sourwood and blackgum dominant, also red maple, white pine, sparse oak
  - Thickets of buckberry, rhodo & mtn. laurel



Chestnut Oak Forest (127-acres)



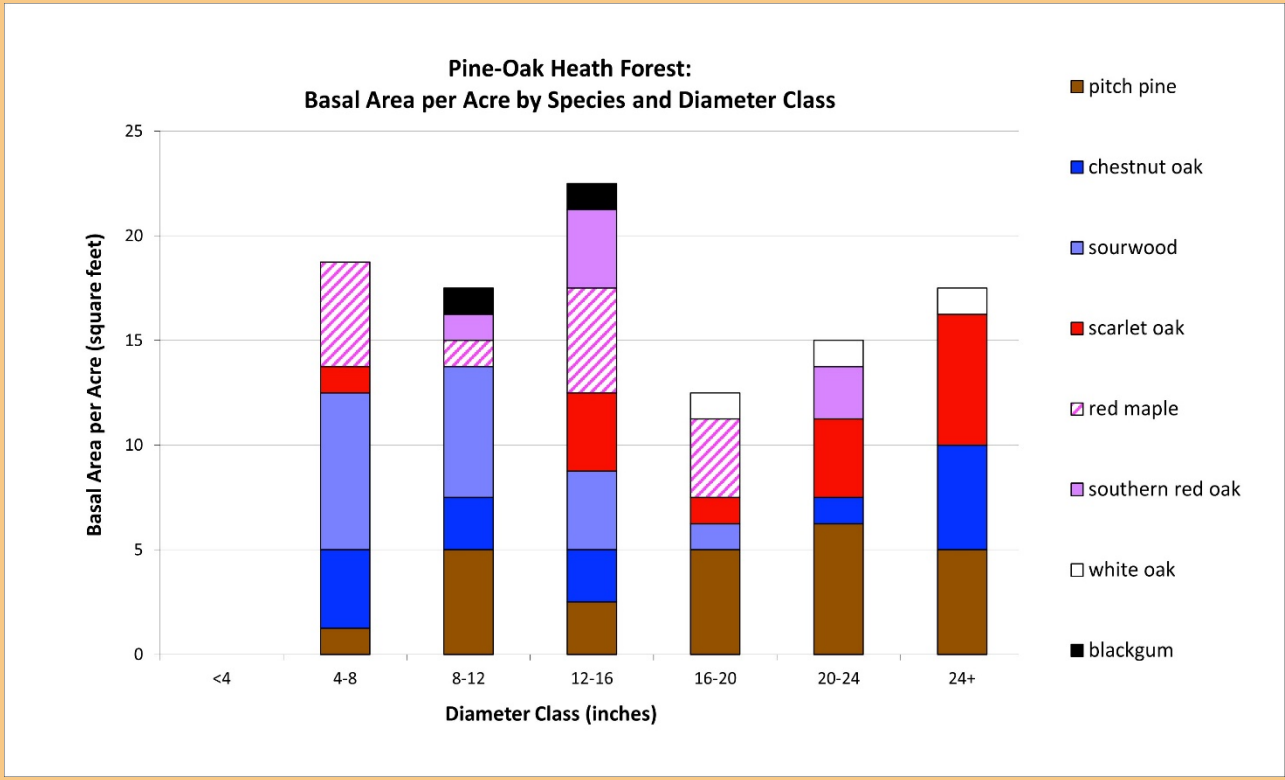
Pine-Oak Heath (56-acres)

Overstory

- Pitch pine, scarlet oak, red maple, other oak sp.

Midstory

- Reduced pine component
- Sourwood dominant, blackgum, red maple, chestnut oak

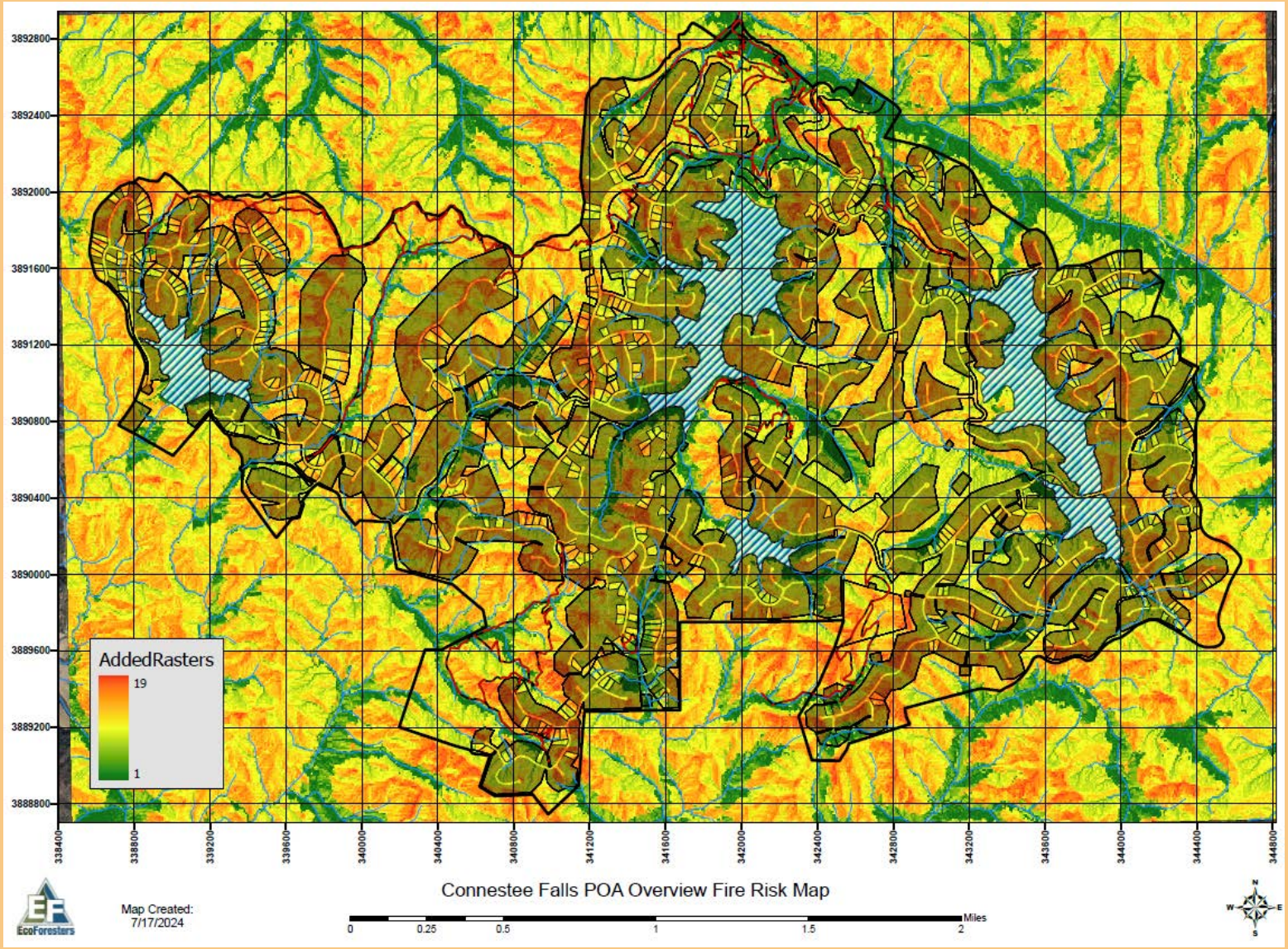


Pine-Oak Heath (56-acres)



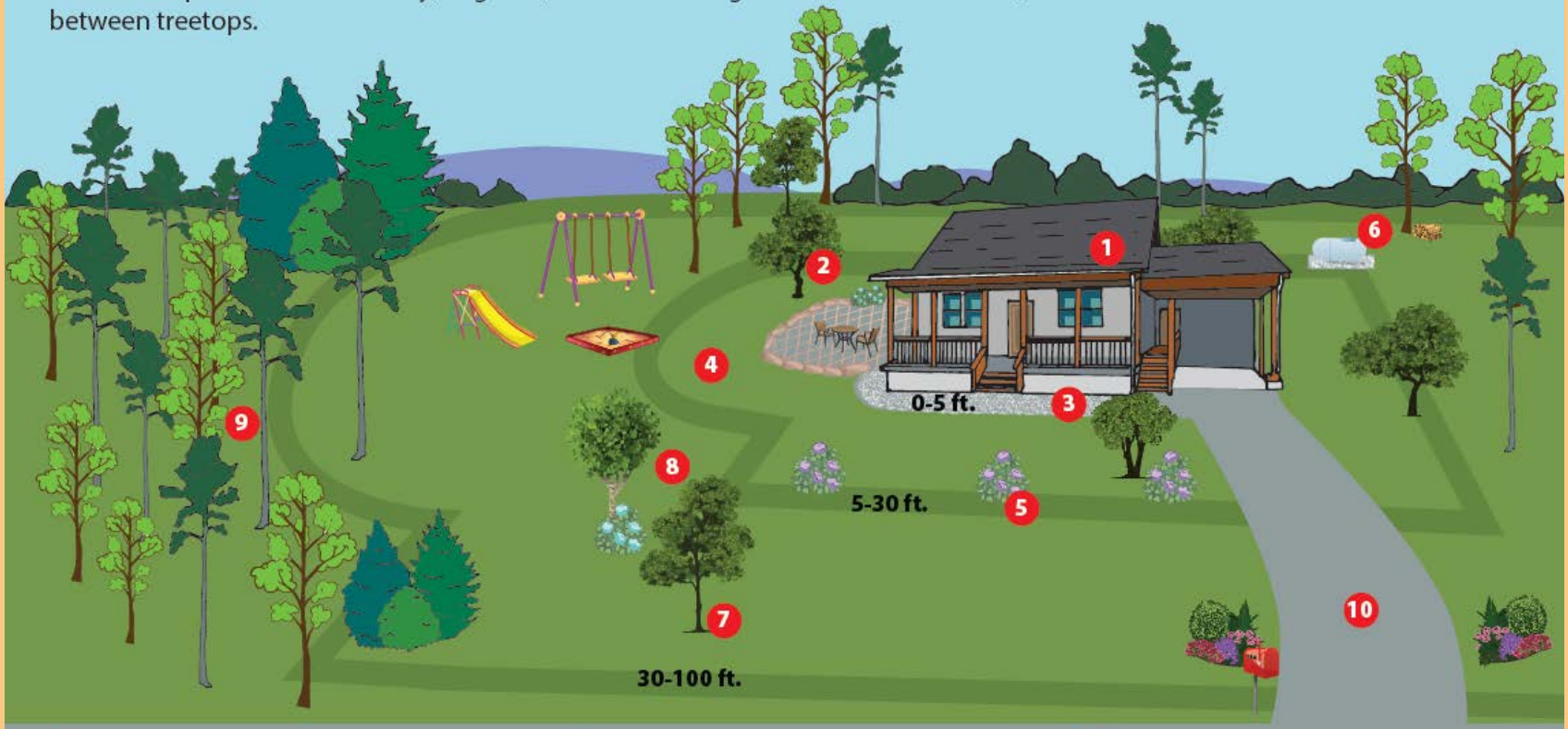
- Tree Regeneration
  - Extremely sparse
  - Sourwood, red maple
- Thick & dense rhodo (un-natural) & mountain laurel (overly dense)
- Fire dependent community
- Xeric (dry / lo-nutrients) & slow growing

Wildfire Risk Modelling



A Fire-Resistant Home

A home's design, building materials and landscape (out to 100 feet) determine its vulnerability to airborne embers, surface fires and crown fires. A fire-resistant home has at least 30 feet of surrounding space that is clear of dead vegetation and flammable debris. It has at least 5 feet of noncombustible mulch material such as river rock or pea gravel. Trees and shrubs are maintained. The landscape consists of healthy, irrigated, fire-resistant vegetation. Within 5-30 feet, trees should have a minimum of 18 feet between treetops.



1. Clean debris from roof and gutters.
2. Trim overhanging branches away from the home and attachments (patios, outbuildings, etc.)
3. Use noncombustible mulch and succulents within 5 feet of structures.
4. Keep lawn mowed, watered, and at a height of 4 inches or less.
5. Landscape with fire-resistant plants and maintain their health.
6. Clear away all dead vegetation and flammable items within 30 feet of structures and propane tanks.
7. Prune branches of large trees to 6-10 feet above the ground.
8. Maintain adequate space between treetops (18 feet).
9. Reduce density of surrounding forest vegetation.
10. Create a firebreak with a driveway wide enough (12 feet) to accommodate emergency vehicles.

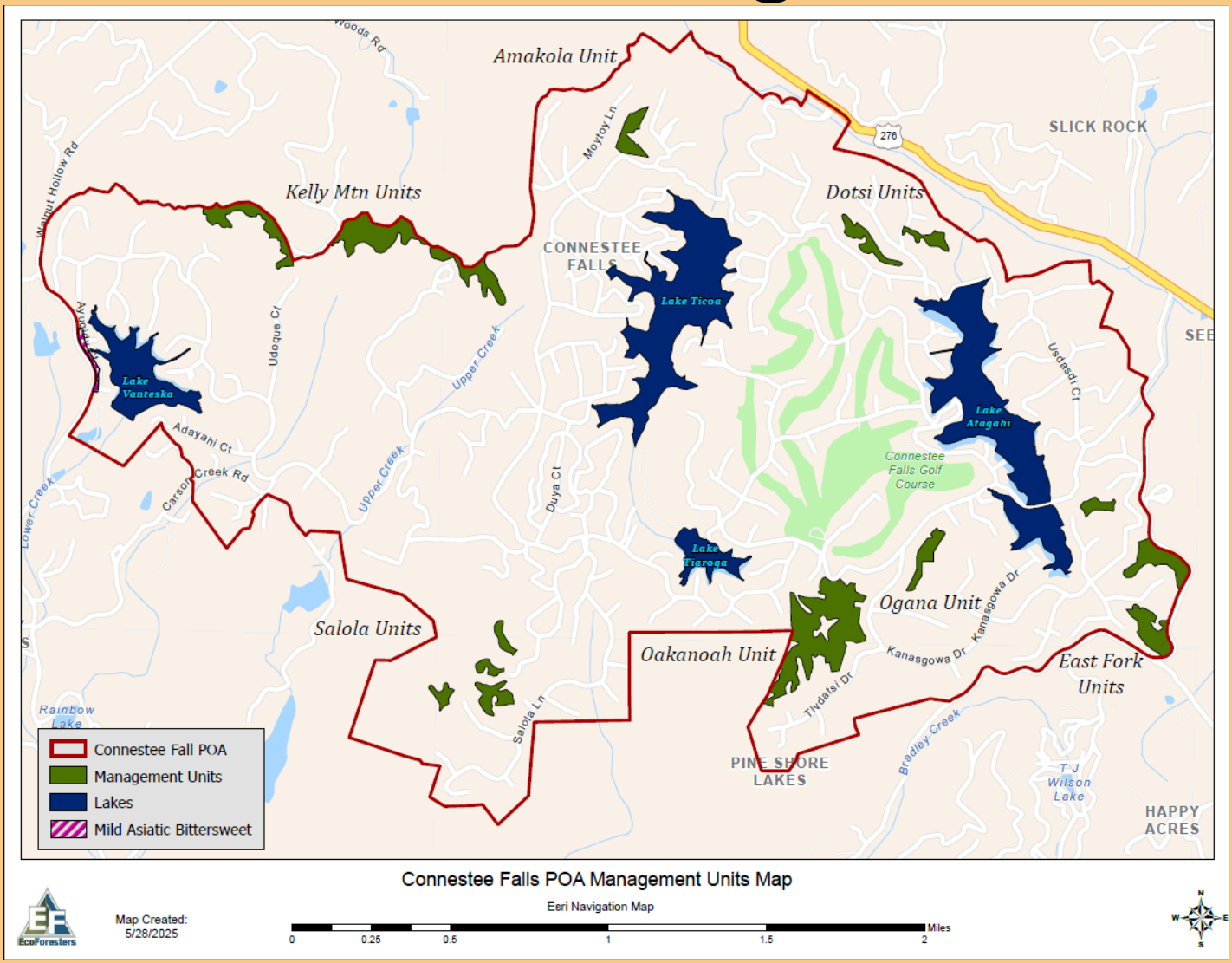
The N.C. Forest Service is a division of the N.C. Department of Agriculture and Consumer Services. Steve Troxler, Commissioner

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Forest Stand Improvement

- Climate Smart Forestry
- Reduce Wildfire Risk
- Control Non-native invasive species
- Favor more desirable or uncommon trees that need help
- Promote oak, hickory, and yellow-pine that are declining
- Increase growth, vigor, and health
- Improve/Create wildlife habitat

CFPOA Forest Management Units



4.3 Recommended Management for the Next Ten Years (2025-2035)

Completion Date	Management Unit	Treatable Acres	Description of Treatment Component	Estimated Cost +++
Year 1	Invasives	2	Asiatic Bittersweet Control - Cut-Stem & Foliar Treatment	~$2,000 - Full day of (initial) invasive treatments
Year 1	Adjacent from Connestee Falls	<1/4	Multiflora Rose -Cut-Stem & Foliar Treatment	
Year 1	Oakanoah*	35	Combo of components including; prescribed fire, hack & squirt thinning, heath shrub reduction, cut and pile, cut and chip, & forestry mulching. Due to the size of the Mgt Unit – it may be broken into sub-units or ease of facilitating practices, over multiple years. *Consider Creating this the Flagship Management Unit, and calling it "*Taylor Demonstration Forest*" Ease of access is great for forestry practices, and for recreation and may be a successful way to educate residents and guests of proactive forestry practices to reduce fire risk and promote ecosystem health.	~$28,000 – Hand Crew Contact Operator for pricing - Forestry Mulcher
Year 2	Invasives	2	Follow Up Spot Treatments - Cut-Stem & Foliar	~$1,000
Year 2	Kelly Mtn 1	9	Mechanical & Chemical - Heath Shrub Reduction & Free Thinning for Biodiversity to promote oak species and yellow pines in the understory. Create occasional gaps for light to penetrate the canopy. Cut brush should be either piled, scattered, chipped, or a combination or practices. Possibly use a forestry mulcher for part of the unit, if accessible.	~$7,500 – Hand Crew Contact Operator for pricing - Forestry Mulcher

Recommended Management for the Next Ten Years, continued (Yrs. 2-4)

Year 2	East Fork 1	2.5	Forestry Mulching** Reducing fuels along residences Optional cut and pile OR cut and chip	Contact Operator for pricing - Forestry Mulcher ~$9,000 – Hand Crew
Year 2	East Fork 2	8		
Year 3	Kelly Mtn 2	13	Mechanical & Chemical - Heath Shrub Reduction & Free Thinning for Biodiversity to promote oak species and yellow pines in the understory Create occasional gaps for light to penetrate the canopy. Cut brush should be either piled, scattered, chipped, or a combination or practices.	~$11,000
Year 3	East Fork 3	7.5	Forestry Mulching** Reducing fuels along residences Optional cut and pile OR cut and chip	Contact Operator for pricing - Forestry Mulcher ~$6,000 – Hand Crew
Year 4	Kelly Mtn 3	7.5	Mechanical & Chemical - Heath Shrub Reduction & Free Thinning for Biodiversity to promote oak species and yellow pines in the understory Create occasional gaps for light to penetrate the canopy. Cut brush should be either piled, scattered, chipped, or a combination or practices.	~$6,000 – Hand Crew Contact Operator for pricing - Forestry Mulcher
Year 4	Invasives	2	Follow Up Spot Treatments - Cut-Stem & Foliar	~$1,000

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Midstory Reduction for Wildfire Mitigation and Oak Regeneration







Source: Dr. Jeff Stringer, University of Kentucky

Implementation Methods: Pre-commercial Crop Tree Release Treatment

Forest Type: Younger Cove Forest, lacking diversity.

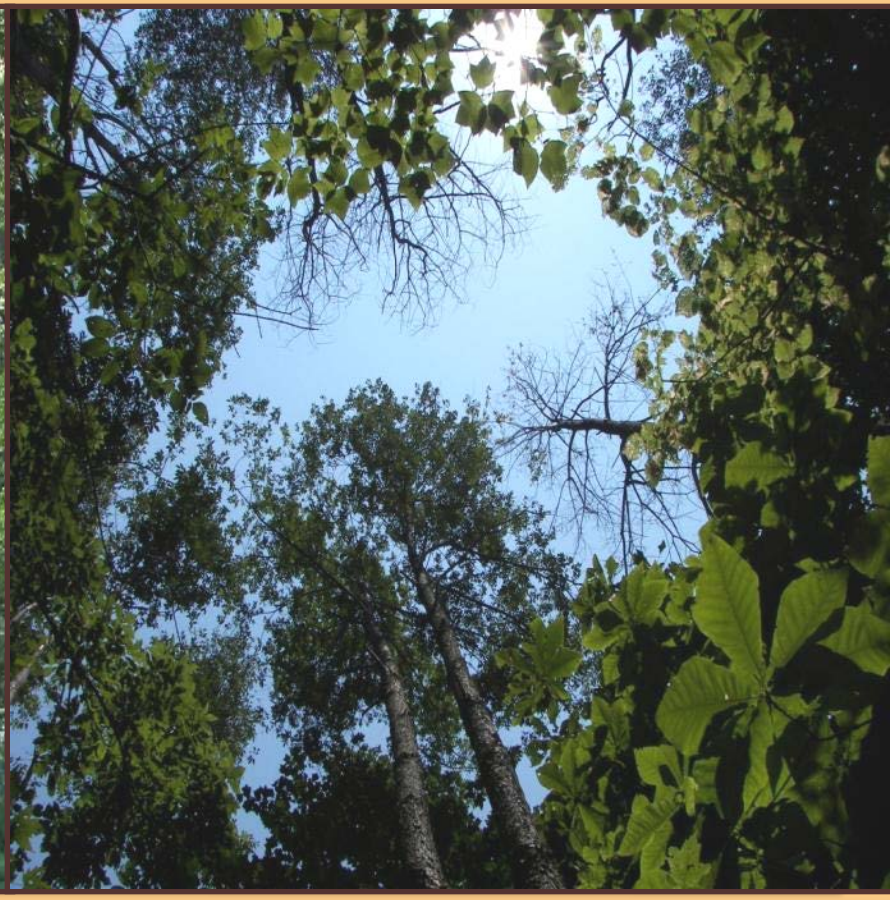
Objective: Enhance Diversity and Forest Health.

Silvicultural Methods: Utilize Crop Tree Release (stem injection method) to increase growing space and health of vigorous trees and desirable species.

Before:



After:



Forest Stand Improvement

Wildfire Mitigation/Fuel Reduction
Increase Wildlife Habitat (inc. Deer)

Thinning to Shape future forest

- **Release more desired trees from overly common competing species.**
- **Remove**
  - **midstory & understory**
  - **evergreen shrub layer**
- **Chemical and/or mechanical treatment**
- **Create snags / reduce fire risk**

Create Small Canopy Gaps
Promotes Desired Midstory and Understory Species

Treat Hemlocks (continual)



Forest Management Recommendations

Wildfire Mitigation / Fuel Reduction
Wildlife Habitat (inc. Deer)
Forest Stand Improvement

Midstory/Heath Shrub Reduction

- **Forestry Mulching**
- **Cut and Chip / Haul / Pile**



Dam Vegetation Management Options

Wildlife Habitat for Pollinators, Birds, Deer…

Create Early Successional Habitat: Native Grassland / Wildflower Meadows

Promote Cover/Food Source/ etc. in Natural Environment

Only maintain (e.g. mowing) 1 time per 1-3 years in early spring.

Invasive Plant Control – Landscape Changeouts

Promote Native Species



Forest Improvement

Invasive Species Control

11 species identified. Most escaped from landscaping and found along roads or in open areas.

Only 2 species found in forest

Multiflora rose – at Connestee Falls

Asiatic bittersweet – along fence/tree line against Walnut Hollow Rd

Erosion

Trails well maintained



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Questions?

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