

The Berry College Longleaf Pine Project

A 20-Year Update and Future Plans



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BERRY
COLLEGE



Regional mountains harbor “Montane” Longleaf Pine



Most longleaf forests are in the Coastal Plain



Longleaf pine forest on Berry's Lavender Mountain

Origins of the Berry College Longleaf Pine Project

- 1995 Roger Birkhead's independent study showed trees >> 200 yrs old on Lavender Mountain
- 1999 Plant Ecology class initiated long-term census work
- 2001 SAVE club responded to logging with a tree planting event
- 2002 Forester Dean Wilson planned expansion into new clear cuts.
- 2002 management plan (developed by Karen Vaughn as an extension of a Plant Ecology project) accepted by administration.



Why develop a management plan? Impetus

- Longleaf pine is an ICUN Red List Endangered Species, occupying only about 2% of their original 92 million acre range.
- Old trees and late 1800's maps suggested widespread longleaf pine forests on Lavender Mountain.
- Few new trees since 1920s-1930s – local population was in decline.
- Burning had been restricted for 60-70 yrs, resulting in hardwood encroachment, hazardous fuel buildup, and near total loss of understory plants.



Why develop a management plan? Opportunities

- Most of mountain was never plowed, suggesting that recovery of understory plants might be possible (seed bank).
- Southern Pine Beetle (SPB) and wildfires are common problems with loblolly and shortleaf pine forests on campus. Longleaf is a more stable resource due to its resistance to fire, insects, and disease.
- *Most importantly, the college campus context gave an excellent opportunity to engage in a variety of educational, research, and service-learning opportunities.*

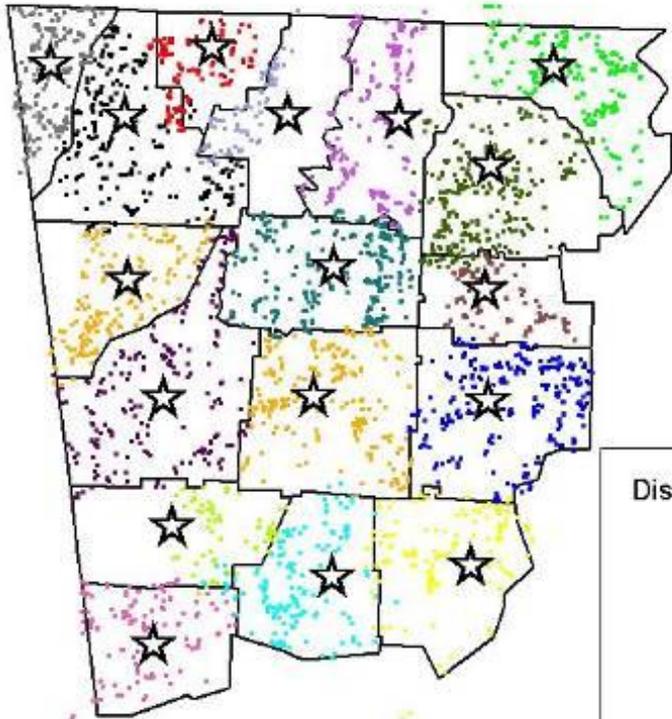




Southern Pine Beetle Survey

August 2002

Rome District

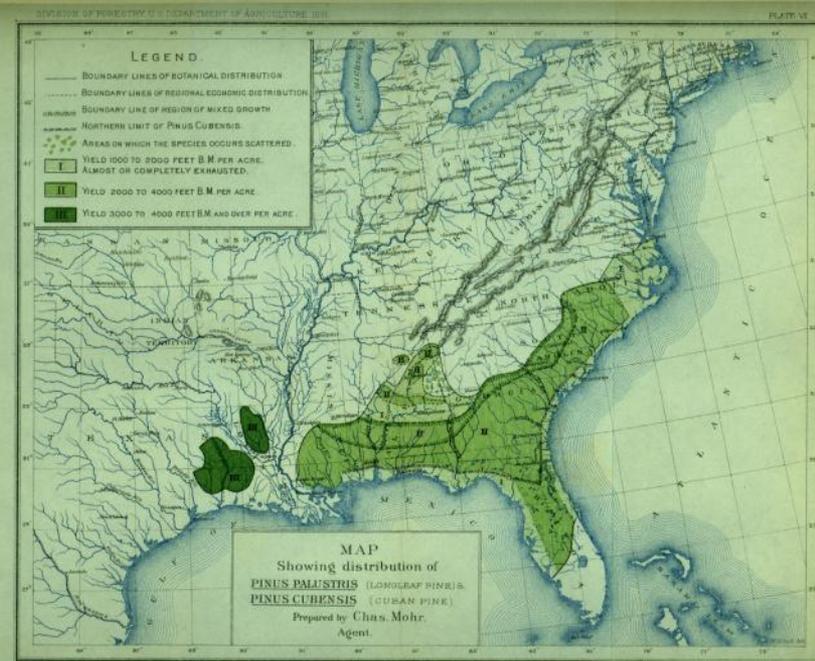


District 1 GFC SPBS 2002

- Gilmer Co. 318 spots
- Murray Co. 212 spots
- Paulding Co. 180 spots
- Catoosa Co. 127 spots
- Fannin Co. 204 spots
- Cherokee Co. 286 spots
- Cobb Co. 91 spots
- Chattooga Co. 107 spots
- Whitfield Co. 226 spots
- Walker Co. 266 spots
- Polk Co. 238 spots
- Pickens Co. 143 spots
- Haralson Co. 151 spots
- Gordon Co. 321 spots
- Floyd Co. 250 spots
- Dade Co. 206 spots
- Bartow Co. 205 spots



Stars indicate the location of the survey point. The number of spots is indicated by the size of the star.

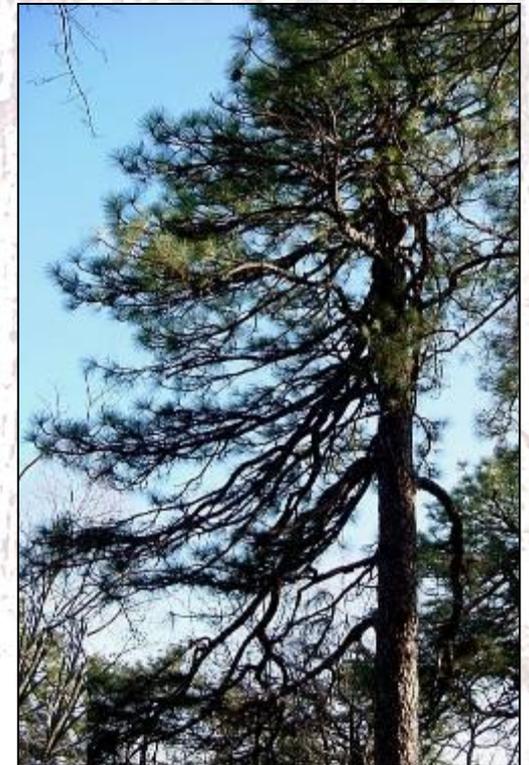


Longleaf Pine Life Cycle

Seeds germinate best on bare soil
Remain in “grass” stage for several
years

Trees only grow upward in
very open conditions

Can live up to 500 years



Longleaf Pine Forests are adapted to periodic surface fires

Causes of fire

- Lightning strikes
- Native Americans and post 1830s settlers



Longleaf pine adaptations

- Resistant grass stage
- Fast height growth
- Thick bark
- High sap and needle production



Longleaf Seedlings and Fire

- Long needles protect bud
- Fire kills hardwoods and other competitors
- Fire protects seedlings from some diseases (e.g., brown leaf spot).



The decline of the Longleaf Pine Ecosystem

- Timber harvesting
 - Tapping for turpentine
 - Replacement with faster growing pines like loblolly
 - Fire suppression!
-
- Combined factors have contributed to a decline from +/- 90 million acres throughout the south to less than 2% of the original range!



U.S. Forest Service



Then came the “Smokey Bear” campaign...



A Changing Message....prevent *wildfires*

One careless match...Yours?



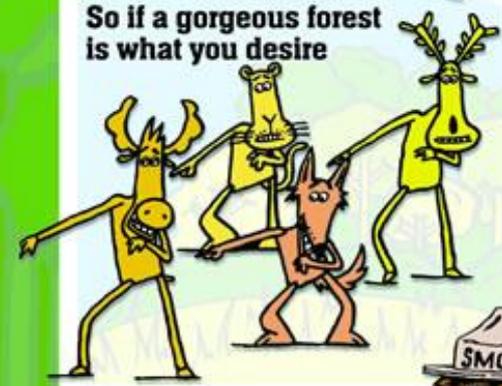
Remember—Only you can 
PREVENT FOREST FIRES!

© U.S. Government of Agriculture Forest Service WITH THE COOPERATION OF THE NATIONAL COUNCIL PROMOTING THE PUBLIC SERVICE OF AMERICAN BUSINESS State Forestry Department

One day these rats were playing in the woods
One lit some matches — and that's no good!



So if a gorgeous forest is what you desire



Don't play with matches...
Don't play with fire!

Only *You* Can Prevent Wildfires.

www.smokeybear.com



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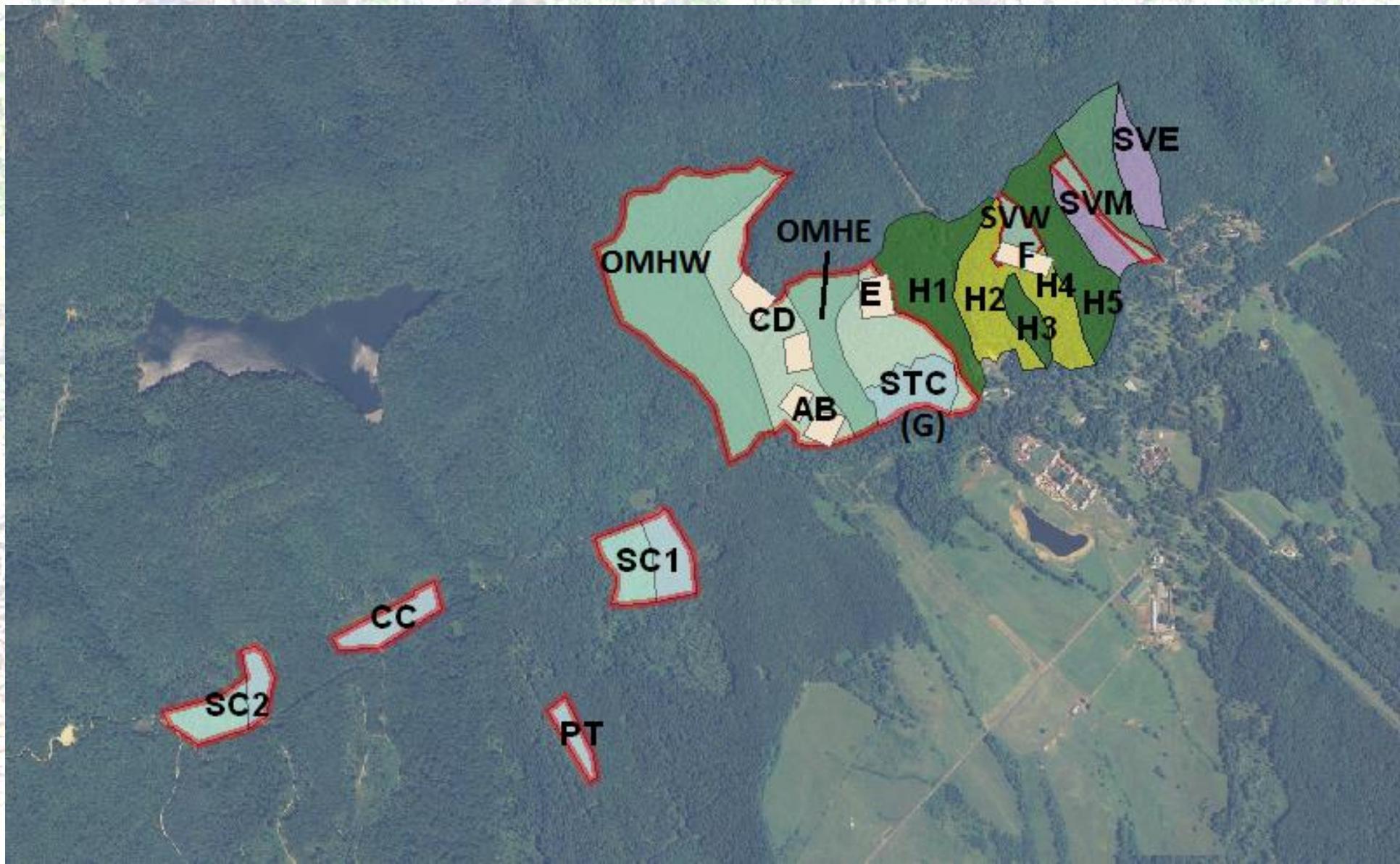
Long-term Management Goals

- **Open pine-dominated canopy**; longleaf pine highest in importance.
- **Stable** longleaf pine population.
- **Reduced hazardous fuels** (duff, litter, and woody debris) and thus *reduced wildfire risk*.
- Increased abundance and diversity of understory **herbs and grasses**.
- Ancillary positive impacts on **animal diversity**.
- **Vegetation composition** similar to frequently burned old-growth mountain longleaf pine forest (e.g., Mountain Longleaf Pine National Refuge [MLL] of AL).

Management History

- **2001** – began planting seedlings (SAVE area)
- **2003** – began restoration burning in old growth areas on planned 3-5 year frequency
- **2005** – began controlling hardwoods and invasive species in old growth areas via removal and herbicide application
- **2005** – began establishing local seed sources via cone collection and seed orchard development (3 orchards to date)
- Along the way - *research, education, and outreach*
- Help from Berry's Forestry and Land Resources, Student Work, Volunteer Services, Berry Longleaf Network, Interagency Burn Team, and various internal and external grants.

Map of Management Areas (+/- 400 acres)





Management: Planting

- Most planting done in SPB clear- and selective-cuts, followed by burning
- Some in areas with hardwood canopy reduced via herbicide injection and burning
- Focus is on lower density “conservation” plantings.
- Everybody loves to plant trees!







Management: Prescribed Burning

- Fuel hazard reduction/restoration burns done in “old growth” areas – some areas burned four times since 2003
- Raking around bases of old growth trees was necessary to control effects of duff smoldering.
- Most planted areas have been burned at least three times since planting.



Management: Student Burn Team

- Trained to meet USFS guidelines. “Firefighter Training” and “Intro to Wildland Fire Behavior” certifications (National Wildfire Coordinating Group)
- Southern Company/NFWF and TNC grants provided needed equipment and personal safety gear
- Necessary assistance provided by Forestry and Land Resources











Management: Herbicides

- Direct injection for hardwood control in old growth management area.
- Directed spray for hardwoods and blackberry in SPB cuts.
- Cut-stump and basal bark spray for hardwoods and shrubs in logged areas.
- Continued use of **prescribed burning** will eliminate the need for further use of chemicals









Management: Grafted Seed Orchard

- NC longleaf pine rootstock planted spring 2003.
- Grafting work initiated winter 2005.
- About 100 trees successfully grafted in 2.5 acre orchard; orchard now used in an agroforestry project (sheep)
- First cones in 2011. First commercial harvest in fall 2020.





Management: Seedling-based Seed Orchards

- 530 seedlings from 50 maternal trees planted on a 4-acre clear cut in 2008 – 2009. Most parent trees were from Berry College.
- Regional orchard established in 2018 - 2019 on 11 acres. Over 1500 seedlings raised from 50+ maternal trees at Berry College, Talladega National Forest, Paulding Forest, and Mountain Longleaf Pine NW Refuge.





Research and Monitoring

- **Plant Ecology/Forest Ecology/Field Botany classes:** Population dynamics, post-fire mortality, soil chemistry, changes in tree and plant community over time
- **Berry Student Work program:** Fuel loads, carbon storage, seedling survivorship, herbaceous plants and grasses, birds, reptiles and amphibians
- **External research** (Univ. West GA, Georgia State, VA Tech, Clemson, Emory, TNC, USFS, etc.) fine root regeneration, soil nutrient dynamics, mycorrhizae, dendrochronology, forest structure, pine snakes, seed orchard development
- **Berry NSF-REU Program:** herbicides and prescribed burning effects, total carbon, herbaceous plants and grasses.
- Key partner with the **Talladega-Mountain Longleaf Pine Conservation Partnership.**
- Numerous publications (3 peer-reviewed; 12 others), presentations (47), and invited workshops, seminars, and public tours (56).

Key results in the first ~15 years of management

- Vegetation in old growth stands has become similar to frequently-burned stands at the Mountain Longleaf Pine National Refuge and Talladega National Forest.
- *Hazardous fuels have been substantially reduced!*
- Herbaceous plants/grasses increased from ~14 spp. (mostly shade-tolerant) to 130-170 spp. Old growth contains many characteristic “mountain longleaf” understory plants.
- Bird abundance increased about 50% in managed areas; shifting from ground-feeding, tree-nesting omnivores to foliage-feeding, ground- and shrub-nesting insectivores or seed/fruit-eaters.
- Reptile and amphibian diversity much higher in managed areas (15 species) vs. unmanaged areas (6 species); community has shifted toward species adapted to dry, sunny conditions.

Public Education and Outreach

- Communications majors: PR plan, website, Facebook page.
- GFC Healthy Forests grant: funded video, pamphlets, other PR
- GA-DNR Interpretive Trails grant: funded Longleaf Trail
- *Dozens of service/learning experiences have involved 100s of primary- and secondary-school students, Berry College students, and members of the general public.*



Public Education and Outreach



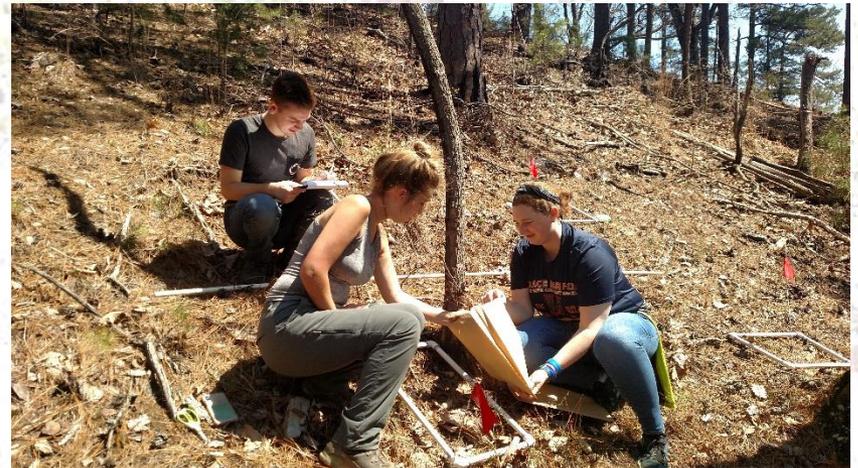
Benefits to Berry College

- **Economic return** from planted stands and seed orchards.
- **Reduced wildfire risk and severity** in and near stands that are treated regularly with prescribed burning.
- Improved wildlife and game **habitat**.
- Up to 10X reduction in risk of ticks and **tick-borne disease!**



Benefits to Berry College

- Continued opportunities for **external grant funding** (total external grants = \$258,808 to date) and for **faculty/student research** focused on forest management.
- **Attraction/retention** of students in programs such as EVS and BIO Wildlife Conservation & Ecology. Potential for the development of **new majors/programs** (e.g., Urban Forestry or Forest Resources) that integrate forest management and education.
- Positive **publicity** in recognition of the college's role in preserving and managing a ***globally endangered ecosystem***.



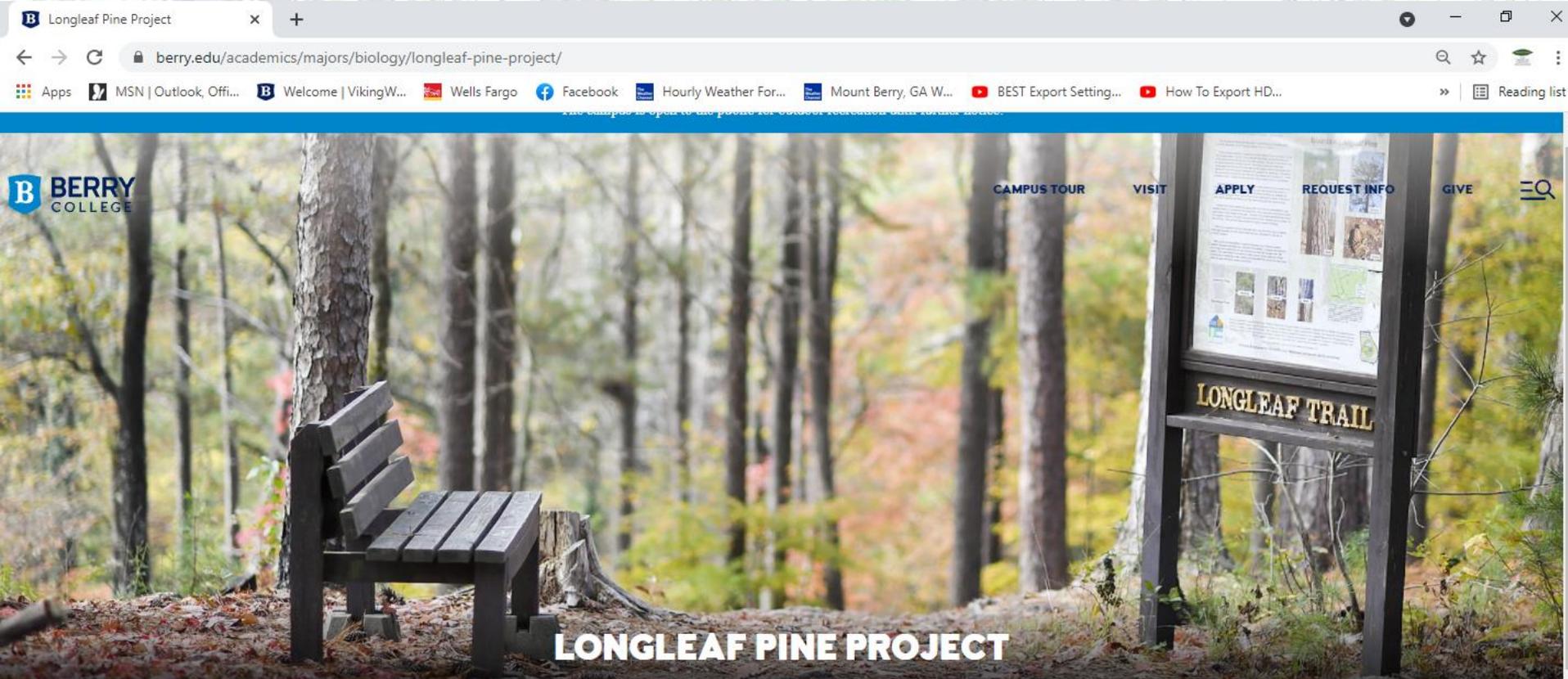
Future of the Project: Leadership and Funding

- 1) With Dr. Cipollini's planned retirement in 2025, new leadership will be needed. Possibilities include:
 - a) A faculty member who replaces Dr. Cipollini
 - b) Berry's Forester (currently Tim Chesnut)
 - c) Guidance from external entities (e.g., TNC, GA-DNR)
 - d) Some combination of the above.
- 2) Need for active prescribed burning program
 - a) Simply put, without proper fire management the project will fail
 - b) Annual need for fire training and ~1 prescribed burn
- 3) Need for funding
 - a) A Berry Longleaf Pine Forest Gift account currently exists.
 - b) Dr. Martin Cipollini and wife Kathy Patrick intend to provide financial support for the program, assuming items #1 and #2 above are sustained by a written plan.

Future of the Project: Components of a New Plan

- 1) Planning and training for annual prescribed burn (each area once every 3-5 years).
- 2) Annual maintenance of Longleaf Pine Trail and the seed orchards (periodic coordination of harvests).
- 3) Annual faculty/student research project(s) focused on forest management questions.
- 4) Periodic updates and contributions to web, PR, and social media resources.
- 5) Periodic review of the project and development of adaptive management recommendations.
- 6) Periodic public outreach events and reports to the college community.

For more information:
berrylongleaf.com and facebook.com/berrylongleaf



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LONGLEAF PINE PROJECT

This project seeks to re-establish a fire-maintained Mountain Longleaf ecosystem on Lavender Mountain, just north of Rome, GA. The mountain is part of the Berry College campus, and is home to one of the few remaining relict stands of Mountain Longleaf Pine. Aside from conservation of biodiversity, two main reasons argue for the restoration of the longleaf pine ecosystem. First, in comparison with other pines, Longleaf Pines are less susceptible to regional diseases and pests, including the Southern Pine Beetle. Second, healthy stands must be maintained by frequent controlled (prescribed) burns, which reduces the likelihood of devastating wildfires in managed areas.

In addition to re-establishing the longleaf ecosystem on the Berry College campus, our project seeks to involve students and other community members actively in the conservation process, and to educate the public on the advantages of Longleaf Pines and proper fire management.