



San Bernard Oak Trail

San Bernard National Wildlife Refuge

Nature's Treasure Trail

Welcome to the San Bernard Oak Trail. The forest you are about to enter is part of an area known as the "Columbia Bottomlands." These forests are adjacent to the Brazos, San Bernard, and Colorado Rivers and extend from the coast approximately 75 miles inland. This is the southern-most bottomland forest on the Gulf of Mexico.

As you walk this 3/4 mile pathway (1-1/4 mile total) keep in mind that this is a natural area. Don't stray from the path because there are venomous snakes. Don't pick or eat any of the vegetation, and don't swing or climb on trees and vines. It is recommended that you use insect repellent for mosquitoes and chiggers. Watch out for fire ants, wasps and poison ivy. Make soft noises because you can frighten the wildlife in the area. Use

your eyes, ears, and nose to experience nature: finally, use this Trail Guide, the trail markers, and your camera to make this a lifetime memory.

Stop #1 ecotone'

If you turn around you will see that you are in an ecotone', a transition zone between wet prairie and bottomland forest ecosystems. The presence of spike rushes (narrow leaf, grass-like plants) is a good clue for generally wet soils. The prairie behind you has been disturbed by past management.

There are three conditions that define an ecosystem: soil type, water diversity, and elevation changes. Look for all three conditions as the plants adapt to the increased shade, the soil changes from sandy to loamy-clay, and the ever changing wet/dry areas.

Stop #2 Forest Layers

Forest ecosystems consist of multiple layers: ground layer, mid-story, and canopy. Each layer adds diversity. The mid-story vegetation, including yaupon holly, laurel cherry, and beautyberry provides cover and edible berries as well as harboring insects and spiders for hungry birds. This food source is vital to song birds like the black and white warbler which crosses the Gulf of Mexico during its migration. Nesting birds like the prothonotary and Swainson's warblers can be found in this forest too. Look for prothonotary warblers near water and Swainson's warblers near small openings in the canopy.

Stop #3 Epiphytes

Look up into the canopy and you will see two epiphytes. These plants use the tree for support but get their nutrients from the sun, air, and rain. Resurrection fern, one of three fern species on the refuge, grows on the upper side of the live oak branches. The fern appears dried and dead if no rain has fallen recently. But give it a good soaking and it comes to life within a day. Hanging from the branches is Spanish moss which is a bromeliad and member of the pineapple family. The plants have small, fragrant green blooms during the early summer.

Stop #4 Cavities

The cedar elm ahead has a large cavity. Natural cavities provide nests and shelter for a variety of animals, including opossums, bats, squirrels, owls, wood ducks, and raccoons. Other cavities that you might find are excavated by numerous woodpeckers, including the large pileated woodpecker. A mature forest will have many dead trees into which natural and constructed cavities can be found.

Stop #5 Ground Plants

Sunlight floods down to the ground vegetation at this marker where the trail, alternate trail, and a pipeline corridor intersect. Numerous ground plants not found under the forest canopy can grow in this sunny spot. Flowering plants provide nectar for a variety of butterflies. While walking the trail notice the but-



terflies that are seen as flashing bright colors. The Bottomlands harbor a large variety of species including the yellow sulfure and the orange Gulf fritillary.

Stop #6 Diversity

The diversity of the forest is evident at this marker because the right-of-way is constantly mowed and the swale you are crossing remains wet during all but the driest seasons. Look for emergent plants that have adapted to growing partially submerged. Two invasive non-native species, the trifoliate orange a thorny tree used to graft citrus, and the Chinese tallow are found in this edge habitat as well.

Stop #7 'Wet Bottomland'

This boardwalk traverses a true "wet bottomland". During wetter years the area may remain saturated for well over a year. The palmettos are a good indicator of the poorly drained soils. Tree species including red mulberry, cedar elm, green ash, hackberry and water oak are well adapted to the prolonged wet cycles. Shade tolerant ground vegetation including frostweed, coralberry and Turk's cap produce a spectacular seasonal array of color.

Stop #8 Reforestation

Large areas of the Columbia Bottomlands, including this forest, have been cleared for farming, grazing pasture, and development. However, since it became a wildlife refuge it is being allowed to mature as a natural forest. Bottomlands are a critical area. 1) they lessen the destructiveness of floods, 2) they reduce soil erosion, 3) they retain river-borne sediments that could impede water traffic, 4) they filter river-borne pollutants helping to purify water, and 5) they recharge the valuable underground aquifers.

Stop #9 Soapberry & Pecan

The western soapberry tree is found surrounded by the predominant grass-like Cherokee sedge. Western soapberry has male and female flowers on separate trees and the fruit is an excellent source of winter food for birds while the sap has been used to make lye soap since the pioneer days. The native pecan tree, common in the bottomlands, is used as the graft tree for larger papershell hybrids.

Stop #10 Lianas

Hanging woody vines are called "lianas" and may twine around tree branches or use tendrils to grasp a tree's bark. Rattan has a smooth greenish bark that twines up the trees. To the left of the boardwalk, the poison ivy vine and live oak to which it is attached are drilled

with sap holes made by the yellow-bellied sapsucker. Trumpet vines found in the canopy have large orange-red flowers that are a food source for hummingbirds. Other vines include the Virginia creeper and mustang grape.

Stop # 11 Burls

Live oak trees come in several different forms and leaf shapes. The numerous burls on its trunk are a result of insect damage. The tree survived the damage and continued to grow around the wound creating a flattened hemisphere on the trunk and large branches. Burls are highly prized by woodcrafters for making bowls, other utility items and artistic works.

Stop #12 Cedar Lake Creek

This shallow wetland was an ancient water course most probably an arm of what is now called "Cedar Lake Creek" that serves as the western boundary of the refuge. These wetlands, referred to as sloughs, provide a myriad of abundant food resources throughout the year. This is home to many reptiles and amphibians including leopard frogs and green tree frogs, skinks, green anoles, box and snapping turtles. Snakes often seen here are the cotton mouth, copperhead, and the secretive eastern coral snake.

Stop # 13 Water birds

Hooded mergansers and wood ducks can be found silently feeding in the slough. The white ibis is a common visitor to the slough especially in dryer seasons. Bottomland trees have very shallow root systems. These are needed so that during dryer seasons, when the soils just begin to dry, the roots can once again absorb oxygen out of the soil. These roots lead to a "leaning tree" phenomena among bottomland tree. Bottomland trees lean in every direction as a result of periodic swelling and drying of the soil because of the ecosystem's alternating periods of drought and heavy rainfall. Aided by wind and gravity the tree eventually falls.

Stop #14 Hackberry tree

The hackberry tree to the right of the boardwalk has a very bulky appearance effected over time by the leaning phenomena. Although forced to lean over, the tree always wants to grow straight up toward the sun. This creates irregular growth patterns. When trees fall in the bottomlands the entire root system is pulled to the surface, forming a bowl-shaped hole called a "rootwald." An obvious example of this is on the left side of the boardwalk. The rootwald creates a new habitat for plants and animals

– mosses can grow and animals like tadpoles can have a safe place to grow into a frog.

Stop #15 Texas State Champion Live Oak

You're getting close to the tree. Can you see it? The San Bernard Live Oak Champion is one piece of a larger and more complex forest. In fact, if the forest surrounding the tree had been cleared during the past 50 years, this tree would not have grown to its championship status. The forest is its own strength and protection from Gulf hurricanes. As you finish your walk to the tree, look around at the other trees, vines, brush, and ground plants that make this Nature's Treasure Trail.

When crowned Texas State Champion Live Oak in 2003 the tree's circumference was 32.2 feet. It stood 67 feet tall and had a crown spread of over 100 feet. The age of the tree is estimated at between 200 and 300 years.



The champion tree has never been groomed or unnaturally supported. For now, it is our responsibility to protect, to defend, to respect, and to enjoy this long-lived and living treasure of nature the Texas Champion Live Oak!

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U.S. Fish and Wildlife Service
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