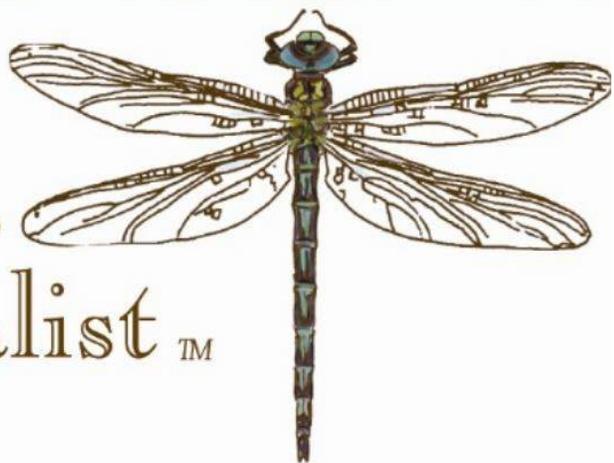


T E X A S

Master
Naturalist™



Texas Master Naturalist – Cradle of Texas
Intern Class of Jan-2016



Loblolly Pine Trees at the Camp Mohawk Area

Intern Field Projects: Objectives, Procedures, Reporting

- **Pre-field investigation preconceptions:**
 - **Camp Mohawk County Park has an abundance of Loblolly Pine growth. It is uncommon for Loblolly Pines to be present in such large numbers on the South Texas Gulf Coast.**
 - **Why are Loblolly Pine Trees growing at Camp Mohawk?**



Intern Field Projects: Objectives, Procedures, Reporting

- **Our Team Hypothesis:**
 - **The extant Loblolly Pine collection at Camp Mohawk is a result of both natural and human impact on the area.**



Intern Field Projects: Objectives, Procedures, Reporting

- **Our Procedure:**
 - **Physical observations of Camp Mohawk and the adjacent areas**
 - **Obtain information on:**
 - **History and background of the Camp**
 - **Loblolly Pine scientific facts**
 - **Other fauna and flora associated with Loblolly growth**
 - **Soil geology of Brazoria County**
 - **Review, evaluate and discuss results**
 - **Develop conclusion**



Our team: Jerry Krampota (mentor), Jo Myers, Karen Leder, Herb Myers, Bryan Frazier (mentor), Lisa Myers, and Kristine Rivers.

Camp Mohawk November 2015. Hardwood leaves have fallen;
the deep green trees are Loblolly Pine.



Camp Mohawk

© 2016 Google

Google earth

1995

Imagery Date: 11/21/2015 29°20'14.14" N 95°17'19.53" W elev 14 ft eye alt 3189 ft

History and Background of Camp Mohawk

- **Before 1800** - Land occupied by Karankawa Indians
 - Remnants found by local settlers
- **Early 1800s** - Pirate Jean Lafitte's crew came up through the area in search of fresh water and to hunt game.
 - Rumors of pirates burying treasure in the area
 - Government banned them from the area and some including Captain Snyder stayed behind and lived on Chocolate Bayou



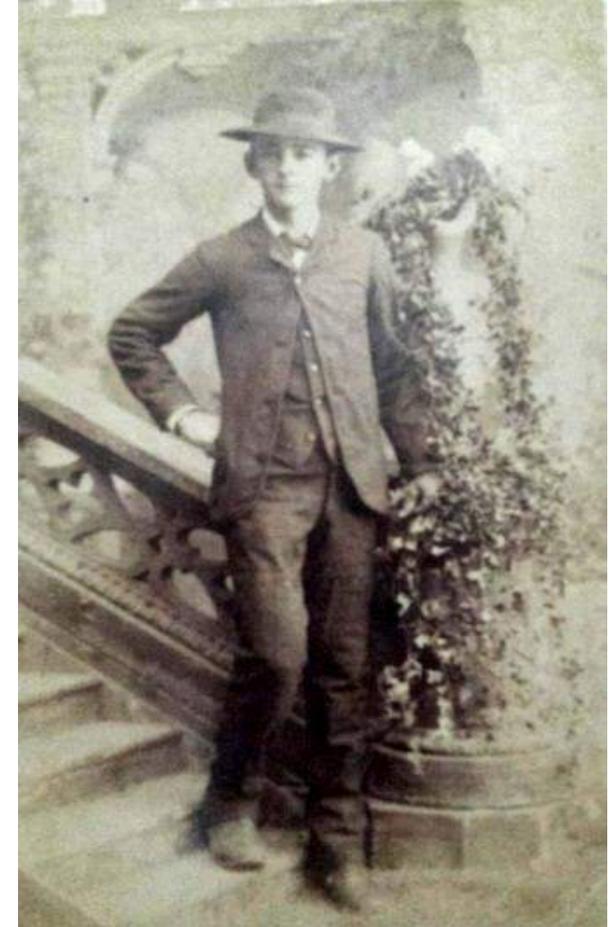
History and Background of Camp Mohawk

- **1861** - Texas joined the Confederate States and the Camp was used as a Confederate Army Training Camp.
 - Brown's Company was stationed here for 18 months, later known as Bates Regiment, one of the most fearless regiments of the Confederate Army.
 - Joseph Clement (Karen's Great-Great-Grandfather) served in the GAC Bates Regiment in 1863 under Capt. Bennett and was wounded.
 - Soldiers built log pens to round up the local's cattle for milking and slaughter.
 - Army built a low water bridge in the area to allow them to roll the cannons across the bayou.
 - Remnants of the low water bridge and old Army barbeque pits were still visible in the 1930s.



History and Background of Camp Mohawk

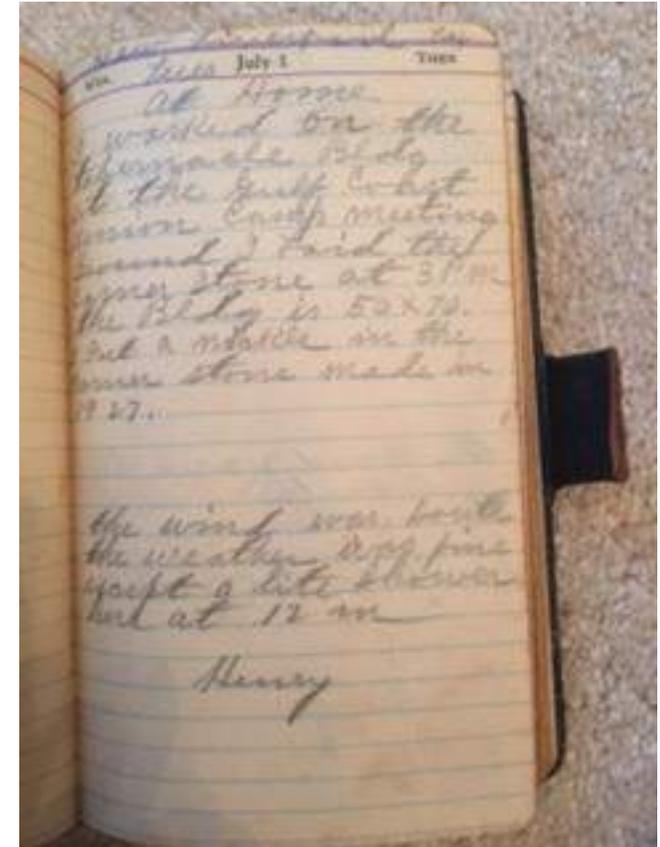
- **1929** - Andrew Moller received a check for \$10,000 for an oil lease on some property he owned, and on December 21 he used it to purchase these 35 acres of land for a camp meeting ground and church camp.
 - Property was deeded to the trustees of the Gulf Coast Union Camp Meeting Association.
 - Neighbors far and wide came to help clear the land for camp meetings.
 - Dug Horseshoe Lake, dammed it up and put a levy around it.
 - Henry Clement (Karen's great-Grandfather) was hired to oversee construction of the camp.



Young Henry Clement

History and Background of Camp Mohawk

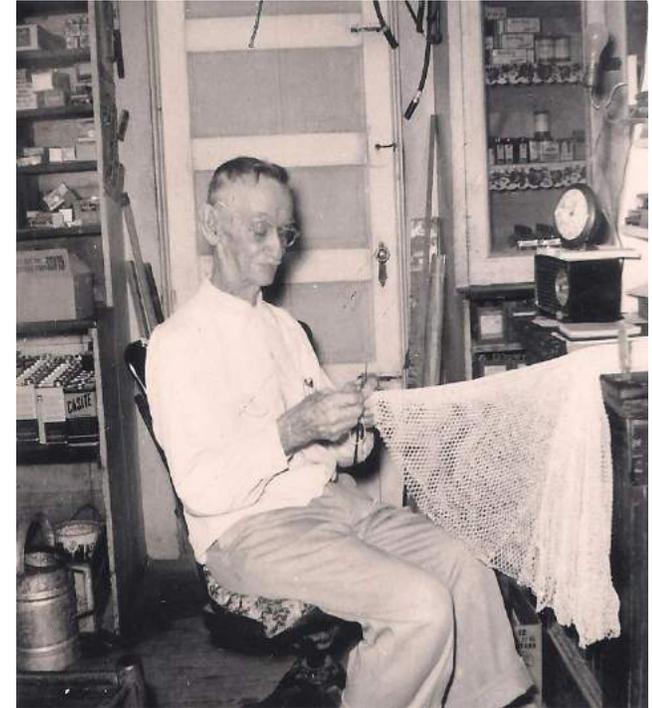
- **1930** - First meeting held on April 21 with 1200-1500 attending.
 - Officially named the Gulf Coast Union Camp Meeting Association.
 - Directors and trustees were elected; W.A. Moller, Henry Clement and J.T. Loggins were elected as the first 3 trustees.
 - Henry Clement built the first Tabernacle and poured the foundation on July 1, placing a 1927 nickel in the cornerstone of the slab, according to his personal diary, which he kept daily from 1894 until his death in 1964.
 - The association began holding non- or interdenominational church service in the Tabernacle.



Page of Henry Clement's personal diary, showing entry from July 1, 1930

History and Background of Camp Mohawk

- **1940** - Brazoria County Old Timers Association was formed.
 - There are no dues or fees to belong to the association.
 - Members voted to have an annual barbeque every year at no cost to attendees.
 - Barbeque to be held 3rd Sunday in October at 1:00pm so all had a chance to attend church before event.
 - The Old Timers reunion and barbeque is still held every year and is attended by many.
- **1941** - Henry Clement fell and broke his hip, and wasn't able to maintain the camp buildings any longer.
 - He walked with a single crutch the rest of his life, but was still able to put a new roof on his home.
 - Died on December 20, 1964 at the age of 95.



Elderly Henry Clement

History and Background of Camp Mohawk

- **1944** - Signed 20-year lease with the Bay Area Boy Scout Council; camp to be used for training and camping programs.
 - Boy Scouts named the site Camp Mohawk and later it was officially changed to that name.
 - Boy Scouts cleaned brush and weeds and built additional camp sites.
 - They also built a large swimming pool at the camp.
 - When lease expired in 1964, the Boy Scouts chose not to renew lease and the camp was used very little after that.
- **1965** - New Chapel was built to replace the old Tabernacle.
 - July 25, the chapel was dedicated and named the Andrew Moller Chapel and a memorial service was held in honor of Henry Clement and EC Kimmons, two faithful workers of the camp that had passed away.



History and Background of Camp Mohawk

- **2001** - Brazoria County acquired the camp property, and made it a county park.
 - It is a 55-acre day use park with overnight facilities.
 - The camp features self-contained cabins, climate-controlled dormitories with kitchens, tent camping areas, a chapel, covered pavilions, picnic areas with grills, a three-acre lake with a canoe launching area, swimming pool, playground, basketball court, baseball field, extended trail system, paved parking areas, and restrooms.
 - The park includes the only native stand of Loblolly Pines in Brazoria County.

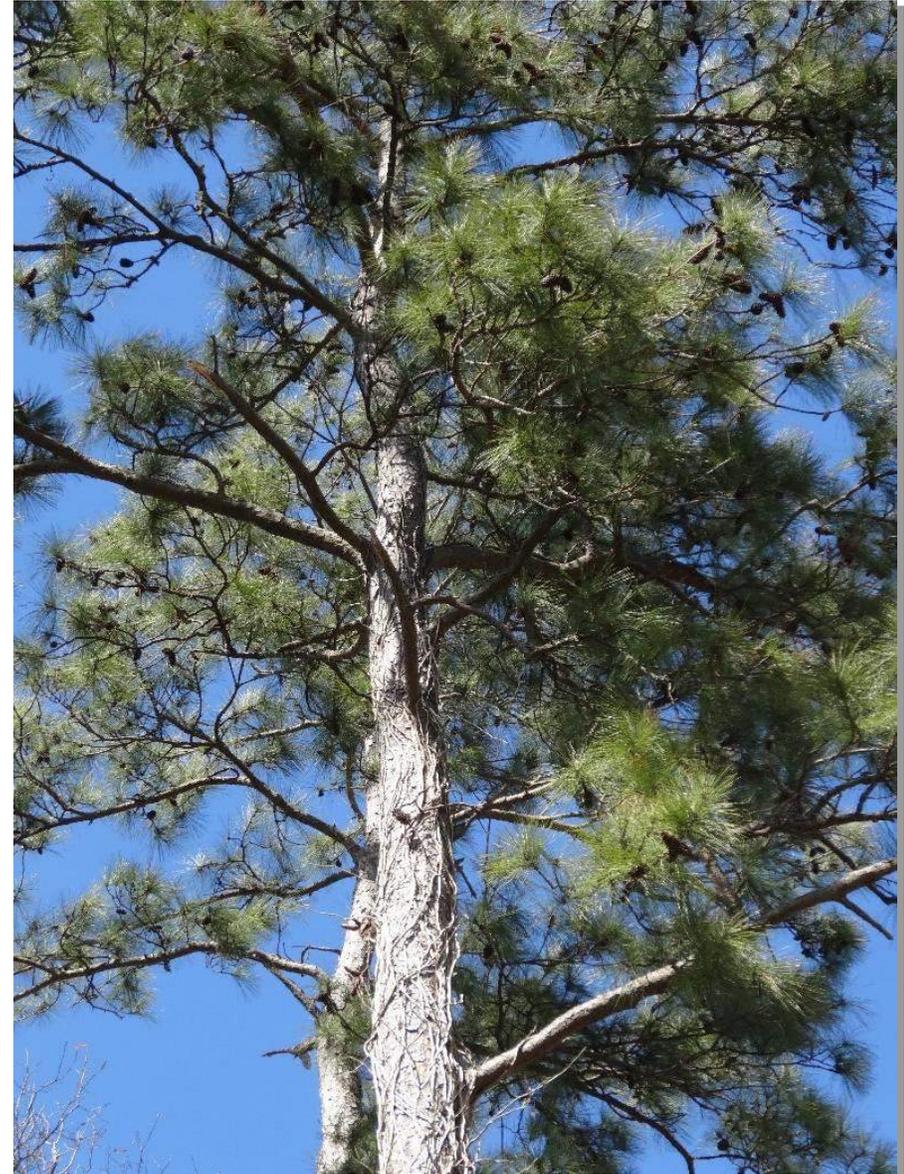


“The pine trees and the winding bayous will echo for some time to come with the strains of ‘Look who’s here,’ and ‘I haven’t seen you in so many years!’”

– *Houston Chronicle* October 2, 1949

Loblolly Pine—Background Information

- *pinus taeda* (pron. PIE-nus TEE-duh)
L., Sp. Pl. 1000. 1753.
- Aka: **rosemary pine** (due to aromatic, resinous foliage); **old field pine** (due to tendency to take over abandoned areas); **bull pine** (due to large trunk); **Indian pine**; **longstraw pine**; **Arkansas pine**; **North Carolina pine**; and **shortleaf pine**.
- In the south, loblolly means “a depression” — originally seen in river beds; also “mudpuddle.”
- It is the most commercially important forest species in southern U.S. — extensively cultivated in forest plantations for pulpwood, lumber, and biomass.
- Also important in reclamation, screen and erosion control, and to provide light shade.



Loblolly Pine Growth Habits

- Medium-lived tree with average life of 100 years.
- Oldest recorded stand (in North Carolina) has an average age of 240 years with largest tree measuring over 53" dbh (diameter at breast height) and 150' tall. (The current species champion near Urania, LA, is 56.3" dbh and 163' tall.)
- Fast growing—2' per year.
- Mature height 50-80+ feet (but can reach 150') with a 30' spread.
- Pyramidal shape when young (so ideal for screening), but loses lower limbs as it ages and forms a fairly open oval with rounded crown at maturity.



Loblolly Pine Growth Habits

- **Foliage**

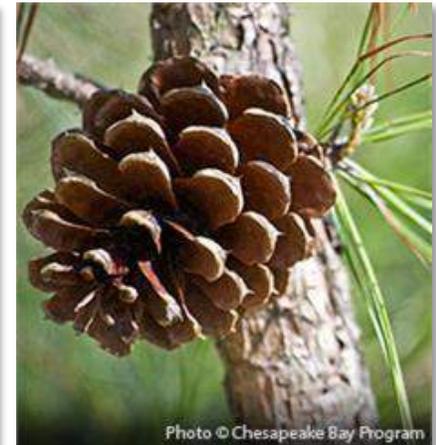
- Simple-leaved evergreen with alternate, spiral leaf arrangement.
- Filiform (needle-like shape)
- Blade length 6-9" with clusters of 3 needles (versus 2 for Virginia Pine, and 5 for Eastern White Pine.)
- Color turns from light green to darker green to brown.

- **Flower**

- Yellowish-orange inconspicuous, spring flowering (Feb-Mar) that gives way to cones

- **Fruit**

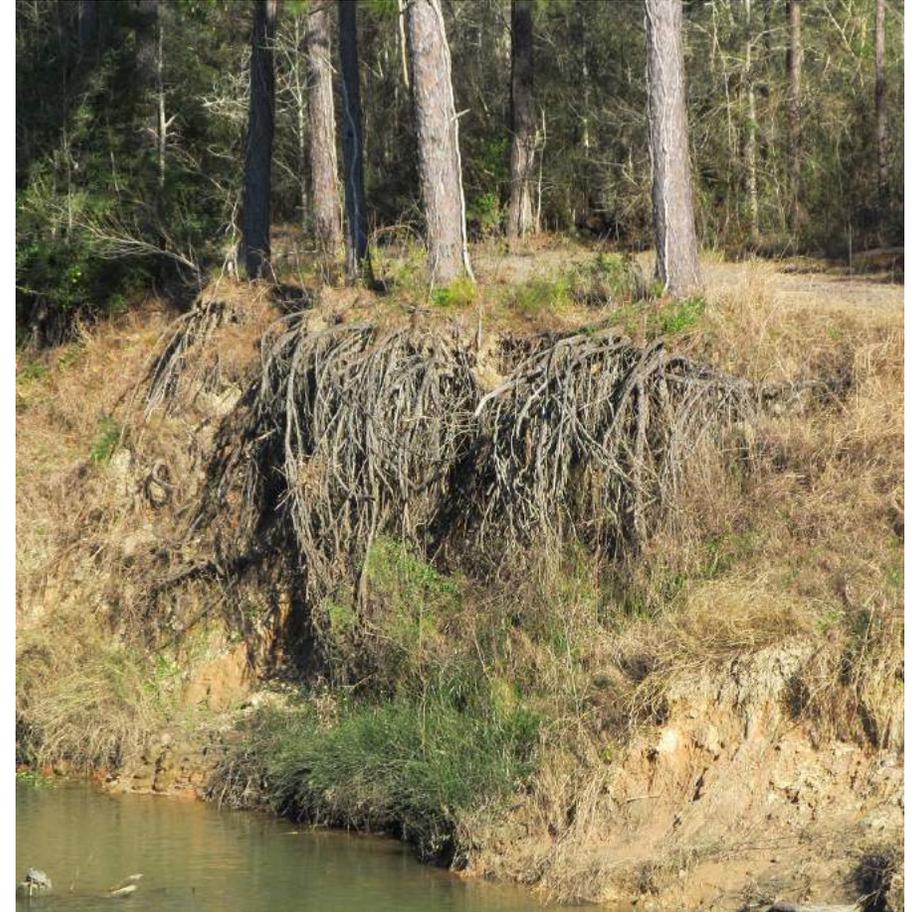
- 3-6" dull-brown, prickly cones in groups of 2-5 with sharp spines that mature in fall.
- Both males and females present on tree; males are yellow and release yellow pollen.



Loblolly Pine Growth Habits

- **Rooting Habit**

- Influenced by age, soil, and soil environment.
- Young trees develop short taproots that generally cease growth in favor of extensive lateral-root system.
- Longer taproots in deep, sandy or loamy soils; shorter and stouter in heavy clay; prominent superficial roots in wet or impenetrable hardpan soils.
- Root system generally wider than crown.



Loblolly Pine Growth Habits

- **Trunk, Branches and Bark**
 - Straight trunk with mostly upright branches that don't droop, and are not showy; susceptible to breakage at crotch or its weakish wood.
 - Thick dark gray and “scaly” bark — resistant to fire; brown layers underneath.



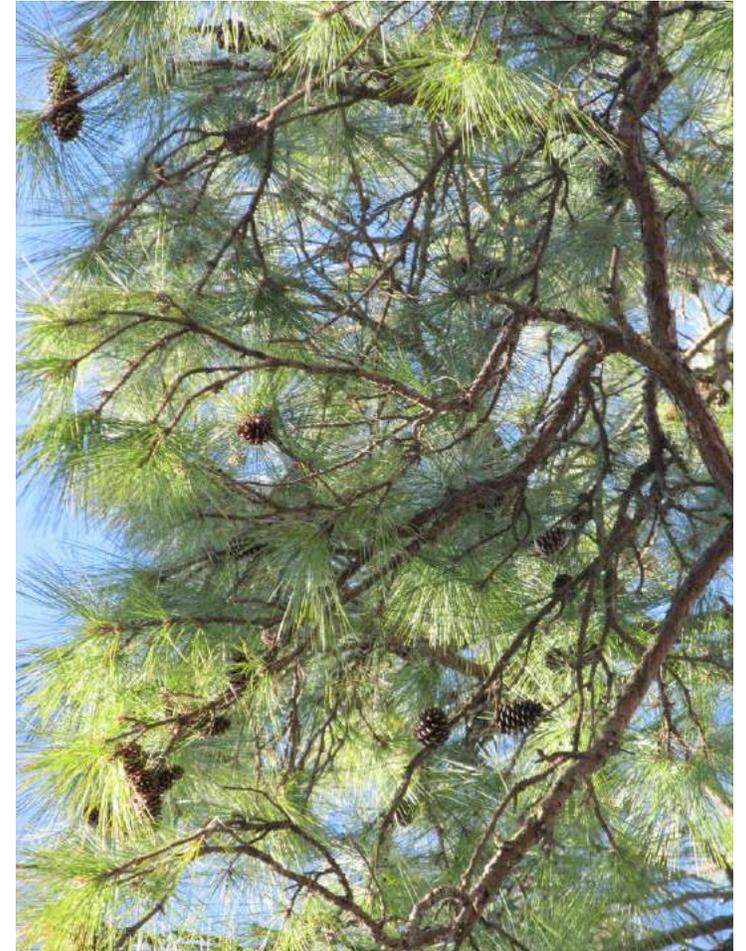
Loblolly Pine Growth Habits

- **Associated Forest Cover**

- Found in pure stands and in mixtures with other pines and/or hardwoods and in association with a great variety of other vegetation. When it predominates, it forms the forest cover type “Loblolly Pine”; in fields it is a pioneer tree.
- In east TX, often found in mixed stands, as is the case in **Camp Mohawk**, where the Feb. 2008 survey identified: cherrybark, bur, live, bottomland post, shumard, swamp chestnut, water and willow oaks; American hornbeam beech; eastern red cedar; rough-leaf dogwood; American, cedar and sugarberry elm; mimosa; American basswood; chinaberry; box elder; red mulberry; green ash; dwarf palm; parsley hawthorn; gum bumelia; western soapberry; Chinese tallow; American sycamore; pecan and water hickory; eastern cottonwood; and black willow.
- Found in association with a great variety of lesser vegetation (per the Feb. 2008 survey, approx. 12 species of shrubs; 13 vines; 46 forbs; 16 grasses; and 1 fungus.)
- Moderately tolerant of shade when young but classed as intolerant as adult.

Fauna Associated with Loblolly Pine

- Camp Mohawk provides a checklist of species that includes:
 - 57 species of birds
 - 46 species of butterflies
 - 17 species of dragonflies
 - 4 species of damselflies
 - 11 species of amphibians and reptiles
 - 4 species of mammals
- We believe that more species are likely that have not yet been documented.
- The Loblolly Pine provides an important source of food and shelter for this fauna.



Fauna Associated with Loblolly Pine

- **Animals Using as Food Source** (*in or likely in Camp Mohawk*):
 - Eastern Cottontail; Eastern Gray Squirrel; White-tailed Deer; Beaver; White-breasted Nuthatch; American Goldfinch; Red-bellied Woodpecker; Carolina Chickadee; Tufted Titmouse; Mourning Dove; Yellow-bellied Sapsucker; Green Stinkbug; Dogday Harvestfly; and Virginia Pine Sawfly.



<https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=eastern+cottontail>



<https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=tufted+titmouse>



<https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=green+stink+bug>

Fauna Associated with Loblolly Pine

- **Animals Using as Shelter** (*in or likely in Camp Mohawk*):
 - Eastern Cottontail; Raccoon; Virginia Opossum; Red Fox; Eastern Gray Squirrel; White-tailed Deer; Pileated Woodpecker; Red-bellied Woodpecker; Bald Eagle; Osprey; and American Robin.



<https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=red-bellied%20woodpecker>



Loblolly Damaging Agents

- **Insects***: *(the majority of attacks are insignificant in terms of damage and mortality)*
 - Bark beetles, especially southern pine beetle (*dendroctonus frontalis*)
 - Pine engraver beetles (*ips spp.*) in small or isolated stands
 - Pine tip moths (*rhyacionia spp.*) in young trees
 - Seedling debarking weevils (*hylobius spp.* and *pachylobius spp.*) in seedlings

* most infestations occur in stands under stress or in dead wood
- **Diseases:**
 - Seedling susceptibility to black root rot (*fusarium spp.*) and fusiform rust (*cronartium quercuum f. sp. fusiforme*)
 - Root rot (*Heterobasidion annosum*), generally not a problem in natural stands
 - *Phaeolus schweinitzii* causing root and butt rot
 - Red heart (*Phellinus pini*) via dead branch stubs and usually in older trees
- **Weather:**
 - High winds (especially older trees and those with large cankers due to rust disease and in thinned stands); cold and ice; water standing over two weeks; severe drought; and lightning.

Loblolly Damaging Agents

- **Fire:**

- On Labor Day 2011, the Bastrop Complex Fire was the worst fire in the history of Texas:
 - 32,400 acres destroyed
 - 1,696 homes / businesses / structures destroyed
- The fire, aided by high winds and severe drought, jumped four-lane divided highway 21, also jumped four-lane divided highway 71, and jumped the Colorado River.
- Many of the trees destroyed in this fire were Loblolly Pine trees, in a part of the “Lost Pines” region of Central Texas.
 - This is the westernmost stand of Loblolly Pine trees in the U.S.



History of Loblolly Damage at Camp Mohawk

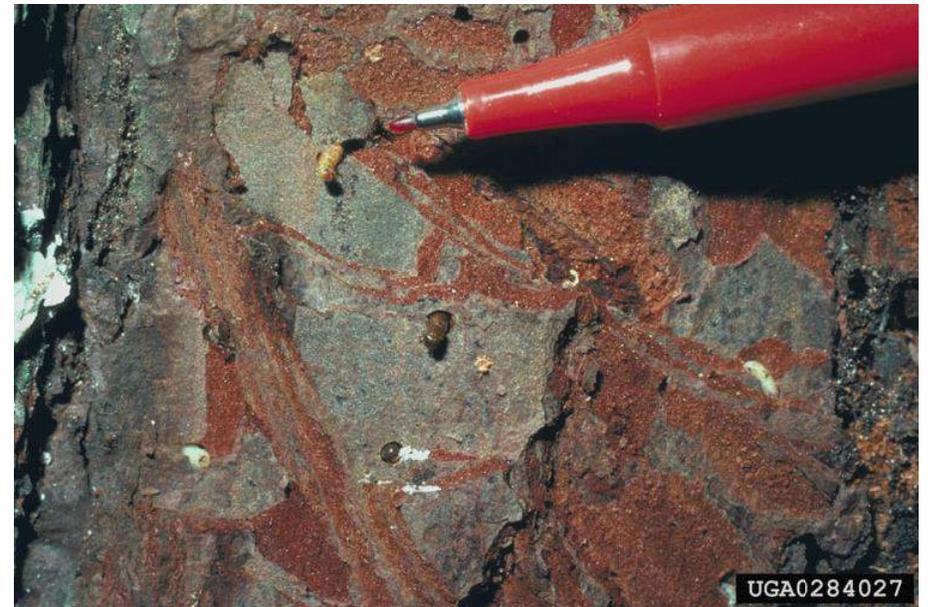
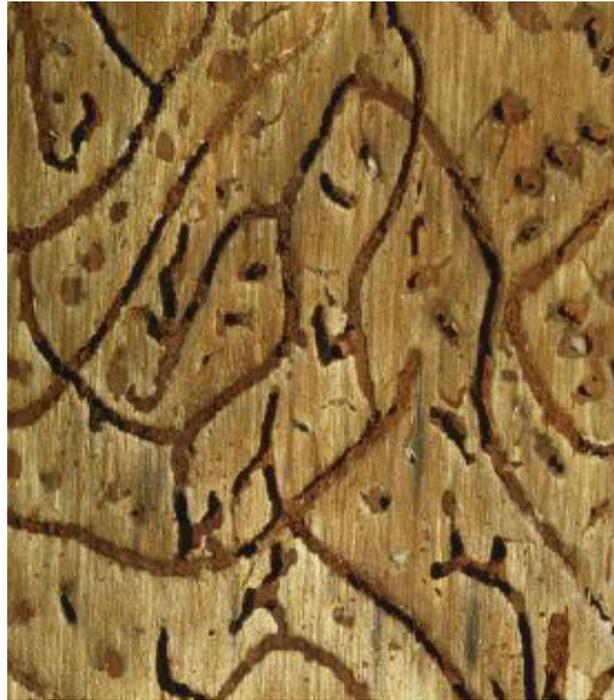
- **Hurricane Ike**
 - In September 2008, caused the loss of approximately 300 Loblolly Pines.
- **Drought**
 - In 2010-2011, the severe drought left the Loblolly Pines susceptible to insects.



History of Loblolly Damage at Camp Mohawk

- **Insects**

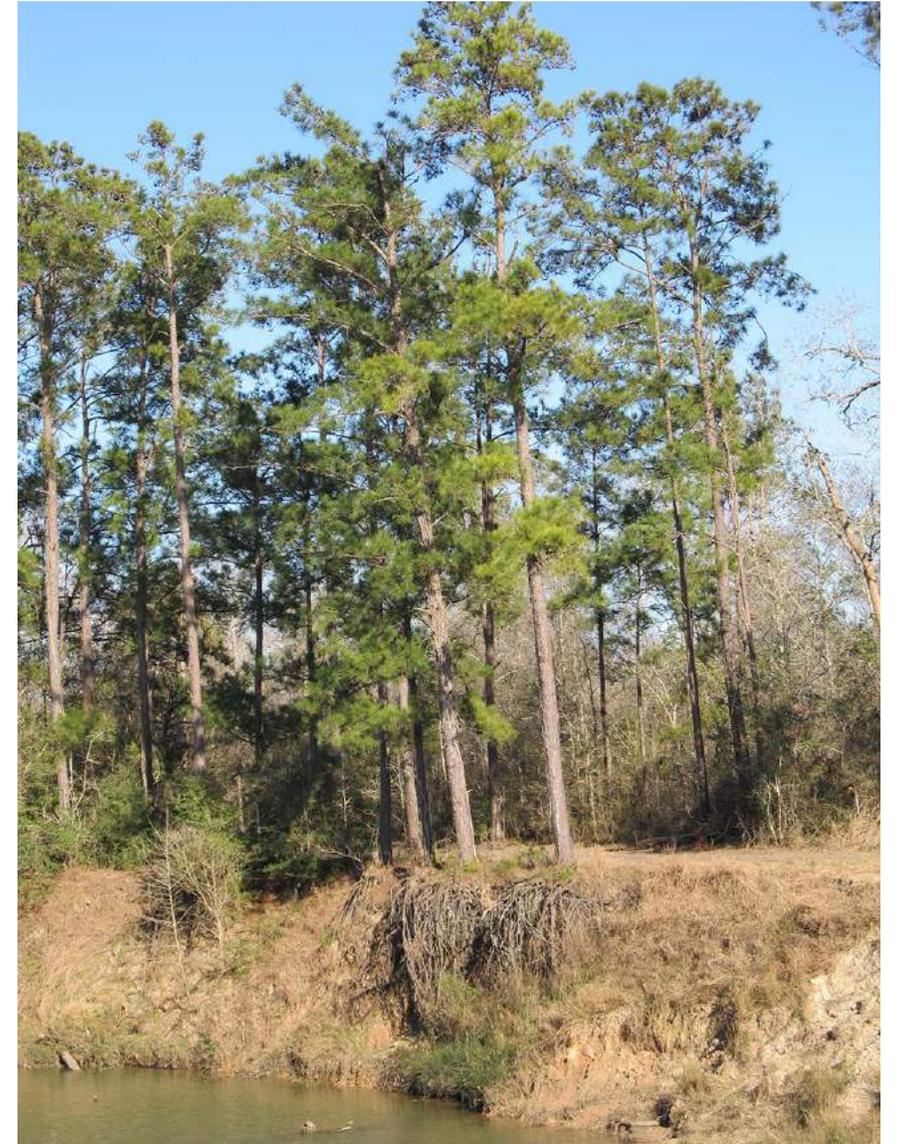
- Southern Pine Beetles caused the loss of approximately 200 more Loblolly Pines.



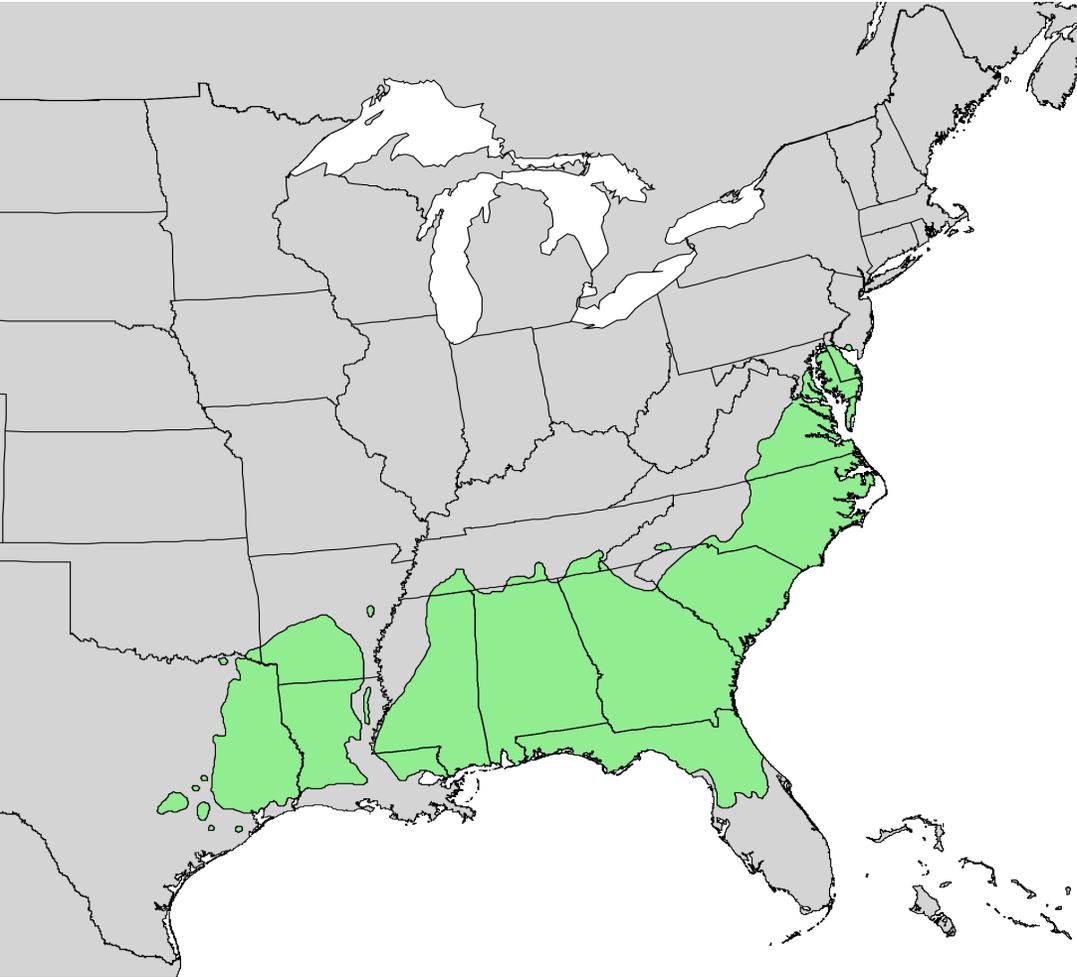
History of Loblolly Damage at Camp Mohawk

- **Erosion**

- Many of the Loblolly Pines along the banks of Chocolate Bayou are in danger of falling as the soil has eroded, leaving their root structures exposed and no longer firmly anchored.

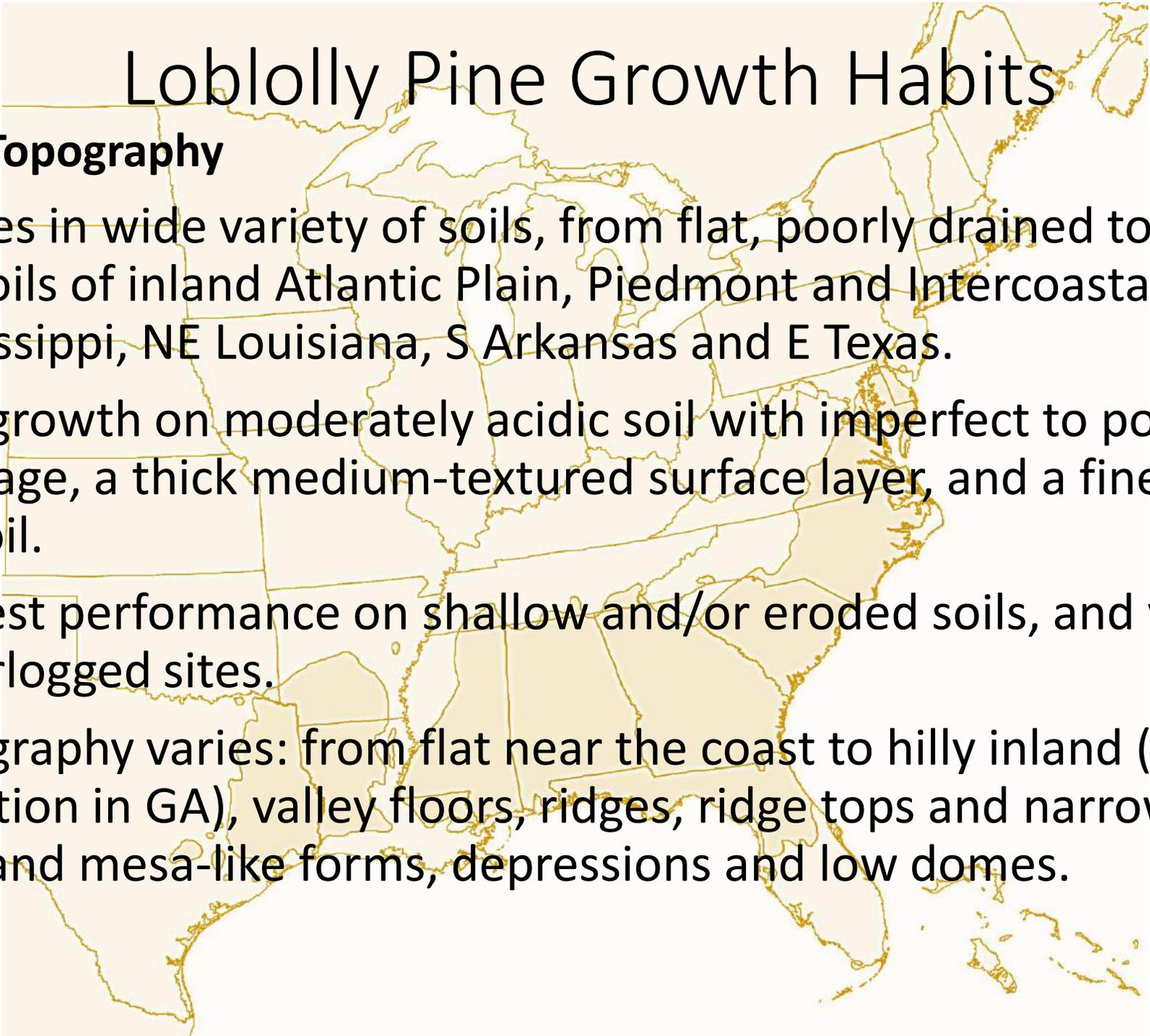


Loblolly Range



- Native evergreen in 14-15 states
- Native Range: east coast from NJ to central FL and west to eastern TX
- Northern extension limited by low temperatures and cold damage
- Western extension limited by inadequate precipitation
- Prefers humid, warm-temperate with long, hot summers and mild winters with avg. annual rainfall from 40-60" and frost-free period in the range of 5-10 months

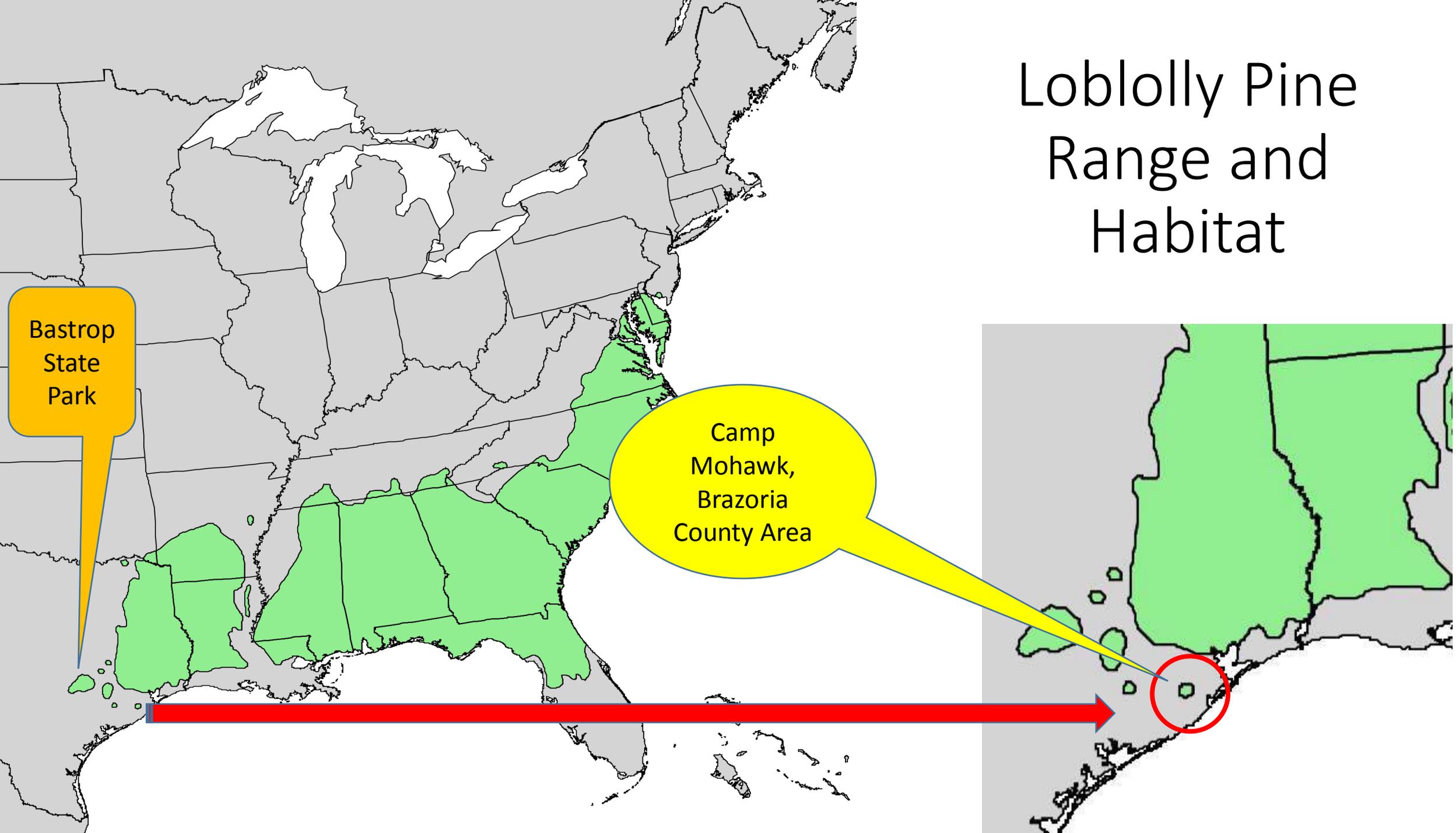
Loblolly Pine Growth Habits

A map of the Southeastern United States, including parts of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi. The map is overlaid with a grid and shows the distribution of Loblolly Pine growth habits. The distribution is concentrated in the coastal plain and piedmont regions of the Southeast, with a shaded area indicating the primary growth range.

- **Soil and Topography**

- Thrives in wide variety of soils, from flat, poorly drained to relatively dry soils of inland Atlantic Plain, Piedmont and Intercoastal Plain of E Mississippi, NE Louisiana, S Arkansas and E Texas.
- Best growth on moderately acidic soil with imperfect to poor surface drainage, a thick medium-textured surface layer, and a fine-textured subsoil.
- Poorest performance on shallow and/or eroded soils, and very wet or waterlogged sites.
- Topography varies: from flat near the coast to hilly inland (up to 1,000' elevation in GA), valley floors, ridges, ridge tops and narrow valleys, flats and mesa-like forms, depressions and low domes.

Loblolly Pine Range and Habitat



Bastrop State Park

Camp Mohawk, Brazoria County Area

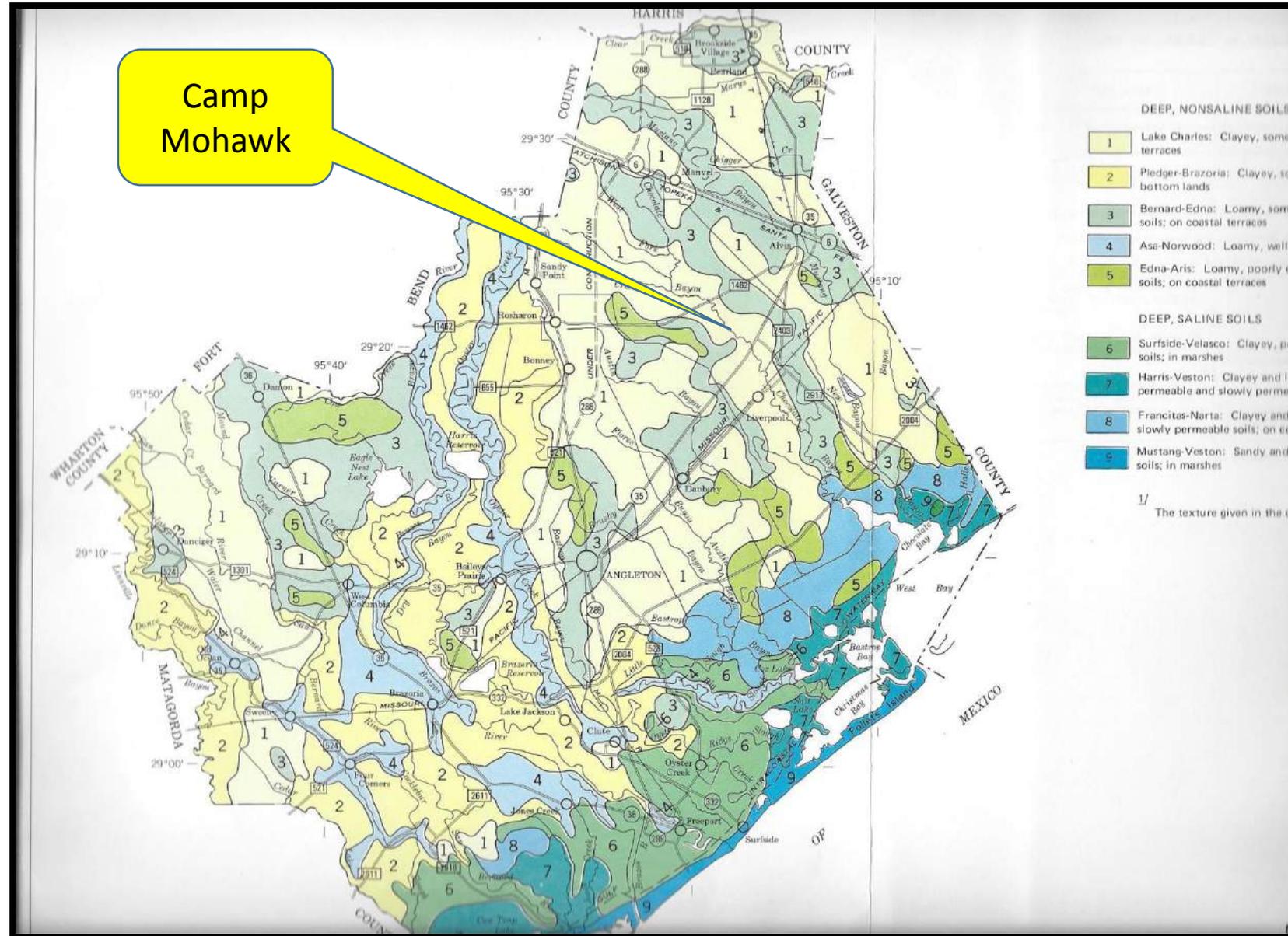
Brazoria Soils Supporting Loblolly Woodland

General Soil Map of Brazoria County

Loblolly Pines along with mixed hardwoods are predominant in the following soil types in Brazoria County:

- 1 Lake Charles
- 3 Bernard-Edna
- 5 Edna-Aris

The remainder of the county soil types predominantly support mixed hardwoods.



Detailed Map of Soil Types

100

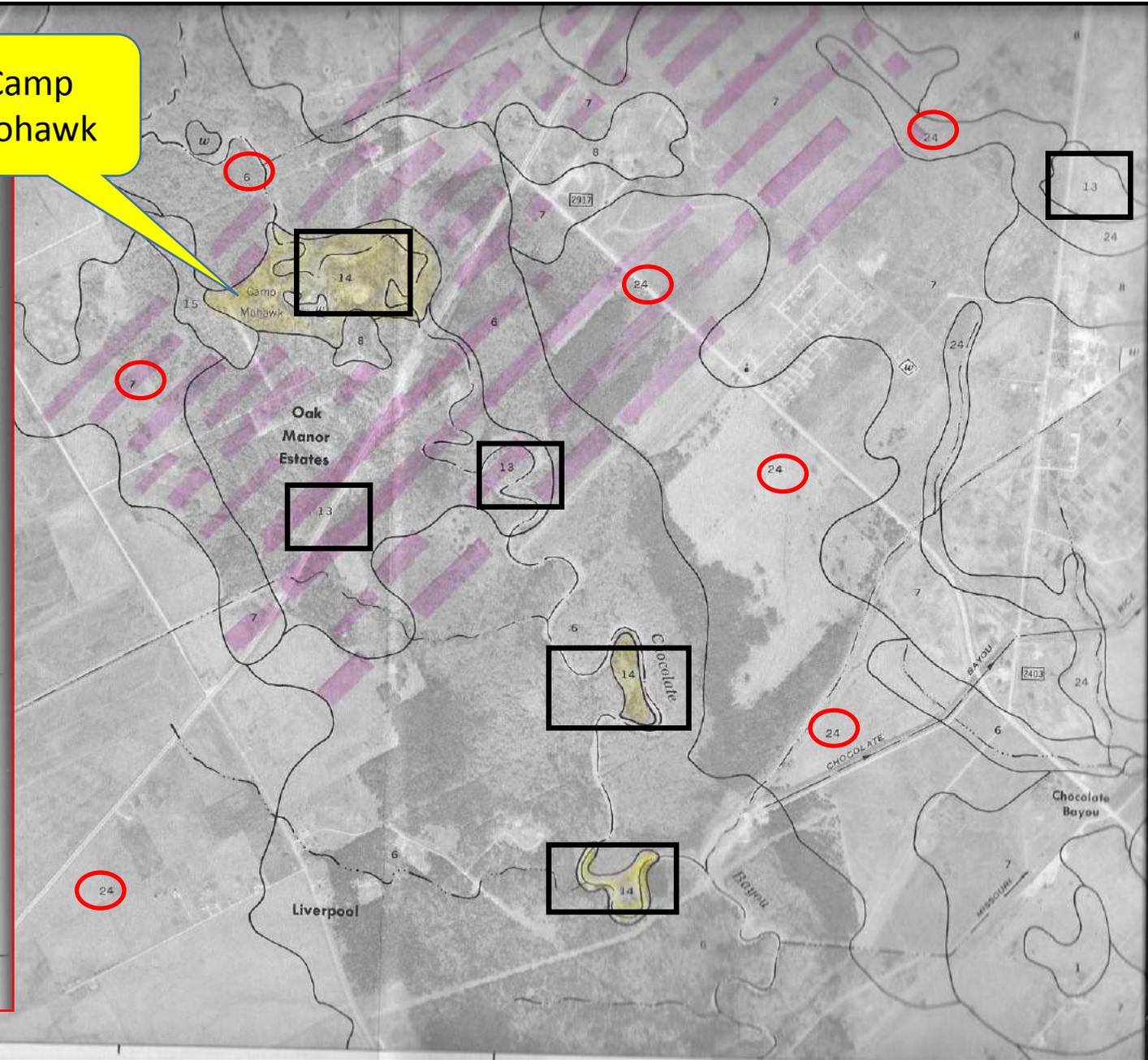
TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
1----- Aria	3w	Slight	Moderate	Slight	Moderate	Loblolly pine----- Water oak----- Cherrybark oak-----	80	Loblolly pine, slash pine.
2, 3----- Asa	2c	Slight	Slight	Slight	Slight	Eastern cottonwood----- Pecan----- White ash-----	100	Eastern cottonwood, black walnut, pecan, white ash.
6----- Beaumont	3w	Slight	Severe	Severe	Severe	Loblolly pine----- Water oak----- Cherrybark oak-----	80 70 70	Loblolly pine, slash pine, water oak, cherrybark oak.
7----- Bernard	3w	Slight	Moderate	Moderate	Severe	Loblolly pine----- Water oak----- Cherrybark oak-----	80 70 70	Loblolly pine, slash pine, water oak, cherrybark oak.
10, 11----- Brazoria	5w	Slight	Severe	Severe	Moderate	Pecan----- Green ash-----	--- 50	Pecan, green ash.
12----- Edna	2c	Slight	Slight	Slight	Slight	Eastern cottonwood----- Pecan----- White ash-----	100 --- ---	Eastern cottonwood, black walnut, pecan, white ash.
13, 14----- Edna	3w	Slight	Severe	Severe	Severe	Loblolly pine----- Water oak----- Cherrybark oak-----	80 70 70	Loblolly pine, slash pine, water oak, cherrybark oak.
23----- Kenney	3s	Slight	Moderate	Moderate	Moderate	Cherrybark oak----- Water oak-----	70 70	Loblolly pine, slash pine, cherrybark oak.
24, 25----- Lake Charles	4w	Slight	Severe	Severe	Severe	Loblolly pine----- Water oak----- Cherrybark oak-----	70 80 60	Loblolly pine, slash pine, water oak, cherrybark oak.
33, 34----- Norwood	2c	Slight	Slight	Slight	Slight	Eastern cottonwood----- Pecan----- White ash-----	100 --- ---	Eastern cottonwood, pecan, white ash, black walnut.
35:* Norwood	2c	Slight	Slight	Slight	Slight	Eastern cottonwood----- Pecan----- White ash-----	100 --- ---	Eastern cottonwood, pecan, white ash, black walnut.
Asa	2c	Slight	Slight	Slight	Slight	Eastern cottonwood----- Pecan----- White ash-----	100 --- ---	Eastern cottonwood, black walnut, pecan, white ash.
36----- Pledger	4w	Slight	Moderate	Severe	Moderate	Pecan----- Water oak----- Green ash-----	60 60 ---	Pecan, water oak, green ash.

* See description of the map unit for composition and behavior characteristics of the map unit.

Camp Mohawk



Conclusion and Future

- Loblolly Pines are normally associated with mixed hardwoods and are primarily located in an 8 to 12 mile radius of Camp Mohawk in northern Brazoria County.
- From the perspective of natural impact, the type of soil is the primary reason for Loblolly Pine success in the area.
- From the perspective of human impact, the historical utilization of the area as an encampment during the Civil War, followed by its use as a private recreational camping area, and finally by its designation as a county park, has protected the extant population of Loblolly Pines from the agricultural clearing that has greatly affected the majority of the landscape in this part of Brazoria County.



Conclusion and Future

- The huge loss of Loblolly Pines due to Hurricane Ike and the pine bark beetle infestation associated with the 2010-2011 drought has already greatly impacted the number of pines remaining in the area.
- Much of the current population is fragile due to erosion along the banks of Chocolate Bayou.
- If weather conditions in the future bring about another devastating storm system and/or drought, we could lose even more of the remaining Loblolly Pines.

Conclusion and Future

- Our team feels that it is important to establish a program focused on transplanting and protecting young pines within the boundaries of Camp Mohawk in order to ensure that the population is able to rebound and thrive. Prescribed burns or clearing may be required.
- The designation of Camp Mohawk as a county park provides us with the opportunity to ensure that the Loblolly Pines are here for many more generations to cherish and enjoy in the future.





Source Information

- Cradle of Texas Master Naturalist Camp Mohawk Flora 02/06/08
- [http:// www.arborday.org/Trees/treeguide/TreeDetail.cfm?ItemID=899](http://www.arborday.org/Trees/treeguide/TreeDetail.cfm?ItemID=899)
- [http:// www.na.fs.fed.us/pubs/silvics_manual/Volume_1/pinus/taeda](http://www.na.fs.fed.us/pubs/silvics_manual/Volume_1/pinus/taeda)
- [http:// www.fcps.edu/islandcreekes/ecology/loblolly_pine.htm](http://www.fcps.edu/islandcreekes/ecology/loblolly_pine.htm)
- <http://www.forestry.ok.gov/Websites/forestry/Images/trees,pineloblolly.pdf> see printout US forest svce dept of agriculture
- http://www.wildflower.org/plants/result.php?id_plant=PITA Lady Bird Johnson Wildflower Center ed 2015
- <https://www.ncsu.edu/project/dendrology/index/plantae/vascular/seedplants/gymnosperms/conifers/pine/pinus/australes/loblolly/loblollypine.html> North Carolina State University
- Soil Survey of Brazoria County, Texas, United States Department of Agriculture Soil Conservation Services, in cooperation with the Brazoria County Commissioners Court and Texas Agriculture Experiment Station, 1978
- “The History of Liverpool, Texas and Its People” published by the Liverpool History Book Committee, 1996
- Personal Diary of Henry Clement , 1929
- Houston Chronicle, Oct. 02, 1964 ‘Brazoria Old-Timers Have Big Reunion’ Page 22A

A woodpecker with a prominent red crest is perched on a pine branch. The bird has black and white plumage on its body and a long, pointed beak. The background is filled with green pine needles and branches, creating a natural, forest-like setting.

QUESTIONS