Observations on a Rare Old-Growth Montane Longleaf Pine Forest in Central North Carolina

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Summary: Montane longleaf pine (*Pinus palustris* Mill.) forests are rare and no detailed inventory exist documenting stands in North Carolina. We inventoried all longleaf pine trees (*n* = 403) growing in a 24-hectare remnant montane longleaf pine forest in the Uwharrie Mountains of central North Carolina, USA in autumn 2014. All longleaf pine were geographically referenced via GPS, measured for height and diameter and a subsample of trees was cored for age determination. All longleaf pine were mapped based on growth-stage categories—grass, juvenile, young adult, and mature—to determine spatial patterning of stand-age characteristics. The longleaf pine stand contained a variety of growth-stage categories, but is dominated (63%) by mature-stage trees growing on south- and southwestern-facing slopes, while nearly all regeneration-stage trees (i.e., grass and juvenile) are growing on northwest-facing slopes, suggesting environmental conditions conducive to establishment have changed. Median (maximum) tree height and trunk diameter for young adult and mature were 17 (25) m and 38 (72) cm, respectively. Median (maximum) tree age was 102 (272), and at least seven trees were greater than 150-years old with four trees establishing in the 18th century. We conclude that the stands characteristics—400+ trees of various ages including old-growth, occurrence principally on steep, southerly slopes, total relief of 85 m, and extending over 24 ha—warrant "montane" longleaf pine forest status in North Carolina.

ABOUT GOLD MINE BRANCH

Located in Uwharrie National. First Identified in 2001 Natural Heritage Inventory as remnant piedmont longleaf pine forest. A rocky substrate of Georgeville silt loam dominates the site and slopes approach 30%.

SAMPLING PROCEDURES

We marked 50 m-wide transects with flagging and documented all live trees along a vertical gradient. For each tree, we recorded GSP and classified individuals as follows: 1) grass stage, 2) juvenile/bottlebrush (i.e., individuals without lateral branch growth) 3) young adult (lateral branches present and DBH ≥10cm but ≤20 cm; 4) mature (>20 cm DBH). We removed one increment core sample each from 50 young adult and mature trees of various diameters at approximately 0.3 m height to determine tree age.

RESULTS

We identified 403 longleaf pines growing at Gold Mine Branch including 41 grass stage, 67 juvenile stage, 39 young adults, and 256 mature trees. During our data collection we identified an additional south-to-east-facing slope undocumented in the 2001 survey that expanded the site to from 17 to 24 hectares. The lowest-elevation tree was located at 170 m and the highest was at 255 m giving a total relief of the longleaf stand of 85 meters

LOCATION OF LONGLEAF
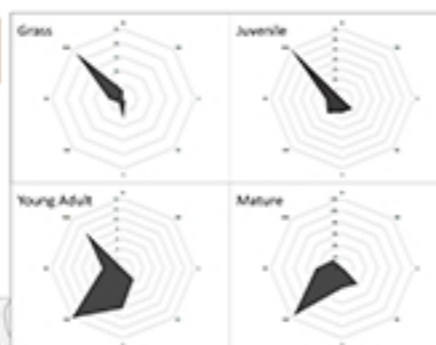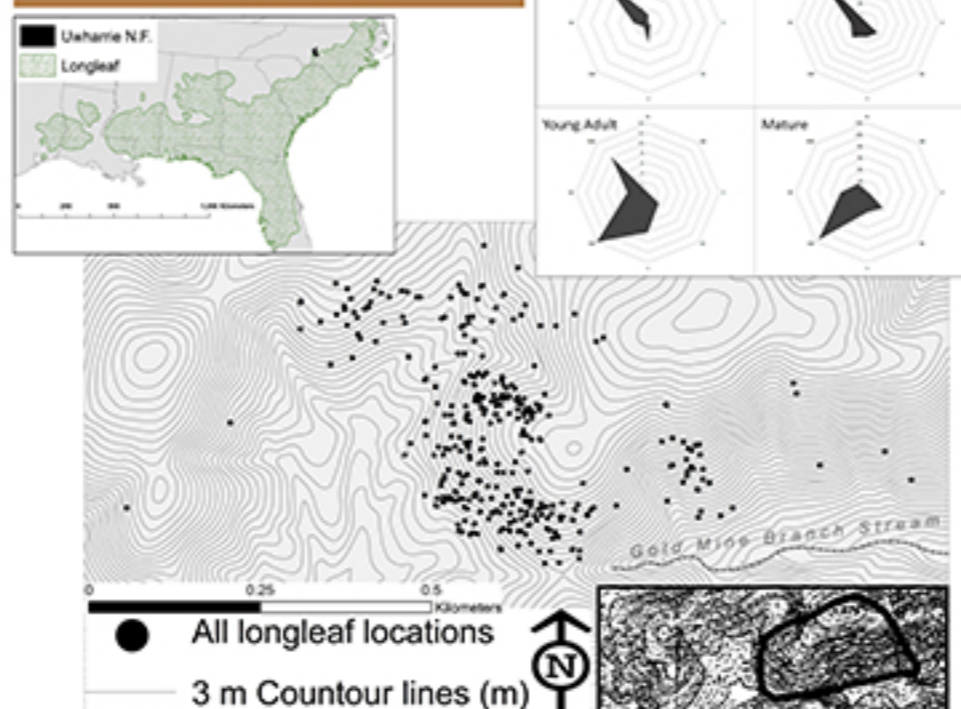
PHOTOS

Longleaf and hardwoods growing out of granitic boulders (left), old growth growing on the SW slope (above left), and regeneration on the NE slope (above right)

Distributions of a) height (m) and b) trunk diameter (cm) for all 403 longleaf pine tree with an age distribution for a subset of 42 trees. Median (maximum) tree height and trunk diameter for all mature trees were 17 (25) m and 38 (72) cm respectively
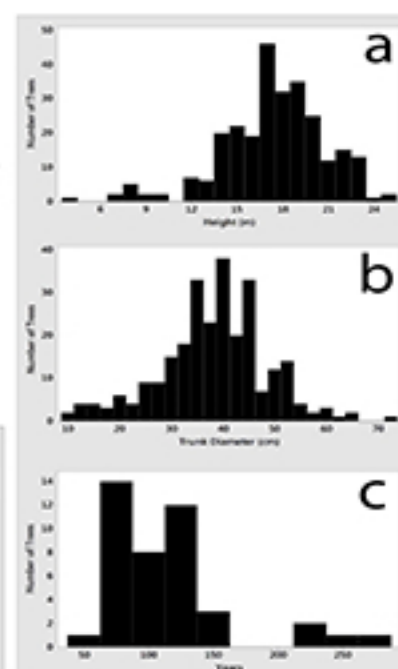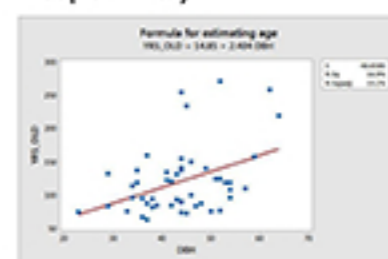
SPECIAL FEATURES

1) Presence of old growth: 6/42 datable trees > 150 yrs.
2) Location of regeneration: recruitment on NE slope suggests competitive exclusion and/or environmental changes
3) Variation in needle length: 25–42 cm
4) Areal extent: west-east ridgeline unmatched elsewhere in Uwharrie Mountains
5) Montane longleaf pine forests not currently identified in North Carolina natural community classification

ACKNOWLEDGEMENTS