**[For instructors and students interested in using** [**NATL**](http://natl.ifas.ufl.edu/maps/natlmap.php)**’s Upland Pine for class or individual projects.]**

**Recent improvements in the** [**five blocks**](http://natl.ifas.ufl.edu/i/UP_Block_Map.pdf) **of restored longleaf pine of NATL’s** [**Upland Pine Ecosystem**](http://natl.ifas.ufl.edu/ecosystems/uplandpine.php)
T. J. Walker and Morgan Byron (6 April 2015)
[The current version of this clickable document can be downloaded [here](http://natl.ifas.ufl.edu/docs/Recent%20improvements%20in%20UP%20Infrastructure.docx).]

1. New diameter and “P-number” maps (*easily viewed, printed, or downloaded* [here](http://natl.ifas.ufl.edu/maps/pinemaps.php#10maps))
	1. Censuses of the pines and their condition updated.
	2. Recent DBH measurements replace the ones made in 2008.
	3. Maps that show the 2008 measurements moved to an [online archive](http://natl.ifas.ufl.edu/maps/pinemaparchive.php).
2. 50x50m grid subdivided and made more evident on the ground
	1. Each of the surveyed gridpoints that mark corners of 50x50m gridblocks made more evident by adding a [10ft flagged pole](http://natl.ifas.ufl.edu/i/B9%2BEthan.jpg).
	2. At the base of each pole is a 40-inch metal gridstake bearing a code ([e.g. B9](http://natl.ifas.ufl.edu/i/gridstakeB9.jpg)) that identifies the two gridlines that cross at that gridpoint. (It also identifies the 50x50m gridblock of which it is the NW corner.)
	3. Each 50x50m gridblock is divided into four 25x25m ¼-gridblocks. These are marked with metal stakes made conspicuous by [6 ft., white PVC poles](http://natl.ifas.ufl.edu/docs/UPstakesPhoto1.pdf). (The poles but not the stakes are removed before each controlled burn.)
	4. The PVC poles have color bands that indicate whether they are on a east-west gridline (yellow), a north-south gridline (blue), or at the center of a 50x50m gridblock (red). [[Map](http://natl.ifas.ufl.edu/i/color-bandMap.pdf) showing color of bands in UP blocks C, D, and E.)
	5. This [gridstake system](http://natl.ifas.ufl.edu/docs/NavigatingByGridstakes.docx) enables users to keep track of exactly where they are as they do field work in the UP blocks.
3. In the restricted area upland pine, access to gridblocks is made easy by keeping the main gridlines easily traveled and by keeping the ¼-block gridlines free of major obstacles.
4. The maps are products of NATL’s GIS which can be downloaded via a link at the top of this [web page](http://natl.ifas.ufl.edu/maps/gismaps.php). The GIS makes available the geographic coordinates of (a) all gridpoints of the 50x50m grid, (b) all ¼-block gridpoints, and (c) all pines that were >12cm DBH in 2008.
5. The reliability of the geographic coordinates of these three categories of items differs as follows:
	1. The 50x50m gridpoints are most reliable because they were based on information from Campus Planning and implemented by members of the UF’s [Geomatics Student Association](http://sfrc.ifas.ufl.edu/gsa/gsa.htm). These student surveyors drove a metal pin to ground level at each gridpoint, and the lumen of the main above-ground marker for each gridpoint contains its pin.
	2. At lower levels of reliability are the ¼-gridblock gridpoints. Most of these fall on main gridlines and were located by finding the midpoint between adjacent main gridpoints, whereas the ones in the center of a grid block were located by finding the midpoint between ¼-gridblock gridpoints on opposite sides of the gridblock. All were marked by driving a 5ft piece of ½-inch metal conduit at least a foot into the ground.
	3. At the lowest level of reliability are the geographic coordinates of the trees. The initial placement of each tree was based on a reading from the best UF GPS device available to NATL in 2008. Their positions were immediately readjusted as needed to make them conform to NATL’s 50x50 grid and to relate to one another in ways that conformed to what seemed obvious in the field. When the ¼-gridblock boundaries were made evident on the ground, the positions of some trees were adjusted again, to conform to the finer-scale reference lines on the ground.
6. It is easy to envision how these three levels of reliability of the points on the maps could be used to create exercises and projects related to GPS measurements and the setting of confidence limits on their accuracy.
7. It is easy to envision how the ¼-gridblocks could be subjected to replicated treatments that could be monitored by successive classes over periods of several years—but experiments of this type would need the agreement of other principal users of the affected blocks and of [NAAC.](http://natl.ifas.ufl.edu/management/)
8. The geographic coordinates that the surveyors used to place the pins that determine the corners of the main gridblocks are [online](http://natl.ifas.ufl.edu/GPSgridpts.xls) as is information about [early precursors](http://natl.ifas.ufl.edu/docs/GridPtChanges.pdf) to the current placements of these points.
9. During NATL’s first 15 years, a series of botanists identified and documented the occurrence in NATL of more than 500 species of vascular plants. For each newly recognized NATL species, the habitat and approximate date of first discovery were recorded but after that, additional occurrences were seldom noted. Thus by 2012 only 62 of the current 227 upland pine species had been documented in [NATL’s master list](http://natl.ifas.ufl.edu/biota/plants.php) of vascular plants as occurring in NATL upland pine ecosystem. Furthermore, for those 62 species little was known of their phenology and distribution within the five blocks. In summer of 2012 that started to change when Sam Hart, an undergraduate with an unusual interest in plant identification, volunteered to study the vascular plants of the five blocks. Sam’s studies lasted for two years and resulted in a [list of 227 species](http://natl.ifas.ufl.edu/docs/Hart%27s%20List%20of%20UP%20VPs%202012-2014.xlsx) that occur somewhere within NATL’s five blocks of upland pine and an estimate of abundance and distribution for each species in each block. For 85 of these species he produced a *phenogram* with a map of the detailed distribution of the species within each block. He then combined the phenogram and the map to produced 85 *phenology sheets* (fully explained [here](http://natl.ifas.ufl.edu/biota/UPphenology.php)). Sam’s [list of 227 species](http://natl.ifas.ufl.edu/docs/Hart%27s%20List%20of%20UP%20VPs%202012-2014.xlsx) has a column that identifies the 85 species for which he made phenology sheets, and, on the [master list](http://natl.ifas.ufl.edu/biota/plants.php) of NATL’s vascular plants, under the scientific name of each of the 85 species, is a link to the phenology sheet for that species.