

Academic Guide to the Upland Pine Nature Trail T.J. Walker, September 2012

This guide: NATL's nature trails were initially made self-guided via printed Basic and Advanced Trail Guides. A variety of signs along the Upland Pine Trail now interpret it to casual users whether from the public or academe. All who wish to learn more about NATL's upland pine ecosystem and its restoration are invited to use this sheet. Its reverse side has background information and introduces important web-posted materials. This side of the sheet is for use as you walk along the trail. It supplements the information on the kiosk and the many signs along the trail.

Numbered stakes along the trail: The numbered items below are keyed to white PVC stakes topped with the number and a broad green band.

- 1. *Woods vs. savannah.*** The biggest contrast between the non-restored upland pine to the north and the restored upland pine to the south is that the latter has no woody understory. In fact, early accounts of pre-settlement upland pine ecosystems indicated that they were more savannahs than forests and that a horse and buggy could be driven almost anywhere within them.
- 2. *Girdled loblollies.*** During the decades that NATL's upland pine ecosystem went unburned, some loblolly pines became established and grew to a fire-tolerant size. To the west are three marked with orange bands. As part of the restoration, two were girdled and recently died. The third apparently died of natural causes--on its lower trunk is evidence of a lightning strike.
- 3. *Mature planted pines.*** Three large pines to the west (marked with blue bands) are slash pine (*Pinus elliottii*), a native species partial to wetlands and alien to this ecosystem. They were planted for fence posts about 50 years ago when this tract was part of the main UF Agricultural Experiment Station.
- 4. *Resin flow.*** The earliest exploitation of longleaf pine forests by Europeans was for "naval stores" (tar and pitch and, later, turpentine and rosin). It was not until the late 1800's that the clear cutting of the Southeast's original longleaf forests for lumber gained momentum, but by the 1920's those forests were essentially gone. A book by L. S. Early, *Looking for Longleaf; the Fall and Rise of an American Forest*, chronicles this history in well-written, rich detail.
- 5. *Seedling cohorts.*** Longleaf pine seeds mature in late fall almost every year but the size of the winter "seed drop" varies enormously from one year to another. For the seeds to germinate, they must reach bare ground. Those that germinate send a couple of leaves (= tiny needles) upward and start growing a tap root downward that might reach reliable moisture and, years later, anchor a rapidly growing, rocket-stage tree. Searching for seedlings in early spring can give an idea of the extent of the recent seed drop and of the abundance the resulting "seedling cohort." The 2006 cohort (from the seed drop of late 2005) was by far the largest cohort observed since the start of upland pine restoration in NATL.
- 6. *Seedling mortality.*** First-year mortality for longleaf seedlings is nearly always greater than 99.9%. Among the causes of early death are drought, fire, disease, and shading by faster growing plants. Of the tens of thousands of seedlings that germinated in NATL's upland pine in 2006, no more than 12 survive today and only 8 of these have grown fast enough to have exited the grass stage and begun to shoot upward. The tallest is now 2m (>6ft)
- 7. *Root competition?*** It is well established that root competition among longleaf pine decreases the survival and slows the growth of young longleafs in the vicinity of mature trees. The young longleaf pine here is growing beneath a mature pine that is a loblolly rather than a longleaf. Should that increase or decrease the likelihood that the longleaf is being significantly slowed in its growth?
- 8. *Tall pines to west.*** If you look toward the DPI parking lot, you will see a group of exceptionally tall, young longleaf pines. None of these was planted more than 8 years ago and all except the tallest, most distant one, were planted when about 1ft tall. What accounts for the unusually rapid growth in this one area? Plentiful sunshine is likely a major contributor—longleafs do best with lots of sunshine and this group is in an opening that lets lots in.

Links to web information: A PDF version of this guide, *with live links* to the URLs on this sheet, is at <http://natl.ifas.ufl.edu/docs/UPacadTG.pdf>.

Longleaf pine ecosystems: An introduction to the longleaf pine forests of the southeastern United States and the upland pine ecosystem of NATL is displayed at the kiosk at the start of the UP Nature Trail. (The kiosk's display may also be viewed at <http://natl.ifas.ufl.edu/docs/UPposter.ppt>.)

Ecosystem nomenclature: All ecosystems dominated by longleaf pines depend on frequent fires for their perpetuation, but their topography, soils, and biotic constituents vary greatly. Ecologists do not agree on how many such ecosystems should be recognized nor the names by which they should be known. A minimal classification is "high pine" and "longleaf pine flatwoods." High pine (i.e., longleaf-dominated ecosystems on well drained sites) is sometimes subdivided into "clayhill" and "sandhill," with the latter being more xeric than the former. "Upland pine," for those who use the term, falls somewhere between clayhill and sandhill. (Florida Natural Areas Inventory at http://www.fnai.org/PDF/NC/Upland_Pine.pdf; Myers and Ewel 1990).

History of NATL's upland pine: NATL's longleaf pines were probably first cut in the 1890's. In about 1940, they were cut once more (http://natl.ifas.ufl.edu/ecosystems/uplandpine_history.php). At each cutting, longleafs too small for the sawmill were left to grow to marketable size and provide for continued longleaf reproduction. Prior to the State of Florida purchasing the land in 1944 the area evidently burned fairly frequently and was subjected to grazing. Once the land was in the hands of the State, burning and grazing ceased. By the late 1950's, the vegetation was scattered longleaf pines with an understory of scrubby turkey oaks. By 1994, when NATL acquired the land, laurel oaks had invaded and produced a continuous canopy—as shown by the series of aerial photographs at <http://natl.ifas.ufl.edu/maps/aerialphotographs.php> and, closer up, by photographs taken in 1997 at each gridpoint in NATL's 50-meter grid (<http://natl.ifas.ufl.edu/photogallery/gridphotos.htm>). By the start of restoration, longleaf reproduction had been shut down for more than 25 years.

Restoration: The principal actions taken to restore NATL's upland pine ecosystem through 2008, are listed in <http://natl.ifas.ufl.edu/docs/UPrestore95-08.pdf>. That document has a map that shows the five management tracts that compose the 13 acres that are being restored. The UP Nature Trail goes through the two tracts that are in NATL's public area and have been subjected to the most intense restoration efforts. An annually updated log of all upland pine restoration activity is at http://natl.ifas.ufl.edu/ecosystems/uplandpine_management.php

In 2007, after 13 years of restoration activity, a committee of interested experts evaluated what had been done and recommended what should be done in the future: <http://natl.ifas.ufl.edu/docs/UPplanUpdate.pdf>. New directions included (1) an emphasis on establishing burnable ground cover, (2) a de-emphasis on planting longleaf pines, because natural seeding is expected to be adequate in most areas, and (3) scheduling controlled burns during the early growing season rather than in winter.

Monitoring restoration progress: The fates of planted longleaf pines and of cohorts of naturally germinated ones were monitored and the results are recorded in spreadsheets posted at http://natl.ifas.ufl.edu/ecosystems/uplandpine_management.php#spreadsheets.

Maps and measurements of pines: In 2008, pine trees that were present in 1995 and had survived the first 13 years of restoration were mapped and measured (<http://natl.ifas.ufl.edu/maps/pinemaps.php>). Of the 401 such pines in NATL's upland pine, 330 were longleafs; nearly all the rest were loblollies, many of which will be killed as restoration proceeds.

Other visit-worthy longleaf sites in Alachua County: LEAFS, <http://longleafs.info/>; Morningside Nature Center, <http://www.museumsusa.org/museums/info/274>; San Felasco Hammock Preserve State Park, <http://www.floridastateparks.org/sanfelascohammock/>.

References

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