

2023 SYMPOSIUM PROCEEDINGS

November 9th-11th Nacogdoches, Texas



Promoting conservation, research and utilization of native plants and plant habitats of Texas through education, outreach and example.

Texas P.O. Box 3017, Fredericksburg, Texas 78624 npsot.org • 830-997-9272 • state@npsot.org This page left intentionally blank.

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SECTION ONE: ABOUT THE PINEYWOODS REGION



Photo Credit: Dawn Stover; Forested grasslands open pine landscapes of East Texas

The Pineywoods of Texas is the easternmost ecoregion found in Texas. It is bordered on the east by Louisiana, to the west by the Post Oak Savanna, and to the south by the Gulf Prairies. Maximum elevation reaches 500 feet and soils are mostly sandy and acidic. Average rainfall can be more than 50 inches per year. The region is dominated by pine forests that were historically populated with longleaf, shortleaf and loblolly pine. Fire is a key component in the landscape, creating botanically diverse, forested grasslands dominated by little bluestem grass. The topography is generally rolling hills; hardwood bottomlands, and lowlands that include swamps, bogs, and marshes.

Blueberries (*Vaccinium* species) grow wild, as do native *Rhododendron* species and both species of pawpaw (*Asimina*). Here you will find orchids, pitcher plants, and numerous rare plants, such as *Gaillardia aestivalis* var. *winklerii*, *Hibiscus dasycalyx*, *Yucca cernua* and *Trillium texanum*. Plants of note on some of the tours include *Sarracenia alata*, *Hamamelis ovalis*, *Gentiana saponaria*, and *Spiranthes odorata*.

SECTION TWO: PAPERS AND ABSTRACTS



Photo Credit: Dawn Stover; Echinacea sanguinea

ORNAMENTAL GARDEN PLANTS NATIVE TO EAST TEXAS BY PETER M. LOOS

Ecovirons PO Box 520 Chireno,TX 75937 <u>SlyCy79@yahoo.com</u> (936) 645-1933

TREES

Chalk Maple

Height:	20' - 40' tall	
Leaves:	3-5 lobed, somewhat palmate or oval shaped yet are simple, opposite and deciduous. Fall color is anywhere from yellow, pink, red or maroon.	
Flower:	Clusters or almost sessile corymbs which are yellow to lime in color in Spring while leafing out, so not showy.	
Fruit:	Showy, reddish brown samaras in clusters which ripen in September - October.	
Traits:	In Texas during Fall, people like to talk about the bright red colors of <i>Acer grandidentatum</i> ; Bigtooth Maple in the Hill Country which is very similar to Chalk Maple, but in East Texas and other high rainfall areas, it is hard to beat Chalk Maple's red to maroon color. Also good is <i>Acer barbatum</i> ; Southern Sugar Maple	
Acer negundo	Box Elder	
Height:	50'-75'	
Leaves:	Odd-pinnately compound with 3-7 leaflets, ovate to oval shaped opposite, and deciduous	

with bright yellow Fall color. Leaflets 1"-3" long, ½"-1 ½" wide.Flower: Greenish, small, not showy on slender stalks that resemble catkins in Mar-May.

Fruit: First visible in Summer in drooping clusters of double samaras which is greenish yellow to

yellow when ripe in Aug-Oct.

Acer leucoderme

Traits:Box Elder's role in nature seems to be as a predominate species in disturbed locations as an
early species in secondary succession, yet records show it has been in cultivation since 1688.
Box Elder tolerates the poorest of soils and site conditions. A fast growing, deciduous tree.

Acer Rubrum var. drummondii Swamp Red Maple

Height:	60' - 80'
Leaves:	3-5 lobed, somewhat palmate or oval shaped, yet are simple, opposite, and deciduous.
Flower:	clusters from staminate or pistillate axillary fascicles, commonly on different trees, and greenish yellow to red in late Jan. to end of Feb.
Fruit:	Showy because of samaras, color varies from green to yellow to red, or brownish red.
Traits:	Coloring of flower, fruit, and foliage varies greatly in Houston; a variety called "San Felipe" has been consistent for it's red flowers and red fruit.

Betula nigra	River Birch
Height:	80' - 90'
Leaves:	Ovate or somewhat egg shaped; simple, alternate, doubly serrate; deciduous with yellow Fall color.
Flower:	Male flowers are catkins, 1" - 3 $\frac{1}{2}$ " long. Female catkins are cylindric and only up to $\frac{1}{2}$ " long in March.
Fruit:	Looks similar to a small pine cone called Strobile, oblong-cylindric.
Traits:	The brown to gray bark that peels into papery strips is another outstanding landscape quality.

Carya aquatica

Water Hickory

Height: 80' - 100'

Leaves: Alternate, deciduous, odd pinnately compound with 7-15 leaflets that are lanceolate-ovate, that turn yellow in Fall.

- Fruit: Clusters of flattened nuts with thin husks, meat is bitter tasting.
- Traits:Hickories are slow growing, yet this species is relatively quick when young; this and the yellowFall color make it a fine landscape tree that tolerates sites with poor drainage.

Carya illinioens	is Pecan
Height:	125' - 150'
Leaves:	Alternate, deciduous, odd pinnately compound with 9-15 leaflets that are lanceolate; yellow green to dark green with dull yellow Fall color
Flower:	Separate male and female catkins on same tree in Mar.
Fruit:	Clusters of edible nuts, meat is hard to get to in native Pecans but can be well worth the effort.
Traits:	Papershell or thin shelled varieties are the most commonly available, but native thick shelled also make fine shade trees

Carya ovata

Shagbark Hickory

Height:	80' - 100'
Leaves:	Alternate, deciduous (yellow Fall color), odd pinnately compound with 5 leaflets.
Flower:	Male and female catkins separate on the same tree in Spring.
Fruit:	Round nut with thick husk (up to $\frac{1}{2}$ " thick), usually thin shelled and edible.
Traits:	Very slow growing, but the long, narrow, loose plates of bark on older trees is quite striking.

Black Hickory

Height:	75' - 85'
Leaves:	Alternate, 5 to 7 odd pinnately compound leaflets that are lanceolate, deciduous with a dark, yellow Fall color.
Flower:	Separate male and female catkins on the same tree in February - March.
Fruit:	Clusters of round nuts with thick husks, but have small, sweet kernel.
Traits:	Very slow growing and one of the most widely distributed of the Hickories, therefore should be utilized more often.

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Fraxinus	americana
110/11/03	annenteanta

White Ash

Height:	80' - 100'
Leaves:	Opposite, 5 to 9 odd pinnately compound leaflets that are lanceolate, deciduous with a variety of Fall color from purple to orange to yellow.
Flower:	Clusters of male and female panicles in April - May.
Fruit:	Clusters (from panicle) of Samaras (6" long) individual fruit looks wing like that ripen at the end of Summer.
Traits:	White Ash is relatively quick growing; add diversity when choosing trees and for variety of Fall color also consider the shorter 40' - 50' tall <i>Fraxinus texana</i> , Texas Ash native to the Texas Hill Country.
Juglans nigra	Black Walnut
Height:	70' - 90'
Leaves:	Alternate, 11 to 23 add pinnately compound leaflets that are ovate - lanceolate, deciduous with Yellow Fall color.
Flower:	Separate male and female catkins on the same tree in May - June.
Fruit:	Thick husked, rounded nut (1" - 2 ½ ") sweet, edible, oily kernel ripe in September - October.

Traits: Black Walnut are utilized for many reasons; it's ornamental, produces an edible fruit, and husks can be used for dye (wood of mature trees is heavily sought after). Useful for wildlife as habitat cover or food.

Juniperus virginiana	Eastern Red Cedar
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Height:	40' - 50'
Leaves:	Small dark green, scale-like or awl-like in shape.
Flower:	Separate male and female catkins on the same tree in March - May and non-showy.
Fruit:	A pale blue berry like cone 1/4 " - 1/3 " long, resinous on straight stalk (peduncle).
Traits:	Useful not only as an evergreen tree but wonderful for attracting birds as cover and food source.

Height:	25' - 50'
Leaves:	Alternate, simple, oval or elliptic, deciduous, dark green above with white below.
Flower:	Creamy white, very fragrant (lemon like) in May - June.
Fruit:	Dark pink, pine cone like shape and showy.
Traits:	Foliage is spectacular when blowing in the wind; evergreen subspecies from East of Texas also worthy of cultivation.

Swamp Tupelo

Height:	100'
Leaves:	Alternate, simple, oval or oblong-ovate, yellow to red Fall color
Flower:	Small clusters, yellowish in color, not showy in Mar Apr.
Fruit:	A drupe or oval shape that turns bluish when ripe

Traits:	A water emergent species that does well in most fertile landscape settings; in the wild, the base of the trunk buttresses (swells) giving it character, but this is not necessarily true in a garden
Pinus spp	Pines
Height:	40' - 75'
Leaves:	Evergreen needles ½"-2" long, covering twigs and branches in bundles of 3 (sometimes 2), dark green to blue-green.
Flower:	Not showy, the flowers are small unisexual cones, in Spring.
Fruit:	A cone that is 1"-3" long, green to brown when ripe in late Summer (Aug-Sep) and very resinous.
Traits:	Species include Longleaf Pine; <i>Pinus palustris</i> : <i>P. echinata</i> ; Shortleaf Pine: <i>P. taeda</i> ; Loblolly Pine. Longleaf savannah habitat once dominated southern deep east Texas has been replaced by Loblolly plantations due to commercial value.

Height:	100'-150'
Leaves:	Simple, alternate ovate with 5 short lobes giving an almost palmate appearance. 4"-12" long and wide. Deciduous, yellow Fall color.
Flower:	Not showy, globose in Apr-May.
Fruit:	Numerous achenes on globose (round) center making it look like a ball. Somewhat showy. Seed ripens in Sep-Oct.
Traits:	Sycamore is a relatively fast growing, sturdy shade tree that is drought tolerant and grows in poor soil conditions. The flaking bark is an added plus. Mexican Sycamore; <i>Platanus mexicana</i> with its hairy leaves creating a blueish cast is also a wonderful ornamental tree.

Sycamore

Platanus occidentalis

Quercus hemisphaerica

Coastal Laurel Oak

Height:	25' - 35'
Leaves:	Alternate, simple, lanceolate (long and narrow); persists in Winter
Flower:	Male and female catkins separate on same tree in early March
Fruit:	Acorn is somewhat small in comparison to other oaks (size of grape)
Traits:	Although different in overall size and ecology, most botanists view this species as Laurel Oak: <i>Quercus laurelifolia</i> ; landscape value is in its smaller size (Laurel Oak is 70' - 100' tall)

Overcup Oak

Height:	60' - 80'
Leaves:	Alternate, simple, deciduous, oblong with varying lobes
Flower:	Male and female catkins separate on the same tree in March
Fruit:	Cap of acorn completely covers acorn which is of interest
Traits:	Tolerates poor soils (poor drainage, heavy clay, low fertility); Alternative species for better sites one could use that is somewhat similar would be Durand Oak: <i>Quercus durandii var. durandii</i> , whose foliage looks like overcup or oversided Water Oak and has bark like a White Oak

Quercus macr	ocarpa Bur Oak
Height:	125' - 150'
Leaves:	Alternate, simple lobed, 5 to 9 lobes, 6" - 12" long, ovate, dark green, deciduous with various Fall colors.
Flower:	Male and female catkins on same tree in March - April.
Fruit:	One of the largest acorns (up to 2" long) to almost completely enclosed by cap (½ to 3/4 of nut) that is heavily scaled.
Traits:	The largest of the Oaks; works in a variety of conditions (Urban streets to creek bottoms), getting more usage making it very easy to find in the nursery trade.

Quercus marilandica

Quercus michauxii

Black Jack Oak

Height:	50' - 70'
Leaves:	Alternate, simple, rigid ovate to 3 lobed at apex, dark green, deciduous.
Flower:	Male and female catkins on same tree in February - March.
Fruit:	Medium sized acorn ($\frac{1}{2}$ " - 1" long) that takes 2 years to ripen. Single acorn or in pairs.
Traits:	Blackjack Oak is a dominant species in Post Oak Savannahs. They are slow and commercially difficult to grow but are worthy of use when available because of adaptability to dry or upland sites.

Height:	75' - 100'
Leaves:	Alternate, simple, deciduous (maroon Fall color with some red, yellow, orange is one of the showiest), oval or obovate.
Flower:	Male and female catkins separate on the same tree in Feb Mar.
Fruit:	Acorns ripening in Sep Oct. and of good size (3/4" - 1 ½" long).
Traits:	A wonderful shade tree with its broad, rounded umbrella shaped crown and fabulous Fall color, worthy of more use.

Swamp Chestnut Oak

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Quercus muhlenbergii
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Chinquapin Oak

Height:	50' - 70'
Leaves:	Alternate, simple, lanceolate to oblong (4" - 6" long/ 1" - 3" wide) with a toothed margin, deciduous.
Flower:	Male and female catkins separate on same tree in February - March.
Fruit:	Acorn of average size (3/4" - 1" long), ripening in Fall.

Traits: A wonderful shade tree with good Fall color that tolerates heavy clay soils.

Quercus texana (nuttallii) Nuttall Oak

Height:	100' - 120'
Leaves:	Alternate, simple, late season deciduous (late Nov. to Dec.) with dark red color, 5-7 deep lobed.
Flower:	Male and female catkins separate on same tree, as late as early April.
Fruit:	Acorn of average size (3/4" - 1"), brownish red and usually striped.
Traits:	A relatively fast growing oak with good Fall color which usually occurs after the red oaks.

Quercus phellos	Willow Oak

Height:	100' - 120'
Leaves:	Alternate, simple, deciduous, lanceolate (long and narrow)
Flower:	Male and female catkins separate on same tree in Feb Mar.
Fruit:	Acorn is small ($\%$ " long) which takes 2 yrs. to mature
Traits:	As with Laurel Oak, this species makes a fine shade tree

Quercus stellata

Post Oak

Height:	30' - 70'
Leaves:	Alternate, simple, has a variety of lobing (4" - 5" long), deciduous but brown leaves often persist on tree through Winter.
Flower:	Male and female catkins separate on same tree in March - April.
Fruit:	Acorn in small (½" - 3/4") maturing in one year, ripe in September.

Traits: Post Oak is a wonderful shade tree whose dominate presence defines Post Oak Savannah, not commonly available in the trade but worthy of use.

Quercus virgini	ana Live Oak
Height:	40'-60'
Leaves:	Simple, alternate, evergreen, dark shiny green above, dull and lighter below. 1"-3" long and ½"-1 ½" wide, oval to oblong, elliptic or obovate.
Flower:	Staminate and pistillate catkins separate but on the same tree, catkins are yellowish green in Mar-May.
Fruit:	Acorn is ½"-1" long (a relatively small acorn compared to other native oaks) in clusters of 3 to 5 in Sep-Nov.
Traits:	Live Oak is a very popular native ornamental, which in my opinion gets used too often in our urban landscapes which speaks volumes about its durability and adaptability. Although over- utilized in cities like Houston (thereby creating a monoculture like environment), Live Oak has a definite useful place in Texas gardens.

Sapindus drummondii	Soapberry
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Height:	25' - 35'
Leaves:	Alternate, pinnately compound (15" - 18" long) leaflets, 6 to 17 in number (1" - 4" long), deciduous with yellow Fall color.
Flower:	Small 5 petaled (1/4" long) in branched clusters in April - May.
Fruit:	Clusters of round, smooth, yellow to brown in color ($\%$ ") that persist throughout Winter containing up to 37% saponin and can be used like soap when mashed and added to water.
Traits:	A good ornamental for Fall color and fruit clusters. Also, it will grow in poor soils. Was once given consideration for state tree of Texas before the Pecan was chosen.

Taxodium distichum

Bald Cypress

Height:	120'
Leaves:	Alternate, 2-ranked (1/4" - 1/2" long) flat, sessile, needle-like, deciduous.
Flower:	Male and female cones separate on same tree, not showy in Mar.
Fruit:	Cones rounded + 1" - 1 ½" diameter ripening in mid Sep. to mid Nov.
Traits:	Cypress makes a wonderful, fast growing, long lived shade tree and is a good urban tree; Pond Cypress: <i>Taxodium ascendens</i> , whose presence in East Texas is subject to debate, is also a good landscape tree; as is Montezuma Cypress: <i>T. mucronatum</i> from South Texas and Mexico which is evergreen in mild winters.

Ulmus crassifolia

Cedar Elm

Height:	30' - 60'
Leaves:	Alternate, simple (1" - 2" long, ½" - 1" wide) with a toothed margin, deciduous, dark yellow Fall color.
Flower:	Inconspicuous, perfect in August - September.
Fruit:	Small ($1/4$ " - $\frac{1}{2}$ ") with most of the size created by a wing that is paper like and surrounds the seed.
Traits:	A fast growing tree that can be used in almost any soil conditions, requiring little to no care.

SMALL TREES

Aesculus pavia

Red Buckeye

Height:	10' -	20'

Leaves: Palmately compound with 5 leaflets (each 2" - 6" long), deciduous, defoliates in mid to late Summer (July - August).

Flower: Terminal clusters (6" - 12" long) of red, tubular or trumpet like flowers (3/4" - 2" long).

Fruit: Rounded with leather like husk containing 1 - 3 chestnut like seeds, ripening in Fall.

Traits: A wonderful small tree because of its showy flowers that should be used more, but may not get more attention because of slow growth and Summer defoliation. Also worthy is *Aesculus arguta*, Texas Buckeye with yellow flowers.

Alnus serrulata

Hazel Alder

Height:	10' - 30', usually in the 10' range
Leaves:	Alternate, simple oval to obovate with serrated margin, deciduous, yellow Fall color
Flower:	Male catkins, 2"-4" long in clusters of 2 to 5, female catkins smaller, 1/4" - 1/3" on same plant
Fruit:	Cone like with several nutlets inside
Traits:	A fine small tree that can also be used as a deciduous shrub hedge; utilized for Fall color (yellow to red) and male catkins

Aralia spinosa	Devil's Walking Stick
Height:	25' - 30'
Leaves:	Alternate, twice pinnately compound, deciduous with red Fall color; leaves can be 3' - 4' long and 2' - 4' wide
Flower:	Large terminal panicle (2' - 3' long), with smaller umbels of individual blooms that are white

- in summer (Jul. Aug.) Fruit: Numerous, black berry-like (drupe) on panicle, ripening in late Sep. - Oct.
- Traits: A conversation piece because of thorns on trunk, also a curiosity because of foliage; has a delicate look which is useful in a garden

Cephalanthus occidentalis

Button Bush

Height: 5'-15'

Flower:	Clustered in round, ball-like group of small white flowers. Clusters are very showy, blooms from Jun-Sep.
Fruit:	Round cluster of brown nutlets ripe in Sep-Nov.
Traits:	Irregular, round shape and unique bloom clusters make for an attractive garden addition. Tolerates standing water for long periods of time which makes it useful for wildlife for cover near water.
Cercis canadens	sis Red Bud
Height:	10'-15'
Leaves:	Heart shaped or cordate, simple, alternate 2"-4" long and 2"-4" wide, dark glossy green, deciduous with yellow to red fall color.
Flower:	Clusters (bundles) of very numerous blooms on short branches forming on terminal or axillary of branches. Individual blooms are pea-like and pink in late winter (Feb-Mar).
Fruit:	Legume, (flat, thick, leathery pod with bean-like seeds), 3"-5" long, brick red to brown when ripe in fall (Sep-Oct).
Traits:	Another showy tree when in bloom or in fall color that is also utilized by a variety of wildlife such as seeds by birds and new growth by deer. It has also been reported that the blooms are fried and eaten in Mexico. It is also known as Judas Tree because it was said that Judas had hung himself from a Red Bud.
Cornus florida	Flowering Dogwood
Height:	25' - 30'
Leaves:	Opposite, simple, oval to rounded in shape (2" - 6" long, 1" - 3" wide), deciduous, Fall color is orange to red to maroon.
Flower:	Small clusters of small, yellowish green blooms subtended by 4 white bracts which are usually mistaken for petals, blooming in February - March.

Opposite or whorls of 3, simple, ovate (2"-8" long, 1"-3" wide), deciduous.

Fruit: Clusters of red oval (football like) fruit, called a drupe, that ripen in Fall and persist until Winter.

Leaves:

Traits: Good drainage is a must, so you should have sandy soils. If not, you may be better off with the shrub *Cornus drummondii*, Roughleaf Dogwood.

Height:	20' - 40'
Leaves:	Alternate, simple, oblong-lanceolate or ovate-rhombic and thick like leather, deciduous, dark green with variety of Fall color
Flower:	Clusters of small, white rose-like blooms in April (has 5 petals)
Fruit:	Pome (apple like) that is blue when ripe in Sep.
Traits:	Good ornamental because of Spring time blooms and compliments other Hawthorns because of blue fruit (haws are usually red with a few yellow fruited species)

Blueberry Hawthorn

Height:	10' - 20'
Leaves:	Alternate, simple (2" - 4" long) oval or rounded, thick glossy dark green above, lighter below, deciduous with yellow to red Fall color.
Flower:	Clusters of white, small (1" - 2") rose like flowers in May - June.
Fruit:	Clusters of red apple like ($\frac{1}{2}$ ") pomes which ripen in Fall and persist into Winter.
Traits:	This, as with most other Haws, makes wonderful small tree that warrant more usage. Others from the area to use include: <i>Crataegus virdis</i> , Green Haw; <i>C. uniflora</i> , Single Flower Haw; <i>C. Mollis</i> , Downy Haw.

Cockspur Haw

Crataegus brachyacantha

Crataegus crus-gallii

Height:	10' - 15' up to 25'
Leaves:	alternate, simple, 3/4" - 1 ½" long, looks like parsley, deciduous, Fall color is yellow but sometimes red or orange

Flower: White, rose-like, 5 petals, flat 1" across in clusters in March

Fruit: Small (pea size) Pome, red in clusters in Fall (Sep. - Nov.)

Traits: Useful for flowers, fruit (wildlife food), and the showy foliage; Care should be taken in placement because of thorns

Parsley Hawthorn

Height:	10' - 25'
Leaves:	Alternate, simple, obovate to somewhat lanceolate, deciduous, dark green above, rusty colored below, various Fall color (red to orange or yellow)
Flower:	White, rose-like, 5 petals, in clusters in February
Fruit:	Pome, ripening in may is red to 1" across, edible
Traits:	Attractive for its white flowers, useful because it can stand seasonally wet feet and edible fruit that makes a wonderful jelly which is now commercially available; Also good for making wine or syrup

May Haw

Cyrilla racemiflora

Crataegus opaca

Crataegus marshallii

Leatherwood, Titi

Height: 15' - 25', on occasion taller

- Leaves: Alternate, simple, semi-evergreen (few that change color can be red to yellow) that is 60% of foliage stays green through Winter, oblong to elliptic
- Flower: Raceme, 2" 9" long, whorled on previous years growth, white, fragrant in late May to early June

Fruit: On raceme, tan or brown persisting through Winter

Traits: One of East Texas' most under used and unappreciated natives; useful for flowers, fruit, semievergreen foliage; grows in wet places, but tolerates drier conditions; popular with bees and makes good honey; Needs to be USED MORE

Hamamelis virginiana

Witch Hazel

Height:	20' - 30'
Leaves:	Simple, alternate, oval to obovate and deciduous with dark yellow Fall color.
Flower:	Clusters of usually bright yellow, sometimes orange, with 4 frilly petals. Blooms anywhere from late Fall to late Winter which adds to its ornamental value because not much else happens in Winter.
Fruit:	A woody capsule that contains 2 (sometimes 1) shiny black seeds. When ripe, dehiscent capsule forces seeds out (shoots out seed).
Traits:	A useful plant for Winter blooms, wildlife habitat, Fall color, or when multi-trunked for its bark and shape.

Morella	cerifera
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Wax Myrtle

Height:	25' - 35'
Leaves:	Alternate, simple, elliptic (1 $\frac{1}{2}$ " - 5" long, 1/3" - 2/3" wide) evergreen
Flower:	Short catkins with male and female flowers on separate plants, green to brown in color and not very showy in Mar Apr.
Fruit:	Small, gray when ripe in October because of thick, waxy coating
Traits:	An excellent evergreen with some drought tolerance; Two other species found in the upper Texas Coast include Dwarf Wax Myrtle: <i>Morella pusilla</i> smaller in size and shrubby, and Bayberry: <i>Morella heterophylla</i> which has bigger foliage and likes moist, fertile soils

Persea borbonia

Planera aquatica

Red Bay

Height:	30' - 50'
Leaves:	Alternate, simple, aromatic, evergreen, elliptic-oblong
Flower:	Small in small panicles, bell shaped, light yellow in March
Fruit:	Dark blue to black drupe in Oct Nov.
Traits:	A useful evergreen small tree for screening, or for its aromatic leaves; also good is Swamp Red Bay: <i>Persea borbonia</i> var. <i>palustris</i> which tolerates wet feet

Water Elm

Height:	30' - 40'
Leaves:	Alternate, simple, ovate (Elm like), serrated edges, deciduous, 2" - 4" long, 1" wide
Flower:	Unique in that it has male, female, and perfect flowers on same tree, all are greenish yellow and non-showy
Fruit:	Compressed, rounded covered with irregular warts, leathery
Traits:	Good for poor soils that are seasonally flooded or as an alternative to the other Elm family members

Prunus mexica	na Mexican Plum
Height:	15' - 25'
Leaves:	Alternate, simple, oval or ovate (2" - 4" long, 1 ½" - 3" wide), deciduous, red, orange, or yellow Fall color (September - October).
Flower:	Clusters of white, small (1/2" - 3/4" across) rose like flowers in May - June.
Fruit:	Cluster of plums (3/4" - 1" round) ripening in August - September.
Traits:	One might also consider the thicket forming shrub <i>Prunus angustifolia</i> , Chickasaw Plum, good as a barrier/screen plant. Or for well drained sites, <i>Prunus umbellata</i> , Flatwoods Plum.

Native Plant Society of Texas

Rhus copallina

Sambucus canadensis

Flameleaf Sumac

Height:	20' - 30'
Leaves:	Alternate, pinnately compound, 5" - 12" long with 7 - 17 leaflet that are lanceolate, deciduous with red Fall color
Flower:	Cluster of polygamo-deciduous blooms, each 1/8" to 1/4" across, showy in mass
Fruit:	Compact panicle that is upright or drooping, individual fruit is a small 1/8" - 1/4" drupe and red when ripe in Fall
Traits:	Attractive Fall color and fruit make this a fine addition to the landscape, it is tough and durable

Elderberry

Height:	15' - 30'	
Leaves:	Opposite, odd pinnately compound (4"-12" long) made up of 5-11 leaflets. Leaflets are elliptic or lanceolate to oval 2" - 6" long, 1"- 2" wide. Deciduous.	
Flower:	Large clusters (terminal cymes) 4" - 12" wide of many small white blooms in May-Jul.	
Fruit:	Clusters of purple or black drupe (berry-like) fruit. Clusters are 4" - 12" wide, ripening in Aug- Nov, edible, and utilized by wildlife.	
Traits:	Elderberry is useful not only for the clusters of first showy blooms and then fruit, but also for attracting wildlife. Elderberry tolerates poor soil conditions.	
Sophora affinis	Eve's Necklace	
Height:	15' - 25'	
Leaves:	Alternate, odd-pinnately compound (6" - 12" long) with 11-19 leaflets that are oval to elliptic (½" - 1" long), deciduous with lemon yellow Fall color.	
Flower:	In a drooping raceme (cluster)(3" - 9" long), individual blooms are typical, legume like (½"), white to pink in May - June.	

- Fruit: A pod that looks like a black necklace (2" 6" long) which is where it gets its common name, ripens in Fall and persists throughout Winter.
- Traits: Useful for its Fall color, blooms, and fruit, this deciduous relative of the Texas Mountain Laurel tolerates heavy clay soils. Adds a graceful, soft look to the landscape.

Styrax americanus

Snowbell

Height: 8' - 15'

Leaves: Alternate, simple, oval or elliptic, 1" - 4" long, deciduous, Fall color is yellow.

Flower: White, bell shaped flowers that hang down in short racemes, $\frac{1}{2}$ - 1" long, May.

Fruit: Small (1/4" to 1/3" diameter) round dry drupe, ripens in Sep. - Oct.

Traits:Showy white flowers make this a wonderful garden focal point. Downy American Snowbell:
Styrax americana var. pulveruleatus looks the same, but has persistent hairs on older foliage
and is happier multi-trunked, both like moist conditions. For drier sites, Bigleaf Snowbell:
Styrax grandifolius, found in mesic sites and mixed hardwood ravines makes a fine garden
plant.

Vaccinium arboreum

Farkleberry

Height:	20' - 25'
Leaves:	Alternate, simple, oval to elliptic (1" - 2" long, ½' - 3/4" wide), deciduous, late Fall color usually maroon, November - January.
Flower:	White bell shaped flowers in clusters (racemes) ($1/4$ " - $\frac{1}{2}$ " long), February - March.
Fruit:	Small blueberry (1/4" - 1/3" dia.), black when ripe in clusters September - November.
Traits:	Farkleberry is useful for a variety of reasons, wildlife, Fall color, blooms and adaptability to poor soils. I have seen it growing in Post Oak Savannahs in infertile red clay soils.

Viburnum rufidulum

Rusty Blackhaw

Height:	25' - 35'
Leaves:	Opposite, simple, round to oval, dark green (1" - 3" long, ½" - 2" wide), deciduous, with various Fall color from Maroon to red to orange in October - November.
Flower:	Flat clusters called cymes (2" - 5" dia.), white, individual small blooms (1/4" dia.) March - April.
Fruit:	Clusters of small (1/4" - ½" dia.) round fruits, dark blue when ripe September - October.
Traits:	Rusty Blackhaw is a wonderful under story tree for flowers, fruit, Fall color, and wildlife, as are several other native viburnums.

<u>SHRUBS</u>

Amelanchier arborea

Serviceberry

- Height: 15' 25'
- Leaves: Simple, alternate, oval to obovate, ½"- 1 ½" long and ½"-1" wide, dark gray-green to dark green, deciduous.
- Flower: Racemes, ½"-1 ½" long with 3-6 white 5 petaled star shaped blooms in late Spring (Apr.-Jun.), showy.
- Fruit: Clusters of pomes (apple-like) fruit, 2"-3" long. Fruit is pea sized red turning blue-black when allowed to remain. Edible.
- Traits: Serviceberry has edible fruit when you can beat the wide variety of wildlife to them. Also worthy for its showy blooms and Fall color.

Amorpha frutec	Bastard Indigo
Height:	10' - 15'
Leaves:	Alternate, odd pinnately compound (6" - 12" long) 11-25 leaflets, leaflets round to oval (½" - 1" long, 1/4" - ½" wide), deciduous, Fall color yellow to red September - October.
Flower:	Many small blooms in a spiked raceme 3" - 9" long, individual blooms are dark purple with orange centers May - August, very showy.

Fruit: Racemes of small brown, round flattened fruits ripe in September - November.

Traits: This wetland emergent is useful for wet places and calcareous soils with delicate looking foliage, interesting blooms, and straight, multi-trunked stems. Also consider *Amorpha paniculata* which has larger leaflets and longer bloom racemes.

Aronia arbutifo	lia Chokeberry
Height:	10' - 15'
Leaves:	Alternate, simple oval (1" - 3" long, $\frac{1}{2}$ " - 1 $\frac{1}{2}$ " wide) deciduous, yellow to red Fall color
Flower:	Terminal clusters (compound cymes) of white, 5 petaled small flowers (1/4" wide), late Feb. to Mar.
Fruit:	Pome, round, small (1/4" diameter) in clusters, red ripens in October but persists into Winter if wildlife allows
Traits:	Attractive, multi-caned shrub for its white cluster blooms and red clustered fruit that is at home in a swamp, but tolerates drier garden conditions. Good for Wildlife

American Beautyberry/ French Mulberry

Height:	3' - 6'
Leaves:	Sub opposite, simple, oval to ovate with pointed tip (4" - 6" long, 2" - 4" wide), deciduous with yellow Fall color September - December.
Flower:	Many blooms in stem whorled cymes (cyme $\frac{1}{2}$ " - 1 $\frac{1}{2}$ " dia.), white to pinkish May - August.
Fruit:	Showiest feature, tight clusters circling stem of many small purple berry-like fruit,

occasionally white (1/4" dia.), September - December.

Traits: A wonderful multi-trunked bushy shrub that tolerates poor soils, with showy fruit for wildlife. Readily available in the nursery trade.

Callicarpa americana

New Jersey Tea/Redroot

Height:	1' - 3'	
Leaves:	Alternate, simple, oval to ovate (2" - 4" long, 1" - 2" wide), dark green, semi-evergreen (leave persist but look haggard).	
Flower:	Many small white blooms in clusters (Panicle) 2" - 4" long in May - June.	
Fruit:	A small (1/4" dia.) 3 lobed capsule (called a drupe) in clusters in September - October.	
Traits:	A showy small shrub rich in folklore, the dried leaves were used as a tea substitute and the roots are used with increasing blood coagulability after surgeries. Merits more use.	

Cornus drummondii

Roughleaf Dogwood

Height:	5' - 10'
Leaves:	Opposite, simple, ovate to lanceolate (1" - 5" long, ½" - 3" wide), deciduous, red Fall color
Flower:	Terminal spreading cymes, perfect, yellowish white in May to July
Fruit:	Drupe in clusters, round (1/4" diameter), white when ripe which is Aug Oct.
Traits:	An irregular spreading shrub that works well as a deciduous hedge or companion shrub.

Erythrina herbacea	Coral Bean/Mamou
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Height:	3' - 6', occasionally larger.
Leaves:	On lower portion of plant below blooms, alternate to whorled at nodes, 3 foliate, leaflets deltoid, green to yellowish green, deciduous.
Flower:	Long spikes (6" - 12" long) of deep red, long (1" - 3" long) legume like blooms in April - June, very showy.
Fruit:	A bean that turns black and splits when ripe (6" - 12" long) exposing bright red (½" long) beans. Showy.
Traits:	An attractive irregular shaped shrub useful as a focal point or traffic deterrent (stem can be thorny) that will freeze back in severe winters, but should come back from the base. <u>Caution:</u> beans are very poisonous.

Euonymous americana	Strawberry Bush or Mamou

Height:	5'
Leaves:	Opposite, simple, ovate to elliptic (2" - 4" long, 1" - 2" wide), deciduous in a variety of Fall color, red to yellow in October - November.
Flower:	Clusters (cymes) of small (½" wide) creamy yellow blooms in June - July.
Fruit:	4 lobed (sometimes 3 lobed) capsule ($\frac{1}{2}$ " dia.), red when ripe that split to expose red coated seed September - October.
Traits:	A wonderful native shrub that has been used in gardening since the 1700's.

Forestiera	acuminata

Hibiscus spp

Swamp Privet

Height:	20' - 25'
Leaves:	Opposite, simple, oblong or ovate (2" - 4" long, 1" - 2" wide), deciduous with yellow Fall color
Flower:	Can be perfect or separate male and female on same plant, yellowish green in March
Fruit:	Oblong drupe (1" long) purplish blue when ripe in Aug Sep.
Traits:	Looks like Privet, but isn't invasive and tolerates wet, swampy sites; irregular branching shape useful as a companion shrub

Height:	1'-6'
Leaves:	Simple, alternate, ovate to reniform or sometimes lobed, 1" - 4" long, ½" - 4" wide, smooth or covered with numerous small hairs depending on species.
Flower:	Showy, White, white with red at petal base, creamy yellow to crimson red in color, 3"-5" wide with 5 petals, each 2"-4 ½" long. Blooms throughout late spring through early fall.
Fruit:	A globose capsule, ½" - 1" in diameter and brown containing numerous seed. Ripens throughout year several weeks after bloom drops.

Mallows

Traits:	A very showy shrub because of the because of the blooms. Species include <i>H. moshutos, H. dasycalyx, H. laevis, H. lasiocarpus, and H. aculeatus</i> . In nature all but <i>aculeatus</i> are found in shallow standing water but tolerate intermittent dry conditions.
llex coriacea	Tall Inkberry Holly
Height:	10' - 15'
Leaves:	Alternate, simple, evergreen, obovate, shiny dark green
Flower:	Male and female flowers on separate plants, small (1/4" diameter), sometimes in clusters, dull white colored petals in March
Fruit:	Round drupe, 1/4" wide, dark blue to black in Aug Oct.

Traits: An upright, multi-trunked, thicket forming holly that is useful for its habit as a hedge, and because it tolerates wet feet, a good wildlife habitat plant

Height:	10' - 15'
Leaves:	Alternate, simple, ovate to elliptic, deciduous, Fall color yellow (½" - 4" long)
Flower:	Male and female flowers on separate plants, small in clusters (1/5" - 1/4" diameter) in March
Fruit:	Round drupe (1/4" wide), bright red in Sep Nov., persists into Winter
Traits:	A showy deciduous holly that I know only in the wild from the Sabine river at (near) I-10; In the East where it is more common, numerous selections have been made; need to utilize Texas germplasm more; At home in wet places or average garden soil situations. Also good for a variety of conditions include <i>llex decidua</i> and for drier sites there is <i>llex longipes</i> and <i>llex ambigua</i> .

Winterberry Holly

llex vomitoria

llex verticillata

Youpon

Height:	10' - 30'	

Leaves: Alternate, simple (1/4" - 1" long, 1/8" - 3/4" wide) oval to elliptic, evergreen.

Flower:	Inconspicuous, small creme to yellowish green, male and female on separate plants April - May.
Fruit:	Clusters of red berries (on female plants) in Fall that persist throughout Winter. Fruit small (1/4" - 1/3" dia.).
Traits:	There are numerous cultivars of Youpon available to include <i>I. v. Will Fleming</i> ; Will's Upright originally from the Post Oak Savvanah (near Hempstead), also <i>I. v. Lynn Lowrey</i> ; Lynn's Big Leaf from South Texas and <i>I. v. Saratoga gold</i> ; Yellowberry Youpon from East Texas.

ltea virginica	Sweetspire
Height:	3' - 6'
Leaves:	Alternate, simple, oblong or oval (1" - 3" long, ½" - 1 ½" wide), deciduous; Fall color is yellow, orange, red, or maroon, persistent into Winter
Flower:	Terminal racemes (2" - 6" long) with numerous small, white flowers in May - Jul.
Fruit:	Capsule on terminal racemes in Oct Nov.
Traits:	Attractive shrub for its flowers and Fall color, need to select Texas varieties as well as using other selections which include "Sarah Eve" which has pink petioles, Henry's Garnet which has maroon fall color, and Peter's Peach Creek. late Fall color

Malvaviscus arboreus var. drummondii

Turks Cap

Height:	3'-5'
Leaves:	Alternate, simple, 2" - 4" long, 2" - 4" wide, rounded sometimes also 3 lobed, deciduous or evergreen when there is no frost or freeze.
Flower:	Unopened mallow (fuschia-like) 1" - 2" long; red sometimes orange tinted, there is a pure white form called T.J.'s white for its discovery by T.J. Marks; Aug-Oct (sometimes as late as Nov).
Fruit:	Small, red, cherry pepper like capsule; good bird food.
Traits:	Useful for its unique flowers in perennial borders, against chain-link fences, under deciduous trees, or mixed foundation plantings; usage dates to early southern gardening. Also worthy is <i>M. a.</i> var. <i>mexicana</i> : Mexican Turks Cap with its larger leaves and larger blooms which is native to southern Texas.

Ribes aureum	Golden Currant
Height:	4'-8'
Leaves:	Simple, clustered or alternate, lobed oval that is orbicular-reniform usually 3 lobes, 1"-2" long and 1"-2" wide, deciduous with nice Fall color.
Flower:	Clusters (racemes), 1"-2 ½" long, made up of 1-15 blooms. Blooms are cream to yellow with 5 petals, showy, and sometimes fragrant in Spring (Mar-Jun).
Fruit:	A smooth red to yellow berry (round or globose) +/- ¼" wide, can be showy on a heavy bearing plant, ripens in Summer (Jul-Sep).
Traits:	A sprawling shrub with ornamental and functional uses with its foliage, flowers, and fruit. Also, as a ground cover for erosion control and for wildlife. This species as with other gooseberries warrant more use.
Sabal minor	Palmetto
Height:	2' - 8' (foliage)
Leaves:	Clustered at base, fan like, evergreen, pale green to dark green
Flower:	Spadix, 4' - 8' tall from spathe, upright or weeping, terminal panicle (cluster) 2'- 3' long, individual flowers small (1/4" diameter), numerous May - Jun.
Fruit:	Round drupe, 1/4" diameter, numerous on panicle, black when ripe, Sep Oct.
Traits:	A trunkless palm that because of fan like leaves can be used for a tropical look; very slow growing taking several years from seed to produce fan like foliage

Stillingia sylvatica

Queens Delight

Height: 2'-4'

Leaves: Simple, alternate, lanceolate or spathulate, 1" - 3" long, 1/4" - ½" wide with a toothed leaf margin.

- Flower: A few to numerous on terminal spike composed of male and female blooms which are small, yellowish and without petals in May-Jun.
- Fruit: A hard globose green capsule, prominently 3 lobed, 1/4" ½" long ripening in late Summer.
- Traits: A tender plant making it more of a perennial in colder regions. Useful for its narrow foliage and interesting yellowish blooming spikes. The seed is reported to be utilized by a number of birds to include quail.

Coralberry

Height:	2' - 4'
Leaves:	Opposite, simple, oval to round ($\frac{1}{2}$ " - 1 $\frac{1}{2}$ " long, $\frac{1}{2}$ " - 1" wide) semi-evergreen to evergreen, dark green to blue-green.
Flower:	Many small blooms in dense clusters (spikes) cream to pinkish, not very showy, in June - July.
Fruit:	Clusters of pink to red or purple drupes (1/4" - $\frac{1}{2}$ " dia.) that ripen in Fall and persist through Winter, showy.
Traits:	This low running shrub can be easily used in mass as a ground cover. Spreads readily from runners. The fruit is utilized by wildlife. Tolerates clay soils and shade.
Viburnum dent	atum Arrowwood Viburnum
Height:	3' - 15'
Leaves:	Opposite, simple, rotund to ovate, 1" - 3" long margin dentate (serrated), deciduous, Fall color red to yellow
Flower:	Cyme (cluster) of white flowers at end of branches, cyme 2" - 3" diameter, May - Jun.
Fruit:	Clusters of drupes (1/4" - ½" diameter) that are dark blue to black, Aug Oct.

Traits: A nice round shaped, multi-trunked shrub that is nice in a shrub border or as a foundation plant; There is a tree form that is also nice

Symphoricarpos orbiculatus

Viburnum nudum

Possum-Haw Viburnum

Height:	10' - 15', occasionally 20'
Leaves:	Opposite, simple, oval, oblong or elliptic (2" - 5" long, 1" - 2" wide), leathery, dull to dark green, deciduous, orange to red Fall color
Flower:	Cyme cluster of white flowers at branch ends, cyme 2 $\frac{1}{2}$ " - 4" diameter, Apr May
Fruit:	Drupe in clusters that are dark blue when ripe in Fall but pinkish in late Summer
Traits:	A fine irregular shaped shrub that is useful for its showy flower clusters and Fall color; can be useful because it tolerates wet feet but does well in a garden setting of fertile soil and less water

GRASS/SEDGE/RUSH

Andropogon ge	rardii Big Bluestem
Height:	2' - 4'
Leaves:	Blades 18" - 24" long from a loose clump, leaves on stem are shorter green to gray green with reddish coloring on blade tips, also on stem at sheath.
Flower:	Racemes on elongated terminal peduncle, 3 - 6 in number fewer on any branches. Yellow blooms on purplish racemes.
Fruit:	Racemes that fade from purple to bronze wit silvery white glumes that persist to Fall color of foliage.
Traits:	A fine grass for a backdrop because of height, but also for color in Winter and wildlife utilization. A fine grass for dry arrangements.

Carex cherokeensis

Carex glaucescens

Bushy Bluestem

Height:	2' - 4'
Leaves:	Blades are long and narrow (10" - 18" long, 1/4" - ½" wide), shiny green leaves, clump forming, deciduous Fall color is reddish purple
Flower:	Dense paired racemes on stalks 2' - 3' above foliage that becomes plume-like with age in Aug Sep.
Fruit:	Racemes continue to look plume-like and turn orange with age, Oct Dec., and persistent orange-brown through Winter
Traits:	Works well associated with water features, planted near ponds or in tubs, either alone or in mass; The plumes look good in light so are good in fresh cut arrangements

Height:	12" - 24"
Leaves:	Blades are long and narrow (12" - 24" long, 1/8" - 1/4" wide) forming dense clumping mat, staying dark green late into Fall early Winter
Flower:	Terminal spikelets (4 - 7) and subterminal spikelets whorled (12 in number), $1/4$ " - $\frac{1}{2}$ " long in early summer May - Jul.
Fruit:	In both types of spikelets in Fall
Traits:	useful for its dense foliar habit and somewhat persistent of green foliage; Can be used in mass or as a border; Tolerates wet or well drained (sandy) situations. Shade tolerant.

Cherokee Sedge

Height:	6"-12"
Leaves:	Blades are long and narrow; 6"-12" long and 1/8"-1/4" wide forming a dense clump, staying blueish green into Fall, early Winter.
Flower:	Terminal spikelets (4-7) and subterminal spikelets whorled 1/8"-1½" long in Jul-Sep.
Fruit:	In both type of spikelets in Fall.

Sedge
Traits: Useful for its dense foliage; can be used in mass as a tall ground cover, as a border. Tolerates shade and wet conditions.

Inland Sea Oats

Height:	1'-4'
Leaves:	Blades are bamboo-like, 4"-6" long and 1/4"-3/4" wide which fade to a silvery gray and persist throughout Winter making it deciduous.
Flower:	In drooping clusters above foliage. The flower spikes are flat and ½"-1" long appearing in Summer and green.
Fruit:	Are composed of the remnant bloom clusters, which look like oats lending to the name, and a brown to silvery gray which persist on plant throughout Winter.
Traits:	A durable grass that is shade and drought tolerant, that has showy blooms and fruit and attractive silvery gray winter color. Re-seeds readily which needs to be kept in mind when placing it in a garden setting so as not to have it become invasive.

Eragrostis spp.	Love Grass
Height:	1'-3'
Leaves:	Strap or blade-like to thread or needle-like, erect to spreading, turfed or mounded, green to blue-green.
Flower:	Open panicle (a cluster of clusters), size depends upon species, Spring to Fall(Sep-Dec).
Fruit:	Open panicles, size and shape varies depending on species in Fall (Sep-Dec).
Traits:	There are a number of perennial species that can be utilized in various ways from ornamental to forage. Love Grasses are a fine group of shorter clumpers that can be used in mass or in mixed plantings. Species include <i>E. mexicana, E. pectinacea</i> ; Spreading Love Grass, <i>E. secundiflora;</i> Red Love Grass, <i>E. intermedia;</i> Plains Love Grass, <i>E. erosa;</i> Chihuahua Love Grass, Red Love Grass, <i>E. spectabilis;</i> Purple Love Grass, <i>E. spicata;</i> Spike Love Grass, and <i>E. trichodes;</i> Sand Love Grass.

Chasmanthium latifolium

Erianthus giganteus

Sugarcane Plume Grass

2	C	
3	C	

Height:	4' - 8'
Leaves:	Blades are long, narrow, and hairy (2' - 4') present on stalk, hairs easy to see at sheath
Flower:	Oblong shaped panicle (6" - 12" long), maroon in Sep Oct.
Fruit:	On panicle, looks like a plume, Nov Dec.
Traits:	A showy tall grass that is an excellent substitute for pampas grass and should be used as such, but is more deciduous yet easy to maintain

Soft Rush

Juncus effusus		
Height:	1 ½' - 2 ½'	

Leaves:	Soft, round, stems that are dark green instead of leaves (bladeless)
Flower:	Panicle noticeable from stem, 30 to 100 flowered in Apr Jun. brownish
Fruit:	Panicle turns brown to gray as seed ripens in late summer
Traits:	This native to all over the world is a fine accent for ponds or in containers near pools, tolerates wet feet

Muhlenbergia filipes	Gulf Muhly

Height:	6" - 24"
Leaves:	Long, very narrow blades (6" - 12" long, 1/8" wide) forming a clump
Flower:	Panicles 6" - 12" above foliage clump, open somewhat pyramid shaped, reddish purple to maroon Oct Nov.
Fruit:	On panicle reddish fading to gray in Nov Dec.
Traits:	This mounding (clump form) grass is spectacular in mass; Useful as a border specimen; Flowers can be used in fresh or dried arrangements

Switch Grass

Height:	4' - 8'
Leaves:	Blades are 18" - 24" long and 1/4" - ½" wide, dark green to gray green, Fall color is various yellows fading to tan
Flower:	Open panicles that appear 1 - 2 feet above foliage clump, blooms can be red, pinkish, or silvery white, Aug Oct.
Fruit:	On panicle, matures to grayish white to brownish tan into the Winter
Traits:	Can be utilized alone or in mass, taller varieties make wonderful backdrop in borders or associated with water (streams, ponds, wet places), excellent for erosion control; Plant parts good for dried flower arrangements

Ηργα	nlø	ctic	val	iduc
пехи	vie	cus	vui	iuus

Soft-stem Bulrush

Height: 6' - 10'

Leaves: Soft, round, stems that are dark green instead of leaves (bladeless).

Flower: Panicle noticeable from stem, spikelets either single or glomerules, with scales exceeding achenes, flowered in Apr. - Jun. Brownish.

Fruit: Panicle turns brown to gray as seed ripens in late summer.

Traits: This native is a fine accent for ponds or in containers near pools, tolerates wet feet and serves as food source and cover for a number of aquatic bird species.

Scirpus cyperinus var. rubicosus Wool Grass

Height:4' - 8'Leaves:Blades form Basal clump 12" - 18" long, 1/4" - ½" wide, medium green, Fall color yellowFlower:Panicle containing 200 - 500 reddish brown spikelets in Aug. - Sep. that usually droops from
straight upright stalkFruit:On panicle in Fall, brown in color that persists into Winter

Sorghastrum ni	utans Indian Grass
Height:	6" - 4' tall foliage clump, 18" - 6' tall in bloom.
Leaves:	Blades 6" - 40" long from open spreading masses. Shorter leaves occur on bloom stalk. Dark green to silvery blue in color.
Flower:	Dense, narrow panicle of many yellow blooms that have long awns (2" - 3"). Panicle 6" - 24" long on stalk above foliage. Good in cut flower arrangements.
Fruit:	Dense panicle fades to silvery gray as it persists into Winter. Good in dry arrangements.
Traits:	A fine grass for a medium to tall backdrop in mass like back in a perennial border for its green to blue foliage. Gail Barton of Meridian Mississippi has short (2' - 3' in bloom) selection that appears to show promise as a dwarf and is in shade for her. My propagule from her, also in some shade, has been a bit taller (3' - 3 ½' tall) but tight in habit.

Height:	2' - 3 ½'
Leaves:	Blades form basal clump 6" - 12" long, 1/8" - 1/4" long, dull green
Flower:	Closed (tight) panicle of 20 - 100 spikelets, stalk is 12" - 18" above foliage clump with blooms on upper half, in Summer
Fruit:	On panicle in late summer to Fall gray to brown
Traits:	Useful for its weeping clumped foliage that lends a delicate look; also useful near water features; Saline tolerance an added plus

Cord Grass

Spartina spartinae

Sporobolus junceus

Pineywoods Dropseed

Height:	6" - 18" tall dense foliage clump 12" - 30" tall in bloom.
Leaves:	Blades 6" - 18" long, very narrow, almost pine needle like. Dark green to gray green or blue.
Flower:	On an open pyramidal panicle with many small blooms on branches of panicle, bronze like bloom when flowering in Fall.
Fruit:	On panicle that is gray or silvery as Winter goes on.
Traits:	A good short mounding grass for front of perennial border or in mass as a ground cover. Tolerates bright (high) shade to full sun at home in well drained sites to heavy clay.

Tripsicum dactyloides	Eastern Gamma Grass
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Height:	4' - 6' tall
Leaves:	Blades 4' - 6' long, 1" - 2" wide, forming a dense clump. Green to dark green.
Flower:	Inflorescence 1' - 3' tall, pistilate part 1/4 the entire length, usually with 2 or 3 terminal racemes with the few staminate below the pistilate.
Fruit:	Looks somewhat like a corn kernal leading some scientists to speculate the possibility of Eastern Gamma being the precursor to modern day corn, but this theory is not well supported.
Traits:	A tall ornamental grass that grows in moist places, that tolerates drier sites, that defines the tall and mixed grass prairies. Rich in history in agriculture, this grass was once more dominant in numbers. Showy ornamental, yet interesting past usage.
Typha latifolia	Cattail

Height:	6' - 10'
Leaves:	Blades long and narrow (6' - 10' long, 1" - 2" wide), green into early Winter
Flower:	A spike on stalk with male above female parts, female flowers tight together 6" - 12" long (collectively) in Mar May and brown in color
Fruit:	Spike is brown around stalk so round into late Fall

Traits: Because a rapid spreader needs to have room like large ponds or golf courses or lakes, must have a wet spot and is useful for wildlife habitat and cover; Works well in tubs near swimming pools; Another good species for flower arrangements

Yucca spp.	Yucca
Height:	3'-30'
Leaves:	Stiff, leathery, blade-like or linear 1'-3' long, ½"-2" wide. Yellow to gray to dark green, evergreen in radiating clusters.
Flower:	A showy, densely flowered panicle on long terminal stalk (scape), scape 1'-3' long with flowers in upper third. Individual blooms have 6 segments (3 petals, 3 sepals) 1"-4" long, creamy white, white, sometimes purple to pink tinged, in Spring (Mar-Jun).
Fruit:	A black to brown capsule, 2"-4" long and 1"-2" wide, 3 celled with many flat seeds. Ripening in late Summer (Aug-Oct).
Traits:	Very showy when blooming, yuccas have been a mainstay landscape plant in xeric (dry) gardening. Species native to East Texas include Y. louisiana, Y. arkansanum, and Y. cernua.

HERBACEOUS

Allium drummondii

Prairie Onion

Height: 3" - 10"

- Leaves: Usually 3 leaved, basal, linear or grass-like and hollow; 5" 9" long, 1/8" ¼" wide. Gives off an onion like aroma when crushed.
- Flower: A cluster (umbel) of 10-25 small blooms, cluster ¼" 1 ½" wide found at top of a solitary hollow scape that is same length as foliage. From white to pink to maroon in Spring (Apr. Jun.).
- Fruit: An ovoid capsule that when ripe dries and becomes papery containing 3 chambers each filled with many small black seeds. Ripens May Jul.
- Traits: This onion-like lily family member is useful for its showy spring blooms and fragrant foliage and bulbs. Cultivated varieties of Allium have been popular in gardening for years with our native species finally gaining attention. Tolerates very poor soil conditions, an added plus.

Asclepias spp.	Milkweed
Height:	6" - 4' depending on species.
Leaves:	Opposite or alternate depending upon species, linear, lanceolate to broadly spathulate along herbaceous stems.
Flower:	Colors vary from white, orange, yellow, lavender, maroon, red, green, and pink. Small individual blooms, $1/8$ " - $\frac{1}{2}$ " wide in clusters or umbel which vary in size from $\frac{1}{2}$ " - 6". Bloom time also varies with species.
Fruit:	Capsule with many flat seeds that have papery covering and silky hairs which help wind dispense seed, but stick to everything.
Traits:	Note: different Milkweed species attract different butterflies and insects. Species to use include <i>A. tuberosa;</i> Butterfly Weed, yellow to orange, 1' - 2', well drained. <i>A. variegata;</i> Red Ring Milkweed, white, 2' - 3', well drained. <i>A. viridis;</i> Antelope's Head, green to cream, 6" - 20", heavy clay to sand; <i>A. rubra & A. lanceolata;</i> Milkweed, 3' - 4', <i>A. perennis;</i> Shore Milkweed, pinkish white, 1' - 2', <i>A. verticillata;</i> Whorled Milkweed, maroon, 6" - 10", wet places.

Baptisia alba va	r. macrophylla	White Wild Indigo
Height:	2' - 4'	
Leaves:	Alternate, compound with 3 leaf green to black, then gray.	lets, oval, 1" - 2" long, ½" - 1" wide, deciduous turning from
Flower:	Terminal raceme 1' - 2' long of m	any white bell shaped (legume) flowers May - Jun.
Fruit:	Legume on terminal raceme, 1"	- 2" long, 1/4" - ½" wide, black when ripe in August.
Traits:	Very showy in mass or in mixed blooming Bush Pea: <i>Baptisia sha</i> Nodding False Indigo	perennial planting, also found in East Texas is the yellow <i>erocarpa</i> which is extremely showy <i>as</i> well as <i>B. braceata,</i>

Native Plant Society of Texas

Winecup or Poppy Mallow

Height:	6" - 2', most are spreading and length can be to 4'.
Leaves:	Alternate, lanceolate to oblong with little to extreme leaf dissection ½" - 3" wide, dies back to carrot like root with a rosette in Winter.
Flower:	5 petaled, shaped like a wine glass or cup with maroon to burgundy color, 2" - 3" wide, March - July.
Fruit:	Many flat, corky seeds in a circular shape like a wagon wheel, ½" - 1" wide in mass, ripening in June - August.
Traits:	The flower blooms are basically the same for all spp. One <i>C. involvcrata</i> var. <i>ineariloba</i> ; Pink Wine Cup from the Hill Country in pink streaks on white. <i>C. digitata</i> ; Standing Winecup is taller to 3', also from central Texas. <i>C. papaver</i> from East Texas is a creeping winecup.

Height:	3'-10' from trailing or climbing stems (vine).
Leaves:	Opposite, compound made up of 3-11 leaflets. Leaflets are linear to lanceolate or rarely 3-cleft, wedge shaped. $\frac{1}{2}$ "-2" long and $\frac{1}{4}$ "-1" wide and deciduous.
Flower:	Single terminal, nodding on long stem (peduncle) which is red to purple with 4 petal like, 1"- 2" long, sepals with wavy margin. The bloom looks bell shaped. Mar-Oct.
Fruit:	A cluster of small, flattened achenes which have a long tail which is covered with hairs which ripen Aug-Dec.
Traits:	For some odd reason, our native Clematis' don't seem to be used much and I can't understand why. Blue Jasmine is fairly easy to grow in the garden as is <i>C. paniculata</i> ; Leatherflower, and the hill country native <i>C. texensis</i> ; Scarlet Leatherflower. All of which are fine delicate like vines for the landscape and warrant more usage.

Blue Jasmine

Crinum americanum

Callirhoe papaver

Clematis crispa

Southern Swamplily

Height: 18" - 36"

Leaves: Strap like (blade like) from bulb, 2' - 4' long, 1" - 2" wide, thick or leathery, usually persists through Winter.

Larkspur

Height:	2'-3'
Leaves:	Simple, alternate, 1"-3" long and wide and extremely lobed, almost creating segments.
Flower:	A dense terminal raceme containing few or many blooms. Bloom dark blue, light blue, almost white, or purplish in color. Made of 5 petal like sepals, the upper one spurred, ½" long and 1/4" wide and 4 petals, the upper two being spurred, Apr-Jul.
Fruit:	Cluster of 10-20 achenes creating globe-like bundles that split open when ripe in Jul-Sep.
Traits:	Native Larkspurs may be smaller than the cultivated ones readily available, but just as attractive and perennial, always an added plus. Attractive to the early butterflies and this as with the other native Larkspurs should be utilized more often.
Echinacea spp.	Purple Coneflower
Height:	1' - 3' tall (rosette 6" - 1' tall).
Leaves:	Mostly basal with some on bloom stalk, alternate, lanceolate, elliptic to spathulata or spear shaped depending on species, some are very hairy (sandpaper like).
Flower:	Has ray and disk flowers (so many flowered composite), ray flowers are pink to purple to lavender to graywhite petaled, several species have drooping ray flower petals (1" - 3" long), April to August.
Fruit:	Cone shaped head containing numerous seeds that are flat to square shaped and dark brown to black.
Traits:	

Delphinium carolinianum

6"-24" Height: Simple, opposite, clasping basally, lanceolate to oblong, 2"-3" long, ½"-1" wide. Leaves: Flower: Single blooms from upper leaf axils and very showy. 5 petals which are deep purple on the outer half of each petal with the interior varying, usually white centered with pink or yellow in the middle. 2"-3" wide, Jun-Sep. An ellipsoid (oval) capsule, dry with 2 parts each containing numerous tiny seed. Capsule Fruit: 1/4"-3/4" long, ripening Sep-Nov. Traits: A site to behold in mass and as showy as any field of Bluebonnets, yet cast aside for the cultivated Lasianthus spp. Is as worthy if not more so for use in the garden. I envy a number of folks in Washington County whose front yards are lighter, then darker blue from March to September with a break in May as it blooms Bluebonnets to bluebells. E. exaltatum; Bluebell Gentian should also be utilized.

Helianthus angustifolius	Swamp Sunflower
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Height:	3' - 6'
Leaves:	Alternate, blade like, 4 " - 6 " long, $1/4$ " - $\frac{1}{2}$ " wide, stiff and hairy all along stem, dying back to rosette.
Flower:	Numerous daisy-like flowers (Disk and Ray) Ray flowers yellow, 2" - 3" across in Fall, Sep Nov.
Fruit:	From disk flowers a achene in a mass, ½" - 1" across
Traits:	Useful for its Fall blooms and spreading habit; Tolerates wet places. Also good is <i>Helianthus maximiliani</i> ; Maximilian Sunflower from the Texas Hill Country that should be substituted when site conditions are drier.

Bluebell

Hymenocallis liriosme

Blue Waterleaf

Height:	1' - 3'
Leaves:	Alternate, lanceolate to oblong on stalk, on creeping basal growth its more scale-like which persist in Winter; Stem and leaves have spines
Flower:	Terminal or axillary cymes that are part of a panicle, 3 - 5 blooms per cyme, blue and 5 petaled; individual blooms $\frac{1}{2}$ " -1" across
Fruit:	Small light brown capsule with many small seeds, Aug early Oct.
Traits:	A nice perennial for its late summer blue flowers; Is at home in wet places and short periods of water or seasonal standing water; good in Bar ditches

Spider Lily

Height:	1 ½' - 2 ½'
Leaves:	Strap like (grasslike) from bulb, 1' - 2' long, 2" wide, dark green and somewhat persistent in Winter
Flower:	Spider like 4" - 7" across in terminal clusters with up to 6 blossoms, white and fragrant May - Jul.
Fruit:	Round capsule, 1" across, pod like, green and fleshy
Traits:	Useful in ponds near edge or other wetland like conditions to well drained flower beds; Spider lily is one of the most striking flowers because of its shape so a fine focal point or conversation piece
Iris virginica	Southern Blue Flag
Height:	3' - 4'
Leaves:	Strapped or blade (grass-like), 3' long, 1" - 2" wide from rhizome
Flower:	1 or more (3 - 5 at most) on flower stalk, light to dark blue with yellow patch or stripe on 3 outer tepals, inner 3 all blue in May - Jun.
Fruit:	Capsule that is cylindrical somewhat 3 angled, 2" - 4" long, 1" - 1 ½" wide.

Traits: A showy spreading native Iris that creates large colonies over time; Very showy in large masses like the one that can be found on the Sabine River at I-10; Will Fleming of Waller has a white flowered form.

Gayfeathers

Height:	1' - 4 ½'
Leaves:	Alternate, all over stem, long and narrow, 4" - 12" long, 1/8" - ½" wide depending on species.
Flower:	Terminal raceme made up of small disk type flowers (5 - 12) in compact heads that are pink to dark purple, Jul - Oct.
Fruit:	Is a achene in compact clusters along raceme
Traits:	Spectacular perennials because of spike-like racemes of blooms; Good for fresh or dried arrangements; Several species that are native to the region include Sharp Gayfeather: <i>Liatris</i> <i>acidota</i> ; Kansas Gayfeather: <i>Liatris pycnostachya</i> ; Pink Scale Gayfeather: <i>Liatris elegans var</i> <i>bridgesii</i> ; Button Gayfeather: <i>Liatris squarrosa</i> , Slender Gayfeather: <i>Liatris tenuis</i> ; and Hill Country Gayfeather: <i>Liatris mucronatum</i> which occurs on Catahoula barrens and Weches

Lobelia	cardinalis

glades in East Texas.

Liatris spp.

Cardinal Flower

Height:	1' - 4' tall in bloom.
Leaves:	Alternate, mostly in basal rosette, lanceolate 3" - 4" long, shorter on lower portion of stalk, reddish green, dark green to green.
Flower:	Many blooms on a terminal raceme 2" - 14" tall. Blooms are tubular with lip at end of lobes, 1/4" - 1" long, frilly looking, dark to scarlet red.
Fruit:	Small capsule containing numerous dust like seed. Many capsules on terminal raceme.
Traits:	Cardinal Flower is at home in moist fertile soil, but does well in most garden conditions in full sun to full shade. Reseeds well which is good because Cardinal Flower in the garden can be annual to short lived perennial. Attracts butterflies and hummingbirds. Mine are very popular with numerous Palamedes Swallowtail butterflies and hummingbirds.

Agave virginiana

Manfreda

Height:	1'-6' bloom stalk from rosette.
Leaves:	Thick, fleshy, succulent strap like leaves forming rosette 6"-18" long and 1"-1 ½" wide with some smaller, shorter ones occasionally appearing on bloom stalk.
Flower:	The scape (stalk) has wide-spaced green to cream or purplish brown blooms that each are 1"- 2" long and 1" wide. Occasionally sepals and petals are missing, blooms May-Jul.
Fruit:	An oval capsule forming along the scape ½"-1" long, 1/4"-3/4" wide, which is chambered with each chamber containing numerous flattened seeds, ripening Jul-Sep.
Traits:	Manfreda which looks a great deal like Aloe Vera is useful for the spreading rosette forming foliage and interesting blooms on tall stalks. Works well when used in mixed perennial plantings.

Height:	2' - 5'
Leaves:	Alternate, mostly basal, blade like; $1' - 3'$ long, $\frac{1}{2}'' - 1''$ wide, on stalk they are smaller and scalelike
Flower:	Terminal Panicle with clusters of creamy or greenish white blooms (1/4" - ½" wide), 6 tepals, May - Jul.
Fruit:	Capsule that is 3 lobed 1/4" long, approximately 10 seed per lobe (chamber), in center of tepals which persist
Traits:	An interesting lily family member, is uncommon and for that reason alone should be used more; A fine substitute for Manfreda

Bunch Flower

Monarda fistulosa

Melanthium virginicum

Wild Bergamont

Height: 2' - 5'

Leaves: Opposite, simple, lanceolate to rounded, 1" - 3" long, ½" - 1 ½" wide, margin serrated, aromatic

Fruit: Schizocarp with 4 nutlets 1 seed per nutlet

Traits: A showy flowered mint with aromatic foliage which is useful for both reasons. A spreading clump that is a fine addition for perennial gardens. This species as well as the white flowered native, *M. lindhiemerii* are wonderful early summer butterfly plants.

Penstemon spp	Foxglove, Penstemon, Naked Ladies, Beards Tongue	
Height:	1" - 4" in bloom (6" - 18" rosettes).	
Leaves:	Opposite, round to oval or lanceolate to spathulate forming basal rosette.	
Flower:	Many trumpet shaped flowers ($\frac{1}{2}$ " - 3" long) on a showy terminal panicle. Color depends on species to include white, pink, lavender and dark orange.	
Fruit:	Many seeded beaked capsules on terminal panicle, size varies with species from 1/4" - 3/4" tall.	
Traits:	The most adaptable is <i>P. tenuis</i> ; Gulf Coast Beards Tongue, dark purple waves up to year round, 1' - 3', short lived yet reseeds (usually elsewhere in the garden, that is, it tends to migrate), coastal gumbo to fertile sands. Other species include <i>P. laxiflorus</i> ; Beards Tongue, pink, 1' - 3', April - May: <i>P. murrayanus;</i> Beards Tongue 2'-5', pinkish orange, May-June: and <i>P. digitalis</i> ; Pineywoods Beards Tongue, white in Spring, 1' - 2' tall, sandy soils.	
Physostegia pu	chella Obedient Plant	
Height:	1' - 2'	
Leaves:	Opposite, simple, on stalk, linear to lanceolate 2" - 3" long; ½" wide with a big gap between leaves, basal rosette foliage smaller appearing late fall through winter until stalk begins forming in late spring	
Flower:	Terminal spike of many bell-shaped blooms, 5-toothed, 2 lipped, 1" long, dark lavender, Jun Jul.	
Fruit:	Schizocarp with 4 nutlets ripens in Aug.	
Traits:	A good species of obedient plant because it blooms in the middle of Summer and less aggressive than the commonly used Fall blooming <i>Physostegia virginiana</i> var. <i>praemorsa</i> ;	

other native obedient plants worth using include *Physostegia angustifolia* (Mar. - Apr.), *Physostegia digitalis* (Jul. - Aug.), a larger bloom, *Physostegia intermedia* (Apr. - May), a smaller bloom; all of which are less aggressive spreading clumps

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Snowy Orchid

Height:	1' - 4'
Leaves:	Alternate, Basal, linear to lanceolate (blade-like) 4" - 9" long, $1/4$ " - $\frac{1}{2}$ " wide
Flower:	Single terminal raceme of many showy white blooms, 3 petals; Raceme up to 6" long of blooms, individual bloom is 1/4" long
Fruit:	Cylindrical capsule with numerous dust-like seed
Traits:	A beautiful terrestrial orchid that is fairly easy in the garden but difficult to germinate so nursery source needs to be reliable; Ladies tress orchids: <i>Spiranthes spp.</i> are also nice, particularly <i>Spiranthes cernua</i> .

Pycnanthemum albescens	Whiteleaf Mountain Mint
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Height:	3' - 5'
Leaves:	Opposite, ovate, 1" - 2" long; $\frac{1}{2}$ " - 1" wide, whitened especially younger foliage, aromatic
Flower:	Terminal cluster of numerous small blooms, subtended by white foliage like bracts, bloom white to lavender tubular, AugSep.
Fruit:	Schizocarp with 4 nutlets
Traits:	This mint's whitened foliage makes it showy when it's not blooming, prolonging its usefulness; The aromatic foliage is an added plus; Works well in perennial borders and at home in an herb garden

Rhexia mariana

Meadow Beauty

Height:	1/2' - 1 1/2'
Leaves:	Opposite, elliptic to lanceolate, $2" - 3"$ long, $\frac{1}{2}" - 1\frac{1}{2}"$ wide, serrated margin, covered with hairs.
Flower:	Cymes of few to many blooms, pink to dark pink, 4 petals, 1" - 1 1/2" wide, Jun Oct.
Fruit:	Urn shaped capsule full of many small seeds.
Traits:	A spreading perennial with a long flowering period (but individual flower lasts only hours); Works well in perennial gardens and wet places.

Sabatia campestris

Sagittaria latifolia

Meadow Pink

Height:	1/2' - 1 1/2'
Leaves:	Opposite, oblong to oval, 1" - 1 $\frac{1}{2}$ " long, $\frac{1}{2}$ " - 1" wide
Flower:	Single blooms from leaf axils forming terminal panicle, 5 petals that are pink with yellow at base that together form a star shape, 1" across, Apr Jun.
Fruit:	Capsule to 1/2" long with many small seed
Traits:	A pretty annual that works well in a wildflower meadow or in a perennial garden; Needs to be utilized more, probably overlooked because its an annual; Pineywood Gentian: <i>Sabatia gentianoides</i> is even showier and should also be utilized more.

Height:	1' - 4'
Leaves:	Basal, pointed tip and lobed at base (triangular shaped), 10" long on long stem (petiole) that is erect
Flower:	Terminal cluster (scape) in whorls of 3, white; 1" wide has 3 petals, May - Jul.
Fruit:	Many achenes crowded at clusterhead
Traits:	A fine species for ponds and other wet places as it tolerates standing water (emergent species) and because of foliage and flowers

Wapato or Common Arrowhead

Salvia spp.	Sage/ Salvia
Height:	1' - 4'
Leaves:	Opposite, one is basal (lyre leaf sage) lanceolate to oblong 1/4" - 6" long.
Flower:	Clusters of terminal racemes, many trumpet shaped blooms ½" - 2" long, bloom color varies with species from blue, white, red, pink.
Fruit:	A schizocarp with up to 4 dark brown to black nutlets (small).
Traits:	Good garden species include <i>S. lyrata;</i> Lyre-leaf Sage, rosette foliage is lobed and up to 6" long, blue, 6" - 18" tall, January to April, any soil, sun to shade. <i>S. coccinea;</i> Tropical Sage, woody perennial (shrubby) 1' - 4' tall, red, white or pink, most garden conditions, reseeds, hummingbirds seem to like this as well as other spp. <i>S. azurea;</i> Giant Blue Sage, blue, sometimes white in late Summer to Fall, heavy clay soils to fertile sand.

Sarracenia alat	a Pitcher Plant
Height:	½' - 2' tall pitchers.
Leaves:	Basal, erect, green to yellowish green, hollow, trumpet shaped with a hood that has red veins (is modified for catching insects as it is carnivorous).
Flower:	Solitary, nodding (as in upside down) on long narrow stalk. It has 5 drooping yellow petals 3" - 4" long, 1" - 2" wide in March - April.
Fruit:	A round globe like capsule on stalk under bracts (½" - 1" wide).
Traits:	I include Pitcher Plant because of the large increase in availability from RESPONSIBLE Nursery sources. It can only be used in specific garden conditions, that is wet yet oxygenated like you find in bogs or "hanging bogs". Conditions can be created in the garden and Pitcher Plants may still not be at "home", but are worth a try because of unique foliage and flowers, carnivorous nature, for dry and fresh floral arrangements (when you can grow enough pitchers.

Lizard's Tail

Height:	2' - 3'
Leaves:	Alternate, oval to lanceolate, 4" - 6" long, 1" - 3" wide
Flower:	A spike made up of numerous (100 +/-) small white blooms that are close together, spike up to 12" long, droops, May - Aug.
Fruit:	Fleshy capsule of 3 to 4 sections, small (up to 1/8" long), 1 seed per section
Traits:	Spreading perennial from aromatic rhizomes that is at home in shallow standing water to very moist soils; Good for pond edges, wet places, or moist garden setting, utilizing spike of flowers

Silphium gi	racile
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Slender Rosinweed

Height:	3' - 6'
Leaves:	Opposite, rounded or lanceolate at base, 4" - 6" long, 2" - 4" wide, some on stem but much smaller, sandpaper like to the touch
Flower:	Numerous flowers on branched stalk, blooms made up of disk and ray flowers (like other composites) ray flowers yellow, (2" - 3" across, Jun Sep.
Fruit:	Cluster from disk flowers, an achene
Traits:	Another showy composite useful for its summertime yellow blooms; Good for perennial gardens. Other species native to East Texas worthy of utilization include <i>S. radula, S. laciniatum,</i> and <i>S. integrifolium</i> .

Solidago sempervirens var. mexicana Goldenrod

Height:	3'-6'
Leaves:	Simple, alternate, numerous so crowded, decreasing in size up the plant. Lanceolate or strap- like near base, 1"-6" long and $\frac{1}{2}$ "-2 $\frac{1}{2}$ " wide, light to gray green.
Flower:	Terminal clusters of many small, yellow blooms which have both disk and ray flowers composing the smaller blooms, Aug-Oct.

Fruit: An achene borne from the small heads on terminal cluster.

Traits: A tall showy Goldenrod that tolerates heavy soils, that I've been told works well as a cut flower. Not as aggressive as common Goldenrod yet spreads in a similar fashion.

Height:	9" - 36"
Leaves:	Opposite, sessile, 4-9 pairs on stem, 1 1⁄2" - 4" long, lanceolate, dark green.
Flower:	Few to many trumpet shaped blooms, red with yellow throat, 1" - 3" long, on terminal spike but only on 1 side which causes it to curl, the more blooms the greater the curl, Spring.
Fruit:	Capsule along terminal spike containing many small black seeds.
Traits:	A clumping spreader good for sun to shade as specimen to in mass as a ground cover. I have seen it thrive in unamended black gumbo clay to deep well drained sandy soils, seems to vary in all aspects of size depending on colony.

Purple Meadow-rue

Indian Pink

Height:	2' - 6' tall in bloom, 1' - 2' rosette.
Leaves:	Alternate, compound (numerous leaflets) leaflet thick, 3 lobed, dark green to gray, $1" - 2"$ long, $\frac{1}{2}" - 1"$ wide.
Flower:	Many small blooms on terminal panicle, looks like puff of smoke.
Fruit:	Many small fruits (acheme) on terminal panicle.
Traits:	In rosette stage, people mistake it for Rue or sometimes Columbine, a tall delicate perennial for the shade garden. Stout stem sometimes purple is another plus. The endemic <i>T. texensis</i> is only 3" tall with very small white flowers making it a curiosity, but worthy of use if for no other reason than its uncommon status. February - March.

An achieve here a from the sma

Spigelia marilandica

Thalictrum dasycarpum

Golden Alexanders

Height:	1 ½' - 3'
Leaves:	Alternate, compound 2 times divided into leaflets and mostly basal leaflets 4" - 5" long and finely dissected
Flower:	A terminal flat topped umbel of a couple to several blooms (1" - 4" wide) individual blooms, yellowish, 1/8" long, Apr Jun. or early July
Fruit:	Schizocarp of 2 mericarps, 1 seed per mericarp, flattened
Traits:	An interesting species for use as a companion plant, so good in a perennial garden or mixed wildflower/grass (Prairie) planting where umbel type flowers are called for.S

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THE SFA PINEYWOODS NATIVE PLANT CENTER – A CASE STUDY IN DIVINE INTERVENTION BY DR. DAVE CREECH

Director, SFA Gardens 2900 Raguet St. Nacogdoches, TX 75961 Email: <u>dcreech@sfasu.edu</u>

The Pineywoods Native Plant Center (PNPC) is a 40-acre mix of uplands, mesic mid- slopes, and wet creek bottomland that lies on the northern edge of Stephen F. Austin State University (SFASU) in the center of Nacogdoches, the "oldest town in Texas."



The PNPC was formerly the estate of Edward and Mimi Tucker who were special citizens in Nacogdoches for many years. In 1941, they built a fine Georgian style home on Raguet Street and Mimi went to tending a large garden. She enjoyed azaleas, lilies and other garden plants of that era. The Tuckers hosted an annual Easter Egg Hunt for the neighborhood that became quite popular. The property has been in continuous forest for over a century. Mimi's passing resulted in the land being put out for bids by the family and SFASU acquired the property in 1986. Once acquired, the property, referred to as the Tucker Woods, became the home of the first 'Tucker trails'', a College of Forestry that created the first trails in the forest and the historic home was used to house KSAU, the

University Radio Station, and as storage. In 1998, Drs. Dave Creech (Agriculture) and James Kroll (Forestry) met in the SFA Mast Arboretum on a bench for an early morning coffee. With the Forest Resources Institute in place, Dr. Kroll was convinced the idea of a "native plant center" had good merit, that the time had come. The Arboretum was doing well, but our interest in native plants was somewhat lost in the mix of the Arboretum collection and the pending Ruby M. Mize Azalea Garden development was looming around the corner. Still, it made sense to have a property that would showcase the best ornamental natives, as well as add significant research on the rare, threatened endangered plants that call east Texas home. The deal was sealed with a handshake and after several meetings a proposal was developed, discussions were made and the idea was presented to the SFA Board of Regents. With this concept in place, a mission statement was created via the SFA Arboretum's Board of Advisors and outside parties:

MISSION STATEMENT

- 1. Feature the best native ornamental plants in a well-designed display garden with appropriate interpretive signage.
- 2. Maintain a documented germplasm collection of rare, threatened, and endangered plants of East Texas.
- 3. Contribute to endangered plant conservation horticulture by linking with federal, state, and private institutions charged with monitoring and saving those plants.
- 4. Educate students and the public in the areas of native plants, conservation, ecology, and the natural environment.

Ellen Temple, Lufkin, Texas, was instrumental in encouraging the SFA Board of Regents approval of the Pineywoods Native Plant Center concept. While the Board's approval was not accompanied with state funding, there was a bigger vision. Ellen was instrumental in the details of the dedication of the property in an outdoor gala event March 27, 1999, which was attended by the SFA Board of Regents, SFA administrators, faculty, involved community leaders and native plant enthusiasts



Ellen's long association with the wildflower and native plant movement and our past work with native plants led to discussions with Bob Breunig of the Ladybird Johnson Wildflower Center. This would eventually lead Ladybird's visit and a special dedication moment in the history of the PNPC.

SUNLIGHT ARRIVES AT THE PNPC

At the time of the PNPC dedication in 1999, the property was essentially forest and understory, almost 100% shade.

We had recently requested the opportunity to thin about eight acres of forest on the east side of Raguet street to create more opportunity for sun loving plant materials. We also requested that Biology relocate an old barn on the property that was being used for boat storage. Both requests were denied, based on resistance to clearing by some in the administration and community, and the fact there was no funding to rebuild the boat barn elsewhere. The result was the property was destined to be a 40-acre native plant <u>shade</u> garden, not our original mantra. It greatly limited our palette and it wasn't what we had in mind.

To end the lack of sunlight as an issue, an EF2 tornado set down about 7PM in Nacogdoches on May 4, 1999. This was a very quick solution to the lack of





sunlight issue. The boat barn was destroyed and many of the boats were not salvageable. The tornado's thirteen-mile path went from west to east and was estimated as 200'wide. The tornado skipped over Raguet Elementary school, set down on the Tucker property and proceeded east, tearing a path through the forest. Second case of divine intervention.



LADY BIRD COMES TO TOWN

With the dedication of the PNPC completed, there was little time to prepare for what was about to happen next. With the approval of the proposal to become the third affiliated garden of the Ladybird Johnson Wildflower Center, a ceremony and grand opening of the PNPC was held April 8, 2000, behind the Tucker house. It was a bright sunny day and a good crowd was on hand. Ladybird was in good spirits and I had the privilege of several hours of conversation in the back of her suburban, followed, of course, by Secret Service Mike and Julie. I was blessed to give her the grand tour of some great sandy land ecosystems on the S.B. Hayter Trust on Highway 21 west of town. We also toured the LaNana creek trail project, the campus and the gardens. The dedication was under a festive red and white tent behind the Tucker House. The crowd included city and university administrators, faculty, staff and the local community. A Fredonia Hotel fund raising dinner that night was a great success. Arthur Temple was so moved he generously donated \$50,000 that day for the PNPC. It bought a tractor. Ladybird was gracious, insightful, blunt, humorous and relaxed. This was the last official visit by Ladybird before her passing. Ladybird's wand over the property changed the future of the place.



Top left, clockwise: 1) Arthur Temple and Ladybird Johnson, 2) Florence Patton and Ladybird, 3) Ellen Temple, Dave Creech, Lady Bird, Secret Service Mike, James Kroll and Bob Breunig, 4) Raguet Elementary children at the Lady Bird Johnson dedication.



APRIL 12, 2000

Stonewall, Jexas

DEAR DAVE,

WHAT A ROYAL WELCOME YOU GAVE ME LAST FRIDAY! I LOVED VISITING THE BEAUTIFULLY PRESERVED MILL CREEK CROSSING AND LANANA CREEK TRAIL, AND I COULD HAVE STAYED ALL AFTERNOON JUST DRINKING IN THEIR BEAUTY!

THE DEDICATION WAS SO WELL PLANNED AND JUST RIGHT IN EVERY WAY FROM THE BEAUTIFUL SUNSHINE, SCOUTS BEARING COLORS AND LEADING THE PLEDGE OF ALLEGIANCE, TO THE INFORMAL BUT ENJOYABLE SPEECHES, THE GRAND OLD TUCKER ESTATE AND THE DEMONSTRATION GARDEN! AND THE LUNCHEON WAS NO LESS ENJOYABLE -- I ESPECIALLY LOVED THE WILDFLOWER TABLE ARRANGEMENTS AND LITTLE POTS OF WINKLER'S WHITE FIREWHEEL!

TOMORROW THE MEN WILL PLANT MY WHITE FIREWHEEL AND I CAN'T WAIT TO SEE THE BEAUTIFUL RARE BLOSSOMS GROWING IN MY VERY OWN YARD! THANK YOU SO MUCH FOR YOUR GENEROSITY IN ALLOWING ME TO TAKE ENOUGH FOR THE RANCH, MY HOUSE IN AUSTIN AND THE WILDFLOWER CENTER!

HOW HAPPY YOU AND JAMES MUST HAVE BEEN TO SEE YOUR DREAM REALIZED, AND I COMMEND YOU FOR YOUR PRESERVATION WORK AND ESTABLISHMENT OF THE PINEYWOODS NATIVE PLANT CENTER AND LADY BIRD JOHNSON DEMONSTRATION GARDEN -- I HAVE THE HIGHEST HOPES FOR BOTH OF THEM! IT DID NOT HAPPEN WITHOUT THE LABOR OF A LOT OF CARING AND DEDICATED HANDS, AND I HOPE EVERYONE CONCERNED IS BASKING IN THE KNOWLEDGE THAT THEY HAVE CREATED SOMETHING OF ENDURING IMPORTANCE FOR THE AREA. PLEASE CONVEY MY BEST REGARDS AND GRATITUDE TO ALL OF YOUR STUDENTS WHO SO ABLY ASSISTED YOU.

WITH A HEART FULL OF THANKS,

Lacy Bud John

DR. DAVID CREECH ROUTE 8, BOX 3295

NACOGDOCHES, TX 79561

CTJ:SJ

DEVELOPIING A SITE PLAN

With the generous help of Ellen Temple, the PNPC secured the services of Darrel Morrison in 2000, a noted landscape architect from the University of Georgia. Darrel created the design for the Lady Bird Johnson Wildflower Research Center in Austin, Texas. His charge was to develop a concept plan for the property. Darrel camped on the property and imagined the trail system, an educational center and a horticultural complex. After his visit,

Drs. Kroll and Creech agreed to



follow the trail design as closely as envisioned, which remains the strategy to this day. With Darrel's work and a plan in place, presentation boards were created and the SFA Board of Regents approved the concept plan December 12, 2007. We had permission for a capital campaign to build a Conservation Education Building.



RESOURCES

<u>Property.</u> The 40-acre tract is bounded on the east by LaNana Creek, on the north by Austin Street, and on the west by SFA property and the two-acre Jimmy Hinds Park on Raguet Street. It's a mix of mostly mesic midslopes and a wet creek bottom.

About ten acres of "upland" on the property is home to the Tucker house, Horticulture facility, the Ina Brundrett Conservation Education Center, the upland marsh boardwalk and other features.

<u>Tucker house</u>. The Tucker house remains the PNPC's crown jewel. The home and the forest that surrounds it are known widely in the community as the Tucker property. The two-story house was built in 1941 and is in the Georgian style. The Tucker house was known for its gardens, its woods, and its annual Easter Egg hunt for the neighborhood children. It was one of the first homes on Raguet Street, now a fine old neighborhood in the city.



<u>Horticulture Facility</u>: In 2000, the newly formed PNPC Board of Advisors approved a plan to put a focus on developing a first-class horticulture facility. The horticulture facility lies just to the north of the PNPC's upland "marsh" – a naturally wet area best defined as a "perched wetland." The horticulture facility was designed so that all effluent from the plant producing areas would naturally flow into the marsh land, a situation that creates an opportunity for visitors to the PNPC to understand at a small scale the influence of horticulture and wetlands on water quality as it leaves this property on its way to LaNana creek. At this writing, the horticulture facility includes the following:

- 1) one 60' X 100' two bay poly house,
- 2) one 30' X 100' Quonset poly house,
- 3) a 50' X 100' full sun container yard,
- 4) a 14' X 100' sun container yard
- 5) a 30' X 50" metal building (headhouse) with office and restroom.
- 6) A 30' X 90' equipment storage barn, open sided.
- 7) The facility is encircled by a 6' solid panel fence to allow security and privacy.

The horticulture facility was externally funded and has an estimated value of \$450,000. As 2023 draws to an end, the SFA Gardens is going to construct one last structure, a 24' X 72' shade house just to the south of the existing horticulture facility. If the gardens are to survive or thrive, whether state funding returns or not, it's apparent that we need to capitalize on the opportunities in front of us. A careful look at the PNPC's effort in research, plant contract-grow projects for the nursery and landscape industry, feeding the two successful plant sales per year, well, they all suggest the prudence of having capacity to deal with needs.

Trails and boardwalks: Through a mix of grants and help from the state, the PNPC was given a much-needed step forward in 2007 with the completion of a 2-mile trail system. With Drs. Creech and Legg as co-PI's, a Texas Parks and Wildlife Recreational Trails grant created a 6' wide ribbon of asphalt that still leads visitors through a variety of vistas, interesting habitats, and the horticultural demonstration gardens around the Tucker house. The match for this grant was provided by the PNPC and the Arthur Temple College of Forestry and Agriculture. Vic Shepherd, SFA transportation manager, was an asphalt artist, and it was exciting to watch him and his crew at work. The trails and boardwalks were dedicated April 21, 2007 with President Baker Patillo and SFA Board of Regents Chairwoman Valerie Erstz cutting the ribbon. In 2021, the three main boardwalks at the PNPC were falling apart and we were close to having to close the trail network. We secured a \$140,000 grant from Keep Nacogdoches Beautiful, who were awarded that amount from the Bright Foundation. The new boardwalks are Trex flooring and should be here for 25 years and more. Unfortunately, we still have one last boardwalk at the north end of the Tucker property that may close due to age. That boardwalk takes the trail over wetlands to SFA's Jimmy Hinds Park which lies along Austin Street. We are working on a proposal to the Texas Parks and Wildlife Recreational Trails Grant at this time.



From top left, clockwise: Vic Shepherd with asphalt laying machine, 2) bicyclist on trail, 3) Asphalt trail, 4) President Baker Patillo and Chairman of the SFA Board of Regents, Valerie Erstz.



THE PINEYWOODS NATIVE PLANT CENTER TRAIL SYSTEM

The Ina Brundrett Conservation Education Building: This building was dedicated in 2012 after a five-year campaign to raise one million dollars. The justification for the building was the strength of the environmental education program for kids built by Elyce Rodewald, the environmental education coordinator. The concept was presented December 12, 2007 to the SFA Board of Regents as a request for permission to initiate a campaign, not as a request for funding. The building is an example of environmentally conscious design. After the project was initiated, a grant from Green Mountain Energy provided the solar array on the south facing roof slopes which provides about 75% of the annual electricity needs. The facility was purposed to support what was then a vigorous environmental education program for kids, K-12. It is also utilized as a meeting place for various SFASU organizations, for the SFA Gardens monthly lectures, workshops and special seminars, as well as a meeting place for university entities, community associations and for weddings and celebrations. During the pandemic it was used as a university classroom because of student spacing issues. The environmental education program and this facility's use continues to be tragically reduced via the impact of the pandemic, state salary line cuts and lack of a full-time coordinator. Elyce retired in early 2020 as the pandemic set in and the position was empty for two years. Fortunately, we were able to hire Dr. Alan That said, the program has generated enough external support to keep the program alive, first by hiring Dr.

Alan Sowards in a half-time capacity to keep the program alive. He did just that. We are also pleased to report that a recent \$50,000 grant from the George and Fay Young Foundation (Nov 2023) is exactly what is needed for the future of this program. With other external funding in place, we are now poised to hire a full-time educational programs coordinator and be able to guarantee three years salary line.



<u>The Ladybird Johnson Wildflower Demonstration Gardens</u>: The gardens surround the Tucker house and features more than 200 species of wildflowers, trees, and shrubs native to Texas and the Southeast. Four plant communities (dry upland, mesic mid- slope, riparian, and marsh) are represented in the garden by native plants that have landscape appeal and provide food for local wildlife. In addition, a signed and interpreted "Firewise" demonstration garden surrounding the Tucker house illustrates how to create a survivable space by selecting, placing, and maintaining plants around one's home that make it less vulnerable to wildfire and other disasters. In 2021, we installed signage and interpretation for the Elisabeth Montgomery trail, a walk way that showcases a few of the rare, threatened and endangered plants of the Pineywoods.

<u>The PNPC Upland Marsh</u>: This portion of the PNPC is just to the east of the Conservation Education Building and the Horticulture facility. It is encircled by an asphalt trail and a boardwalk and viewing area across it's length. The spot has a long reputation as a wet spot. Even though it's an upland it has long been known as a spot that held water. Underlain by the Weches rock, water is held "perched and trapped above normal drainage to the ground water reservoir. Water from the greenhouse facilities drain into this area.



Blueberry Research Plot: Blueberries are native to the Gulf South. SFASU's blueberry research program has a long history (1970s), one that can be found in the author's resume on line. The blueberry plots are located at the North end of the PNPC. The plots are irrigated and surrounded by a deer proof fence. The Blueberry research program has cooperated with numerous institutions involved in blueberry research over many years, including the University of Georgia, University of Florida, Mississippi State and USDA. In addition, the program has six clones under evaluation from the blueberry breeding program of Professor Yu Hong of the Nanjing Botanical Garden. One is particularly promising, Selection A119. It's in commerce in China as 'Chaoyue No. 1' and it blooms late, ripens early and is especially fragrant at flowering. The plots have suffered



in the last three years because of climate challenges but are being resurrected at this writing.

<u>Muscadine Research Plot</u>: This research plot is actually located in the Jimmy Hinds Park which borders the PNPC on the north side. This project is primarily a variety and selection screening trial. With over 70 varieties and selections involved, we typically gather data for vine health, yield, sugar content and consumer acceptance. This project capitalizes on collaborations with colleagues at TAMU, Mississippi State, USDA Poplarville and the University of Georgia. In the last few years, we have opened the plots to a Pick Your Own to generate funding for maintenance of the plots.



ENVIRONMENTAL EDUCATION

Since 2000, the SFA Gardens environmental education program has provided hands-on, experiential learning opportunities for all ages. Prepandemic, the program reached over 11,000 children each year and became a source of university pride. For twenty years, the Environmental Education program was led by Elyce Rodewald, who was blessed with strong personality skills to create, organize, and manage a wide range of educational efforts that included:

<u>Arboretum Adventures</u> – Action- packed explorations of Arboretum theme gardens, beehive, and compost exhibit encourage students to use their curiosity, ingenuity, and creativity to learn about water, soil, seeds, compost, animals, pollination, plants, parts of a flower, bees, trees, and forest ecology. Current learning excursions target four grade levels.

Bugs, Bees, Butterflies, and Blossoms (BBBB)–This activity-oriented, science field day focuses on trees, bees, insects, butterflies, flowers, and recycling. BBBB is a cooperative project of the SFA Department of Elementary Education, Texas Forest Service, and the SFA Mast Arboretum. SFA elementary education teaching majors participate in planning and facilitating lessons at BBBB to fulfill requirements for a junior-level "Teaching Science" course.

<u>GardenQuest</u> - Teachers and students discover the secrets of blossoms, bees, bottle trees, and more on this self-guided ultidisciplinary exploration of the Arboretum.





<u>Go Wild!</u> School groups discover rare and endangered plants, investigate adaptations, and explore East Texas ecosystems while taking a guided hike. Students collect and analyze water samples, create rope from plant material, and learn about the benefits and uses of native plants.

<u>Wild About Science</u> Students participate in work performed by science professionals— data collection, orienteering, tree measurement, and water analysis. Fun, hands-on activities connect science to real-life situations.

Earth Science Exploration Students meet ancient rocks and discover examples of constructive and destructive forces during activities that focus on the water cycle, soil, erosion, and observing geologic processes present at the Pineywoods Native Plant Center.

<u>Wild About Wetlands</u> is an in-depth investigation where students learn about hydric soils, characteristic wetland plants, the importance of watersheds, and the water cycle.

Students also collect and analyze macroinvertebrates to determine the health of a wetland at the PNPC.

Forest Awareness - Tours Students



visit six activity stations at the SFA Experimental Forest to learn about snakes, soils, tree growth and measurement, insects, wildlife, and herbaceous forest plants. The PNPC provides a hands-on activity about the nitrogen cycle. This event is sponsored by the Texas Forest Service and Texas AgriLife Extension Service.

<u>Trees Are Terrific</u> PNPC staff join Texas Forest Service personnel to visit area fifth graders with a fun and informative message about the importance of trees. Students are introduced to tree identification, physiology, and ecology, and they are encouraged to demonstrate their tree knowledge and creativity by entering the National Arbor Day Foundation Arbor Day Poster Contest.

<u>Pineywoods Camps</u> Discovery learning opens a new and exciting world for 4 to15- year-olds to have an outrageously good time in the woods while learning about the natural world. Campers enjoy canoeing, fishing, hiking, exploring, creating nature crafts, singing silly songs, meeting new friends, and having close encounters with the flora and fauna of East Texas. Campers hone observation skills as they learn about outdoor safety, snakes, wildlife, water sheds, insects, water quality, food webs, endangered plants, competition, cooperation, connections, and so much more. Three 5-day sessions accommodate three age groups. The Advisory Board for the SFA Gardens provides scholarships for 25-30% of the campers who would not otherwise be able to attend.
<u>The Tucker Memorial Easter Egg Hunt</u> has been a popular family event for many years. Introduced in 2008 for families are the "Pirates in the Pineywoods Party" and "Nature Realized" series hosted by the Texas Forest Service. We will resurrect these educational and entertaining events and others as soon as we can replace the two staff we lost in the pandemic.

<u>The Lone Star Regional Native Plant</u> <u>Conference.</u> The LSRNPC is a major



educational effort associated with the PNPC. This conference is affiliated with the Cullowhee Native Plant Conference (Cullowhee, NC) and connected well-known speakers and native plant experts with landscapers, scientists, and native plant enthusiasts for four days of field trips, lectures, banquets, socials, book signings, workshops, plant sales and networking. The Proceedings of the conference are online: https://scholarworks.sfasu.edu/sfa_gardens_lonestar/. For most participants, this is a special event that would never have prospered without the help and support of Peter and Cass Loos, Greg Grant, Elyce Rodewald and an army of volunteers. For those who

have attended, all would attest that it was a fun and education filled event. For the historical record, five LSRNPC conferences have been hosted: 2001, 2003; 2006, 2008, 2020 and 2012. The LSRNPC conference was not sustainable and was dropped from the program in 2012. We propose a return of the conference in 2025.

The essence of the PNPC's environmental education program can be found here: <u>https://www.youtube.com/watch?v=6ATQjSpV3Yg</u>

CONSERVATION

Dr. Creech and Stacy Scott (Graduate Research Assistant) introduced and pioneered the concept of the "Three Rs," in the mid 1990s – a slogan for an endangered plant "Rescue, Research, and Reintroduction" strategy, which was designed to find, identify, collect, propagate and study a wide range of endangered, rare and threatened Pineywoods species. The Mast Arboretum and now the PNPC have a long track record with *Hibiscus dasycalyx*, the Neches River rose



mallow, *Gaillardia aestivalis* var. *winklerii*, Texas white firewheel and *Phlox nivalis* ssp. *texensis*, Texas trailing phlox. The PNPC is part of the Texas trailing phlox recovery

project and has grown plants used in reintroduction efforts in the Big Thicket. There are great opportunities to exploit the skills of horticulturists to solve some of the problems facing precarious native species.

As a foundation, the PNPC recognizes that of the 30,000 species of plants in North America, 5700 are native to Texas, and 2300 reside in the Pineywoods of East Texas. That's lots of flora. While only four East Texas native plants are listed as federally endangered, there are at least 50 species in East Texas that deserve immediate conservation attention due to their small numbers or the fact they are in danger of extirpation from their native habitats. Jason Singhurst's thesis provided a fine foundation for our effort. For species in precarious condition, rescue simply means propagating the plant and getting it into a secure setting. Research means studying the species biology, seed, vegetative propagation and cultural requirements to keep the population healthy and sustainable. Reintroduction means introducing the plants back "into the wild," hopefully into appropriate sites in the plant's natural range, and hopefully on public lands where the species can enjoy some protection. Reintroduction work falls on the shoulders of a number of agencies including the Texas Parks and Wildlife, U.S. Fish and Wildlife Service, Texas Forest Service, Nature Conservancy of Texas, Center for Plant Conservation, and the Lady Bird Johnson Wildflower Center.

ELISABETH MONTGOMERY ENDOWMENT

The PNPC receives an annual distribution from the Elisabeth Montgomery Endowment that supports native plant research and outreach. In 1997, Elisabeth Montgomery – "Baby Sis" – carved out a precious piece of property six miles west of town on the Hayter Trust land holdings for "conservation", and she created an endowment that yields funds annually for various conservation projects and environmental educational programming by the PNPC. It's a wonderful perpetual gift. In 2022 we used the funding to create new signage for 8 of our rare, threatened or endangered species in the demonstration gardens at the PNPC.



SIGNAGE AND INTERPRETATION

The PNPC has received a number of grants over many years that support signage and interpretation. The first element of this program is the Tucker House's "Firewise Landscape" signage and interpretation. This makes the most of the opportunity to connect visitors and students to the natural world through colorful and informative interpretative signage. It's all really a part of a PNPC promotion of landscaping with a "defensible space" strategy - whether from fire, hurricanes or



herds of pigs. Intelligent horticulture recognizes how big trees can become – and how easily they can fall on your home. In East Texas, that's about 100' or a little more for most of the tallest. The PNPC has always been committed to the development of a strong interpretive sign program to educate local citizens about what to plant and how. It is our belief that signage and interpretation will further enhance the PNPC experience for students and visitors in many arenas - and create a loyal army of supporters eager to see the PNPC become a permanent, long-lived center for environmental learning.

After twenty years we are facing faded and worn signage and this has been evaluated. Estimated need \$30,000

ORNAMENTAL NATIVE INTRODUCTIONS

For the most part the, the PNPC collection is focused on the native flora of the Gulf South. It is also focused on introducing improved selections and encouraging their



use in the nursery and landscape trade. New plants come from chance finds and selections from breeding lines. In the case of SFA Gardens, we have benefitted by a close working relationship with many breeders and nurserymen that have shared their

material with our gardens. Our own work has produced interesting selections that are shared with our colleagues. Some have surfaced as ornamental natives and are in the trade. The SFA Gardens work with bald cypress improvement is well known in the nursery trade. Two introductions have performed well, one is 'LaNana' and the other is 'Banita', both bald X Montezuma cypress, hybrids with no knees and high alkalinity tolerance. We have introduced a number of native woody ornamentals,



including a sweetspire, *Itea virginica*, 'Petite Blanc' that is a shorter statured version of sweetsprire more suited to the landscape. Ornamental native introductions include *Wisteria frutescens* 'Dam B', *Hydrangea quercifolia* 'Lowrey,' *Callicarpa americana* 'Matt's Pink,' *Scuttelaria suffrutescens* – pink form, *Gaillardia aestivalis* var. *winklerii* 'Grape Sensation,' *Bignonia capreolata* 'Helen Fredel' and other clones, *Malvaviscus* 'Big Momma' and 'Pam Puryear', and *Hibiscus moscheutos* 'Peppermint Flare'.

Ongoing projects involve development of improved ornamental salt marsh mallow (*Kosteletzkya virginica*) selections and further *Malvaviscus*, *Hibiscus*, and *Glandularia* hybridization and selection.

SFA Gardens has patented one plant, primarily to say we have and to understand the process. *Prunus* X 'Purple Pride' is a purple leaf plum with native genetics and we have licensees and there has been a small return. I am convinced that SFA Gardens and intellectual property opportunities are significant. However, the process at this small university has been difficult. New varieties could be capitalized on if this university was blessed with a foundation seed division, as is true at the land grants and larger universities. Working plant patents through a small university with no one dedicated to that arena can be a challenge. Licensee issues, branding, trademarking and other realities of the box store picture suggest an overhaul of how we deal with intellectual property at this institution. Being part of the University of Texas system (effective Sept 1, 2023) will be a positive with that institution's experience in patenting.

WILD HOGS, DEER AND BEAVERS

A major constraint in the PNPC and the neighborhood is the damage inflicted by deer, wild hogs and beavers. Deer and hogs, which were never a problem twenty years ago, have now both emerged as a major obstacle to our horticultural hopes and dreams. Pig damage in 2010 and 2011 was extensive due to drought which drove wild hogs into the city. Watered and manicured lawns were too tempting to pass up. Deer are an annual problem from herbivory and bucks rubbing their antlers, which can and does kill young plant material. Beavers are an aggravation on LaNana creek with the bald cypress collection but caging trees near the creek has been a good approach.

FUNDING

Currently, the PNPC relies almost completely on external funding. Until a month ago, there have been no staff dedicated specifically to the 40-acre property. We have just hired John Carrillo as the Technician on the ground for the PNPC. Until recently, care, culture and activities have been collectively managed with existing on the ground staff in positions dedicated to our three named gardens: Mast Arboretum, Ruby Mize Garden, Gayla Mize Garden. The SFA Gardens staff and volunteers generate funding through plant sales and membership campaigns. Three foundations have provided much needed facility development and educational programming: the George and Fay Young Foundation (over \$400, 000 via18 grants over twenty years), the Meadows Foundation (\$107,000 in 2005), and the Bright Foundation (\$140,000 for trail and boardwalk renovation in 2022). Volunteers provide much appreciated funding for special projects and day to day care and culture of the greenhouse and nursery operation. The membership campaign for SFA Gardens is an annual success and provides much needed support for the budgets and activities of the PNPC, SFA Mast Arboretum, Ruby

M. Mize Azalea Garden and Gayla Mize Garden, all unique resources at this institution of higher learning. Through a portion of the gifts, research grants, the "friends" group, and two plant sales per year, the PNPC manages a substantial landscape and still finds ways to improve each year.

THE FUTURE

The number one hardship for SFA Gardens is the loss of the state funded Environmental Education Programs coordinator. That said, we are now able to hire a coordinator on recently acquired external funds. With the transition of SFASU to the University of Texas system we are hoping that our previous state funded salary lines will be returned. We are convinced the future should and will include strong support for the PNPC's environmental education support, the exact mix of state and external support yet to be determined.

Expand the native woody and herbaceous collections at the PNPC. We continue to develop extensive collections of small native flowering tree and shrub varieties that allow side-by-side comparisons in a garden setting.

Adding to the PNPC's outreach, we will be continuing our work with climate resilient trees by developing a Urban Tree and Shrub Research Center (UTSRC) at the 12-acre university property on Stallings. Currently the headquarters of the Center for Applied Rural Research and Innovation (CARRI) and SFA Gardens has a presence there with a history of tree nursery work there since 2010. A recent CARRI grant will be creating a research plot for evaluating annuals working with a number of the major brands (i.e., Proven winners, Bailey's)

At the PNPC's Horticulture facility, design and install a system that allows complete recapture and recycle of runoff water, from the Horticulture facility and the CEB.

CONCLUSIONS

The Pineywoods Native Plant Center is a unique property in the center of Nacogdoches. It has high teaching, research and outreach value in the region. In the last twenty-five years, the property has seen considerable transformation, some created by climate anomalies and others created by implementing infrastructure projects. The resources are many. The Conservation Education building, the Horticulture facility, the upland marsh boardwalk, the trails and other features are all testimony to the progress made in the last twenty plus years. The foundation built at the PNPC for an environmental education program for kids is second to none. Great opportunities lie ahead for the SFA Gardens. There's no doubt the last three years has been an epic test for the resilience of this garden. There's much that needs to be done. We are convinced the PNPC is an important part of the mission of the SFA Gardens and the University and our goal is gaining an endowment to insure its perpetuity.

NATIVE PLANT PUBLICATION AND PRESENTATIONS SINCE 1990

The following publications, refereed and trade, and presentations are presented here as an indication of our history of work with native plants. Only those that were directly related to native plants are presented.

- D.L. Creech and C. Martindale. 1990. Site analysis of a proposed woody plant preserve. Oral paper presentation at the annual meeting of the Texas Academy of Science, Southwest Texas State University, San Marcos, Texas, March 2-3, 1990 (published abst. 210).
- Creech, D.L. 1990. The sweet spire: an east Texas native of merit. Native Plant Society of Texas News 8(3): 3.
- Creech, D.L. 1991. The Strawberry bush, a native of merit. NPSOT News 9(3):3,5.
- Creech, D.L. 1991. Under-utilized native shrubs. Gardens and More 5(3):12-15.
- Creech, D.L. 1991. On the trail of the Silky Camellia. NPSOT News 9(5), 1-2.
- Creech, D.L. 1991. The Native Plant Society of Texas: facing the future. **NPSOT 1991** Symposium Proceedings, 1-8.
- Creech, D.L. 1992. Bald . . . is beautiful. Gardens and More VI(10):14-17.
- Loos, Peter, D. Creech, and G. Lowry. 1992. The ecology of the two known Texas stands of silky camellia, *Stewartia malacodendron* L. **Symposium Proceedings of the Native Plant Society of Texas,** 1-9.
- Creech, D.L. and C. Martindale. 1992. Site analysis of a proposed plant preserve, Nacogdoches County, Texas. **Symposium Proceedings of the Native Plant Society of Texas**, 10-20.

- McDonald, D., D. Creech, and D. Kulhavy. 1992. Geographic information systems (GIS) as a tool in native plant species conservation. **Symposium Proceedings of the Native Plant Society of Texas**, 83-90.
- Creech, D.L. 1992. Favorite natives in the SFASU Arboretum. Oral presentation to the Houston chapter of the Native Plant Society of Texas, Houston, Texas, May 21, 1992.
- Consultant for: 100 Texas Wildflowers, published by the Southwest Parks and Monuments Association, ISBN 1-877856-35-5, in association with the Native Plant Society of Texas, 116 pp.
- Creech, D.L., D. Kulhavy, and D. McDonald. 1992. GIS and CAD as a tool in native plant species conservation. Oral paper at the annual meeting of the Texas Academy of Science, Denton, Texas, March 4-6, 1993 (Because of back ailment, Dave Kulhavy presented the paper).
- Creech, D.L. and Darrel McDonald. 1993. Geographic Information Systems: A Conservation Tool. Journal of the American Association of Botanical Gardens and Arboreta: The Public Garden 8 (4):18-20, 36.
- Creech, D.L. 1993. Creating a Border . . . Texas Style. Native Plant Society of Texas News (November December, 1993): 1,4.
- Lindley, Susan and D. Creech. 1994. ArcCAD as a GIS platform for understanding urban vegetation. Presented as an oral paper at the Texas Academy of Science annual meeting, Houston, Texas, March 4, 1994 in the Geography and Landscape Ecology symposium.
- Jason Singhurst, D.L. Creech and J. Williams. 1994. Remote sensing as a tool in native plant conservation. HortSci. 29(7): 729 (abst.). Norman F. Childers graduate paper competition. Did not place.
- Susan Lindley and D.L. Creech. 1994. ArcCAD as a GIS platform for understanding the vegetation of Stephen F. Austin State University. **HortSci.** 29(7): 729 (abst.).
- Creech, D.L. and Jason Singhurst. 1994. The endangered plants of east Texas: a conservation strategy. Poster paper at the annual meeting of the American Association of Botanical Gardens and Arboreta, Pasadena, California, June 15-18, 1994. Published abstract.
- Singhurst, Jason and D. Creech. 1994. Remote sensing as a tool in east Texas endangered plant species conservation. Presented as an oral paper at the Texas Academy of Science annual meeting, Houston, Texas, March 4, 1994 in the Geography and Landscape Ecology symposium.
- Jason Singhurst, Darrel McDonald, and David Creech. 1994. Oral paper presentation by graduate research assistant: "Monitoring the status of the nineteen endangered and sensitive plants within the piney woods region of east Texas." at the 21st annual

Natural Areas Conference, Palm Beach Gardens, Florida, October 19-22, 1994. Published abstract.

- Creech, D.L. 1995. Two oral presentations presented at the annual Spring Gardening Conference, Tyler, Texas, February 4, 1994: 1) Biodiversity: Meeting the Challenge (General Session: 350 in attendance), 2) Outstanding Native Plants for East Texas Landscapes (Ornamental's session: 200 in attendance).
- Creech, D.L. 1995. Two oral presentations presented at the annual Spring Gardening Conference, Tyler, Texas, February 4, 1994: 1) Biodiversity: Meeting the Challenge (General Session: 350 in attendance), 2) Outstanding Native Plants for East Texas Landscapes (Ornamental's session: 200 in attendance).
- Erin Smith and David Creech. 1995. A propagation and reintroduction strategy for the Neches River Rose Mallow, Hibiscus dasycalyx. **HortSci.** 30(4): 805 (abst.).
- Creech, D.L. 1996. Research with Native Plants: What the Universities are doing. **NPSOT News** 14(1): 8-9, 11.
- Creech, D.L. 1996. Endangered species issues and answers. Presentation to the Friends of the NCSU Arboretum lecture series, June 27, 1996. 50 in attendance.
- Singhurst, J. R. 1996. The status of nine endangered plants of east Texas: historical, ecological, and phytogeographical notes. M.S. Thesis, Stephen F. Austin State University, Nacogdoches, TX
- Clark, Liz. 1996. Saving the Species. Article by editor on the SFA Arboretum's endangered plants program and sidebars promoting the Arboretum Garden Gala Day in May, 1996. I wrote one sidebar on endangered species and a list of specialty nurseries that deal with uncommon native plants. Gardens 10 (5): 32- 35.
- Singhurst, J. R. 1996. The status of nine endangered plants of east Texas: historical, ecological, and phytogeographical notes. M.S. Thesis, Stephen F. Austin State University, Nacogdoches. Served as graduate advisor.
- Creech, D.L. 1996. SFA Arboretum's Three R's Conservation Program Rescue, Research and Reintroduction. Native Plant Society of Texas News 14 (6): 6-7.
- Scott, Stacy and David Creech. 1997. Saving the rare Neches River rose mallow, Hibiscus dasycalyx. Native Plant Society of Texas News 15 (1): 10.
- Creech, D.L. 1997. In support of Biodiversity. American Nurseryman 184 (12): 38-43. Creech, D.L. 1997. The three R's conservation program: rescue, research, reintroduction. Presented at the Texas Wetlands in Retrospect and Prospect conference, a symposium sponsored by the Center for East Texas Studies, SFA, Nacogdoches, Texas, May 7, 1997. (50 in attendance).

- Scott, Stacy. 1997. The horticultural treatment and introduction of a rare wetland plant Neches River rose mallow (*Hibiscus dasycalyx*). Presented at the Texas Wetlands in Retrospect and Prospect conference, a symposium sponsored by the Center for East Texas Studies, SFA, Nacogdoches, Texas, May 7, 1997. (50 in attendance).
- Scott, Stacy. 1997. The Horticultural Treatment and Introduction of a Rare Wetland Plant Neches River Rose Mallow. Thesis, Stephen F. Austin State University, Dr. Creech served as graduate advisor.
- Creech, D.L. 1997. The three R's Rescue, Research and Reintroduction. Slide presentation to the NPSOT Longview chapter, May 15, 1997. (30 in attendance)
- D. Creech, D. McDonald, D. Kulhavy, and P.R. Blackwell. 1998. Utilizing a GIS vegetation model for a campus-as-arboretum development. Oral paper at the Southern Region of the American Society for Horticultural Science conference, Little Rock, Arkansas, January 30 - February 2, 1998.
- Dawn Parish and D. Creech. 1998. Applying conservation horticulture to *save Hibiscus dasycalyx*, the endangered Neches River rose mallow. Oral paper by GRA at the Southern Region of the American Society for Horticultural Science conference, Little Rock, Arkansas, January 30 February 2, 1998. Dawn took 2nd place in the graduate research paper competition (\$200 award).
- D. Creech. 1998. Endangered species perceptions and realities. Slide presentation to the Harris County Master Gardeners, Houston, Texas, March 17, 1998 (126 in attendance).
- D. Creech. 1998. The SFA Arboretum's 3 R's Conservation Endangered Plants Program -Rescue, Research, Reintroduction. Presentation to the annual Cullowhee Plants Conference, Cullowhee, NC, July 22-26, 1998 (300+ in attendance).
- Mark A. Norman. 1999. Site analysis of the Tucker estate, Nacogdoches, Texas.
- Thesis, Stephen F. Austin State University, Creech served as graduate advisor. Creech, D., Dawn Parish, and Bea Clack. 1999. Saving the Neches River rose mallow, Hibiscus dasycalyx. **Native Plant Society of Texas News** XVII (3): 1, 3.
- Parish, D., D. Creech, B. Clack and J. Greer. 1999. Genetic characterization and conservation horticulture of *Hibiscus dasycalyx*, the endangered Neches river rose mallow. Annual Southern Region meeting of the American Society of Horticultural Science, Memphis, Tennessee. January 28 - February 1, 1999.
- Kathleen Davis, D. Creech and B. Clack. 1999. Propagation and reintroduction of *Hibiscus dasycalyx*, the Neches River rose mallow. Slide presentation by GRA Davis to the Big Thicket Science Conference, Beaumont, TX, Oct 7-8, 1999.
- Creech, D. 2000. The natives are restless. Slide presentation to the Gulf Coastal Plain chapter of the Native Plant Society of Texas, Conroe, Texas, June 11, 2000. 30 in attendance.

- Article featuring Pineywoods Native Plant Center in Fall 2000 issue of **Native Plants** 17 (3/4): 21.
- Creech, D. Native trees for Texas landscapes. Slide presentation at the annual conference of the Lady Bird Johnson Wildflower Center and Native Plant Society of Texas symposium. This year's theme: Celebrating Trees. Austin, Texas. 125 in attendance. 02/24/2001.
- Creech, D. 2001. Trees, shrubs and vines you shouldn't live without. Garden symposium, Rice University, Continuing Education. Houston, Texas. 90 in attendance. 03/14/2001.
- Creech, D. Landscaping with Natives. Master Gardener Mercer Arboretum Training Session, Humble, Texas. 51 in attendance. Attending from SFA: Barb Stump, Wes Nichols and three graduate students in the Public Garden Management class. 04/12/01.
- Creech, D. The natives are restless. At our First Cullowhee Lone Star Regional Native Plant Conference; multi-day conference, dorm assignments, 243 registrants with all but 20 from outside of Nacogdoches. Bus tours of East Texas. Two luncheon banquets. One social. A Saturday night bar-b-que and dance. Great success. 05/30 – 06/03/2001
- Creech, D. 2001. slide presentation on the status of the PNPC, FRI annual research reports by scientists receiving FRI funding – 25 in attendance. August 21, 2001. Nacogdoches, TX
- October 16, 2002 slide presentation "Living in a Fire Ecology" at the annual conference of the Texas Urban Forestry Council, Waco, Texas, 74 in attendance.
- November 4, 2002 slide presentation to the Tyler chapter of the Native Plant Society of Texas, "The Pineywoods Native Plant Center, a new regional resource for all of us." Tyler, Texas. 54 in attendance.
- March 26, 2002 "Landscaping with Natives" presentation to Master Gardeners training session, Mercer Arboretum, Houston, Texas. 41 in attendance.
- March 28, 2002 "Making Peace with the Natives" presentation at the Texas Forestry Museum, Lufkin, Texas.
- June 19-28, 2002 Visit of Professor Yin Yun Long from the Nanjing Botanical Garden; Taxodium project for SE China; reception with Mayor Roy Blake presenting Professor Yunlong with the key to our city; trips to bald cypress habitats in Texas and Louisiana, Texas nurseries, and the San Antonio Botanical Garden.
- November 14, 2002 slide presentation at the annual banquet of the Harris County Landowners Association, "Native Plants in the Urban landscape." Houston, Texas. 47 in attendance.
- January 30 February 3, 2003. Oral paper presentation, "Taxodium X 'Nanjing Beauty' a new landscape plant for the South." Presentation at the 63rd annual conference of the

Southern Region of the American Society for Horticultural Science. Mobile, Alabama. Shuttle explosion over Nacogdoches that Saturday becomes the benchmark of grief for the participants at the conference – and even worse back at home.

- February 6, 2003 three-hour class on "An Introduction to Native Plants" delivered to the Conroe Master Gardeners, Conroe, TX 81 participants.
- February 2003. Creech, David. The Bald and the Beautiful. **American Nurseryman** 197(4): 30-35. National trade magazine for the nursery industry; China breeding and innovation with Taxodium.
- May 8, 2003. Native plants for the Southern Landscape. Presentation to the Master Gardener's Association, Mercer Arboretum, Houston, Texas. 62 in attendance.
- September 15, 2003 How to choose, plant and grow the very best natives presentation to the Master Gardeners and public Conroe, TX 83 in attendance
- Mendoza E Adriana. 2004. Genetic diversity with *Hibiscus dasycalyx*, *Hibiscus laevis* and *Hibiscus moscheutos* Utilizing ISSR Techniques. MS thesis, Stephen F. Austin State University with a major in Biotechnology. 222 pp. (served on committee).
- September 25, 2004 Two presentations at the Lufkin Friends of Gardening Native Plant Symposium – "The Three R's, a conservation strategy of the PNPC at SFA" and "Taxodium – China likes our native son". 57 in attendance
- November 13, 2004 Remembering Lynn Lowrey presentation at "A Symposium: A lifetime of Botanizing in Mexico and Texas" Rice University, Houston, TX 86 attendees.
- February 14, 2005. Native Plants Workshop 3 hr. Master Gardener course 80 in attendance
- Creech, D. October 14, 2005. The Natives are Restless. Presentation to the Federated Garden Clubs of Houston. 110 in attendance.
- Creech, D. February 3-6, 2005. Improvement, propagation, and use of Taxodium in southeastern China. Poster paper at the annual meeting of the Southern Region of the American Society for Horticultural Science, Orlando, Florida.
- Lijing Zhou. 2007. Salt Tolerance, Propagation, and Provenance Evaluation of Taxodium as a Landscape and Coastal Wetland Tree. MS thesis. Stephen F. Austin State University, May 2007. 60 pp.
- October 14, 2005 The Natives are Restless presentation to the Federated Garden Clubs of Houston, Houston, TX 97 in attendance
- February 3-6, 2006 Propagation, Improvement and Use of Taxodium in Southeastern China. Southern Region American Society for Horticultural Science annual meeting, Orlando, Florida – 30 in attendance.

- February 23, 2006 Native Plants for East Texas Gardens Montgomery County Master Gardeners, Conroe, TX – 90 in attendance
- June 3-6, 2006 3rd Lone Star Regional Cullowhee Native Plant Conference 180 participants in a major extravaganza five bus tours, 3 banquets, 18 speakers, a Proceedings, two socials and a Saturday night dance and presentation by Dr. Barney Lipsomb, BRIT.
- In Illustrated Flora of East Texas: D. Creech and D. Stover. 2006. A suggested list of ornamental native plants: trees, shrubs, vines, grasses, wildflowers, and ground covers for east Texas. Appendix 15: pages 1231-1241.
- In Illustrated Flora of East Texas: D. Creech and D. Stover. 2006. A suggested list of ornamental native plants: trees, shrubs, vines, grasses, wildflowers, and ground covers for east Texas. Appendix 16: pages 1243 1263.
- Feb 8, 2007. Native Plants for Pineywoods Gardeners. 2.5 hour presentation to the Master Gardeners, Conroe, Texas.
- Creech D. 2007. Notes from the Mast Arboretum Indian pink *Spigellia marilandica*. Louisiana Nursery and Landscape News 30 (2): 17.
- Peer-reviewed Book Chapter: Krauss, K.W., J.L. Chambers and D. Creech. Salt tolerance of tidal freshwater swamp species: advances using baldcypress as a model for restoration.
 In: Ecology of Tidal Freshwater Forested Wetlands in the Southeastern United States (W.H. Conner, T.W. Doyle, K.W. Krauss, eds.). Springer Publishers, Germany
- Creech, D. 2006. Going bald in China. Ornamental Outlook 16(1): 26-27.
- Esther A. Mondoza, David Creech, and Beatrice A. Clack. Analysis of East Texas Hibiscus Populations Using Intersample Sequence Repeats to Identify Genetic Diversity Among *H. dasycalyx*, *H. laevis*, and *H. moscheutos* (Malvaceae). Submitted to the **Journal of Heredity** (under revision).
- Creech, D. 2007. Taxodium studies at the SFA Mast Arboretum Part One. **Conifer Quarterly** 24 (2): 6-12.
- Creech, D. 2007. Taxodium studies at the SFA Mast Arboretum Part Two. **Conifer Quarterly** 24 (3): 10-18.
- Creech D. 2007. The Natives are Restless. Delivered two session presentations of this talk at the annual La Master Gardeners Conference, Lafayette, LA, October 10 12, 2007 Plus led the rare plant auction at the Thursday night social. 300 in attendance.
- Creech, D. 2008. The Natives are Restless. Banquet talk for the annual Denton County Master Gardeners Association. January 9, 2008. Lewisville, TX

- Creech, D. 2008. Will the Real Montezuma Cypress X Japanese Cedar Hybrid Please Stand Up? Conifer Quarterly 25 (1): 40-44.
- L.C. Richard Garry V. McDonald¹, Geoffrey C. Denny², Andrew King³, Donita L. Bryan³, Michael A. Arnold³, Larry W. Barnes⁴, and David L. Creech⁵. 2008. Expression Of Leaf Blight Symptoms Vary Among Provenances Of *Taxodium distichum* (L.) ¹316 Plant Science Department of Horticulture, University of Arkansas, Fayetteville AR 72701, ²Gulf Coast Research and Education Center, University of Florida IFAS, 14625 CR 672, Wimauma, Florida 33598, ³Department of Horticultural Sciences, Texas A&M University, College Station, TX 77843-2133, ⁴Department of Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77843-2132, ⁵Agriculture Department, Stephen F. Austin State University, P.O. Box 13000 SFA Station, Nacogdoches, TX 75962 – presentation at the ASHS Southern Region meeting, February 1-4, 2008, Dallas, TX. - presentation by Garry McDonald at the ASHS Southern Region meeting, February 1-4, 2008, Dallas, TX.
- Creech, D. 2008. Native Plants. Master Gardener class lecture (3 hrs) to the Montgomery County Master Gardeners conference, Conroe, TX – February 21, 2008 – 50 participants.
- Lijing Zhou* and Dave Creech. 2008. Continuing studies in salinity tolerance of Taxodium. SFA Mast Arboretum PO Box 13000, Stephen F. Austin State University, Nacogdoches, TX 75962 - oral paper presentation at the ASHS Southern Region meeting, February 1-4, 2008, Dallas, TX.
- Creech, D. 2008, Panel Presider. Remembering Lady Bird: A Conversation Among Friends, Reminiscences and a General Discussion. With panelists Duke DeWare (Jefferson, TX), M'Liss Hindman (Tyler Jr. College), and Damon Waitt, University of Texas, Austin. The East Texas Historical Association Spring Conference, Tyler, TX, February 14-16, 2008.
- Lijing Zhou^{*1}, Dave Creech¹, Leon Young¹, Yin Yunlong², Kenneth Farrish¹, and Dave Kulhavy¹. Effects of Salt Sources and Rates on Three Taxodium Genotypes.

¹College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962-3000; ²Nanjing Botanical Garden, PO Box 140035, Nanjing, China. **HortScience** 44 (3): 578.

- Lijing Zhou* and Dave Creech. 2010. Effects of Submersion and Salt Rates on Two *Taxodium* Genotypes. College of Forestry and Agriculture, PO Box 13000, Stephen F. Austin State University, Nacogdoches, TX 75962. **HortSci**. 45(4): 489.
- David Creech*¹, Lijing Zhou¹, Yin Yunlong², Don Rockwood³, and Ken Krauss⁴. 2010. Taxodium Genotype Performance at SFA Gardens. ¹College of Forestry and Agriculture, PO Box 13000, Stephen F. Austin State University, Nacogdoches, TX 75962, ²Nanjing Botanical Garden, PO Box 1435, Nanjing, China 210014, , ³School of Forest Resources and Conservation, University of Florida, Box 110410, Gainesville, FL 32611-0410, ⁴U.S.

Geological Survey, National Wetlands Research Center, 700 Cajundome Blvd, Lafayette, LA 70506. **HortSci** 45(4): 492-493.

- January 25, 2010 Creech, David. The Natives are Restless. Jasper County Master Gardeners training program. Jasper, TX. 35 participants.
- David Creech* and Elyce Rodewald. 2010. History and Analysis of the Environmental Education Program at SFA *Gardens*. College of Forestry and Agriculture, PO Box 13000, Stephen F. Austin State University, Nacogdoches, TX 75962. HortScie.
- August 31, 2010 The Natives are Restless best of the best native plants for landscapes in the south presentation Jasper Master Gardener Training, 48 in attendance.
- Creech, D. October 6, 2010 SFA is curing nature deficit disorder in children presentation to Jacksonville Rotary and others, special seminar Jacksonville, Texas 48 participants
- Lijing Zhou, David L. Creech, Ken W. Krauss, Yin Yunlong, and David L. Kulhavy. 2010. Can We Improve the Salinity Tolerance of Genotypes of Taxodium by Using Varietal and Hybrid Crosses? **HortScience** 45(12):1773–1778.
- Feb 15, 2011 Native plants a 3 hr training session for the Montgomery County Master Gardeners class, Conroe, Texas. 63 in attendance
- February 28, 2011. The Natives are Restless. Presentation at the Davidson College Horticultural Symposium, Davidson College, North Carolina. 160 in attendance
- March 12, 2011 Deciduous azaleas a presentation at the Azalea symposium, Nacogdoches, TX 15 in attendance
- March 8, 2011 Taxodium research at SFA Big Thicket conference, near Tyler, TX 55 in attendance
- David Creech, Lijing Zhou, Yin Yunlong, Teobaldo Eguiluz. 2011. Can Taxodium be Improved? Arnoldia 69 (2): 11-20.
- Patent process on 'Purple Pride" plum, a dark burgundy foliaged seedling of Prunus angustifolia 'Guthrie'. Cost \$2800.
- Wei Yuan¹, Lijing Zhou², Guangrui Deng¹, Ping Wang¹, David Creech² and Shiyou Li¹. 2011. Anthocyanins, Phenolics, and Antioxidant Capacity of *Vaccinium* L. in Texas, USA. *Pharmaceutical Crops*, 2011, 2, 1-13.
- Feb 14, 2012. The Natives are Restless. MG Training on Native Plants in Conroe, TX. 65 in attendance.
- Feb 16, 2012. The Natives are Restless. MG Training on Native Plants in Huntsville, TX. 64 in attendance.

- Apr 24, 2012 Native plants a primer. Presentation to the Diboll Garden club, Diboll, TX 21 in attendance.
- Mar 5, 2012. Native Plants. Jasper Master Gardeners, Jasper, TX 27 in attendance. Mar 5, 2012. Native plants. Master Gardeners, Conroe, TX training 63 in attendance
- Spence Simmons*, Dave Creech, Leon Young, and Lacey Russell. 2013. Influence of N Source and Rate on Growth and Leaf Nutrient Content of a Taxodium Clone. SFA Gardens, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75961. HortScience 48(9) (Supplement): S16
- Creech, David. 2013. The Natives are Restless. Montgomery County Master Gardener training, Feb 12, 2013 3 hrs, Conroe, TX 52 in attendance
- Feb 14, 2013 The Natives are Restless. Walker County Master Gardener Training, 3 hrs, Huntsville, TX 32 in attendance
- March 4, 2013 presentation to the Botanical Garden, Universidad Nacional Autonoma de Mexico, Mexico City, Mexico – Taxodium Studies at Stephen F. Austin State University – 36
- March 18, 2013 Best Natives for East Texas Landscapes, presentation seminar for the Angelina County Master Gardeners, Lufkin, TX 42 in attendance.
- Aug 5-8, 2013. Taxodium Evaluation at SFA Gardens. Presentation and proceedings article for Research Conference at the Southern Nurserymen's Association, Atlanta, Georgia, 46 in attendance.
- Creech, David. 2013. Is Conservation Horticulture and Opportunity or a Headache? TNLA Green Nov – Dec 2013: 31-33.
- David L. Creech*, David L. Kulhavy, Daniel R. Unger, and Matthew A. Wade. A Spatial Analysis of a Colony of *Hibiscus dasycalyx*, the Neches River Rose Mallow, Established in 1996 in Nacogdoches County, Texas. Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962. (dcreech@sfasu.edu)
- David L. Creech*, David L. Kulhavy, Daniel R. Unger, and Matthew A. Wade. A Spatial Analysis of a Colony of *Hibiscus dasycalyx*, the Neches River Rose Mallow, Established in 1996 in Nacogdoches County, Texas. Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962. Jan 30 – Feb 2, 2014 American Society for Horticultural Science Southern Region annual conference, Dallas, Texas (dcreech@sfasu.edu)
- Creech, David. 2014. Notes from SFA Gardens Is Redbud the New Crapemyrtle? TNLA Green Vol 16 (6): 37-39.

- Creech, David*, David L. Kulhavy, Daniel R. Unger, and Matthew A. Wood Is Pictometry[®] a useful tool for tree, shrub and landscape evaluation? Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962. Jan 30 Feb 2, 2014 American Society for Horticultural Science Southern Region annual conference, Dallas, Texas (dcreech@sfasu.edu)
- Creech, David. Feb 6, 2014. The Natives are restless. Presentation to the Master Gardener class, Montgomery county, TX. 67 in attendance
- Creech, David, David Kulhavy, Dan Unger, I-Kuai Hung and Dan Fyne. Neches River Rose Mallow, *Hibiscus dasycalyx*, Spartial Analysis and Survival. A poster at the Bright Ideas Conference, SFASU, Nacogdoches, TX 05-06-2014
- Creech, David. 2015. The Natives are Restless. Montgomery County Master Gardener Training, Conroe, TX. Jan 20, 2015. 62 attendees.
- Creech, David. 2015. Influence of Three Pruning Strategies on Growth and Form of Three Taxodium Clones David Creech SFA Gardens, Dept. of Agriculture, 1924 Wilson Dr., Stephen F. Austin State University, Nacogdoches TX 75962-3000. HortScience 50(9) (Supplement)—2015 SR–ASHS Annual Meeting—30 January–1 February 2015 S33
- Creech, David. 2015. Trees for a 21st Century Texas. Presentation to the 2015 North Central Texas Urban Forestry Conference, Feb 20, 2015. Grand Prairie, TX. 158 in attendance.
- Yuhong Zheng³, Bea Clack², Yin Yunlong³, David Creech¹. Genetic Diversity of a Range of *Taxodium distichum* Genotypes and Cultivars Based on ISSR Markers. ¹Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches TX 75962; ²Department of Biology, Stephen F. Austin State University, Nacogdoches, TX 75962; ³Institute of Botany, Jiangsu Province & Chinese Academy of Sciences, Nanjing, China 210014. Hortscience 51(9): S24
- Qin Shi, Yunlong Yin, Zhiquan Wang, David Creech & Jianfeng Hua. Influence of soil properties on the performance of the Taxodium hybrid 'Zhongshanshan 407' in a shortterm pot experiment. 2017. Soil Science and Plant Nutrition. Pages 1-8 | Received 17 Nov 2016, Accepted 14 Feb 2017, Published online: 20 Mar 2017
- E. Fowler, S.C. Wagner, K. Farrish, E. Harris, D. Creech. 2016. Assessment and Characterization of Microbial Communities in Salt Affected Soil on Galveston Island. Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas. November 11, 2016. A presentation to the Texas Branch Fall Meeting of the American Society for Microbiology, UT- Dallas, TX
- E. Harris, K.W. Farrish, D. Creech, and J.L. Young. 2016. Soil Amelioration and Plant Establishment on Sodium Affected Soils on Galveston Island, Texas. Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas. A presentation to the Society for Ecological Restoration Texas Chapter, Livingston, TX, November 11, 2016.

- Dave Creech, Kenneth Farrish, and Elaine Harris. 2017. Woody Ornamental Plant Establishment Studies on a Salt-Affected Soil, Galveston Island, Texas. Presentation to 2017 Annual Conference of the Southern Region American Society for Horticultural Science, Mobile, Alabama, Feb 3-6, 2017.
- Anna Koonce, a young high schooler from Louisiana, has won second in the world in the ISEF Fair 2017, Los Angeles, CA, May 18, 2017 with a paper titled, "The Effect of Sodium Chloride on Hybrid Taxodium Selections." Anna had previously won the state completion in Louisiana. We collaborated with Anna and Dr. Ed Bush, LSU, to bring this project to completion. Results indicated the Taxodium hybrids were more salt tolerant than native bald cypress.
- D. Creech*, K. Farrish, E. Harris, S. Wagner, and E.Fowler. July 27, 2017. Finding climate change friendly ornamentals for Galveston Island, Texas and the Strategies Needed to Deal with a Salt Challenged Environment. Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX. I moderated the T6-14 session on "Botanical Gardens and the Exploration of Salt Tolerant Crops." Fifty in attendance.
- Creech, David. 2018. The Natives are Restless. Three hour training presentation to the Montgomery County Master Gardeners, Feb 13, 2018. 65 in attendance.
- Creech, David. 2018. Trees for NW Louisiana an East Texas Perspective. Presentation to the Allen Owings Horticulture Symposium, American Rose Center, Shreveport, LA. 145 in Creech, David. 2018. Winning trees and shrubs for a post Hurricane Harvey world. Arborgate presentation. Mar 22, 2018. 47 in attendance.
- Creech, David. 2018. Is there life after live oaks? Landscape Architecture Continuing Education Seminar, Tomball, TX. Mar 24, 2018. \$1500 donation to SFA Gardens. 22 in attendance.
- David Creech^{1*}, Malcolm Turner¹, Steve Wagner², Josephine Taylor², and Kenneth Farrish³. A Synopsis of Three Years of Tree Research at Moody Gardens, Galveston Island, Texas.
 ¹ Department of Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962, ²Biology Department, Stephen F Austin State University, Nacogdoches, TX 75962, ³Division of Environmental Science, Stephen F. Austin State University, Nacogdoches, TX 75962, ³Division of Environmental Science, Stephen F. Austin State University, Nacogdoches, TX 75962. Oral presentation at the American Society for Horticultural Science Southern Region, Birmingham, Alabama. 20 in audience.
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INTRODUCING PLANTS OF THE PINEYWOODS PART 1 BY DR. JAMES VAN KLEY

Stephen F. Austin State University

Nacogdoches, Texas, USA

jvankley@sfasu.edu

ABSTRACT

The publication in 2023 of *Plants of the Pineywoods Part 1: Herbaceous Eudicotyledons, Herbaceous Magnoliids, and Nymphaeiids,* provides a local floristic manual for the Pineywoods region of eastern Texas and western Louisiana and marks the first time that most of the area's flora has been represented in a local manual. Beautifully illustrated by Nacogdoches artist Bruce Lyndon Cunningham, it includes the plant groups (herbaceous Eudicotyleons) that are not covered by other locally-relevant works. Information for the for keys and descriptions of the taxa treated and for the habitat descriptions for each species were derived from the relevant literature, specimens at the ASTC Herbarium, locally sampled vegetation plot data, the Pineywoods Plants Digital Gallery, and the USDA Plants database. Following an introduction to the natural ecosystems of the Pineywoods and keys to the major plant groups, I treat 1343 herbaceous eudicotyledon species, six nymphaeiid (water lilly clade) species and six herbaceous Magnoliids, and Woody eudicotyledons will provide a complete local flora. I hope that *plants of the Pineywoods* will long provide a valuable resource to scientists, professionals, land managers, naturalists, hobbyists and others and give a lasting service to our community we face the challenges of the 21st Century.

INTRODUCTION

Despite a long history of botanical research and exploration in the Texas Pineywoods region, until 2023 the area's flora had not been fully covered in a published local floristic manual. The publication of *Plants of the Pineywoods Part 1: Herbaceous Eudicotyledons, Herbaceous Magnoliids, and Nymphaeiids* marks the first time that most of the area's flora has been treated in a local manual.

Although the flora of the Pineywoods is represented in several regional, state and national manuals, for example Weakley et al. 2022, Correl & Johnston, 1979, and the (still incomplete) *Flora of North America* project (Flora of North America Editorial Committee, 1993+), local-scale manuals have great advantages as a reader does not need to sift through numerous out-of range taxa while attempting to identify local plants and it is possible to include locally-relevant information in plant descriptions including local variation in plant features, geographic distribution within the local portion of a species' range, and local-scale ecology and habitat preferences.

The closest-matching flora for our region, the *Illustrated flora of East Texas* (Diggs et al. 2006) remains incomplete, with only Volume 1 available and the remaining volumes (which would include the eudicotyledons, the largest plant group of our Pineywoods flora) still unpublished after 17 years; moreover it does not officially cover the Louisiana parishes adjacent to the Texas Pineywoods and it extends westward into areas with a much different climate (and plant species) than the Pineywoods. Though the *Flora of the Southeastern United States* (Weakley et al. 2022) is an excellent work, its coverage extends northeastward to Pennsylvania and roughly half the species included in it are not found in the Pineywoods. Likewise the *Manual of the Vascular Plants of Texas* (Correll and Johnston 1979) also includes roughly two thousand taxa not found in the Pineywoods; moreover much of the taxonomy is obsolete, the work lacks illustrations, and uses highly technical language -an impediment to users who are not trained botanists. *Trees Shrubs and Woody Vines of East Texas* (Nixon 2012), though mostly restricted to the Pineywoods, only includes woody plants, uses somewhat dated taxonomy, and provides rather skeletal plant descriptions.

Future plans for Part 2: *Ferns and monocotyledons*, and Part 3: *Conifers, Woody Magnoliids & Woody Eudicotyledons*, will provide a complete local flora for the Pineywoods. Meanwhile (as of 2023), *Plants of the Pineywoods Part 1* plus the Illustrated *Flora of East Texas vol. I* (Diggs et al 2006) and *Trees, Shrubs, & Woody Vines of East Texas'* (Nixon 2012) together provide a nearly complete local flora for our region.

METHODS & SOURCES

The area covered in *Plants of the Pineywoods* corresponds to the Pineywoods ecoregion described for Texas by Correll and Johnston (1979) and Hatch et al. (1990) along with Beauregard, Allen, Evangeline, Vernon, Rapides, Sabine, Nachitoches, Grant, De Soto, Red River, Winn, Caddo, Bossier, Bienville, Jackson, Webster, Claiborne, & Lincoln Parishes in Louisiana and the northern portions of Calcasieu, Jefferson Davis, and Acadia, Parishes. It encompasses a large portion of the region known as the West Gulf Coastal Plain. The climate is humid subtropical with hot, humid summers, mild winters, occasional frost, and (usually) negligible snowfall (Larkin and Bomar 1983). Precipitation is fairly evenly distributed year-round, although more tends to fall in winter and spring. Summer precipitation is usually in the form of afternoon thunderstorms. Lightning from these historically ignited low-intensity fires that frequently burned through the pine-dominated woodlands typical of the upland areas in presettlement times (Christenson 1981, Frost 1993). Mean precipitation increases from west to east, ranging from 42 inches (107cm) in Houston County, TX (Larkin and Bomar 1983) to 57 inches (145 cm) in Rapides Parish, LA. Surface geology consists of a series of largely east–west sedimentary deposits that become progressively younger from north (Eocene) to south (Miocene and Pliocene), (Sellards et al. 1932; Snead and McCulloh 1984).

Plants of the Pineywoods includes only plants native to the region and introduced species that have naturalized (have established naturally-reproducing populations in uncultivated areas). Cultivated species were largely excluded. Occasionally it was a difficult choice to distinguish between species that may have occurred as waifs, often at the edge of the range or as very rare cultivation escapes from rare species with established, reproducing populations in the area.

Important sources for the plant descriptions and keys in this manual included the checklist of Hatch et al. (1990) an unpublished draft entitled *Ferns and Herbaceous Plants of East Texas* by the late E.S. Nixon and

John Kell, and specimens from the Herbarium of Stephen F. Austin State University (ASTC). Many of the keys and measurements used in the plant descriptions were adapted from the Manual of the Vascular Plants of Texas Correll & Johnston (1979). Diggs et al. (1999) and FNA 1993+ were also important sources for descriptions and key information. *The Manual of the Vascular Flora of the Carolinas* (Radford et al 1968), *Asteraceae of Louisiana* (Gandhi et al. 1989), *Native & Naturalized legumes (Fabaceae) of the united States (Exclusive of Alaska & Hawaii)* (Isley 1998) and *Flora of North-Central Texas* (Diggs et al. 1999) were also consulted. Additional monographic works were consulted for relevant genera. Simpson (2010) and Judd et al 2015 provided useful information for plant family descriptions and Christenhusz & Byng (2016) provided the approximate numbers of species in each plant family.

The decision to include a species was based on the list of species indicated as occurring in the Texas Pineywoods in Hatch et al. (1990), the USDA Plants database (https://plants.usda.gov), other literature, and on the more than 25 years of accumulated excursion species lists and samples-by-species plot datasets collected by Dr. James Van Kley and his students. Many of these excursions and projects took place in the four National Forests of Texas, The Big thicket National Preserve, Kisatchie National Forest, Caddo Lake State Park and Wildlife Management Area, and numerous natural areas in Nacogdoches, Angelina, and surrounding Counties of Texas, and the Pineywoods Native Plant Center in Nacogdoches.

An important goal of *Plants of the Pineywoods* was to provide habitat and ecological information about each species treated. The principal source for both the ecosystem descriptions in the book's Introduction and the habitat information in the species descriptions is the Western Woods Dataset: a data set of more than 700 vegetation plots from the Texas and Louisiana Pineywoods sampled by Dr. J. Van Kley and his students between 1994 and 2019. Many of these plots formed the basis for earlier publications including Van kley and Hine (1998), Van Kley (1999a); (1999b,) Van Kley In. Diggs et al. (2006), and Van Kley et al. (2007); however, the field data from these various studies were combined to form a single dataset and were re-analyzed using multivariate ordination and classification analyses prior to developing these descriptions. Indicator species analysis (ISA), (Dufrêne & Legendre 1997) was used to identify species statistically associated with specific habitat types and is the principal source of the species listed in the ecological descriptions in the book's introduction. Additional important species-occurrence and habitat information was derived from an unpublished specimen database maintained by Dr. Van Kley for the 8,805 images of 950 eudocotyledon taxa that appear in the Pineywoods Plants Digital Gallery (https://james-vankley.com/PineywoodsPlants/index.html). Other ecological sources consulted include Brooks et al. (1993), George and Nixon (1990), Harcombe et al. (1993), MacRoberts & MacRoberts (1991, 1992, 1993), Marks & Harcombe (1983), Nixon, et al.(1987), Sulivan and Nixon (1971), and Ward (1984).

Flowering plant family circumscriptions follow the *Angiosperm Phylogeny Group* (APG IV) system (APG 1998, 2003, 2009, 2016). Species nomenclature generally follows the *Flora of North America* (*FNA* 1993+) series where possible and the Integrated Taxonomic Information System (ITIS), (https://www.usgs.gov/tools/integrated-taxonomic-information-system-itis) for groups not yet published in *FNA*. In limited cases I used nomenclature from other sources in preference to *FNA* to reflect the broader scientific consensus or newer information published since the pertinent *FNA* volume. Standardized common names from the USDA Plants Database (https://plants.usda.gov) were also included for each species treated. Families were treated alphabetically and genera and species are arranged alphabetically within each family.

Each species treated was illustrated with drawings by local Nacogdoches artist-publisher Bruce Lyndon Cunningham, as were selected indicator species and landscape scenes in the habitat description section of the Introduction. Additionally, each term in the Illustrated Glossary as well as selected choices in the keys were illustrated with his drawings.

DESCRIPTION: PLANTS OF THE PINEYWOODS PART 1

The 454-page volume is dedicated to the late E.S. Nixon who pioneered both floristic botany and vegetation research in the Pineywoods during his tenure at Stephen F. Austin State University in the 1960's, 70's, 80's, and early 90's and accessioned the bulk of the specimens in the ASTC herbarium.

The first few pages of *Plants of the Pineywoods* are devoted to an introduction to plant classification, using scientific keys, botanical terminology, and collecting plants. An introduction to the chief natural and semi-natural ecosystems of the Pineywoods follows with descriptions of sixteen general ecosystem types: Sandylands; Upland Longleaf Pine Forest; Herbaceous Seeps; Prairies, Glades and Barrens; Dry-mesic Mixed Upland Forest; Wet Upland Depressions and Flats; Mesic Lower Slopes, Terraces, Ravines, & Stream-bottoms; Forested Seeps; Wet-Mesic Bottoms & Terraces; Sugarberry-Elm Rich Floodplains; Seasonally-Flooded Floodplains; Regularly-Flooded (Shallow-Water) Swamps; Semi-permanently-Flooded (Deepwater) Swamps; Riverbanks, Streambanks, & Sandbars; Marshes, pond edges, & lakeshores; and Human-Dominated, Disturbed "Ruderal" Communities. Included in each description is a list of the plant species typically present as well as indicator species for each ecosystem type; the principal source for these lists was multivariate analysis of plot data.

The taxonomic section begins on Page 29 with keys to the major groups of plants and subsequently to the eudicotyledon plant Families. I made an effort to avoid very long keys where readers are easily lost and which are very difficult to revise if future changes or corrections are required; rather the 80 Eudicot families treated are identified through a series of eight linked keys, none more than 25 couplets long. I used a similar structure for keys to genera for large families such as Asteraceae and Fabaceae. I attempted to use everyday language or to use in-line definitions of technical terms where possible in order to make the book more generally accessible. Beginning on Page 40, 1,343 herbaceous and semi-woody eudicotyledon species in 80 families are treated followed by treatments of six nymphaeiid species in two families and six herbaceous Magnoliid species also in two families. Each species treated is illustrated with line-drawings by Bruce Lyndon Cunningham.

An effort was made to make each species description consistent with all others throughout the book with comparable information in each case presented in the same order: Each description includes the scientific and common names followed by life-span, height, and growth-habit information. Subsequent information includes leaf arrangement, leaf size and shape, flower size, flower color, inflorescence information, fruit type, fruit size, bloom-season, nativity, local geographic distribution, and the ecosystem type(s) the species usually occurs in.

The taxonomic treatments are followed by an illustrated glossary where 449 botanical terms are defined and illustrated with Bruce Cunningham's line drawings; an effort was made to include all botanical terms used in the book in the glossary. The volume concludes with a literature cited section and indexes to common and scientific names.

CONCLUSION

One of the biggest impediments during this author's 30-year career in vegetation research and teaching field botany in the Pineywoods has been the lack of a comprehensive local Flora for the region's plantsespecially when attempting to introduce students to such research. The publication of this volume largely solves the problem. The Plants of the Pineywoods project is rather unusual among multi-volume local and regional floras in that the (eud)dicotyledons are treated in the first volume and the remaining plant groups (the bulk of which are the monocotyledons) are to be treated in the proposed subsequent volumes; most projects begin with ferns, gymnosperms, and monocots and continue to the (eu)dicots. The fact that Diggs et al (2006) already covered these groups for much of our region drove this decision. As of 2023, work on part2 (*Ferns, Lycophytes, and Monocotyledons*) is ongoing and I plan to complete the project with Part 3: (*Conifers, Woody Magnoliids* and *Woody Eudicotyledons*). It is hoped that *plants of the Pineywoods* will long provide a valuable resource to scientists, professionals, land managers, naturalists, hobbyists and others and give a lasting service to our community as we face the challenges of the 21st Century.

Beyond contributions to science and natural history, the illustrations of artist Bruce Lyndon Cunningham in this work are immediately recognizable as his unique style and thus this book, like the numerous previous publications that he has illustrated --for example *Trees, Shrubs, and Woody vines of East Texas* (Nixon 2012) and *Gymnosperms of the United States & Canada* (Nixon 2010)-- is a part of an authentic Nacogdoches artistic culture that exists nowhere else in the world.

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HISTORY OF MYCOLOGY IN TEXAS BY DAVID P. LEWIS

TEXAS MUSHROOM STUDIES: 1840-1948

The study of fungi in Texas has a long and interesting history going back to the days when Texas was still part of Mexico. From 1840 to 1948 three Botanist/Mycologist made major contributions to the fungal flora of the state. They include Charles Wright, Henry William Ravenel and William Long.

Charles Wright (1811-1885) was a New England botanist that spent 15 years in Texas in Newton, Jasper, Tyler and Angelina counties in East Texas. He also was on the 1849 expedition from San Antonio to El Paso. Many of his collections were sent to Berkeley and eventually deposited in the Kew Fungarium in England. A number of Wright's collections were reported by Berkeley in the Journal of the Linnean Society, Grevillea and Annals of the New York Academy of Sciences. Wright taught at Rutersville College in Fayette County from 1845 to 1846, and represented some of the first science field work done in Texas Schools.

Henry William Ravenel (1814-1887). A South Carolina scientist who visited the Houston-Galveston area to study the cause of Texas cattle fever. He collected in the area from March 29 to May 10, 1869 and many of his collections were published in 1880 by M.C. Cooke in the Journal of the Linnean Society. Twenty-five of these were new to Science.

As far as I can tell, the first species reported from Texas was Scleroderma texense, published in 1845 and apparently collected by Drummond. It's interesting to note that Drummond died in 1835, so the collection must have been made before his death.

William Long (1867-1947). A Texas born mycologist who worked on Gasteromycetes, Polypores and rust fungi from 1900 to 1948. His publications include in 1900, "The local distribution and occurrence of the fungi of Austin, Texas and vicinity." Also in a series of 18 papers he studied the Gasteromycetes of the American Southwest. Some of his work was in the Denton, Texas area. Later he was located in New Mexico working for the USDA studying fungal pathogens.

TEXAS MUSHROOM STUDIES: 1950-1990

Harry Thiers 1950-1963

Harry Thiers was born and raised in Texas. Working out of Texas A&M University he initiated a study of the agarics and boletes of E. Texas. His thesis was "The Agaricaceae of the pine belt and adjacent areas in eastern Texas". He found about 200 species, 33 were new to science

Texas Mycological Society 1977-2008

The Society was founded by Raymond Lawrence & Cynthia Rogers. Susan Metlzer served as President for 25 years and annual forays were in East Texas where many prominent mycologists attended.

Other Texas researchers include Joe Restivo (1971-SFA Experimental Forest), Castro-Mendoza (1978-Central Texas), David Lewis (1978-Big Thicket), and Bill Cibula (1978-Big Thicket).

TEXAS MUSHROOM STUDIES: 1990-PRESENT

Since 1990 numerous groups and researchers visited the Big Thicket region and made important contributions to its mycological flora. They include Susan & Van Metzler who wrote "Texas Mushrooms",

O. Jejelowo & S. Abraham who studied the Kingwood forest north of Houston, the North American Mycological Association annual foray held in Beaumont in 2000 and The Big Thicket National Preserve ATBI project from 2006-2017.

Other researchers include Bart Buyck with the French Museum of Natural History, Paris, the late Russian Scientist Larissa Vasilyeva, Henry Beker, a European mycologist, and Rod Tulloss an American mycologist.

A compendium of Texas fungi were published by David Lewis, Clark Ovrebo and Jay Justice in two papers in the Journal of the Botanical Research Institute of Texas and in 2019, Mushrooms of the Gulf Coast States: a field guide to Texas, Louisiana, Mississippi, Alabama and Florida were published by Alan and Arleen Bessette and David Lewis through the University of Texas Press.

You may be wondering where Texas fungal collections are deposited. Many of Lewis's are deposited in Chicago's Field Museum, the Univ. of Tennessee., the cryptogrammic fungarium in Paris and various other herbaria. With the encouragement of Dale Kruse, the curator at the S.M. Tracy herbarium I started depositing material there. The fungarium is part of the S.M. Tracy Herbarium. It consists of 66 wooden cabinets and was made into a room to help secure the collection. It contains about 6700 dried fungal specimens.

GRASSES AND SEDGES OF EAST TEXAS AND ID HINTS BY DR. CHARLES ALLEN

native@camtel.net

Grasses (Poaceae) and sedges (Cyperaceae) are both monocots with long narrow leaves with parallel veins and composed of a sheath and blade. The sheath wraps around the stem and the blade is free. The perianth in both families is reduced; (in grasses to lodicules and in the sedges to bristles or scales. Table 1 is a listing of most of the differences between the two families. Grasses and sedges produce their reproductive parts (pistil and stamens) in spikelets.

Grass and sedge identification often requires close examination with a hand lens or microscope but your choices for grasses can be narrowed down using the type of inflorescence that the spikelets are arranged in. In grasses, there are five basic inflorescence types; open panicle, contracted panicle (spikelike panicle), rames (digitate or racemose), and spike (Figure 1). A spike is an inflorescence with spikelets all sessile on the main axis, e.g., *Secale*. n inflorescence that is branched and has the spikelets pedicellate on the branches is a panicle. The panicle may be open as in **Briza** or contracted and spike-like as in **Alopecurus**. If the spikelets are sessile to short-pedicellate along primary branches, the inflorescence is considered a rame. The rames may be digitate at the culm apex as in *Chloris* or racemose as in *Leptochloa*. The spikelets on a rame may be all sessile or short-pedicellate as in *Paspalum* or paired (1 sessile, the other pedicellate) as in *Andropogon*. "Rachis" is applied to the main axis in a spike and to the primary branches in rames. "Pedicel" is applied to the stalk of an individual spikelet and "peduncle" to the stalk of a cluster of spikelets. The base of the branches in some panicles is swollen and called a pulvinus. "Involucre" is a cluster of bristles or branchlets that surrounds a spikelet or group of spikelets as in *Cenchrus*. The inflorescence is usually exserted beyond the leaves, but in a few species, the inflorescence is surpassed by the leaves. A few grasses produce inflorescences that are hidden in sheaths or spathe-like structures formed by an expanded sheath or blade.

The grass stem is termed a culm and may be simple, branched at base, or branched above. Culms may be erect, ascending, decumbent, geniculate, or prostrate. The term "stolon" is applied to those culms that are above ground, prostrate, and rooting at the nodes. The culms that are underground, prostrate, and rooting at the nodes are called rhizomes. Culms growing in dense clumps due to branching at the base are said to be densely tufted or cespitose. "Tussock" is applied to a group of culms that are densely cespitose.

Grasses are annuals or perennials. Annuals are simple, stoloniferous, or cespitose plants. The perennial species may be cespitose, tussocked, rhizomatous, or stoloniferous.

The root system of grasses is fibrous or diffuse. All roots of most mature grass plants arise from the base of the culms or from the nodes of stolons and rhizomes and thus are adventitious.

Leaves are borne long the culm in two rows and are said to be two-ranked. The node (point on the culm where a leaf arises) is nearly always solid in cross-section, while the internode (section of culm between two successive nodes) is solid or hollow. The node is the same thickness as the internode or swollen or sunken. The node is the same or a different color as the internode. The leaf is composed of a proximal sheath which tightly enfolds the culm and a distal blade or lamina. The margins of the sheath are usually free and the sheath is said to be open; but in a few grasses, e.g., *Glyceria*, the margins are fused and the sheath is said to be closed. Most blades are flat but some are partially to completely involute, conduplicate (folded together lengthwise with the upper surface inside), or plicate (folded together in pleats lengthwise). Linear or lanceolate blades with parallel veins are common but a few species develop ovate blades, e.g., Arthraxon hispidus, and in others, a distinct, large midrib is found as in Zea mays. The ligule (a membranous scale or fringe of hairs) occurs at the juncture of the blade and sheath on the ventral or adaxial surface of most grass leaves. On the dorsal or abaxial surface, this juncture point is termed the collar. In Arundinaria and Setaria palmifolia, there is a petiole-like constriction between the blade and sheath. In some grasses, auricles (paired projections of tissue) are developed laterally at the apex of the sheath or base of blade. Parts of the culm and leaf, including the margins, may be glabrous or variously pubescent and the margins may be the same or a different texture as the central portion.

The spikelet is the basic component of the inflorescence or flowering part of the plant. A spikelet consists of an axis, the rachilla, along which glume(s) and/or florets are borne alternately in two rows. The number of florets per spikelet varies from one to many. A floret typically consists of a lemma, a palea, and a flower, but the palea or flower or both may be absent. In a floret, the lowermost bract is the lemma and normally bears in its axil, the flower. The flower usually consists of a pistil, 1-6 stamens, and 2(3) lodicules. The flower in grasses is naked as neither the calyx (sepals) nor the corolla (petals) is present. The term perianth is used to refer to both the sepals and the petals. The pistil is usually a 1-loculate ovary with 2 stigmas and 2 styles (1 style in *Zea* and 1-3 in *Arundinaria*). The number of carpels in the ovary of grasses has been the subject of controversy for many years. Gould (1968) considered the grass ovary to be a reduced form of the typical 3-carpellate monocotyledonous ovary. The lodicules, green or white scale-like processes, are borne at the base of the flower and are thought to be the reduced perianth. The palea, if present, is the uppermost bract in the floret. The floret may be perfect, carpellate, staminate, or neuter. The neuter florets may be interspersed with the other florets in the spikelet or terminal or basal only. Some neuter florets are morphologically similar to the other florets while others are variously modified. A spikelet may consist of all perfect, all carpellate, or all staminate florets, or may be a mixture. All of the florets of a spikelet may or may not be morphologically similar to one another. The spikelet may be laterally or dorsally compressed or terete. The spikelets may disarticulate below the glume(s), above the uppermost glume, at the nodes of the rachilla above the glume(s), or below the lowest lemma in glumeless spikelets. In some species, the spikelets do not disarticulate but fall entire and attached (singly or as part of a unit) to the inflorescence or part of the inflorescence.

"Callus" is applied to the hard, usually pointed, base of the spikelet or floret (in <u>Eriochloa</u>, it is the thickened node and remnant 1st glume). The fruit of nearly all grasses is a caryopsis, which is defined as a dry, 1-seeded, indehiscent fruit with the pericarp fused to the seed coat. However, <u>Dactyloctenium</u>, <u>Eleusine</u>, and <u>Sporobolus</u> produce a bladdery, 1-seeded, indehiscent fruit that has the pericarp free from the seed coat and is called a utricle. In some grass species, the caryopsis is shed with the glume(s) and/or lemma and/or palea still attached to it. The caryopsis plus the various attached part(s) will be considered here as the grain. The lemma, palea, glume(s), and caryopsis may be nerveless or 1 to many nerved; glabrous or variously pubescent; membranous, cartilaginous, or indurate; awnless or awned; variously colored; with margins of the same or a different texture and color as the central portion.

In sedges, each flower is subtended by one scale. A spikelet is a group of the flowers with their one scale usually clustered along a rachis like a spike inflorescence. The number of genera in the sedge family (Cyperaceae) is small fewer than 20 but some genera (Carex, Cyperus, Rhynchospora) have numerous species. ID to genus is usually easy but to species if often difficult with so many species.

TABLE 1 GRAMINOID DIFFERENCES

Color:	Cyperaceae (sedges) light to medium green		<u>Poaceae (grasses)</u> light to medium green
Stem: Stem shape: Nodes: Internodes:	herbaceous triangular inconspicuous solid		herbaceous/rarely woody round or flat conspicuous, often swollen hollow
Leaves:3-ranke Sheaths: Collar: Auricles: Ligules :	ed closed indistinct absent absent	2-rank	ed open distinct absent or present present
Blades:	flat rarely septate channeled upper		flat never septate
Margins:	glabrous scabrous		glabrous or pubescent smooth, scabrous, or ciliate
Inflorescence:	spikelets		spikelets
Flowers: if imperfect:	spiral or distichous monoecious		distichous monoecious or dioecious
Perianth:	1-6 scales or bristles		2 lodicules
Bracts/Scales:	one scale = bract bract odd nerves no extra bract		two scales = lemma & palea palea 2 nerves glumes
Stamen: Anthers: Pollen:	3 basifixed cryptotetrads		3 (2 or 6) versatile monads
Ovary: Ovules(seeds)	1-locular : one		1-locular one

Fruit: achene

grain (caryopsis)/utricle

Habitat: wet

dry to wet

FIGURE 1 GRASS INFLORESCENCE TYPES





Open Panicle

Contracted Panicle



GRASS SPIKELET





Grass spikelet, one-flowered (i.e., with one floret), showing the palea (p), lemma (le), second or upper glume (g2), and first or lower glume (g1).



Diagrammatic longitudinal section of a one-flowered grass spikelet. Stamens not shown. g2 = second or upper glume; g1 = first or lower glume.



Diagrammatic cross section of a oneflowered grass spikelet. Glumes shown with darker lines than rest of spikelet, p = palea; le = lemma; g2 = second or upper glume; g1 = first or lower glume.

dorsal

compression



Several- flowered grass spikelet, showing glumes (g1, g2) and florets (fl).



Diagrammatic longitudinal section through a several-flowered grass spikelet. Flowers not shown. g1, g2 = glumes; f1 = floret; ped = pedicel; r = rachilla (extension of pedicel into spikelet). 41 .
KEY TO COMMON GENERA OF SEDGES (CYPERACEA)

Note: some recent changes in genera like Dichromena and Psilocarya are now in Rhynchospora and Scirpus split into several genera.

A. /	Achene enclosed by a perigynium (sac like structure)Ca	rex
B. /	Achene not enclosed by a pperigynium	В
	B(A). Achene covered with a white or gray bony pericarp, often atop	a disc eria
	B. Achene bare, no bony pericarp	C
C(B)) Scales two-ranked	D
C: S	Scales spirally ranked	E
	D(C Plants scapose, inflorescence terminal, no bristlesCy D Plants with leafy stems, inflorescence axillary, bristles presentDe	perus Ilichium
F(C	Snikelets with 1 or 2 achenes	F
E	Spikelets with 3 or more achenes	G
	F(E Achenes with a stylopodium, bristles usually present	ynchospora
	F Achenes lacking a stylopodium and bristlesClac	dium
G((F. Achenes with a stylopodium	Н
G	Achenes lacking a stylopodium	I
	H(G) Spikelets solitary, terminal, leaves reduced to basal sheath, b usually present	ristle Pocharis
	H Spikelets 2 or more, leaves with blades, no bristlesPsi	locarya
I(C	G) Achene subtended by 3 scales and usually 3 small bristles, scales aw	ned,
	Spikelets looking like a cocklebur fruitFu	iirena
ΙA	Achenes subtended by bristles only, scales awned or awnless, spikelets r	not
	looking like a cocklebur fruit	J
	J(H) Bristles lacking, style usually fringedFim	bristylis
	J Bristles usually present, style not fringedScir	pus

SOME FALL BLOOMING NATIVE GRASSES OF EAST TEXAS





Eastern gama grass (Tripsacum dactyloides)



Inland Seaoats (Chasmanthum latifolium)





Some Common Fall Blooming Native Sedges of East Texas



SHORTBRISTLE HORNED BEAKSEDGE: Rhynchospora corniculata



Wooly Sedge (Scirpus cyperinus)



globe sedge (Cyperus croceus)



White Topped Sedge (Rhynchospora/Dichromena latifolia)



Southern Waxy Sedge (Carex glaucescens)



Great Bladder Sedge (Carex intumescens)

GEOLOGY AND PLANTS PRESENTED BY TYSON HART

MLRA Soil Survey Leader South Central Region Nacogdoches MLRA Soil Survey Office Soil and Plant Science Division Natural Resources Conservation Service United States Department of Agriculture

11/2023

Abstract: The ecological systems of the Western Coastal Plain have been shaped through time. The native plants found in the "Pineywoods" have developed in concert with differing climate, organisms, parent material, and soils. A basic understanding of the processes will aid in search for desired plant communities.

FIRE AS THE GREAT RENEWER: EXPLORING THE DIVERSITY OF A FIRE-MAINTAINED FOREST BY DAWN STOVER

11/2023

Winston 8 Tree Farm, a wonderful example of an open pine-grassland savanna sprawled over 3,300 acres. The land has been managed using a variety of conservation practices including uneven age stand management, selective thinning and harvesting, prescribed burns and longleaf and shortleaf pine restoration efforts. The open canopy coupled with frequent prescribed burns has led to a rich and diverse understory and wildlife habitat. Nearly 900 distinct plant species have been documented within the canopy of longleaf, shortleaf and loblolly pines. Xeric sandhills, mesic creeks and several baygalls occur in the rolling topography of this property. The Winston family received the 2014 Leopold Conservation award, the state's highest honor for private land conservation. The following plant list was compiled by botanist Eric Keith over a two-year period. Plants in bold font are included in the presentation.

Acanthaceae	Dicliptera brachiata	Branched foldwing	
Acanthaceae	Justicia lanceolata	Loose flower waterwillow	
Acanthaceae	Ruellia carolinensis	Carolina wild petunia	
Acanthaceae	Ruellia humilis	Low ruellia	
Acanthaceae	Ruellia pedunculata	Stalked wild petunia	
Aceraceae	Acer barbatum	Southern sugar maple	
Aceraceae	Acer negundo	Box elder	
Aceraceae	Acer rubrum	Red maple	
Agavaceae	Manfreda virginica	False aloe	
Agavaceae	Yucca freemanii	Freeman yucca	Rare, not recognized in most plant books
Agavaceae	Yucca louisianensis	Louisiana yucca	
Alismataceae	Sagittaria platyphylla	Delta arrowhead	
Alliaceae	Allium canadense var. canadense	Canada onion	
Alliaceae	Allium canadense var. mobilense	Wild garlic	
Alliaceae	Nothoscordum bivalve	Crow poison	
Amaranthaceae	Iresine rhizomatosa	Woodland amaranth	
Amaranthaceae	Froelichia floridana	Florida snakecotton	
Amaryllidaceae	Crinum zeylanicum	Ceylon swamp lily	
Amaryllidaceae	Hymenocallis eulae	Henry's spiderlily	
Amaryllidaceae	Hymenocallis liriosome	Texas spiderlily	
Amaryllidaceae	Ipheon uniflorum	Spring starflower	
Anacardiaceae	Rhus aromatica	Aromatic sumac	
Anacardiaceae	Rhus copallina	Winged sumac	
Anacardiaceae	Rhus glabra	Smooth sumac	
Anacardiaceae	Toxicodendron pubescens	Poison oak	
Anacardiaceae	Toxicodendron radicans	Poison ivy	
Anacardiaceae	Toxicodendron vernix	Poison sumac	
Annonaceae	Asimina parviflora	Dwarf pawpaw	
Apiaceae	Centella erecta	American coinwort	

Apiaceae	Chaerophyllum tainturieri	Wild chervil
Apiaceae	Cynosciadium digitatum	Finger dogshade
Apiaceae	Daucus carota	Queen Anne's lace
Apiaceae	Daucus pusilla	Dwarf wild carrot
Apiaceae	Eryngium integrifolium	
Apiaceae	Eryngium prostratum	Creeping eryngo
Apiaceae	Eryngium yuccifolium	Rattlesnake master
Apiaceae	Hydrocotyle bowlesioides	Largeleaf marsh pennywort
Apiaceae	Hydrocotyle umbellata	Manyflower pennywort
Apiaceae	Hydrocotyle verticillata	Whorled pennywort
Apiaceae	Limnosciadium pinnatum	Tansy dogshade
Apiaceae	Oxypolis rigidior	Cowbane
Apiaceae	Ptilimnium capillaceum	Herbwilliam
Apiaceae	Ptilimnium costatum	Mock bishopweed
Apiaceae	Ptilmnium nuttallii	Laceflower
Apiaceae	Sanicula canadensis	Black snakeroot
Apiaceae	Sanicula odorata	Clustered black snakeroot
Apiaceae	Spermolepis diffusa	Scaleseed
Apiaceae	Torilis arvensis	Hedge parsley
Apiaceae	Trepocarpus aethusae	Whitenymph
Apocynaceae	Trachelospermum difforme	Climbing dogbane
Aquifoliaceae	Ilex ambigua	Carolina holly
Aquifoliaceae	Ilex decidua	Decidous holly
Aquifoliaceae	llex opaca	American holly
Aquifoliaceae	llex vomitoria	Yaupon
Aracaceae	Sabal minor	Dwarf palmetto
Araceae	Arisaema dracontium	Green dragon
Araceae	Arisaema triphyllum	Jack-in-the-pulpit
Araceae	Peltandra virginica	Arrow arum
Araliaceae	Aralia spinosa	Devil's walking-stick
Asclepiadaceae	Asclepias amplexicaulis	Clasping milkweed
Asclepiadaceae	Asclepias tuberosa	Butterflyweed
Asclepiadaceae	Asclepias variegata	Redring milkweed
Asclepiadaceae	Asclepias viridis	
Asclepiadaceae	Asclepias verticillata	Whorled milkweed
Asclepiadaceae	Gonolobus suberosa	Anglepod
Asclepiadaceae	Matelea hirtelliflora	Hairy-faced spinypod
Asparagaceae	Polygonatum biflorum	Solomon's seal
Aspleniaceae	Asplenium platyneuron	Ebony spleenwort
Asteraceae	Ageratina altissima	White snakeroot
Asteraceae	Ambrosia artemisiifolius	Common ragweed
Asteraceae	Ambrosia psilostachya	Western ragweed
Asteraceae	Ambrosia trifida	Tall ragweed
Asteraceae	Antennaria parlinii	Pussy toes
Asteraceae	Baccharis halimifolia	Eastern baccharis
Asteraceae	Berlandiera betonicifolia	Texas greeneyes
Asteraceae	Berlandiera pumila	Soft greeneyes
Asteraceae	Bidens aristosa	Bearded beggarsticks

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Asteraceae	Bidens bipinnata	Spanish needles	
Asteraceae	Bidens frondosa	Devil's beggarticks	
Asteraceae	Bidens polylepis	Bur marigold	
Asteraceae	Boltonia diffusa	Doll's daisy	
Asteraceae	Bradburia pilosa	Soft goldenaster	
Asteraceae	Brickellia eupatorioides	False boneset	
Asteraceae	Cirsium carolinianum	Carolina thistle	
Asteraceae	Cirsium horridulum	Yellow thistle	
Asteraceae	Conclinium coelestinum	Blue mistflower	
Asteraceae	Conyza canadensis	Horseweed	
Asteraceae	Coreopsis basilis	Goldenmane tickseed	
Asteraceae	Coreopsis intermedia	Goldenwave tickseed	Very rare
Asteraceae	Coreopsis lanceolata	Lanceleaf coreopsis	
Asteraceae	Coreopsis tinctoria	Plains coreopsis	
Asteraceae	Croptilon divaricatum	Scratch daisy	
Asteraceae	Diaperia candida	Pygmy cudweed	
Asteraceae	Doellingeria seriocarpioides	Flat-topped aster	
Asteraceae	Echinacea sanguinea	Purple coneflower	
Asteraceae	Elephantopus carolinianus	Leafy elephant's foot	
Asteraceae	Elephantopus tomentosus	Elephant foot	
Asteraceae	Engelmannia peristenia	Engelman daisy	
Asteraceae	Erechtites hieracifolia	Fireweed	
Asteraceae	Erigeron philadelphicus	Philadelphia fleabane	
Asteraceae	Erigeron strigosus	Prairie fleabane	
Asteraceae	Erigeron tenuis	Slender fleabane	
Asteraceae	Eupatorium capillifolium	Dogfennel	
Asteraceae	Eupatorium perfoliatum	Common boneset	
Asteraceae	Eupatorium rotundifolium	Roundleaf boneset	
Asteraceae	Eupatorium serotinum	Boneset	
Asteraceae	Eupatorium x pinnatifidum	Thoroughwort	
Asteraceae	Eurybia hemisphaerica	Southern prairie aster	
Asteraceae	Euthamia leptocephala	Bushy goldentop	
Asteraceae	Eutrochium fistulosum	Joe-pye weed	
Asteraceae	Facelis retusa	Trampweed	
Asteraceae	Fleischmannia incarnata	Pink thoroughwort	
Asteraceae	Gaillardia aestivalis	Lanceleaf blanketflower	
Asteraceae	Gaillardia pulchella	Indian blanket	
Asteraceae	Gamochaeta antilliana	Delicate everlasting	
Asteraceae	Gamochaeta argyrinea	Silver everlasting	
		Narrowleaf purple	
Asteraceae	Gamochaeta calviceps	everlasting	
Asteraceae	Gamochaeta coarctata	Grey everlasting	
Asteraceae	Gamochaeta pensylvanica	Pennsylvania cudweed	
Asteraceae	Gamochaeta purpurea	Purple cudweed	
Asteraceae	Helenium amarum	Sneezeweed	
Asteraceae	Helianthus angustifolius	Narrowleaf sunflower	
Asteraceae	Helianthus debilis spp. cucumerifolius	Cucumber leaf sunflower	
Asteraceae	Helianthus hirsutus	Hairy sunflower	
Asteraceae	l Helianthus maximilliana	Maximillian sunflower	

Asteraceae	Helianthus mollis	Downy sunflower	
Asteraceae	Heterotheca subaxillaris	Camphorweed	
Asteraceae	Hieracium gronovii	Hawk's beard	
Asteraceae	Hymenopappus artemisiifolius	Woolywhite	
Asteraceae	Hypochaeris glabra	Smooth cat's ear	
Asteraceae	Iva angustifolium	Narrowleaf sumpweed	
Asteraceae	lva annua	Sumpweed	
Asteraceae	Krigia cespitosa	Weedy dwarfdandelion	
Asteraceae	Krigia dandelion	Dwarf dandelion	
Asteraceae	Krigia virginica	Virginia dwarf-dandelion	
Asteraceae	Lactuca canadensis	Canada wild lettuce	
Asteraceae	Lactuca hirsuta	Hairy wild lettuce	
Asteraceae	Lactuca ludoviciana	Western wild lettuce	
			may be Liatris
Asteraceae	Liatris aspera	Tall blazing star	squarrulosa
Asteraceae	Liatris bridgesii	Bridges' blazing star	
Asteraceae	Liatris pycnostachya	Prairie blazing star	
Asteraceae	Liatris squarrosa	Scaly blazing star	
			Rare, but locally abundant
Asteraceae	Liatris tenuis	Slender blazing star	on W8
Asteraceae	Mikania scandens	Climbing hempvine	
Asteraceae	Packera glabella	Butterweed	
Asteraceae	Packera obovata	Golden groundsel	
Asteraceae	Pityopsis graminifolia	Silkgrass	
Asteraceae	Pluchea camphorata	Camphor pluchea	
Asteraceae	Pluchea foetida	Stinking camphorweed	
Asteraceae	Pluchea odorata	Marsh fleabane	
Asteraceae	Prenanthes barbata	Barbed rattlesnake root	Rare
Asteraceae	Pseudognaphalium obtusifolium	Fragrant cudweed	
Asteraceae	Pyrrhopappus carolinianum	Carolina false dandelion	
Asteraceae	Pyrrhopappus pauciflorus	Small-flower false dandelion	
Asteraceae	Ratibida peduncularis	Mexican hat	
Asteraceae	Rudbeckia hirta	Black-eyed Susan	
Asteraceae	Senecio ampullaceus	Texas ragwort	
Asteraceae	Senecio vulgaris	Common groundsel	
Asteraceae	Silphium radula	Roughstem rosinweed	
Asteraceae	Smallanthus uvedalia	Bear's foot	
Asteraceae	Solidago altissima	Tall goldenrod	
Asteraceae	Solidago dispersa	Louisiana goldenrod	
Asteraceae	Solidago nitida	Flat-topped goldenrod	
Asteraceae	Solidago odora	Fragrant goldenrod	
Asteraceae	Solidago petiolaris	Downy ragged goldenrod	
Asteraceae	Solidago radula	Rough goldenrod	
Asteraceae	Solidago rugosa	Roughleaf goldenrod	
Asteraceae	Solidago ulmifolia	Elm-leaved goldenrod	
Asteraceae	Soliva sessilis	Stickers	
Asteraceae	Sonchus asper	Spiny sowthistle	
Asteraceae	Symphyotrichum drummondii	Drummond aster	
Asteraceae	Symphyotrichum dumosum		

Asteraceae	Symphyotrichum lanceolatum	Panicled aster	
Asteraceae	Symphyotrichum lateriflorum	Calico aster	
Asteraceae	Symphyotrichum oolentangiense		
Asteraceae	Symphyotrichum patens	Late purple aster	
Asteraceae	Symphyotrichum pratense	Barrens silky aster	
Asteraceae	Symphyotrichum racemosum	Small white aster	
Asteraceae	Symphyotrichum subulatum	Annual aster	
Asteraceae	Tetragonotheca ludoviciana	Louisiana squarehead	Rare
Asteraceae	Verbesina helianthoides	Yellow crownbeard	
Asteraceae	Verbesina virginica	Frostweed	
Asteraceae	Vernonia missurica	Missouri ironweed	
Asteraceae	Vernonia texana	Texas ironweed	
Athyriaceae	Athryium filix-femina	Southern lady fern	
Balsaminaceae	Impatiens capensis	Touch-me-not	
Berberidaceae	Nandina domestica	Heavenly bamboo	
Berberidaceae	Podophyllum peltatum	Mayapple	
Betulaceae	Alnus serrulata	Smooth alder	
Betulaceae	Betula nigra	River birch	
Betulaceae	Carpinus caroliniana	American hornbeam	
Betulaceae	Ostrya virginiana	Eastern hophornbeam	
Bignoniaceae	Bignonia capreolata	Crossvine	
Bignoniaceae	Campsis radicans	Trumpet creeper	
Bignoniaceae	Catalpa speciosa	Northern catalpa	
Blechnaceae	Woodwardia areolata	Netted chain fern	
Blechnaceae	Woodwardia virginica	Virginia chainfern	
Boraginaceae	Heliotropium indicum	Indian heliotrope	
Boraginaceae	Lithospermum occidentale	Western marbleseed	
Boraginaceae	Myosotis macrosperma	Forget-me-not	
Brassicaceae	Cardamine bulbosa	Spring cress	
Brassicaceae	Cardamine hirsuta	Hairy bittercress	
Brassicaceae	Cardamine pensylvanica	Pennsylvania bittercress	
Brassicaceae	Lepidium virginicum	Smooth peppergrass	
Brassicaceae	Rapistrum rugosum	Turnipweed	
Bromeliaceae	Tillandsia usneoides	Spanish moss	
Buddlejaceae	Polypremum procumbens	Juniper leaf	
Cactaceae	Opuntia xanthoglochia	Pricklypear	
Callitrichaceae	Callitriche heterophylla	Water starwort	
Callitrichaceae	Callitriche terrestris	Terrestrial water starwort	
Campanulaceae	Lobelia appendiculata	Pale lobelia	
Campanulaceae	Lobelia cardinalis	Cardinal flower	
Campanulaceae	Lobelia puberula	Downy lobelia	
Campanulaceae	Triodanis biflora	Small venus' looking glass	
		Clasping Venus's looking-	
Campanulaceae	Triodanis perfoliata	glass	
Campanulaceae	Wahlenbergia marginata	Southern rockbell	
Cannaceae	Canna x generalis	Indian shot	
Caprifoliaceae	Lonicera japonica	Japanese honeysuckle	
Caprifoliaceae	Lonicera sempervirens	Trumpet honeysuckle	
Caprifoliaceae	Sambucus canadensis	Black elderberry	

Caprifoliaceae	Viburnum nudum	Possumhaw viburnum
Caprifoliaceae	Viburnum rufidulum	Rusty blackhaw
Caryophyllaceae	Cerastium glomeratum	Sticky mouse-ear chickweed
Caryophyllaceae	Petrohagia dubia	Hairy pink
Caryophyllaceae	Polycarpon tetraphyllum	Fourleaf allseed
Caryophyllaceae	Sagina decumbens	Pearlwort
Caryophyllaceae	Silene antirhina	Sleepy catchfly
Caryophyllaceae	Silene gallica	Common catchfly
Caryophyllaceae	Stellaria media	Common chickweed
Celastraceae	Euonymus americanus	Strawberry bush
Chenopodiaceae	Dysphania ambrosioides	Mexican tea
Cistaceae	Helianthemum carolinianum	Carolina rockrose
Cistaceae	Helianthemum georgianum	Georgia rockrose
Cistaceae	Helianthemum rosmarinifolium	Rosemary rockrose
Cistaceae	Lechea mucronata	Hairy pinweed
Cistaceae	Lechea tenuifolia	Slender pinweed
Clusiaceae	Hypericum crux-andrea	St. Andrew's cross
Clusiaceae	Hypericum drummondii	Nits and lice
Clusiaceae	Hypericum gymnanthum	Clasping St. John's wort
Clusiaceae	Hypericum hypericoides	St. John's wort
Clusiaceae	Hypericum mutilum	Dwarf St. John's wort
Clusiaceae	Hypericum pseudomaculatum	False spotted St. John's wort
Clusiaceae	Hypericum walteri	Marsh St. John's wort
Commelinaceae	Commelina diffusa	Climbing dayflower
Commelinaceae	Commelina erecta	Erect dayflower
Commelinaceae	Commelina virginica	Virginia dayflower
Commelinaceae	Tradescantia hirsutiflora	Hairy spiderwort
Commelinaceae	Tradescantia occidentalis	Prairie spiderwort
Commelinaceae	Tradescantia ohioensis	Ohio spiderwort
Commelinaceae	Tradescantia reverchonii	Reverchon's spiderwort
Convolvulaceae	Dichondra carolinensis	Ponyfoot
Convolvulaceae	Ipomoea cordatotriloba	Common morningglory
Convolvulaceae	Ipomoea lacunosa	White morningglory
Convolvulaceae	Ipomoea pandurata	Man of Earth vine
Convolvulaceae	Jacquemontia tamnifolia	Hairy clustervine
Convolvulaceae	Stylisma pickeringii	Pickering's dawnflower
Cornaceae	Cornus florida	Flowering dogwood
Cornaceae	Nyssa biflora	Swamp tupelo
Cornaceae	Nyssa sylvatica	Blackgum
Cucurbitaceae	Melothria pendula	Little cucumber
Cupressaceae	Juniperus virginiana	Eastern red cedar
Cuscutaceae	Cuscuta compacta	Compact dodder
Cuscutaceae	Cuscuta glabrior	Smooth dodder
Cyperaceae	Bulbostylis capillaris	Densetuft hairsedge
Cyperaceae	Bulbostylis ciliatifolia	Capillary hairsedge
Cyperaceae	Carex abscondita	Thicket sedge
Cyperaceae	Carex albicans	Whitetinge sedge
Cyperaceae	Carex albolutescens	Greenwhite sedge

Cyperaceae	Carex atlantica	Atlantic sedge	
Cyperaceae	Carex aureolensis	Goldenfruit sedge	
Cyperaceae	Carex blanda	Woodland sedge	
Cyperaceae	Carex caroliniana	Carolina sedge	
Cyperaceae	Carex complanata	Hirsute sedge	
Cyperaceae	Carex corrugata	Prunefruit sedge	
Cyperaceae	Carex crebriflora	Coastal plain sedge	
Cyperaceae	Carex crinita	Fringed sedge	
Cyperaceae	Carex debilis	White edge sedge	
Cyperaceae	Carex digitalis var. floridana	Asymmetric finger sedge	
Cyperaceae	Carex festucacea	Fescue sedge	
Cyperaceae	Carex flaccosperma	Thin-fruit caric sedge	
Cyperaceae	Carex floridana	Florida sedge	
Cyperaceae	Carex glaucescens	Southern waxy sedge	
Cyperaceae	Carex joorii	Swamp sedge	
Cyperaceae	Carex leavenworthii	Leavenworth's sedge	
Cyperaceae	Carex leptalea	Bristle-stalked sedge	
Cyperaceae	Carex longii	Long's sedge	
Cyperaceae	Carex lupulina	Hop sedge	
Cyperaceae	Carex lurida	Sallow sedge	
Cyperaceae	Carex muehlenbergii	Muhlenberg's sedge	
Cyperaceae	Carex oxylepis	Sharpscale sedge	
Cyperaceae	Carex texensis	Texas sedge	
Cyperaceae	Carex triangularis	Eastern fox sedge	
Cyperaceae	Carex tribuloides	Blunt broom sedge	
Cyperaceae	Cyperus acuminatus	Tapertip flatsedge	
Cyperaceae	Cyperus brevifolius	Shortleaf spikesedge	
Cyperaceae	Cyperus croceus	Baldwin flat sedge	
Cyperaceae	Cyperus echinatus	Globe flatsedge	
Cyperaceae	Cyperus erythrorhizos	Redroot flatsedge	
Cyperaceae	Cyperus esculentus	Yellow nutsedge	
Cyperaceae	Cyperus haspan	Haspan flatsedge	
Cyperaceae	Cyperus hystricinus	Bristly flatsedge	
Cyperaceae	Cyperus odoratus	Fragrant flatsedge	
Cyperaceae	Cyperus plukenettii	Plukenet's flatsedge	
Cyperaceae	Cyperus pseudovegetus	Marsh flatsedge	
Cyperaceae	Cyperus reflexus	Bentawn flatsedge	
Cyperaceae	Cyperus retroflexus	One-flower flatsedge	
Cyperaceae	Cyperus retrosus	Pine barren flatsedge	
Cyperaceae	Cyperus rotundus	Nut grass	
Cyperaceae	Cyperus sesquiflorus	Fragrant spikesedge	
Cyperaceae	Cyperus retrosus X C. echinatus	Undescribed flatsedge	Hybrid species
Cyperaceae	Cyperus strigosus	Straw colored flatsedge	
Cyperaceae	Cyperus virens	Green flatsedge	
Cyperaceae	Eleocharis baldwiniana	Baldwin's spikerush	
Cyperaceae	Eleocharis obtusa	Blunt spikerush	
Cyperaceae	Eleocharis palustris	Common spikerush	
Cyperaceae	Eleocharis tortilis	Twisted spikerush	

Cyperaceae	Fimbristylis dichotoma	Forked fimbry
Cyperaceae	Fimbristylis miliacea	Hoorahgrass
Cyperaceae	Fimbristylis vahlii	Vahl's fimbry
Cyperaceae	Fuirena squarrosa	Hairy umbrella sedge
Cyperaceae	Isolepis carinata	Bulrush
Cyperaceae	Rhynchospora capitellata	Brownish beaksedge
Cyperaceae	Rhynchospora cephalantha	Bunched beaksedge
Cyperaceae	Rhynchospora corniculata	Horned beaksedge
Cyperaceae	Rhynchospora globularis	Globe beaksedge
Cyperaceae	Rhynchospora glomerata	Clustered beaksedge
Cyperaceae	Rhynchospora gracilenta	Slender beaksedge
Cyperaceae	Rhynchospora harveyi	Harvey's beaksedge
Cyperaceae	Rhynchospora inexpansa	Nodding beaksedge
Cyperaceae	Rhynchospora mixta	Mingled beaksedge
Cyperaceae	Rhynchospora recognita	Big globe beaksedge
Cyperaceae	Scirpus cyperinus	Woolgrass
Cyperaceae	Scleria ciliata	Fringed nutrush
Cyperaceae	Scleria oligantha	Littlehead nutrush
Cyperaceae	Scleria reticularis	Netted nutrush
Cyperaceae	Scleria triglomerata	Whip nutrush
Dennstaedtiaceae	Pteridium aquilinum	Bracken fern
Dioscoreaceae	Dioscorea villosa	Wild yam
Droseraceae	Drosera brevifolia	Dwarf sundew
Droseraceae	Drosera capillaris	Pink sundew
Ebenaceae	Diospyros virginiana	Persimmon
Elaeagnaceae	Elaeagnus pungens	Silverberry
Ericaceae	Monotropa uniflora	Indian pipe
Ericaceae	Rhododendron oblongifolium	Texas azalea
Ericaceae	Vaccinium arboreum	Farkleberry
Ericaceae	Vaccinium corymbosum	Highbush blueberry
Ericaceae	Vaccinium elliotii	Elliott's blueberry
Ericaceae	Vaccinium fuscatum	Black highbush blueberry
Ericaceae	Vaccinium stamineum	Deerberry
Eriocaulaceae	Eriocaulon texense	Texas pipewort
Eriocaulaceae	Lachnocaulon anceps	Whitehead bogbuttons
Euphorbiaceae	Acalypha gracilens	Three-seed mercury
Euphorbiaceae	Acalypha monococa	One seed mercury
Euphorbiaceae	Acalypha virginica	Virginia mercury
Euphorbiaceae	Cnidoscolus texanus	Texas bull-nettle
Euphorbiaceae	Croton argyanthemus	Silver croton
Euphorbiaceae	Croton glandulosus	Toothed croton
Euphorbiaceae	Croton lindheimeri	Wooly croton
Euphorbiaceae	Croton michauxii	Michaux's croton
Euphorbiaceae	Croton monanthogynus	Oneseed mercury
Euphorbiaceae	Euphorbia cordifolia	Heartleaf spurge
Euphorbiaceae	Euphorbia cyathophora	Fire-on-the-mountain
Euphorbiaceae	Euphorbia maculata	Spotted spurge
Euphorbiaceae	Phyllanthus carolinensis	Carolina leafseed

Euphorbiaceae	Phyllanthus urinaria	Peewater leafseed	
Euphorbiaceae	Stillingia sylvatica	Queen's delight	
Euphorbiaceae	Tragia smallii	Small's noseburn	
Euphorbiaceae	Tragia urticifolia	Nettleleaf noseburn	
Euphorbiaceae	Triadica sebifera	Chinese tallow	
Fabaceae	Albizia julibrissen	Mimosa tree	
Fabaceae	Amorpha fruticosa	Indigo bush	
Fabaceae	Amorpha paniculata	Panicled false indigo	
Fabaceae	Amphicarpaea bracteata	Hog peanut	
Fabaceae	Apios americana	Ground nut	
Fabaceae	Baptisia nuttalliana	Nuttall's wild indigo	
Fabaceae	Centrosema virginiana	Butterfly pea	
Fabaceae	Cercis canadensis	Red bud	
Fabaceae	Chamaecrista fasciculata	Partridge pea	
Fabaceae	Chamaecrista nictitans	Sensitive partridge pea	
Fabaceae	Clitoria mariana	Pigeonwings	
Fabaceae	Crotalaria sagittalis	Rattlebox	
Fabaceae	Dalea phleoides	Slimspike prairie clover	
Fabaceae	Dalea villosa	Silky prairie clover	
Fabaceae	Desmanthus illinoinensis	Illinois bundleflower	
Fabaceae	Desmodium ciliare	Little-leaf tick-clover	
Fabaceae	Desmodium fernaldii	Fernald beggar's ticks	
Fabaceae	Desmodium glabellum	Dillenius' tick-trefoil	
Fabaceae	Desmodium laevigatum	Smooth tick-trefoil	
Fabaceae	Desmodium obtusum	Stiff tick-trefoil	
Fabaceae	Desmodium paniculatum	Panicled tick-trefoil	
Fabaceae	Desmodium sessilifolium	Sessileleaf ticktrefoil	
Fabaceae	Desmodium viridiflorum	Velvetleaf ticktrefoil	
Fabaceae	Erythrina herbacea	Coral bean	
Fabaceae	Galactia regularis	Downy milkpea	
Fabaceae	Gleditsia triacanthos	Honey locust	
Fabaceae	Hylodesmum glutinosum	Point-leaved tick-trefoil	
Fabaceae	Hylodesmum nudiflorum	Naked flower tick-trefoil	
Fabaceae	Kummerowia striata	Japanese bush-clover	
Fabaceae	Lathyrus hirsutus	Caley pea	
Fabaceae	Lathyrus pusillus	Tiny pea	
Fabaceae	Lespedeza cuneata	Chinese bushclover	
Fabaceae	Lespedeza hirta	Hairy bush clover	
Fabaceae	Lespedeza procumbens	Trailing bush clover	
Fabaceae	Lespedeza repens	Creeping bush clover	
Fabaceae	Lespedeza stuevei	Tall bush clover	
Fabaceae	Lespedeza virginica	Virginia bush clover	
Fabaceae	Medicago polymorpha	Burclover	
Fabaceae	Melilotus albus	White sweetclover	
Fabaceae	Mimosa nuttallii	Sensitive briar	
Fabaceae	Mimosa strigillosa	Powderpuff	
Fabaceae	Pediomelum digitatum	Palm-leaf scurf-pea	
Fabaceae	Pediomelum hypogaeum	Little Indian breadfruit	

Fabaceae	Rhynchosia latifolia	Prairie snoutbean	
Fabaceae	Senna marilandica	Maryland senna	
Fabaceae	Senna occidentalis	Coffee senna	
Fabaceae	Sesbania herbacea	Bagpod	
Fabaceae	Strophostyles helvola	Trailing fuzzybean	
Fabaceae	Strophostyles leiosperma	Slickseed fuzzybean	
Fabaceae	Strophostyles umbellata	Wild bean	
Fabaceae	Stylosanthes biflora	Pencil flower	
Fabaceae	Tephrosia onobrychoides	Multibloom hoary pea	
Fabaceae	Tephrosia virginiana	Goat's rue	
Fabaceae	Trifolium campestre	Yellow hop clover	
Fabaceae	Trifolium carolinianum	Carolina clover	
Fabaceae	Trifolium dubium	Hop clover	
Fabaceae	Trifolium incarnatum	Crimson clover	
Fabaceae	Trifolium lappaceum	Burdock clover	
Fabaceae	Trifolium pratense	Red clover	
Fabaceae	Trifolium repens	White clover	
Fabaceae	Trifolium vesiculosum	Arrowleaf clover	
Fabaceae	Vicia hirsuta	Hairy vetch	
Fabaceae	Vicia ludoviciana	Louisiana vetch	
Fabaceae	Vicia minutiflora	Pygmyflower vetch	
Fabaceae	Vicia sativa	Common vetch	
Fabaceae	Vicia tetrasperma	Four-seed vetch	
Fabaceae	Wisteria frutescens	Kentucky wisteria	
Fagaceae	Castanea pumila	Chinquapin	Planted in yard
Fagaceae	Quercus acutissima	Sawtooth oak	
Fagaceae	Quercus alba	White oak	
Fagaceae	Quercus falcata	Southern red oak	
Fagaceae	Quercus hemisphaerica	Upland laurel oak	
Fagaceae	Quercus incana	Bluejack oak	
Fagaceae	Quercus laurifolia	Laurel oak	
Fagaceae	Quercus lyrata	Overcup oak	
Fagaceae	Quercus margarettae	San post oak	
Fagaceae	Quercus marilandica	Blackjack oak	
Fagaceae	Quercus michauxii	Swamp chestnut oak	
Fagaceae	Quercus nigra	Water oak	
Fagaceae	Quercus pagoda	Cherrybark oak	
Fagaceae	Quercus phellos	Willow oak	
Fagaceae	Quercus pumila	Runner oak	Planted along road
Fagaceae	Quercus shumardii	Shumard red oak	
Fagaceae	Quercus stellata	Post oak	
Fagaceae	Quercus texana	Nuttall oak	
Fagaceae	Quercus virginiana	Coastal live oak	
Fagaceae	Querus x comptoniae	Compton oak	Planted in yard
Fumariaceae	Corydalis micrantha	Smallflower fumewort	
Gentianaceae	Centaurium pulchellum	Lesser centaury	
Gentianaceae	Sabatia angularis	Rosepink	
Gentianaceae	Sabatia campestris	Meadow pink	

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Geraniaceae	Geranium carolinianum	Carolina geranium	
Haloragaceae	Myriophyllum heterophyllum	Broadleaf water milfoil	
Haloragaceae	Proserpinaca palustris	Marsh mermaidweed	
Hamamelidaceae	Liquidambar styraciflua	Sweetgum	
Hippocastanaceae	Aesculus pavia	Red buckeye	
Hydroleaceae	Hydrolea ovata	Blue waterleaf	
Hydroleaceae	Hydrolea uniflora	One flower false fiddlehead	
Hypoxidaceae	Hypoxis sessilis	Sessile stargrass	
Iridaceae	Alophia drummondii	Pinewoods lily	
Iridaceae	Herbertia lahue	Prairie nymph	
Iridaceae	Gladiolus dalenii	Dragon's head lily	
Iridaceae	Sisyrinchium angustifolium	Narrowleaf blue-eyed grass	
Iridaceae	Sisyrinchium (intermediate annual form)	Blue-eyed grass	Possibly undescribed species
Iridaceae	Sisyrinchium rosulatum	Annual blue-eyed grass	
Iridaceae	Sisyrinchium elizabethiae	Elizabeth's blue-eyed grass	New species
Iteaceae	Itea virginica	Virginia sweetspire	
Juglandaceae	Carya aquatica	Water hickory	
Juglandaceae	Carya cordiformis	Butternut hickory	
Juglandaceae	Carya glabra	Pignut hickory	
Juglandaceae	Carya illinoinensis	Pecan	
Juglandaceae	Carya ovata	Shagbark hickory	
Juglandaceae	Carya texana	Black hickory	
Juglandaceae	Carya tomentosa	Mockernut hickory	
Juglandaceae	Juglans nigra	Black walnut	
Juncaceae	Juncus acuminatus	Tapertip rush	
Juncaceae	Juncus brachycarpus	Littlehead rush	
Juncaceae	Juncus bufonius	Toad rush	
Juncaceae	Juncus coriaceus	Leathery rush	
Juncaceae	Juncus dichotomus	Forked rush	
Juncaceae	Juncus diffusissimus	Slim-pod rush	
Juncaceae	Juncus effusus	Common rush	
Juncaceae	Juncus marginatus	Grass-leaf rush	
Juncaceae	Juncus nodatus	Stout rush	
Juncaceae	Juncus tenuis	Path rush	
Juncaceae	Juncus trigonocarpus	Redpod rush	
Juncaceae	Juncus validus	Round-head rush	
Juncaceae	Luzula bulbosa	Woodrush	
Lamiaceae	Hedeoma hispida	False pennyroyal	
Lamiaceae	Lamium amplexicaule	Henbit	
Lamiaceae	Lycopus rubellus	Water hore-hound	
Lamiaceae	Monarda citriodora	Lemon beebalm	
Lamiaceae	Monarda fistulosa	Wild bergamont	
Lamiaceae	Monarda punctata	Spotted beebalm	
Lamiaceae	Perilla frutescens	Beefsteak plant	
Lamiaceae	Physostegia digitalis	Finger false dragonhead	
Lamiaceae	Prunella vulgaris	Self heal	
Lamiaceae	Pycnanthemum albescens	Mountain mint	

Lamiaceae	Pycnanthemum tenuifolium	Narrowleaf mountain mint	
Lamiaceae	Salvia azurea	Blue sage	
Lamiaceae	Salvia lyrata	Lyre-leaved sage	
Lamiaceae	Scutellaria cardiophylla	Gulf skullcap	
Lamiaceae	Scutellaria elliptica	Eggleaf skullcap	
Lamiaceae	Scutellaria integrifolia	Helmet flower	
Lamiaceae	Scutellaria ovata	Heartleaf skullcap	
Lamiaceae	Scutellaria parvula	Small skullcap	
Lamiaceae	Stachys tenuifolia	Smooth hedgenettle	
Lamiaceae	Teucrium canadense	American germander	
Lamiaceae	Thymus vulgaris	Thyme	Planted in garden
Lamiaceae	Trichostema dichotomum	Forked bluecurls	
Lauraceae	Sassafras albidum	Sassafras	
Lentibulariaceae	Utricularia subulata	Zigzag bladderwort	
Linaceae	Linum medium	Stiff yellow flax	
Linaceae	Linum striatum	Ridged yellow flax	
Lindernaceae	Lindernia dubia var. anagallidea	False pimpernel	
Loganiaceae	Gelsemium sempervirens	Carolina jessamine	
Loganiaceae	Mitreola sessilfolia	Hornpod	
Loganiaceae	Polypremum procumbens	Juniperleaf	
Lycopodiaceae	Lycopodiella prostrata	Featherstem clubmoss	
Lycopodiaceae	Pseudolycopodiella caroliniana	Slender bog clubmoss	
Lygodiaceae	Lygodium japonicum	Japanese climbing fern	
Lythraceae	Lagerstroemia indica	Crepe myrtle	
Lythraceae	Rotala ramosior	Toothcup	
Magnoliaceae	Liriodendron tulipifera	Tulip tree	Planted by shop
Magnoliaceae	Magnolia grandiflora	Southern magnolia	
Magnoliaceae	Magnolia virginiana	Sweetbay	
Malvaceae	Callirhoe papaver	Woodland poppymallow	
Malvaceae	Hibiscus dasycalyx	Neches River rose mallow	
Malvaceae	Hibiscus laevis	Halbeardleaf rose mallow	
Malvaceae	Hibiscus moscheutos	Swamp rosemallow	
Malvaceae	Modiola caroliniana	Carolina modiola	
Malvaceae	Sida lindheimeri	Showy fanpetals	
Malvaceae	Sida rhombifolia	Diamond-leaf sida	
Malvaceae	Tilia americana	American basswood	
Mazaceae	Mazus pumila	Japanese mazus	Weed in lodge lawn
Melanthiaceae	Stenanthium gramineum	Featherbells	
Melanthiaceae	Veratrum virginicum	Virginia bunchflower	Westernmost location
Melastomataceae	Rhexia mariana	Maryland meadow beauty	
Melastomataceae	Rhexia virginica	Virginia meadow beauty	
Meliaceae	Melia azedarach	Chinaberry	
Molluginaceae	Mollugo verticillata	Carpetweed	
Montiaceae	Claytonia virginica	Spring beauty	
Moraceae	Morus rubra	Red mulberry	
Myricaceae	Morella carolinensis	Southern bayberry	
Myricaceae	Morella cerifera	Wax myrtle	
Nyctaginaceae	Mirabilis albida	Four o' clock	

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Nymphaeaceae	Nymphaea odorata	White waterlily	
Oleaceae	Chionanthus virginicus	Fringetree	
Oleaceae	Forestiera ligustrina	Upland swampprivet	
Oleaceae	Fraxinus americana	White ash	
Oleaceae	Fraxinus pennsylvanica	Green ash	
Oleaceae	Ligustrum sinense	Chinese privet	
Onagraceae	Ludwigia alternifolia	Seedbox	
Onagraceae	Ludwigia decurrens	Willow primrose	
Onagraceae	Ludwigia leptocarpa	Anglestem primrose willow	
Onagraceae	Ludwigia linearis	Narrow-leaf seedbox	
Onagraceae	Ludwigia octovalvis	Mexican primrose willow	
Onagraceae	Ludwigia repens	Creeping primrose willow	
Onagraceae	Lugwigia glandulosa	Torrey's seedbox	
Onagraceae	Lugwigia palustris	Marsh purslane	
Onagraceae	Oenothera biennis	Evening star	
Onagraceae	Oenothera filiformis	Longflower beeblossum	Gaura longiflora
U		Variable leaf evening	
Onagraceae	Oenothera heterophylla	primrose	
Onagraceae	Oenothera laciniata	Cutleaf evening primrose	
Onagraceae	Oenothera linifolia	Sundrops	
Onagraceae	Oenothera mexicana	Mexican evening primrose	
Onagraceae	Oenothera speciosa	Showy evening primrose	
Onocleaceae	Onoclea sensibilis	Sensitive fern	
Ophioglossaceae	Sceptridium biternatum	Sparse-lobed grapefern	
Ophioglossaceae	Sceptridium dissectum	Cut-leaved grapefern	
Orchidaceae	Platanthera ciliaris	Orange fringed orchid	Rare
Orchidaceae	Spiranthes cernua	Nodding ladies' tresses	
Orchidaceae	Spiranthes vernalis	Spring ladies' tresses	
Orobanchaceae	Phelipanche ramosa	Hemp broomrape	
Osmundaceae	Osmunda cinnamomea	Cinnamon fern	
Osmundaceae	Osmunda regalis	Royal fern	
Oxalidaceae	Oxalis debilis	Pink woodsorrel	
Oxalidaceae	Oxalis dillenii	Common woodsorrel	
Oxalidaceae	Oxalis violacea	Violet woodsorrel	
Papaveraceae	Argemone albiflora	White pricklypoppy	
Passifloraceae	Passiflora incarnata	Purple passionflower	
Passifloraceae	Passiflora lutea	Yellow passionflower	
Penthoraceae	Penthorum sedoides	Ditch stonecrop	
Phyrmaceae	Mimulus alatus	Monkeyflower	
Phytolaccaceae	Phytolacca americana	Pokeweed	
Pinaceae	Pinus echinata	Shortleaf pine	
Pinaceae	Pinus elliottii	Slash pine	
Pinaceae	Pinus palustris	Longleaf pine	
Pinaceae	Pinus taeda	Loblolly pine	
Plantaginaceae	Mecardonia acuminata	Axilflower	
Plantaginaceae	Plantago aristata	Bracted plantain	
Plantaginaceae	Plantago hookeriana	Hooker's plantain	
Plantaginaceae	Plantago lanceolata	Ribwort plantain	
Plantaginaceae	Plantago virginica	Paleseed plantain	

Plantaginaceae	Plantago wrightiana	Wright's plantain	
Plantaginaceae	Scoparia dulcis	Licorice weed	
Platanaceae	Platanus occidentalis	Sycamore	
Poaceae	Agrostis hyemalis	Winter bentgrass	
Poaceae	Agrostis perennans	Upland bentgrass	
Poaceae	Aira caryophyllea	Silver hairgrass	
Poaceae	Andropogon gerardii	Big bluestem	
Poaceae	Andropogon glomeratus	Bushy bluestem	
Poaceae	Andropogon gyrans var. stenophyllus	Elliott's bluestem	
Poaceae	Andropogon ternarius	Splitbeard bluestem	
Poaceae	Andropogon virginicus	Broomsedge	
Poaceae	Anthoxanthum aristatum	Annual vernal grass	
Poaceae	Aristida dichotoma	Churchmouse three-awn	
Poaceae	Aristida lanosa	Woolysheath three-awn	
Poaceae	Aristida longespica	Slim-spike three-awn	
Poaceae	Aristida oligantha	Oldfield three-awn	
Poaceae	Aristida palustris	Longleaf three-awn	
Poaceae	Aristida purpurascens	Arrowfeather three-awn	
Poaceae	Aristida purpurascens var. virgata	Arrowfeather three-awn	
Роасеае	Arundinaria gigantea	Giant can	
Роасеае	Avena fatua	Wild oats	
Роасеае	Axonopus fissifolius	Carpetgrass	
Poaceae	Bothriochloa ischaemum	King Ranch bluestem	
Роасеае	Bothriochloa laguroides	Silver bluestem	
Poaceae	Briza minor	Little quaking grass	
Poaceae	Bromus japonicus	Japanese brome	
Poaceae	Bromus secalinus	Rve brome	
Poaceae	Bromus unioloides	Rescue grass	
Poaceae	Cenchrus echinatus	Southern sandbur	
Poaceae	Cenchrus spinifex	Sand burgrass	
Poaceae	Chasmanthium latifolium	Creek oats	
Poaceae	Chasmanthium laxum	Slender woodoats	
Poaceae	Chasmanthium sessiliflorum	Woodoats	
Poaceae	Chloris canterai	Paraguayan windmill grass	
Poaceae	Coelorachis cylindrica	loint-tail grass	
Poaceae	Cynodon dactylon	Bermuda grass	
Poaceae	Dichanthelium aciculare	Needleleaf rosettegrass	
Poaceae	Dichanthelium acuminatum	Wooly rosette grass	
Poaceae	Dichanthelium angustifolium	Narrowleaf witchgrass	
Poaceae	Dichanthelium boscii	Bosc's rosettegrass	
Poaceae	Dichanthelium commutatum	Variable rosettegrass	
Poaceae	Dichanthelium consanguineum	Blood rosettegrass	
Poaceae	Dichanthelium depauperatum	Starved witchgrass	
Poaceae	Dichanthelium dichotomum	Cypress witchgrass	
Poaceae	Dichanthelium dichotomum spn_lucidum	Swamp witchgrass	
	Dichanthelium dichotomum spp. ideidum		1
Роасеае	roanokense	Roanoke witchgrass	
Poaceae	Dichanthelium ensifolium	Dwarf cypress witchgrass	
Poaceae	Dichanthelium filiramum	Hairy needleleaf witchgrass	

Роасеае	Dichanthelium lanuginosum	Western panic grass	
Роасеае	Dichanthelium laxiflorum	Open-flower panic grass	
Poaceae	Dichanthelium lindheimeri	Lindheimer's witchgrass	
Poaceae	Dichanthelium oligosanthes	Few-flower panic grass	
	Dichanthelium oligosanthes spp.		
Poaceae	Scribnerianum	Scribner's rosettegrass	
Poaceae	Dichanthelium ovale	Egg leaf rosettegrass	
Poaceae	Dichanthelium polyanthes	Roundseed panicgrass	
Poaceae	Dichanthelium ravenelii	Ravenel's rosettegrass	
Poaceae	Dichanthelium scoparium	Velvet panic grass	
Poaceae	Dichanthelium sphaerocarpon	Roundseed rosettegrass	
Poaceae	Dichanthelium villosissimum	White-hair witchgrass	
Poaceae	Digitaria ciliaris	Crabgrass	
Poaceae	Digitaria cognata	Fall witchgrass	
Poaceae	Digitaria filiformis	Slender crabgrass	
Poaceae	Digitaria ischaemum	Smooth crabgrass	
Poaceae	Digitaria villosa	Hairy crabgrass	
Poaceae	Digitaria violascens	Violet crabgrass	
Poaceae	Echinochloa colona	Jungle rice	
Poaceae	Echinochloa muricata	Rough barnyard grass	
Poaceae	Echinochloa walteri	Walter's barnyard grass	
Poaceae	Eleusine indica	Goosegrass	
Poaceae	Elymus canadensis	Canada wildrye	
Poaceae	Elymus glabriflorus	Southeastern wildrye	
Poaceae	Elymus macgregorii	Early wildrye	
Poaceae	Elymus virginicus	Virginia wild rye	
Poaceae	Eragrostis elliottii	Elliott's lovegrass	
Poaceae	Eragrostis secundiflora	Red lovegrass	
Poaceae	Eragrostis spectabilis	Showy lovegrass	
Poaceae	Eragrostis superba	Wilman lovegrass	
Poaceae	Eragrostis trichoides	Sand lovegrass	
Poaceae	Eremochloa ophiuroides	Centipedegrass	
Роасеае	Festuca paradoxa	Clustered fescue	Rare, showy grass
Роасеае	Gymnopogon ambiguus	Bearded skeletongrass	
Роасеае	Hordeum pusillum	Little barley	
Poaceae	Leersia lenticularis	Catchfly grass	
Роасеае	Leersia virginica	White grass	
Роасеае	Limnodea arkansana	Ozark grass	
Poaceae	Lolium perenne	Ryegrass	
Poaceae	Melica mutica	Twoflower melic grass	
Poaceae	Muhlenbergia schreberi	Nimblewill	
Poaceae	Oplismenus hirtellus	Basketgrass	
Poaceae	Panicum anceps	Beaked panicum	
Poaceae	Panicum brachyanthum	Prairie panicgrass	
Poaceae	Panicum dichotomiflorum	Fall panicgrass	
Poaceae	Panicum rigidulum	Redtop panicgrass	
Poaceae	Panicum longifolium		
Poaceae	Panicum verrucosum	Warty panic grass	
Poaceae	Panicum virgatum	Switchgrass	

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Poaceae	Paspalum dilatatum	Dallis grass	
Poaceae	Paspalum floridanum	Florida paspalum	
Poaceae	Paspalum laeve	Roundseed paspalum	
Poaceae	Paspalum notatum	Bahia grass	
Poaceae	Paspalum plicatulum	Brownseed paspalum	
Poaceae	Paspalum setaceum	Thin paspalum	
Poaceae	Paspalum urvillei	Vasey grass	
Роасеае	Phalaris angusta	Timothy canarygrass	
Poaceae	Phalaris caroliniana	Carolina canary grass	
Poaceae	Phanopyrum gymnocarpon	Savanna panicgrass	
Poaceae	Poa annua	Annual bluegrass	
Poaceae	Poa autumnalis	Autumn bluegrass	
Poaceae	Poa sylvestris	Woodland bluegrass	
Роасеае	Saccharum alopecuroides	Silver plumegrass	
Роасеае	Saccharum brevibarbe var. contortum	Bentawn plumegrass	
Poaceae	Saccharum giganteum	Sugarcane plumegrass	
Poaceae	Sacciolepis striata	American cupscale	
Poaceae	Schedonorus arundinaceus	Tall fescue	
Poaceae	Schizachyrium scoparium		
Poaceae	Schizachyrium scoparium ssp. divergens	Pinehill bluestem	
Poaceae	Setaria numila	Yellow foxtail	
Розсезе	Sorghastrum elliottii	Elliott's Indiangrass	
Poaceae	Sorghastrum putans		
Poaceae	Sorghum halanonso	lobrongrass	
Poaceae	Schononholis longiflora		
Poaceae	Sphenopholis obtusata	Drairie wedge grass	
Poaceae	Sperebolus clandostinus	Prairie wedge grass	
Poaceae		Rough dropseed	
Poaceae	Sporobolus compositus		
Poaceae		Smutgrass	
Роасеае	Sporobolus pyramidatus	Whorled dropseed	
Poaceae	Sporobolus vaginiflorus	Poverty dropseed	
Роасеае	Steinchisma hians	Gaping panicgrass	
Poaceae	Stenotaphrum secundatum	St. Augustine grass	
Poaceae	Tridens flavus	Purpletop	
Poaceae	Tripsacum dactyloides	Eastern gamagrass	
Poaceae	Urochloa platyphylla	Broadleaf signalgrass	
Poaceae	Urochloa texana	Texas signalgrass	
Poaceae	Vulpia bromoides	Brome fescue	
Poaceae	Vulpia octoflora	Six weeks grass	
Poaceae	Vulpia sciurea	Squirrel fescue	
Poaceae	Zizaniopsis miliacea	Giant cutgrass	
Polemoniaceae	Phlox drummondii	Drummond phlox	
Polemoniaceae	Phlox pilosa	Beautiful phlox	
Polygalaceae	Polygala mariana	Maryland milkwort	
Polygalaceae	Polygala polygama	Racemed milkwort	
Polygalaceae	Polygala verticillata	Whorled milkwort	
Polygonaceae	Brunnichia ovata	American buckwheat vine	
Polygonaceae	Eriogonum multiflorum	Heartsepal buckwheat	

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Polygonaceae	Persicaria hydropiperoides	Water pepper	
Polygonaceae	Persicaria lapathifolia	Pale smartweed	
Polygonaceae	Persicaria maculosa	Lady's thumb	
Polygonaceae	Persicaria pensylvanica	Pennsylvania smartwee	
Polygonaceae	Persicaria punctata	Spotted smartweed	
Polygonaceae	Persicaria virginiana	Jumpseed	
Polygonaceae	Rumex altissimus	Tall dock	
Polygonaceae	Rumex crispus	Curly dock	
Polygonaceae	Rumex hastatulus	Sheep sorrel	
Portulacaceae	Portulaca oleracea	Common purslane	
Portulacaceae	Portulaca pilosa	Hairy purslane	
Potamogetonaceae	Potamogeton diversifolius	Diverse-leaved pondweed	
Primulaceae	Anagallis arvensis	Scarlet pimpernel	
Primulaceae	Lysimachia minima	Chaffweed	
Primulaceae	Samolus valerandi	Brookweed	
Ranunculaceae	Clematis crispa	Swamp leatherflower	
Ranunculaceae	Clematis reticulata	Netleaf leather flower	
Ranunculaceae	Clematis virginiana	Virgin's bower	Westernmost location
Ranunculaceae	Delphinium carolinianum	Blue larkspur	
Ranunculaceae	Ranunculus fascicularis	Early buttercup	
Ranunculaceae	Ranunculus muricatus	Spiny fruit buttercup	
Ranunculaceae	Ranunculus pusillus	Small buttercup	
Rhamnaceae	Berchemia scandens	Alabama supplejack	
Rhamnaceae	Ceanothus americanus	New Jersey tea	
Rhamnaceae	Frangula caroliniana	Carolina buckthorn	
Rosaceae	Crataegus crus-galli	Cockspur hawthorn	
Rosaceae	Crataegus marshallii	Downy hawthorn	
Rosaceae	Crataegus opaca	Mayhaw	
Rosaceae	Crataegus spathulata	Littlehip hawthorn	
Rosaceae	Geum canadense	White avens	
Rosaceae	Potentilla indica	Indian strawberry	
Rosaceae	Prunus angustifolia	Chickasaw plum	
Rosaceae	Prunus caroliniana	Cherry laurel	
Rosaceae	Prunus gracilis	Oklahoma plum	
Rosaceae	Prunus mexicana	Mexican plum	
Rosaceae	Prunus serotina	Black cherry	
Rosaceae	Prunus umbellata	Flatwoods plum	
Rosaceae	Pyrus calleryana	Callery pear	
Rosaceae	Rhaphiolepis indica	Indian hawthorn	Hedge around lodge
Rosaceae	Rubus flagellaris	Northern dewberry	
Rosaceae	Rubus pensilvanicus	Blackberry	
Rosaceae	Rubus trivialis	Southern dewberry	
Rosaceae	Spiraea cantoniensis	Reeve's meadowsweet	
Rubiaceae	Cephalanthus occidentalis	Buttonbush	
Rubiaceae	Diodia teres	Poor joe	
Rubiaceae	Diodia virginiana	Virginia buttonweed	
Rubiaceae	Galium aparine	Cleavers	
Rubiaceae	Galium pilosum	Red-flower bedstraw	

Rubiaceae	Galium tinctorium	Stiff marsh bedstraw	
Rubiaceae	Galium uniflorum	Oneflower bedstraw	
Rubiaceae	Houstonia micrantha	Southern bluets	
Rubiaceae	Houstonia pusilla	Little bluets	
Rubiaceae	Mitchella repens	Partridge berry	
Rubiaceae	Oldenlandia boscii	Bosc's mille graines	
Rubiaceae	Oldenlandia uniflora	Clustered mille graines	
Rubiaceae	Richardia scabra	Rough Mexican clover	
Rubiaceae	Sherardia arvensis	Field madder	
Rubiaceae	Stenaria nigricans	Bluets	
Ruscaceae	Liriope spicata	Creeping lilyturf	At old trailer park
Rutaceae	Poncirus trifoliata	Trifoliate orange	
Rutaceae	Zanthoxylum clava-herculis	Toothache tree	
Salicaceae	Salix nigra	Black willow	
Sapotaceae	Sideroxylon lanuginosum	Gum bumelia	
Saururaceae	Saururus cernuus	Lizard's tail	
Scrophulariaceae	Agalinis fasciculata	Beach false foxglove	
Scrophulariaceae	Agalinis purpurea	Purple false foxglove	
Scrophulariaceae	Agalinis tenuifolia	Slender false foxglove	
Scrophulariaceae	Gratiola neglecta	Yellow seed hedge-hyssop	
Scrophulariaceae	Gratiola pilosa	Shaggy hedgehyssop	
Scrophulariaceae	Gratiola virginiana	Roundfruit hedge-hyssop	
Scrophulariaceae	Micranthemum umbrosum	Mudflower	
Scrophulariaceae	Nuttallanthus canadensis	Canada toadflax	
Scrophulariaceae	Nuttallanthus texana	Texas toadflax	
Scrophulariaceae	Pedicularis canadensis	Canada lousewort	
Scrophulariaceae	Penstemon digitalis	Foxglove beardtongue	
Scrophulariaceae	Penstemon laxiflorus	Nodding beardtongue	
Scrophulariaceae	Verbascum thapsus	Mullein	
Scrophulariaceae	Veronica arvensis	Corn speedwell	
Scrophulariaceae	Veronica peregrina	Purslane speedwell	
Smilacaceae	Smilax bona-nox	Saw greenbrier	
Smilacaceae	Smilax glauca	Cat greenbrier	
Smilacaceae	Smilax laurifolia	Laurel greenbrier	
Smilacaceae	Smilax rotundifolia	Roundleaf greenbrier	
Smilacaceae	Smilax smallii	Small's greenbrier	
Smilacaceae	Smilax walteri	Walter's greenbrier	
Solanaceae	Physalis angulata	Cutleaf groundcherry	
Solanaceae	Physalis cinerascens	Smallflower groundcherry	
Solanaceae	Physalis heterophylla	Clammy groundcherry	
Solanaceae	Physalis macrosperma	Groundcherry	Newly described species
Solanaceae	Physalis mollis	Field groundcherry	
Solanaceae	Physalis pubescens	Downy groundcherry	
Solanaceae	Physalis virginiana	Virginia groundcherry	
Solanaceae	Solanum carolinense	Carolina horse-nettle	
Solanaceae	Solanum dimidiatum	Western horse-nettle	
Solanaceae	Solanum emulans	Black nightshade	
Styracaceae	Styrax americanus	American snowbell	

Symplocaceae	Symplocos tinctoria	Sweetleaf	
Taxodiaceae	Taxodium distichum	Bald cypress	
Typhaceae	Typha domingensis	Southern cattail	
Typhaceae	Typha latifolia	Broadleaf cattail	
Ulmaceae	Celtis laevigata	Sugar hackberry	
Ulmaceae	Celtis tenuifolia	Slender hackberry	
Ulmaceae	Ulmus alata	Winged elm	
Ulmaceae	Ulmus americana	American elm	
Urticaceae	Boehmeria cylindrica	Button-hemp	
Urticaceae	Parietaria pensylvanica	Pennsylvania pellitory	
Urticaceae	Urtica chamaedryoides	Heartleaf nettle	
Valerianaceae	Valerianella radiata	Beaked cornsalad	
Verbenaceae	Callicarpa americana	American beautyberry	
Verbenaceae	Glandularia canadensis	Canada vervain	
		South American mock	
Verbenaceae	Glandularia pulchella	vervain	
Verbenaceae	Lantana camara	Common lantana	
Verbenaceae	Verbena brasiliensis	Brazilian vervain	
Verbenaceae	Verbena halei	Texas vervain	
Verbenaceae	Verbena urticifolia	White vervain	
Verbenaceae	Verbena xutha	Gulf vervain	
Violaceae	Viola missouriensis	Missouri violet	
Violaceae	Viola palmata	Early blue violet	
Violaceae	Viola pedata	Bird's foot violet	
Violaceae	Viola primulifolia	Primrose-leaved violet	
Violaceae	Viola sagittata	Arrowleaf violet	
Violaceae	Viola sororia	Common blue violet	
Violaceae	Viola villosa	Hairy violet	
Vitaceae	Ampelopsis arborea	Peppervine	
Vitaceae	Parthenocissus quinquefolia	Virginia creeper	
Vitaceae	Vitis aestivalis var. aestivalis	Summer grape	
Vitaceae	Vitis cinerea	Greybark grape	
Vitaceae	Vitis rotundifolia	Muscadine grape	
Vitaceae	Vitis vulpina	Fox grape	
Woodsiaceae	Woodsia obtusa	Bluntlobe cliff fern	
Xyridaceae	Xyris difformis	Bog yellow-eyed grass	
Xyridaceae	Xyris jupicai	Richard's yellow-eyed grass	
Xyridaceae	Xyris laxifolia var. iridifolia	Iris leaf yellow-eyed grass	
Xyridaceae	Xyris torta	Twisted yellow-eyed grass	

POLLINATION STATION NATIVE PLANTS AT SFA GARDENS BY JORDAN CUNNINGHAM

SFA Gardens Greenhouse and Nursery Manager, SFA Gardens Stephen F. Austin State University

Abstract: The SFA Gardens Pineywoods Native Plant Center is a wonderful display of plants native to the deep East Texas region. The garden is a hub of activity for local pollinators of all types. The list of guests includes butterflies, moths, bees, wasps and even flies. Flower shape and orientation often determine what kind of pollinator will frequent each bloom. The result is a colorful dance of symbiosis. Native plants play a special role in the growth and success of our pollinator population.

HOW TO BUILD A GRASS HOUSE: THE ARCHAEOLOGY OF TRADITIONAL CADDO BUILDING MATERIALS AND LANDSCAPES IN EAST TEXAS BY LESLIE L. BUSH

The land we call East Texas today is the southwestern portion of the traditional homeland of the indigenous Caddo people (Figure 1). While East Texas was home to the Hasinai Caddo, other groups in the Caddo Confederacy during the late sixteenth through early eighteenth centuries included the Kadohadacho Caddo along the Red River in Texas and Arkansas and the Nachitoches Caddo near the city now named for them in Louisiana (Newkumet and Meredith 2009; see also Swanton 1996:7-16 and Perttula 1992: 217-221). Caddos today are a tribe of about 6,000 people, about half of whom live around Binger, Oklahoma, where their ancestors were settled in 1859 (Newkumet and Meredith 2009).

Figure 1: Location of the traditional Caddo homeland showing vegetation areas (Texas Beyond History 2023)



ECOLOGICAL BACKGROUND

The Caddo homeland lies in the southwesternmost extension of the southeastern pine forests, known locally as the "Pineywoods" (Griffith et al. 2007). In the Caddo area of the Pineywoods, uplands are typically dominated by shortleaf pine (*Pinus echinata*), hickory (several species but frequently *Carya texana*) and oaks (*Querus* spp., both red and white groups represented) (Diggs et al. 2006:88-89). Historically, many small prairies were present in the pineywoods. The "Redlands" around Nacogdoches are

often mentioned, but prairies were also found elsewhere (Diggs et al. 2006:82). Fray Francisco Hidalgo noted in 1710 that, "The whole country, as far as it has been examined, is wooded. It contains many small open spaces, and stretches of sand and marshes where the Indians live" (Hatcher 1927b:55). As Hidalgo implies, prairie openings were sought out or actively created by Caddo ancestors for villages and agricultural land. Prairie openings supported game animals, grasses used for thatching, medicinal plants, and edible underground plant parts such as wild onion bulbs (*Allium* spp.) and gayfeather corms (*Liatris* spp.) (Diggs et al. 2006:98). Larger villages are usually located along terraces of major rivers and near springs, where a variety of riparian and wetland ecosystems could be found that supported useful construction plants such as willow (*Salix* spp.), river cane (*Arundinaria* spp.), common reed (*Phragmites australis*), and cattails (*Typha* spp.), and edible tubers such as arrowhead (*Sagittaria* spp.) and ground nut (*Apios americana*) (Diggs et al. 2006:100-105; Gow 1905).

CULTURAL BACKGROUND

Tribes that speak Caddoan languages were traditionally located at the interface between the Eastern Woodlands and the Great Plains, where they grew crops, hunted bison, and traded goods between Woodlands and Plains peoples (Figure 2). Caddo Mounds State Historic Site (41CE19), formerly called the George C. Davis Site, provides a good example of site location in relation to landscape features: It is located at the intersection of two major transportation routes, the Neches River and the trail that we now call the Camino Real. The village is also located on a prairie opening, called Mound Prairie in historic times. Springs can be found on the east side of the property south of Mound A, and Bowles Creek runs along the west side of the property.

Figure 2: Locations of Caddoan-speaking tribes in the 17th and 18th centuries, with arrows showing movement during that period (Texas Beyond History 2023)



The southernmost of the Caddoan speaking tribes, Caddos share cultural characteristics not only with other Caddoan-speakers but also tribes of the southeastern United States such as Chickasaws, Choctaws,

Cherokees, and others whose ancestors were Mississippian moundbuilders. Caddo ancestors are known among archaeologists—and continue to be celebrated in contemporary times—for the quality and creativity of their pottery and other aspects of material culture. Caddo leadership in historic times was divided between a political leader (the Caddi) and a spiritual leader (the Xinesi) (Swanton 1996:170-173). Traditional houses, the regular buildings where families lived, were usually round and thatched from ground to peak in grass (Figure 3).

Figure 3: Finished exterior of the 2022 Koo-Hoot Kiwat, Caddo Grass House at Caddo Mounds State Historic Site with Mound C in the background, November 2023



THE GRASS HOUSE

The Caddo tradition of building grass houses died out in the late 19th century, but their Wichita relatives continued to build grass houses in the slightly different Wichita style. The grass house depicted on the Wichita tribal seal shows four projecting poles on top and a textured exterior surface that are typical of Wichita (Kirikir'i:s) but not Caddo houses (Figure 4; Owings and Baugh 2021). The Caddo tribal seal features the Dance Ground, one of the few architectural spaces that has been part of traditional practice from ancient times to the present day (Newkumet and Meredith 2009).



Figure 4: Seals of the Wichita and Affiliated Tribes (left) and Caddo Nation (right)

Wichitas were one of several tribes who built a traditional house for the 1904 World's Fair in St. Louis (Parezo and Fowler 2009:100). Caddo Elder Phil Cross, who led the 2016 grass house construction at Caddo Mounds, learned from Wichita and Caddo tradition bearers (Allen et al. 2006). His professional background as an engineer gave him additional technical knowledge of house construction and materials science. Figure 5 shows additional differences between traditional Wichita and Caddo house construction: Wichita houses are more likely to have an interior frame, and the horizontal supports are closer together than on the Caddo houses constructed at Caddo Mounds. I speculate that the latter characteristic is due to ecological differences between Wichita and Caddo homelands. Grasses are typically taller in East Texas than on the Southern Plains, allowing for wider spacing between the lattices that hold the thatch bundles.



Figure 5: Wichita house under construction at the 1904 World's Fair (Library of Congress 2023)

HISTORICAL SOURCES

The earliest historic accounts of Caddo grass house architecture are from French writers who were part of La Salle's Texas expedition in the 1680s. Anastase Douay visited Caddo villages in northeast Texas with La Salle in mid-1686 (Douay 1853). Henri Joutel, who had remained at the camp on Garcitas Creek during the earlier expedition, joined the later, larger party that enjoyed Caddo hospitality in 1687 and eventually arrived in Canada (Foster 1998). Both men noted Caddo temples and other types of buildings, but they were especially fascinated by the grass houses. Father Espinosa was able to describe more of the social aspects of grass house construction during his visits to East Texas a few decades later (Hatcher 1927c).

As described by 17th and 18th century Europeans, Caddo houses were made of long poles with ends planted in a circle, bent at the top, and tied together to form a conical structure. Horizontal supports were tied to the poles with strips of tree bark, and the entire structure was covered with grass (Douay 1853:204; Hatcher 1927c:154-155; Foster 1998:208). Inside, a central hearth warmed the house, and beds were arranged in alcoves along one or both sides (Foster 1998:208; Douay 1853:204). Hildalgo implies that the floors were covered by mats (Hatcher 1927b:56). Douay indicates that each house typically held two families (Douay 1853:204), but larger houses may have housed more. Joutel calculates eight to ten families living in a Hasinai Caddo house he describes as "one of the largest in the canton" and "several" in a Nasoni house (Foster 1998:209, 236). Large pots and general possessions were stored in shelving above the living area (Foster 1998:209, 237; Hatcher 1927b:56). Espinosa notes that leaders had larger houses than ordinary families Hatcher 1927c:155). Joutel adds that larger houses could be 60 feet in diameter (Foster 1998:208).

ARCHAEOLOGICAL SOURCES

Archaeologists have examined the remains of Caddo buildings through excavation and remote sensing (e.g., magnetometry, resistivity, ground penetrating radar). These methods are particularly good at revealing the floor plans of buildings, in the form of stains in the soil where the posts decayed. As a consequence, archaeologists have tended to think about Caddo buildings in terms of their shape, dividing them essentially into round and square (or rectangular) – a distinction that almost certainly understates the complexity of lived experiences in the past (Trubitt 2009). Nonetheless, most structures interpreted as houses ("regular domiciles") on Texas Caddo sites are round or nearly so and typically 7-12 m in diameter. In other parts of the Caddo world, square or rectangular houses are more common than in Texas, but there is still a recognizable tendency for houses to be circular and buildings that archaeologists recognize as "special purpose structures" (e.g., buildings located atop mounds or that have unusually complex floorplans) to be square or rectangular (Trubitt 2009).

At Caddo Mounds, where the primary occupation dates to roughly AD 1000-1200, both excavated houses and those known only through remote sensing are predominantly round (Newell and Kreiger 1949; Schultz 2010). The same is true at Oak Hill Village in Rusk County, where the primary occupation dates to AD 1250-1450 and broad scale excavations exposed multiple house floors (Rogers and Perttula 2004). The trend

persists at Pine Tree Mound in Harrison County, where occupation begins in the late 1300s and persists into the historic period (circa AD 1650) (Fields and Gadus 2012).

The plant materials of Caddo ancestors, whether the remains of corn, cordage, baskets, or house materials, are generally preserved by fire in the form of charcoal. Preserved, unburned plants cached in bags and baskets in dry Ozark rockshelters are exceptions that offer exciting glimpses into ancient crops, weaving techniques, and lost fiber arts (e.g., Fritz 1984, Horton 2010; Schultz 1975; Wilson 1981).

The wooden posts and grass thatching of Caddo houses do not survive long after use in the humid climate of East Texas. They become compost, with buried portions (e.g., ends of posts in the ground) surviving only as stains in the soil. When a house is burned, however, plant materials can turn into charcoal which preserves anatomical characteristics that are often identifiable to genus and more rarely to species. In the Caddo world, special purpose buildings were often deliberately burned once their use life was over (Trubitt 2009). Unfortunately for archaeology, regular houses were not. At Caddo Mounds, 3 of the 20 special purposes buildings excavated were burned but none of the 30 excavated regular houses were noted as burned (Spock 1977 in Schultz 2010:62). Large-scale excavations of domestic areas at Oak Hill Village and Pine Tree Mound also show few to no burned houses.

Perhaps the most striking aspect of the archaeology of regular domestic structures is precisely how very few of them apparently burned accidentally despite the constant presence of fire in the vicinity of large quantities of dried grass. The very paucity of archaeological evidence of house materials speaks to a strong culture of fire wisdom that persisted though the centuries. Even though fire was ubiquitous, fires must have been carefully tended to keep sparks down, and flareups quickly extinguished. Fire carries multiple important meanings in Caddo life and cosmology that are beyond the scope of this paper. Suffice to say that appreciation for the cleansing power of fire and smoke is apparent in its use to decommission the special buildings on mounds, but the destructive power of fire was also appreciated and controlled.

GRASS HOUSES AT CADDO MOUNDS STATE HISTORIC SITES

My experience with Caddo grass houses comes from participation in the construction of the 2016 and 2022 houses at Caddo Mounds. A previous reconstruction at the site was built in 1981 by a team led by Scooter Cheatham, who later founded Useful Wild Plants (Cheatham et al. 1995-2015). He conceived the project as a rigorous exercise in experimental archaeology, accomplished only with period tools and materials. The house stood until 1995 when it was ceremonially burned (Perttula and Skiles 2014). The structure was located near Highway 21 almost directly across the road from Mound A.

The 2016 house stood for less than three years until it was destroyed by a tornado on Culture Day in April 2019. It can be seen in an award-winning documentary film about the construction that aired on Public Broadcasting stations in 2018 (Texas Historical Commission 2018; see also Craven 2022). In 2022, a second,

slightly larger house was built at the same location, a spot where no houses had been built in former times and where the grass house can be seen from the Visitor Center framed by Mounds B and C.

THE BUILDING PROCESS

The build process began, in the present as in the distant past, with a meeting of leaders. For the Caddo Mounds houses, leadership was provided by site staff and the Caddo Mounds Friends Group in collaboration with members of Caddo Nation. The Caddo Mounds leadership team stayed constant between the two builds. It included many people but especially Jeffrey Williams, Tony Souther, and Rachel Galan. The 2016 Caddo leaders, Phil Cross and Chad Earles, were not available in the summer of 2022, so a new team of Caddos stepped up to learn the building techniques and pass them on to others. The 2022 team was led by elder Kay O'Neal along with Jacqueline Bullard, Katey Polly, Debbie Turner, and Lauren Haupt. Local people and Caddos from across the nation also came to help with the build.

In the past, a family that needed a house would meet with their Caddi to secure permission to build, determine the appropriate size for their house, and set a build date. The entire house was typically built between dawn and a little after midday (Hatcher 1927c:154-155). Materials were gathered by many families and brought to the site in advance of the work day. The construction was done not by the prospective householders but by other families who had been asked to participate by the Caddi, each family bringing whatever number of housepoles the Caddi assigned them and enough thatch to cover the poles. During the construction, the new householders were busy preparing a post-construction feast to be enjoyed by all.

Volunteers accomplished the modern constructions in a period of weeks, but work was occasionally paused for days or months due to weather or to gather additional materials. Although both constructions started in July, gathering of materials began as early as eight months prior. Actual construction began with ceremony, song, and placement of poles aligned to the cardinal directions, beginning with the east pole and moving counterclockwise.

POLES

The 2016 and 2022 houses were 26 feet (7.9 m) and 28.5 feet (8.7 m) in diameter, respectively. Each used between 30 and 35 pine poles for the outer frame, with trees chosen for straight growth and 8-10 inch (20-25 cm) diameter in the early spring, but harvested later. In the hot summer of 2022, poles needed to be cut and peeled immediately before use. Peeled poles were kept as wet as possible by spraying them with a hose, but several were lost to cracking and snapping. The poles used in the 2016 and 2022 houses were perhaps slightly shorter than in the past, about 30-35 feet long. Douay described Caddo houses as 40-50 feet tall and shaped like a beehive (Douay 1853:204), although other writers indicate Caddo houses could also be dome-shaped (Hatcher 1927b:56). Wichita houses were typically shorter, (Nabokov and Easton 1989; Owings and Baugh 2021:130), perhaps adaptations to the shorter trees and higher winds of the Plains.

Historic accounts do not describe how house poles were held together at the top of the structure, suggesting they were simply lashed to each other. Poles in more recent Wichita houses and the 2016 and 2022 Caddo Mounds houses were attached to a hoop made from a grapevine, with the four directional poles attached first (Owings and Baugh 2021:137). In 2016 and 2022, scaffolding was constructed for workers to stand on while bending the poles (Figure 6). In former times the trunk of a tree would have been planted in the ground, with bases of the branches left intact so it could function as a ladder (Hatcher 1927c:154). The depression left after the tree trunk was removed was lined with clay and became the hearth.

Figure 6: Bending the four directional poles to attach them to the loop. Caddo Mounds State Historic Site, July 2022



One of the rare burned houses from which archaeological charcoal samples were taken for identification was a house at Pine Tree Mound in Harrison County named "Overlook House" by the excavators (Fields and Gadus 2012:233-234). All of the burned posts were made from a species of oak in the red group, possibly blackjack oak (*Quercus marilandica*), southern red oak (*Q. falcata*), or shumard oak (*Q. shumardii*).

A few individual burned posts that were associated with other Caddo houses are also known archaeologically: a red group oak center post from Coyote house at Pine Tree Mound and an oak of some kind from the Foggy Fork Site in Nacogdoches County (Fields and Gadus 2012; Dering 2008). Other individual burned posts include five oaks and a hickory from four sites near Lake Naconichi, and two red group oaks and another hickory, each from a different Caddo farmstead in Titus County (Dering 2008; Fields et al. 2014). Charcoal of a hardwood with very fine diffuse pores (*Liquidambar styraciflua*?) and "probably pine" were recovered from Feature 8 at Caddo Mounds, a structure Carolyn Spock interprets as a house (Newell and Krieger 1949:180; Spock 1977 in Schultz 2010:59).

The oaks and hickories that make up most of the identified house poles are common trees in the Pineywoods and Post Oak savannahs where Caddos made their homes in East Texas. It is somewhat surprising that pine is not well represented archaeologically. It was used in a rectangular house at the Winding Stair site in Arkansas and possibly in two special purpose houses at Caddo Mounds (Early 2000; Newell and Krieger 1949:180). Woods such as bois d'arc (*Maclura pomifera*) and redcedar (*Juniperus virginiana*) would have made more rot-resistant poles, but bois d'arc trees do not typically produce the tall, straight stems needed for Caddo grass houses. Wichitas did use redcedar for outer house poles (Douglas 1932; Owings and Baugh 2021). Willow poles were used by the Wichitas who built the World Fair house, and cottonwood poles are also mentioned for Wichita grass houses (Parezo and Fowler 2007:106; Nabokov and Easton 1989). Willow and cottonwood would have been available in riparian zones on the Plains.

HORIZONTAL SUPPORTS

Archaeological evidence for the material used for horizontal supports is lacking. Willows were used in the 2016 and 2022 houses at Caddo Mounds. Branches approximately 2 inches (5 cm) wide were harvested locally in advance and stored in water until they were needed for construction. Withitas also used willow for their 1904 World's Fair house (Parezo and Fowler 2007:106). Black locust (*Robinia pseudoacacia*), which may not have been present in the region until relatively recent times, is also considered traditional and was used on a late 19th century house (Karestz 2015; Owings and Baugh 2021:119, 125).

As with the horizontal supports themselves, little is known archaeologically about what kind of ties were used to bind them to the poles. Espinosa describes ties as "made from the bark of a tree, and so strong that they can not be broken between the hands however thin they may be" (Thatcher 1927c:154). Paleoethnobotanist Elizabeth Horton suggests that the inner bark of hickory would have made good ties because it tightens as it dries, becoming nearly impossible to dislodge. Caddos taught Henri Joutel how to use hickory (or possibly walnut) bark to make straps for the French horses when he visited in the 1680s (Foster 1998:236). Rawhide, leather, and grape vine were used on the 1981 house (Perttula and Skiles 2014). Wichitas traditionally used slippery elm bark, tanned deer leather, and willow bark (Douglas 1932; Nabokov and Easton 1989; Owings and Baugh 2021:128; Parezo and Fowler 2007:106). In modern times, Wichita and Caddo houses are tied with rope or twine made from sisal, hemp, or other commercially available materials.

DOORS

Traditional Caddo houses probably had only one door, facing east, and this was the plan followed by the 2016 Caddo Mounds house. The 2022 house has two doors, one east and one west. The two doorways ensure compliance with the Americans with Disabilities Act (ADA) and are also designed to facilitate quick evacuation of many visitors in the event of an emergency. Larger Wichita houses traditionally had four doors while smaller or more recent houses had two (Douglas 1932; Owings and Baugh 2021:133). Modern doorways are also taller than traditional doors, which were designed to minimize heat loss and were often
covered with a hides, a removable section of thatching, or a wooden door in later times (Owings and Baugh 2021:131). Grass houses were used more in the winter than in summer (Owings and Baugh 2021:129; Parezo and Fowler 2007:106), when most activities took place outside, often under the shade of a ramada or work arbor built near the grass house (Douglas 1932).

THATCHING

Methods. Harvesting of thatching material for the 2022 Caddo Mounds house began in December 2021, when the grass was dry but standing and in good condition. All genders participated in contemporary thatch gathering. In the past, women were in charge of providing the grass and ties while men took care of the poles. Tony Souther and Rachel Galan calculate that it takes approximately one to three acres of switchgrass to thatch a Caddo house.

The process of thatching essentially consists of sewing bundles of grass onto the house frame with a very large needle and rope. Contemporary needles are straight. The Caddo Mounds needles were made from commercial wooden dowels. At least one curved bone needle has been found on a Wichita archaeological site (Owings and Baugh 2021:130), indicating needles were curved in former times. In 2022, thatching teams used a lift provided by Jimmy Allen, the mayor of Alto, Texas, to reach the upper portions of the house. In former times, small, agile women would have simply climbed up the outside of the structure. As in former times, our activities were made more lively by the presence of dogs and children, with the added benefit that the children grow up more ready to formally learn the tradition and pass it on.

Each section of the Caddo Mounds houses were covered by two or three layers of thatch for a thickness of about a foot, roughly equivalent to the "three hand breadths" thickness described by Espinosa (Hatcher 1927c:155). Wichita thatching was traditionally two to three feet thick, appropriate to their more northern homeland (Owings and Baugh 2021:131). Additional branches of the same material as the horizontal supports are used to secure each row of thatch on the outside of the building. Thatching was applied to the frame starting at the bottom of the house and working toward the top, which European observers noted was the opposite of traditional thatching in their homelands (Hatcher 1927c:155). Espinosa mentions decorations woven into the thatch of Caddo houses but does not describe them (Hatcher 1927c:155).

Materials. Espinosa describes the grass used for thatching "coarser than the largest wheat", a reference to familiar European thatching traditions where wheatstraw is common. Nineteenth century Caddo and Wichita grass houses were described as covered in "prairie grasses" (Douglas 1932; Fletcher 1907; Parezo and Fowler 2007:106; Swanton 1997:152). Switchgrass (*Panicum virgatum*), a tall prairie grass that Elder Phil Cross had used in previous houses, was chosen to cover the 2016 and 2022 Caddo Mounds houses (Allen et al. 2006). Switchgrass grows in easily harvestable bunches and was available through the generosity of private landowners and the UDSA East Texas Plant Materials Center.

Another thatching material that was likely used in the past is common reed (*Phragmites australis*), a wetland grass that was used for the 1981 grass house at Caddo Mounds (Perttula and Skiles 2014). Common reed has also been a preferred thatching for Wichita houses. Wichitas traditionally chose common reed because deer would eat prairie grasses such as big bluestem (*Andropogon gerardii*) and little bluestem (*Schizachyrium scoparium*) (Owings and Baugh 2021:122). The color of dried reeds also gave Wichita houses better camouflage against the prevailing landscape (Owings and Baugh 2021:123). In the Caddo world, deer-proofing and camouflage may have been desirable at outlying farmsteads where all residents may have been absent for days or weeks, hunting, trading, or visiting relatives. With a population estimated at 600-900 people and apparently no need for a defensive stockade, residents of Caddo Mounds may not have had had a deer problem or any need for camouflage during much of the town's history.

Other grasses, or even cattails or rushes, may also have provided thatching material for Caddo houses. "Ricegrass" is mentioned as part of the 1904 World's Fair Wichita house (Parezo and Fowler 2007:106). None of the plants that carry the common name "ricegrass" in the NPIN database occur in the Caddo or Wichita regions (Kartesz 2015; NPIN 2023). Rice cutgrass (*Leersia oryzoides*), however, occurs in both. Rice cutgrass plants grow up to five feet tall, but their sharp edges may have made them less desirable as thatching material (NPIN 2023).

Thatching is probably not the limiting factor in the lifespan of a grass house. Thatch roofs made from common reed Europe, where common reed is also native, typically last 50-60 years (Wichmann and Köbbing 2015). Decay happens near the soil line, and posts are particularly susceptible. Carolyn Good used fence post studies to estimate a 10-15 year life span for houses at the Deshazo Site in East Texas (Good 1982). This age likely understates the average age of an actively inhabited house where the floor was maintained and the house poles protected from the elements by thatch. The estimate seems reasonable for an untended house, however. The 1981 house at Caddo Mounds, that no one lived in, lasted 14 years before it was burned down in 1995. Wichita houses up to 50 years old have been reported (Owings and Baugh 2021:122)

SMOKE HOLES

One feature that often surprises visitors is that traditional Caddo houses lack a smoke hole (Foster 1998:208; Figure 7). Smoke from the central hearth wafts out through the high roof, which probably has the benefit of deterring insects and mold in the thatching and in crops stored in the upper levels of the house (Holley and Patel 2005). There does seem to have been variation in the practice, however. Archaeologists have documented a house in Shelby County, Texas with a circular arrangement of daub in the center that they interpret not as a hearth but a collapsed roof where a smoke opening had been reinforced and protected from sparks with daub (Middlebrook and Middlebrook 2016). A nineteenth century drawing shows Wichita grass houses with smoke holes at the top, although there are doubts as to the historical accuracy of the drawing (Nabokov and Easton 1989:145). Traditional Wichita houses do have

smoke holes, but they are located in the upper side of the house over the east door (Owings and Baugh 2021:119, 132). Hearths have not been documented in all Caddo houses (Middlebrook and Middlebrook 2016). Many hearths would have been plowed away or destroyed in logging activities, but it is entirely possible that some houses had neither hearths nor smoke holes.



Figure 7: Roof interior of the 2022 grass house before ropes that secure the thatching were trimmed

INTERIOR FURNISHINGS

The resident family or families furnished the interior of the structure at a later time. Bed platforms were installed around the walls, or perhaps around half the walls in the case of leaders whose dwelling places would also function as council houses. Beds were made with mats, probably made from river cane and supported by forked branches like a cot (Foster 1998:208; Douay 1853:204). Additional mats, often large and colorful, were bent to form alcoves around each individual bed (Douay 1853; Douglas 1932; Foster 1998:209, 236). Storage shelves made of wood and cane were constructed above the living area, where they held supported baskets of cane and bark that stored shelled corn, beans, nuts, acorns, and other foodstuffs plus mortars and pestles for grinding corn and other foods indoors during bad weather (Foster 1998:209, 237; Hatcher 1927b:56). Seeds saved for planting were kept in ceramic seedpots that are known archaeologically. The bulk of the crops are probably stored in exterior granaries, however.

BUILT LANDSCAPES

As one might expect, Caddo houses were not located randomly but clustered and aligned with other structures and features of the natural landscape. The 1691 Teran map shows compounds of one to three houses with associated granaries and ramadas that extended over several kilometers along the Red River (Figure 8). A temple mound and associated ramada can be seen at the center left. Orchards or woodlands between the farmsteads may have included cultivated plants such as plums and grape vines, plants that Wichitas used to separate their agricultural fields (Owings and Baugh 2021:126). Henri Joutel, on the Neches River, also describes an expansive village with houses clustered in hamlets and fields between clusters (Foster 1998:206). Even though the Xinesi's family received provisions from other Caddos, Friar

Francisco Casañas notes that they still planted a small plot in front of his house "so that he might have something green to enjoy" (Thatcher 1927a:217).

Figure 8: "Teran Map" of the Caddo (Upper Nasoni) settlement on the Red River, 1691 (Texas Beyond History 2023)



The diverse ecosystems that the materials of Caddo houses came from would have occurred within easy reach of most villages and farmsteads. These were not wild, untended landscapes, however (Anderson 2006; Cronon 1983; Stewart 2009). Human cultivation ensured that plant parts in the most useful shapes and stages of growth were available as needed. Cultural fires encouraged tall, disease-free trees for poles and even-aged stands of cane for mats and basketry, stands of willow were pruned for horizontal supports, and prairies were burned to prevent woody plants from encroaching on open prairies and the thatch they provide.

Just as Caddo cultivation of the land does not stop at the end of the agricultural field, a Caddo house does not stop at the walls, either in the activities of the household or the connections to other people and places. Communal construction of a house, in the past and in the present, cements ties within and between communities and bring people from all over to eat, dance, tell stories.

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SECTION THREE: SPEAKER BIOS



Photo Credit: Dawn Stover; Red milkweed, Asclepias rubra, blooming at the Watson Rare Native Plant Preserve





DR. CHARLES ALLEN

Presentation

"Grasses and Sedges of East Texas and ID hints"

Overview of differences between grasses and sedge will be presented plus hints on the characters to look for to identify selected genera. Examples of some of the common species and their distribution in east Texas will be given. Notes on the rarer or less common species will also be added.

Bio

Charles Allen is a retired professor of Biology from the University of Louisiana at Monroe and as a Senior Research Associate at Fort Polk, La thru Colorado State University's Center for Environmental Management of Military Lands. He and wife Susan own and operate Allen Acres B and B where he teaches plant id classes including grasses/sedges and rushes, edibles, etc. He has published grasses of Louisiana, Trees, shrubs, and woody vines of Louisiana, Louisiana Wildflower Guide, Edible Plants of the Gulf South, and Butterfly/Moth Gardening. He is a past president of the Louisiana Native Plant Society and has been a member of NPSOT since 1999. He has presented to the annual meeting on several occasions and he and Susan have attended a number of NPSOT meetings.





DR. DAVID CREECH

Director of SFA Gardens (with headquarters at the Pineywoods Native Plant Center)

Presentation,

"Lessons Learned from Forty Years of Native Plant Studies in the Pineywoods"

The Pineywoods of Texas is home to thousands of species, many unknown and many underutilized. While the typical urban landscape of east Texas is packed with exotics, many of those have proven unsustainable in the climate challenges of just the last three years. Yet, the native plant palate remains solid and deserving of greater use. Being pro native plants does not necessarily mean being anti-exotic but it does suggest that greater use of native plants is prudent, reduces the death and destruction that comes with the epic heat, drought, floods and freezes never seen before. To add to the mix of challenges, the Pineywoods Native Plant Center and others recognize that there are about fifty rare, threatened or endangered species deserving greater conservation concern. Many think that the opportunities for rescue, research and reintroduction should be taken to a higher level. This presentation will recount the efforts made, the successes, the failures, the challenges we face with a changing climate and a plan for the path forward.

Bio

After a long career in the Stephen F. Austin State University Department of Agriculture, Dr. David Creech retired in 2007 and returned to serve as the Director of SFA Gardens in a ½ time position. The 138-acre SFA Gardens is an umbrella for numerous theme gardens and collections of trees, shrubs, vines, herbaceous perennials and fruit. These serve as a valuable germplasm resource for the Gulf South. Dr. Creech received his BSc from Texas A&M University in 1970, his MSc from Colorado State University in 1972 and his PhD from Texas A&M University in 1978. Since arriving at SFASU in 1978, Creech's research interests have been varied and include urban tree evaluation, blueberry and golden kiwifruit evaluation, horticultural crop nutrition studies, new plant introductions for the ornamental horticulture industry, endangered native plant rescue, research and reintroduction and finding sustainable solutions to environmental horticultural concerns. He is the author of numerous scholarly and trade articles, and he has accumulated a long list of international consultancies since 1981 to Pakistan, Guatemala, Mexico, Nepal, Israel, Chile, New Zealand and China. In 2022, he received the ASHS Career Award for Outstanding International Horticulturalist which recognizes a member who has made an outstanding and valuable

contribution to international horticultural science, education, research and/or outreach for a period of 10 or more years. Dr. Creech has served as president of the Native Plant Society of Texas, the Southern Region American Society of Horticulture Science, and the International Plant Production Society Southern Region.





DAVID P. LEWIS

Presentation,

"History of Mycology in Texas"

Collections of fungi in Texas date back to the 1840s. This presentation will tell the story of early collectors, what they found, and bring up to date mycological research that is continuing in Texas.

Bio

David P. Lewis, M.S., is a retired chemist and avid mycologist with a BS and MS from Lamar University, Beaumont, TX, where his master's thesis was based on a study of East Texas mushrooms. David is currently a Research Associate with the Field Museum of Natural History, Chicago, IL, where 5000 collections of his fungi are deposited. He is a Research Associate with the Tracy Herbarium at Texas A&M University where 5500 of his fungi collections are deposited. From 2006 to 2018, he had been the Fungal TWIG (coordinator for mycologists) for the Big Thicket National Preserve All Taxa Biodiversity Inventory. He is past president of the Gulf States Mycological Society, has authored many papers related to mycology, and discovered several new species of mushrooms (four species are named for him). In 2009 he received The North American Mycological Association's award for Contributions to Amateur Mycology, and in 2010, the R.E. Jackson Conservation Award from the Big Thicket Association. In 2021 he received the Mycological Society of America "Gordon and Tina Wasson award" for contributions to Mycology. With Alan and Arleen Bessette, he co-authored "Mushrooms of the Gulf Coast States- A Field Guide to Texas, Louisiana, Mississippi, Alabama and Florida". He and his late wife Patricia live on 60 heavily wooded acres in Newton County, Texas where they study plants, fungi and wildlife.





DAWN STOVER Study Leader/Agronomist, East Texas Plant Materials Center USDA Natural Resources Conservation Service

Presentation,

"Fire as the Great Renewer"

Experience the amazing botanical richness of East Texas forests that are managed with prescribed fire. The Winston 8 Ranch, a 2014 Leopold Conservation Award recipient, will be featured and boasts a botanical survey including nearly 900 distinct plant species.

Bio

Dawn Stover joined the USDA Natural Resources Conservation Service in November 2021 as the study leader/agronomist at the East Texas Plant Materials Center in Nacogdoches, TX. She is currently working on germplasm adaptation trails, conservation plant releases and seeding rate studies to benefit landowners and land managers in the Western Coastal Plain.

Prior to her current service, Dawn spent more than 2 decades as a Research Associate at Stephen F. Austin State University where she developed an extensive program to collect, propagate, display, and distribute plants native to the Pineywoods of East Texas. She has extensive greenhouse and nursery experience, and a focus on growing plants that are beneficial to pollinators. She enjoys sharing her knowledge and experiences with the public through talks, tours and in-person demonstrations. Dawn earned a Bachelor of Science in Biology from West Texas A&M University and a Master of Science in Agriculture from Stephen F. Austin State University. She is a member of the Pineywoods Chapter of the Native Plant Society of Texas.





GAIL BARTON Landscape Consultant Meridian, Mississippi

Presentation,

"Plant Propagation Workshop: Make More Plants in Your Own Backyard!"

This interactive hands-on workshop will focus on propagation techniques for native plants. Since biodiversity is such an important part of native plant gardening, we will concentrate mostly on seed propagation. We will handle samples of many types of seed and discuss harvesting techniques and timing. Participants will process fruit to get clean plant-able seed. We will review seed treatment options and techniques for storing or planting seed and discuss where and how to successfully grow young seedlings. We will then take cuttings, divide plants and discuss timing and follow up care. The instructor will recommend pots, soil, plant labels, irrigation & winter protection that would be useful in a small commercial or backyard nursery. Participants should wear comfortable clothes that can handle some dirt. Please bring a pair of sharp scissors and lots of questions.

Bio

After a long career in the Stephen F. Austin State University Department of Agriculture, Dr. Gail Barton taught Plant Propagation for over two decades as part of the Meridian Community College Horticulture Program. During her long horticultural career, she worked as a Horticulture Instructor, owner of a retail mail order nursery, garden writer and landscape consultant. She is past president of the Mississippi Native Plant Society and currently serves as the MNPS Field Trips Chair. Gail maintains a small backyard nursery on her 6 acre home place in Meridian, Mississippi. She firmly believes that small scale propagation is one of our best hopes for preserving and maintaining local ecotypes. Gail is a certifiable plant fool. She enjoys botanizing, kayaking and exploring her own wooded nature trails with her pack of happy dogs.





DR. JAMES E. VAN KLEY

Professor, Department of Biology, Stephen F. Austin State University

Presentation,

"Introducing 'Plants of the Pineywoods Part 1'."

We introduce "Plants of the Pineywoods-Part 1". Written by James Van kley and beautifully Illustrated by Bruce Lyndon Cunningham, it covers the herbaceous native and naturalized eudicotyledons (largest of flowering plant groups) along with the herbaceous magnoliids and the waterlillies (Nymphaeiids) of the Pineywoods of eastern Texas and western Louisiana. Filling a major gap in earlier treatments, it marks the first time that there has been comprehensive coverage of the entire flora for this region in a local-level manual. Other publications including 'Flora of East Texas vol. I' (Diggs et al. 2006) cover most remaining plant groups). A second volume, currently in progress, will treat the ferns, lycophytes, & monocotyledons and a proposed third volume will cover the woody plants. The manual provides an important resource for scientists, naturalists, land mangers, recreationists, and others who wish to identify the native plants around them. It is available at https://forester-artist.com/.

Bio

James E. Van Kley was born in Chicago, IL and grew up in Grand Rapids MI, USA where where he attended Calvin University. He continued his education with an MS in Biology from Central Michigan University and a PhD in Forest Ecology from Purdue University. In 1993, he took his current position at Stephen F. Austin state University (SFASU) in the east Texas Pineywoods. He teaches a variety of both undergraduate and graduate courses in areas including general biology, botany, local flora, plant systematics, plant ecology, and wetland ecology and he has authored several publications in his field of plant ecology. His research interests can be broadly summed up as "What grows in the woods and why". They include description and analysis of the natural vegetation and ecosystems of the Texas Pineywoods and the impact of invasive species such as giant salvinia on local wetland ecosystems, changes over time in permanent plots in local forest ecosystems, and floristic botany. Dr. Van Kley is curator of the herbarium at SFASU (ASTC) and of the SFASU Biology Conservatory (live plant) Collection. He also maintains the 'Pineywoods Plants Digital Gallery' (a photographic documentation of the local east Texas flora) along with several other related galleries. Beyond academia, his interests include exploring Nature, botanical photography, playing music, gardening, mountain biking, hiking, canoeing, and other outdoor activities.





JORDAN CUNNINGHAM

SFA Gardens Greenhouse and Nursery Manager

Presentation,

"Pollination Station: Native Plants at SFA Gardens"

Looking at the native plants that are very attractive to pollinators at SFA Gardens.

Bio

As an undergraduate, she received impressive summer internships with Moore Farms Botanical Garden in Lake City, South Carolina, and with Disney Horticulture, Orlando, Florida. After earning her degree, Cunningham worked as a garden supervisor at the Dallas Arboretum in the Paseo de Flores. Her current responsibilities include maintaining the greenhouse and nursery areas along with contributing to the design and planting in the landscapes of the SFA Gardens.





LESLIE L. BUSH

Owner, Macrobotanical Analysis, Manchaca, TX

Presentation,

"How to Build a Grass House: The Archaeology of Traditional Caddo Building Materials and Landscapes in East Texas"

Grass houses were a common sight in the Pineywoods of East Texas for more than a millennium before the Caddo people were removed to Oklahoma in 1859. Preserved plant materials and artifacts, remote sensing, archaeological excavations, and the traditional knowledge of contemporary Caddo people reveal much about traditional grass houses and how they were constructed. These findings in turn suggest how people worked with the land to create the materials needed for construction while balancing other demands on those plants and habitats. Examining the layout of the physical environment within the household -- and within the farmstead, village, and region -- also offers insights into the organization of social space.

Bio

Leslie L. Bush is a paleoethnobotanist, an archaeologist who specializes in identifying bits of plants preserved on archaeological sites, usually in the form of charcoal and occasionally as waterlogged or desiccated plant parts. She received her Ph.D. from Indiana University in 2001. Through her consulting practice, Macrobotanical Analysis, she has worked on sites in nineteen states. Leslie is currently involved with investigations at sites in Iowa and Illinois and at Hueco Tanks and Mission Dolores in Texas.





MATT BUCKINGHAM

Naturalist, Photographer, and Protected Species Biologist

Presentation,

"An Overview of the Plant Communities of the Pineywoods"

This presentation will provide a broad overview of the varied natural communities present within the Pineywoods. It will also discuss current threats and conservation concerns.

Bio

Matt Buckingham is a naturalist, photographer, and protected species biologist based out of Lufkin. Matt has spent the last 20 years exploring the Pineywoods and studying and photographing the region's incredible biodiversity. Matt received a bachelors in wildlife management from Stephen F. Austin State University (SFA) in 2007. In 2011 Matt graduated from SFA with a masters in biology with an emphasis on ecology and evolutionary biology. For his thesis, Matt studied the bird communities of Iguazu National Park, Argentina. While in Argentina he met his wife, Carolina, who was studying monkeys at the time. Matt has a long history of working as a research biologist on a variety of projects including: the ecology of inland American alligators in the Pineywoods, migration ecology of Neotropical migrant songbirds along the Texas coast, nesting and population ecology of Snowy Plovers in the Texas panhandle, and developing population estimates and habitat preference models for secretive marshbirds in the Chesapeake Bay. Matt previously worked as a conservation biologist for Bayou Land Conservancy, a land trust in the Houston area. Currently Matt's work focuses on endangered species conservation, road ecology research, finding innovate ways to reduce impacts to wildlife from road construction activities, and developing solutions for wildlife/vehicle conflicts. Matt and Carolina currently live in Lufkin and spend as much time as possible exploring the Pineywoods around their home.





Peter Loos

Owner/Operator of Ecovirons, Chireno, Texas Pineywoods Chapter President, Native Plant Society of Texas

Presentation,

"Ornamental Garden Plants Native to East Texas"

This presentation will take a look at and cover just a small sampling of flora native to the Pineywoods ecoregion of East Texas. It will focus on species reasonably easy to find in the nursery trade in today's market and are adaptable to a wide range of garden conditions. The presentation will cover trees, small trees, shrubs, grasses/grasslike plants, and herbaceous plants.

Bio

Peter is the owner/Operator of Ecovirons located in Chireno, deep in the heart of the Pineywoods. His lifelong love for the outdoors led getting degrees from SFASU in Horticulture/Botany, with his Masters project being on the Ecology of Silky Camelia. He has served at numerous levels in numerous organizations over the years concerning native plants. From landscaping to nursery work to wetland mitigation/creation and currently documenting (surveying) native species along with genetic conservation of numerous native plant species, Peter continues to promote native flora whenever possible.

SUZANNE BIRMINGHAM WALKER

Owner/ Vice President of Azimuth Forestry Services, Inc.

Presentation,

"New Occurrences and Rediscoveries in East Texas Flora"

Discussion of new populations of rare plants and the locating of rare plant populations thought lost forever.

Bio

Suzanne Birmingham Walker is a co-owner and vice-president of Azimuth Forestry Services, Inc. and has been working and



living in east Texas for over 30 years. Suzanne consults as a forester, botanist/biologist and arborist and holds degrees in forestry and biology. She started her career in the forest industry and then worked for several years as a silvicultural forester and ecologist with U.S. Forest Service before starting a consulting practice with her husband. Suzanne served for several years on the Texas Prescribed Burning Board, the National Research Council, and is a member of the Association of Consulting Foresters and the American Society of Consulting Arborists. She has been responsible for finding new occurrences of rare plants in the National Forest and on private property and has worked on numerous projects detailing habitat suitability for listed species. Suzanne has a personal affinity for the longleaf pine habitat.





TYSON HART

NRCS

MLRA Soil Survey Leader South Central Region Nacogdoches MLRA Soil Survey Office Soil and Plant Science Division Natural Resources Conservation Service United States Department of Agriculture

Presentation,

"Geology and Plants"

Plants are affected by many abiotic and biotic factors. Understanding the parent material leading to the creation of soils is an important factor in studying the distribution of differing plant species.

Bio

Tyson Hart grew up in north Texas and graduated from Allen High School. From there he attended Texas A&M University receiving a bachelor's degree in wildlife ecology and master's degree in wetland hydrology. He began working for the USDA in Lubbock, TX as a soil conservationist, then was transferred to Henrietta, TX as a range management specialist. He then moved to Nacogdoches, TX accepting a position as an ecologist and eventually promoting to a soil survey leader. In his spare time he enjoys birding, camping, hunting, and ultimate frisbee with his wife and two kids.

SECTION FOUR: FIELD TRIPS



Photo Credit: Matt Buckingham; Forest Aflame, Deep East Texas

F1 ANGELINA NATIONAL FOREST UPLAND ISLAND WILDERNESS AREA

Bouton Lake Rec Area, Zavalla, TX 75980 57 miles, 1 hour from the Fredonia Hotel & Convention Center

Description:

This walk will allow participants to experience several healthy Habitats on what Ned Fritz called Longleaf Ridge. From bogs/baygalls, seeps, savannahs, and a Longleaf Sand Cap. Some rare plant species at the site include Louisiana Squarehead/ *Tetragonetheca ludivichiana*, Texas Bartonia/*Bartonia texanum*, Bog Giant Coneflower/*Rudbeckia scabrifolia*, and Bogmoss/*Mayaca aublletii*. There are several species of Milkweed/ *Asclepias spp*, Gayfeathers/*Liatris spp*, Asters amongst the Grasses galore. Location is located in part of what Ned Fritz coined Longleaf Ridge.

Leader: Peter Loos and Jason Singhurst Difficulty: Moderate, no formal trail. Keep in mind that Baygalls and Bogs are wet by nature, otherwise hiking boots are encouraged. Some elevation change. Wheelchair/ADA accessible: No Start Time: Noon Duration: 3-3.5 hours Maximum number of attendees: 30 Fees: No Facilities: No Other: Field trip occurs during hunting season. Wear bright colors, such as blaze orange.

F2 WATSON RARE NATIVE PLANT PRESERVE

527 CR 4777, Warren, TX, United States, 77664 98 miles, 2 hours

Description:

This walk will allow participants to see excellent examples of a pitcher plant Bog, with slopes dominated by Longleaf Pine Savanah. Home to one of the larger populations of the rare Chapman's Fringed Orchid there are several other orchid species found at the site. Other unusual species at the Preserve include Sweet Pepper Shrub/*Clethra alnifolia*, Bigleaf Magnolia/*Magnolia macrophylla*, *Liatris spp*, several species of Milkweed/*Asclepias spp* (to include *Rubra*, *Lanceolata*, *obovata*), and Tall Catchfly/*Silene subcilliata*

See more information: Watson Rare Native Plant Preserve on Facebook Watson Rare Native Plant Preserve Website

Leader: Joe Liggio Difficulty: Easy; Property has areas of dirt-based paths and boardwalks to maneuver through the bog areas. Minimal elevation change. Wheelchair/ADA accessible: No Start Time: Noon Duration: 2.5 hours Maximum number of attendees: 30 Fees: No Facilities: Portable Toilet

F3 PINEYWOODS NATIVE PLANT CENTER (PNPC), STEPHEN F. AUSTIN STATE UNIVERSITY

2900 Raguet St, Nacogdoches, TX 75965 2.3 miles, 10 min

Description:

One of the premier public display gardens in the Pineywoods and Texas, the 42-acre PNPC is a part of the SFA Gardens. Home to the twice annually SFA Garden Plant Sales, the property is home to 2.3 miles of asphalt trails, boardwalks and bridges and interesting plants at every turn. The property includes the LaNana creek bottomland, some wetlands, mesic midslopes, some dry upland and a perched upland wetland marsh. The Tucker House remains the crown jewel and center piece. The nearby Ina Brundrett Conservation Education building was dedicated in 2015 and is the result of a campaign for the SFA Garden's environmental education program for kids. With this facility as a backdrop, Elyce Rodewald transformed the program into 10-12,000 kids per year in a wide range of outdoor education events. The Horticulture facility at the PNPC is the nerve center for 128-acres SFA Gardens with a focus on research, plant sale crop development, and promoting superior plants as we encounter them. With 9000 square feet of greenhouses and an adjacent nursery, the PNPC's future is a given. The mist propagation bench in the quonset deserves a look. The PNPC includes the blueberry and muscadine grape evaluation plots, a penchant for the gardens since the 1980s.

Leader: Dr. David Creech and Jordan Cunningham

Difficulty: Easy Wheelchair/ADA accessible: Yes, in places Start Time: 11 am Duration: Flexible as it can include other native collections located in other parts of the Gardens Maximum number of attendees: 30 Fees: No Facilities: Yes

F4 SCRAPPIN' VALLEY

North Newton Co. Meeting at corner of TX-87 and State Hwy 255 86 miles, 1.5 hours from the Fredonia Hotel & Convention Center

Description:

Scrapping Valley is a wonderful example of Longleaf Pine habitat and contains numerous plant communities to include Pitcher Plant Bogs, Dry Upland Sand Caps, Baygalls, Mesic Creeks, and Barrens. Located in part of the area Ned Fritz coined Longleaf Ridge. Highlight will be a stop at what some call a cave but is more of a Grotto where one might see Tall Catchfly, Bottle Gentians, Native Azaleas. The property has become a conservation area since changing ownership and continues to have numerous scientific research activities from monitoring RCW (Red-cockaded Woodpeckers) to Louisiana Pine Snake.

Leader: Scott Walberg Difficulty: Moderate; No organized trails but short walks from roads at numerous stops, some sites have gentle slopes. Wheelchair/ADA accessible: No Start Time: 11:45 am Duration: 2.5-3 hours Maximum number of attendees: 30 Fees: No Facilities: No

F5 SABINE NATIONAL FOREST, FOX HUNTERS HILL

TX-87 Sabine Co. (Meet at Public Boat Ramp south side of lake crossing at community of Six Mile.) 72 miles, 1.5 hours from Fredonia Hotel & Convention Center

Description:

Another site located on Longleaf Ridge, this location is another excellent example of Longleaf Pine habitat. Plant communities include Sand Cap/Dry Sand Hills, Wet Creek bottoms, Mesic Creek Bottoms, Pitcher plant Bog, Baygalls Catahoula Barrens, and Savannahs. Two of the more unusual species participants should see include Bottle Gentians and Bigleaf Witch Hazel/Hamamelis ovalis. Home to numerous RCW (Red-cockaded Woodpecker) clusters, the site also includes large colonies of Sandhill Sellaginella and several colonies of Tall Catchfly/Silene subcilliata and Yellow Sandhill Blazing star/Liatris bridgesii.

Leader: Suzanne Birmingham Walker Difficulty: Difficult; no trails, numerous slopes Wheelchair/ADA accessible: No Start Time: 11:45 am Duration: 2.5-3 hours Maximum number of attendees: 30 Fees: No Facilities: No, though there are Rest Rooms at the meeting site Other: Field trip occurs during hunting season. Wear bright colors, such as blaze orange.

F6 USDA-NRCS EAST TEXAS PLANT MATERIALS CENTER AND WINSTON 8 TREE FARM

6598 FM2782, Nacogdoches, TX 75964 12 miles, 20 min from the Fredonia Hotel & Convention Center

Description:

The group will start with a tour of the USDA-NRCS East Texas Plant Material Center seed production fields and facilities. After that the group will travel to the nearby Winston 8 Tree Farm, a wonderful example of an open pine-grassland savanna sprawled over 3,300 acres. Nearly 900 distinct plant species have been documented within the canopy of longleaf, shortleaf and loblolly pines. Xeric sandhills, mesic creeks and several baygalls occur in the rolling topography of this property. See numerous species such as *Salvia azurea, Liatris bridgesii* and *L. squarrulosa, Solidago petiolaris and S.* rugosa, *Symphyotrichum patens* and

S. pratense, and more than 100 species of grasses. The Winston family received the 2014 Leopold Conservation award, the state's highest honor for private land conservation.

Leader: Dawn Stover Difficulty: Easy, there will be several short walks from unpaved roads. At Winston Ranch there are some gentle slopes. Wheelchair/ADA accessible: No Start Time: 11:30 am Duration: 3-3.5 hours Maximum number of attendees: 30 Fees: No Facilities: Yes

F7 DAVY CROCKETT NECHES BLUFF OVERLOOK

Neches Bluff scenic overlook, FR511A, Grapeland, TX 75844 36 miles, 60 min from the Fredonia Hotel & Convention Center

Description:

After meeting at the Neches Bluff Overlook where participants might see Clematis carrizoensis, Thaspium sp, the group will caravan to a nearby seasonal wetland "bowl" full of Spiranthes odorata which also contains two species of Hibiscus and Cardinal Flower. Next stop will be a Post Oak dominated roadside site with a large colony of Palafoxia sp. From there its on to Pond Camp along the way seeing Louisiana Squarehead/Tetragonetheca ludivichiana adjacent to a large colony of Bluejack (or Sand Jack) Oak. At Pond Camp there will be an opportunity to see *Liatris aspera*, *Liatris tenuis*, Rattlesnake Master/*Eryngium yuccifolium*, and Red Ring Milkweed/*Ascelepias varigata*.

Leader: Mark Tietz Difficulty: Moderate, no formal trails off roadsides Wheelchair/ADA accessible: No Start Time: 11:45 am Duration: 2.5-3 hours Maximum number of attendees: 30 Fees: No Facilities: Yes, only at Neches Bluff overlook Other: Field trip occurs during hunting season. Wear bright colors, such as blaze orange.

F8 BIG THICKET NATIONAL PRESERVE, PITCHER PLANT TRAIL

Co Rd 4850, Warren, TX 77664, Tyler County 90 miles, 2 hours from the Fredonia Hotel & Convention Center

Description:

One of the Big Thicket Preserve's premier Pitcher Plant bogs and home to numerous bog species to include Bog Coreopsis/Coreopsis gladiata, several Gayfeathers/Liatris spp (to include pycnostachya and acidota) numerous orchid species such as Grass Pinks/Calypogon, Rose Pagonia/Pagonia, Yellow Fringed Orchid/Plantanthera cilliaris, and Chapman's Fringed Orchid/Plantanthera chapmanii. The bog is

surrounded by Baygall on lower wet side with Swamp Titi/*Cyrilla racemiflora*, Tall Inkberry Holly/*Ilex coriacea*, and Sweetbay Magnolia/*Magnolia virginiana*. The higher drier land on the walk in has Beautyberry, Dwarf Pawpaw/*Asimina parviflora*, and several Oak species.

Leader: Eric Keith Difficulty: Easy, paved trail from parking lot to boardwalk at Pitcher Plant Bog Wheelchair/ADA accessible: Yes Start Time: Noon Duration: 2.5-3 hours Maximum number of attendees: 30 Fees: No Facilities: Yes Other: Wearing bright colors suggested. Field trip occurs during hunting season but this field trip is in a no shooting zone with well-established asphalt/boardwalk trail.

F9 CADDO MOUNDS STATE HISTORIC SITE

1649 State Hwy 21 West, Alto, TX 75925 32 miles, 35 minutes from the Fredonia Hotel & Convention Center

Description:

Tour the Caddo Mound grass houses and discover how they are constructed using local vegetation. Learn about how the Caddo utilized native plants for food and medicine. Get to know the plants established at the prairie restoration site.

Leader: Rachel Galan and Leslie Bush Difficulty: Easy; Main trails are composed of a gravel that is rated for accessibility and golf carts are available for visitors to use. Wheelchair/ADA accessible: Yes; talk/walk will occur in areas that are accessible to the attending group. Start Time: Estimated 11:45 Duration: 2.5-3 hours Maximum number of attendees: 30 Fees: \$4 Facilities: Family restroom expected to be open in new museum area.

SECTION FIVE: SPONSORS



Photo Credit: Dawn Stover; Grass pink orchid, Calopogon tuberosus, in the Angelina National Forest

