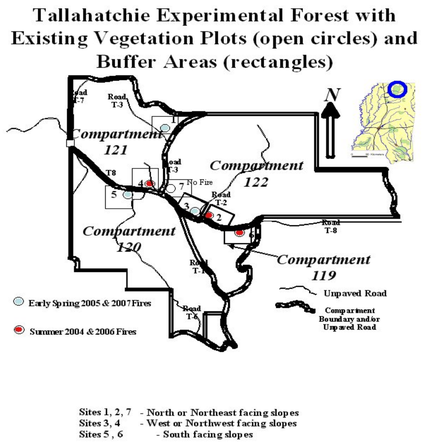
Tallahatchie Experimental Forest



Introduction

The 1416-ha Tallahatchie Experimental Forest (TEF), located in the Upper Coastal Plain on the Holly Springs National Forest (HSNF), near Oxford, Mississippi, was created in 1950 to study relationships between mixed pine and hardwood forests, flooding, and soil erosion. The TEF and associated hydrological research provided science support for a large federal reforestation and soil stabilization effort, the Yazoo-Little Tallahatchie roject, which was conducted in northern Iississippi from 1949 to 1985.

Flags marking colonies of a fire dependent forb (silkgrass golden aster) in a TEF research plot.

Recent research on the Forest focused on plant and bird responses to altered fire regimes and effects of prescribed fire on native and non-native plant communities. Current research is examining effects of post-tornadic salvage logging on the plant communities. To accomplish this work, seven, 75 x 70 m vegetation plots were established from 1998-2003 and additional reference and post-tornado salvage-logged vegetation plots are also being established. Three small watersheds (the Pine-Hardwood watersheds) were established in 1959 about 0.6 km east of the TEF and provide a long-term hydrological record. These watersheds are informally considered part of the TEF by Research and National Forest staff.

Hot season (autumn) prescribed fire on the TEF.

Climate and Soils

The TEF has hot, humid summers with many brief convective, high intensity summer storms and mild winters with rare snow and ice storms (mean annual precipitation 1321 mm, growing season ~218 days, Jan and Jul mean temperatures 6.1 and 26.6 C, respectively). Soils are predominantly Coastal Plain sandy loams, mostly Ruston, and smaller amounts of silt loams of loessial origin, mostly Lexington, Loring, and Grenada.

Long-term Data Bases

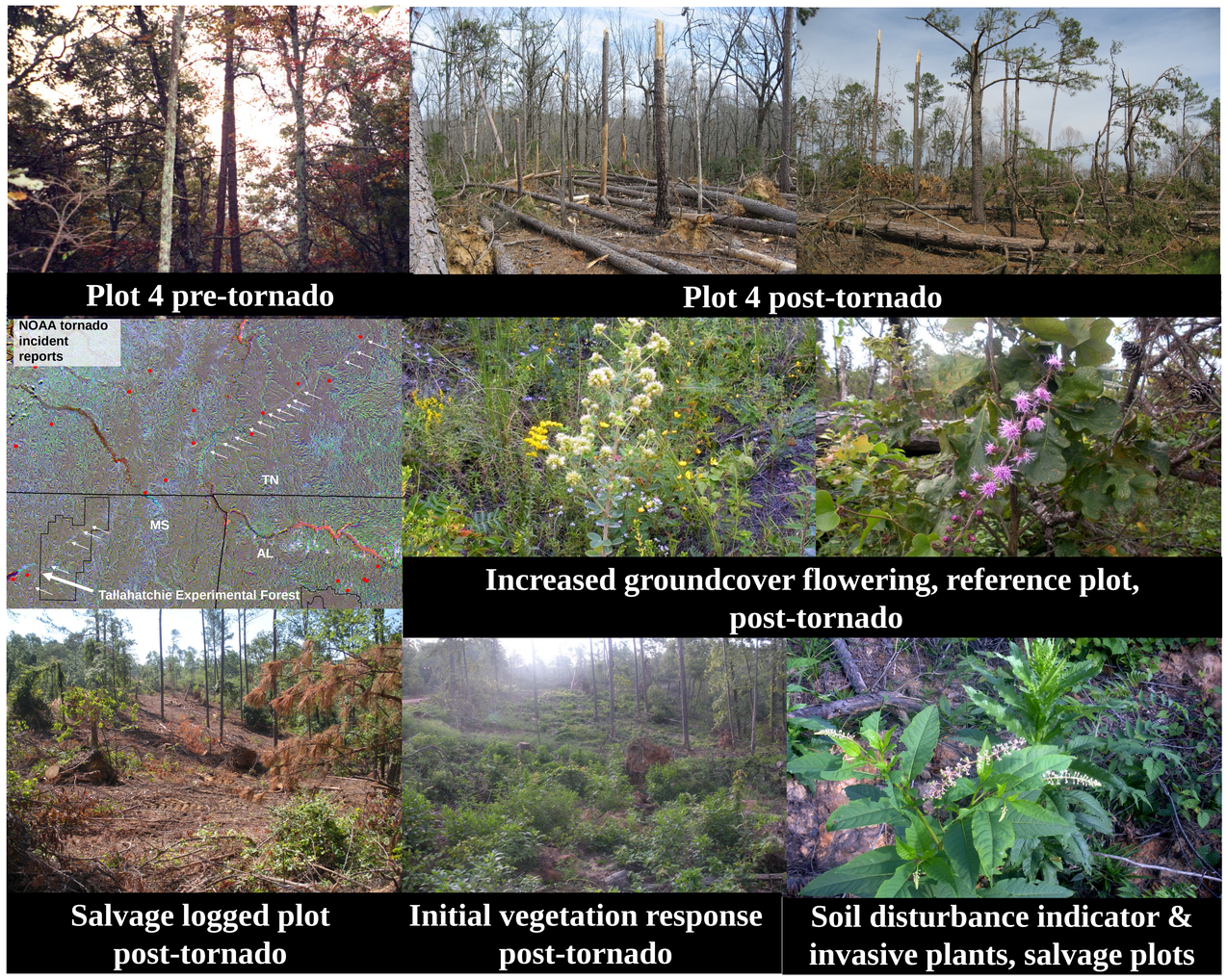
- Rainfall amount and intensity (1954 – 2001)
- Humidity and temperature measurements (1954 – 89)
- Streamflow, sediment, and sediment chemistry (1982-89, Pine-Hardwood)
- Rainfall, streamflow, sediment yield, and vegetation and litter measurements (1959-97, Pine-Hardwood watersheds)
- Surface and subsurface flow (1971-89, selected Pine-Hardwood watersheds)

Past Research

- Sediment yields and runoff rates from small, undisturbed shortleaf pine-hardwood forest basins versus small, harvested basins
- Small mammal burrow influence on stormflow in pine-covered watersheds
- Precipitation chemistry in conjunction with acid rain studies

Facilities

The TEF has one small, Quonset-style building (electric power available) and TEF includes ~11 km of improved, Forest Service roads (dirt), and ~9 km of unimproved roads. Lat 30° 30' 10"N, Long 89° 26' 17" W



Tornados in 2008 damaged much of the TEF, but existing vegetation research plots were arrayed across a gradient of disturbance, setting the stage for ongoing research on forest plant community response and recovery with and without salvage logging.

Vegetation and Disturbance

Until recently, forest cover was predominantly 79 yr old mixed shortleaf pine-oak-hickory forest which had only minimal disturbance since establishment (oldest hardwood stand ~150 years old, oldest pine stand ~100 yr old). High diversity of saplings and herbaceous plants (≥ 90 species) was revealed by surveys in 300 m^2 plots; richness estimates likely will be much higher when all overstory species are included. One or more tornados (5 February 2008) blew down, snapped, or damaged trees across ~1,000 ha of the TEF.

Recent Research

- Historically important fire/disturbance regimes in oak-pine forests of north Mississippi
- Tree species composition of pre-settlement forests derived from 1830-1840 bearing tree surveys
- Effects of cool season prescribed fire on bird communities and nesting success of TES species
- Association of tree species composition and changes in fire frequency
- Effects of prescribed fire on the invasive plant, Japanese stiltgrass, *Microstegium vimineum*
- Effects of simulated fire on flowering of a fire-adapted forb in infrequently burned oak-pine forests
- Effects of cool season prescribed fire on herbaceous, understory, and overstory vegetation
- Effects of tornados and salvage logging on forest structure, composition, and recovery (ongoing)

Major Research Accomplishments and Effects on Management

- Effects of timber harvest on runoff rates and sediment yields from basins with highly erodible soils
- Improved understanding of forest plant community changes from long-term fire suppression
- Documenting effects of cool season prescribed fire on plant and bird communities
- Increased recognition that hot season fire in the upper Coastal Plain may be critical for effective and efficient improvement of forest condition, health, and diversity

Primary Research Opportunities

- Hydrologic studies of small basins with long-term databases (>40 years)
- Interactions of natural disturbance and salvage logging in forest restoration

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