

Geology, Biology and Human Impact

Big Thicket Auto Tour

Special Thanks

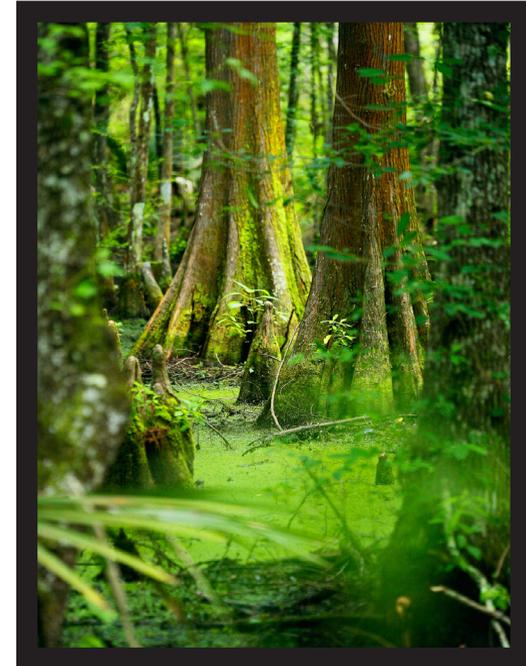
Jefferson County Tourism Committee for
Hotel Occupancy Tax Grant Funds
Photographer- Michael Black



**Big Thicket
Association**

Founded 1964

PO Box 198
Saratoga, TX 77585-0198
Ph. 936-274-1181
www.bigthicket.org



(Tour focuses on Jefferson County)

By Mary C. Johnston
President, Big Thicket Association

SOUTH

McFadden National Wildlife Refuge, PO Box 358, 12 miles west of Sabine Pass, 55,000 acres off Hwy 87, Sabine Pass, 77655, (409)971-2909, Hrs: Daily from sunrise to sunset, special regulations during hunting season

Sea Rim State Park, PO Box 356, 20 miles South of Port Arthur on Hwy 87, Sabine Pass, 77655, (409)971-2559, http://www.tpwd.state.tx.us/spdest/findadest/parks/sea_rim/

Texas Point National Wildlife Refuge, adjacent to town of Sabine Pass, 7950 S. Gulfway Dr., Sabine Pass, 77655, (409)971-2909, Hrs: Daily sunrise to sunset, special regulations during hunting season

EAST

Museum of the Gulf Coast, 700 Procter, Port Arthur, 77640, (409)982-7000, (409)984-6445, <http://www.museumofthegulfcoast.org/>

Shangri La Botanical Garden and Nature Center, 2111 W. Park, Orange, 77630, (409)670-9113, www.shangrilagardens.org

The W.H. Stark House, 610 West Main Ave., Orange, TX 77631, (409)883-0871, www.whstarkhouse.org

WEST

Gator Country Alligator and Reptile Adventure Park, 21159 FM 365 @I-10 Exit #838, Winnie, (409)794-WILD, Adm: Adult- \$12, Child- \$9, www.gatorrescue.com

Anahuac National Wildlife Refuge, Anahuac, 77514, (409)267-3337, Hrs: 1 hr before sunrise; 1 hr. before sunset, <http://www.fws.gov/southwest/refuges/texas/anahuac/index.html>

Trinity River National Wildlife Refuge, 601 FM 1011, Liberty, 77575, (936)336-9786

Geology, Biology and Human Impact

The variety of habitat thriving in the Big Thicket is related to geological and climatic history resulting in great diversity and a Southeast Texas treasure that is internationally recognized. Four major glacial stages and deposition of sediments from ancient seas left a tilted topographical terrain in what is now the middle Neches River Watershed. As organisms in pre-historic salt water seas dried and settled to the ocean floor, they were covered with sand and mud. Over time the compressed matter turned to crude oil and natural gas and the sand became sedimentary rock. The hundreds of thousands of year's difference in the age of the geological formations, resultant differences in elevation, drainage, patterns and soil types contributed to the biological diversity of the Big Thicket and shaped the landscape. The region's abundant natural resources fueled population growth and development. This human impact altered the land's geographical face. Industry in Southeast Texas, particularly petroleum and refining, provided financial stability for generations of families and continues today with vital services for a fuel dependent nation. Education and growing awareness and appreciation of the United Nations' UNESCO designation of the Big Thicket as a "*Man and Biosphere Reserve*" contributed to stewardship strategies designed to sustain and save remaining fragments. Consumption of natural resources is a survival need of humans but this should be balanced with preservation and restoration practices to enhance the quality of life for residents and to manage and maintain the diversity that will ensure its future.

Geology

The **Fleming Formation**, found in northern rim of Big Thicket, is over 12 million years old. It is the oldest and highest and was formed by shallow marine deposits. The **Willis Formation**, late Pliocene to early Pleistocene, is 1 to 3 million years of age and is deeply dissected and well drained. It has sand, and gravel with petrified wood and contains today's upland Beech-Magnolia-Loblolly Pine forests. The **Bentley Formation**, Pleistocene period, is older than 100,000 years and has gently rolling hills and many undrained depressions. It has pine savannah, wetland vegetation as does the **Montgomery Formation** which is of the same age. The Montgomery, of the pre-Wisconsin Pleistocene period, is relatively flat except for some pimple mounds, a few feet high. The **Beaumont Formation**, older than 70,000 years, has an undeveloped drainage pattern and terrain scarcely touched by erosion. Coastal wetland prairies at one time stretched across the entire expanse of this Pleistocene upland. Here the calcareous clay floodplains of Pine Island and Little Pine Island Bayou and frequent standing water make ideal habitat for palmetto. The **Deweyville Formation** occupies filled valleys of ancient streams and is about 34,000 to 12,000 years old. Acid bogs and baygalls formed here when abandoned channels and oxbow lakes of the Neches and Trinity River and in some places along Village Creek became partially filled with organic debris. The most extensive arid sandylands are found on Village Creek terraces of the Deweyville, created from eroded sand from the creek's upper watershed.

Reference:

Aronow, Dr. Saul and Watson, Geraldine E., Big Thicket Participants Handbook for Contemporary Science Seminar, Houston Museum of Natural Science, 1975.

Auto Tour Nearby Areas- NORTH

Big Thicket National Preserve, 6044 FM 420, Kountze, 77625, (409)951-6700; Hrs: 9-5 daily; Adm: Free; <http://www.nps.gov/bith/index.htm>

Heritage Village Museum and the Pickett House Restaurant, Hwy 190 West, Woodville, (409)283-2272, www.heritage-village.org, info@heritage-village.org

Kirby Hill House Museum, 210 West Main Street, Kountze, 77625, (409)246-8000, 1-866-244-8442

Martin Dies Jr. State Park, 634 Park Rd 48 South, Jasper, 75951, (409)384-5231; Adm: \$3 per day per person 13 and older, Free- Children under 12 and school sponsored trips, Extra fees to camp

Roy E. Larsen Sandyland Sanctuary, The Nature Conservancy, 4208 Highway 327 West, Silsbee, 77656, (409)781-5071; Hrs: Daily during daylight hours; Adm: Free; www.nature.org/texas

Silsbee Ice House Museum and Cultural Center, 818 Earnest Ave, Silsbee, 77656, (409)385-2444, Hrs: Wed-Fri 10:30-3:00, Sat. 9:30-2:30.

Village Creek State Park, PO Box 8565, 8854 Park Road 74 (Off Alma Drive) Off US 96, Lumberton, TX 77657, (409)755-7322; Hrs: 8 AM to 10 PM every day; Adm: \$3 per person 13 and older, Free Children under 12 and school sponsored trips, Extra fees to camp

Auto Tour Day 3

St. Anthony Basilica, 700 Jefferson and Wall Street, Bmt. 77701, (409)833-6433, Hrs: Sun 9-2, Mass Sat 4 PM, Sun 10 AM, 12 PM, www.stanthonycathedral.org

Tyrrell Park, 5305 Tyrrell Park Rd., Bmt., 77705

Tyrrell Park Garden Center: Beaumont Botanical Gardens Binks Horticultural Center and Warren Loose Conservatory, 6088 Babe Zaharias Dr., Bmt., 77705, (409)842-3135; Hrs: M, T, Th, F 10-4, Sat/ Sun 1-5; Adm: Free

Tyrrell Park's Cattail Marsh, on Babe Zaharias Drive at entrance to Tyrrell Park, (409)842-0458; Hrs: 7 Days a Week 6 AM- 9 PM

Sabine Pass Battleground State Historical Park, FM 3322, Port Arthur, 77640, (409)971-2559; Hrs: 7 Days a Week 8 AM-5 PM, Closed Holidays; Adm: Free, <http://www.visitsabinepassbattleground.com/index.aspx?page=14>

Attend a service or tour the Basilica. Construction for **St. Anthony** Cathedral began in 1903. It was dedicated a Minor Basilica in 2006.

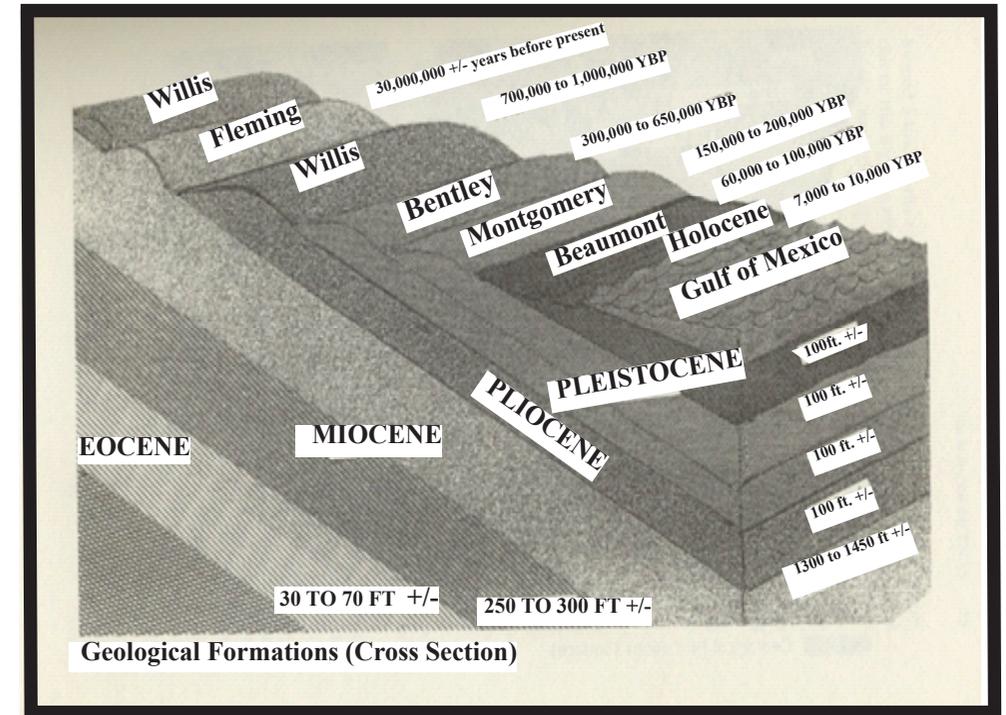
Activities at **Tyrrell Park** include jogging, biking, horseback riding, bird watching, and picnicking. The Garden Center features Grandmother's Garden, a Herb Garden, and Antique Rose Garden.

Cattail Marsh is a 900 acre constructed wetland. It attracts an incredible diversity of waterbirds. One can walk or jog the levees on the 5 mile trail.

Travel Hwy 87 as it threads through refineries, railroads and pipelines to **Sabine Pass**. The town was heavily damaged by storms in 1886, 1900, 1915, 1957, 2005, and 2008. View the Intracoastal Waterway and imagine the significance of the goods transported on this major transportation artery. Picnic on a Civil War battleground. Crab on the shores of Keith Lake.

Holocene deposits are the most recent geofomation and are probably less than 5000 years old. They are found in the floodplains of the Neches and Trinity Rivers and other, minor, streams.

Geraldine Watson's Geological Formations



Biology

The history of the earth is one of unrelenting change- of tearing down through erosion and weathering and building up. Thus, all lands have varying degrees of elevation and slope. Consequently, the geology of the Big Thicket differs vastly in age, altitude, drainage patterns and soil type, contributing to the wide variety of habitats. As the topography of the surface changes and with it the moisture content of the soil some plants die and others adapt for survival resulting in different types of vegetation. These include:

- Xerophytes- Plants that retain moisture and can live in hot, arid soils
- Hydrophytes- Plants that can tolerate flooding
- Mesophytes- Plants that are unable to tolerate excessive aridity or moisture
- Halophytes- Plants that can grow near salt water

Other factors that determine plants and their habitat are the plants' tolerance for water, fire, temperature, pH (alkalinity or acidity), and salt. All of these plants are represented in the Big Thicket.

Reference:

Watson, Geraldine E., Big Thicket Plant Ecology An Introduction, Big Thicket Association University of North Texas Press, 2006.

Auto Tour, Day 2

John Jay French Trading Post, 3012 French Road, Bmt., 77706, (409)898-0348, Hrs: Tues-Fri 10-3, Sat 1-2; Adm: Adult \$3, Child \$1

Gladys City Boomtown Museum, Hwy 69 at University Drive, (exit at Highland Ave) Bmt., 77710, (409)835-0823, Hrs: Tues-Sat 10-5, Sun 1-5; Adm: Adult- \$5, Child- \$2, www.spindletop.org

McFaddin Ward House Historic House Museum, 1906 Calder Ave., Bmt., 77701, (409)832-2134, Hrs: Tues- Sat 10-11, 1:30-2:30; Sun 1-3; Children must be at least eight yrs.
McFaddin Ward Carriage House, Hrs: Tues-Sat 10-3, Sun 1-3, Adm: Self guided and free, Children all ages welcome. www.mcfaddin-ward.org

Chambers House Museum 1906, 2240 Calder, Bmt., 77701, (409)832-4010, Hrs: Tue-Fri 10-3, Sat 10-2; Adm: Adult-\$3, Students-\$1

Tour the oldest house in Beaumont (1845-1865), home of the prosperous Texas pioneer, **John Jay French**. See pioneer artifacts including a blacksmith shop, tannery, corncrib and smokehouse.

Glimpse life during the first oil boom and learn how **Gladys City** transformed from a village of several hundred to nearly 30,000 in a matter of weeks. The Boomtown features oil derricks of the era and 15 clapboard buildings including a general store, saloon and stable.

Built in 1905-06 the **McFaddin Ward** 12,800 sq. ft. home and furnishings reflects the lifestyle of a prominent family. They occupied the home for 75 years. Now it is a Texas State Historic Landmark.

Visit the historic home of Homer and Edith Fuller **Chambers**. The building and its contents reflect life in Beaumont from 1920-45.

Auto Tour, Day 1

Texas Energy Museum, 600 Main Street, Bmt., 77701, (409)833-5100, Hrs: Tues-Sat 9-5; Sun 1-5, Adm: Adult \$2, Child \$1, www.texasenergy-museum.org

Tyrrell Historical Library, 695 Pearl Street, Bmt. 77701, (409)833-2759, Hrs: Mon-Sat 9-6, Adm: Free, wgrace@cibeauumont.tx.us; www.beauumontlibrary.org

Riverfront Park on the Neches River, 701 R Main Street, Bmt. 77701, (800)782-3081

Neches River Salt Water Barrier, near Morgan Park, 6790 Bigner Rd., Bmt., 77708 (409)898-0561

Cardinal Neches River Adventure, call for schedule and public tours, prices and reservations. The boat can be chartered. (409)880-8907, www.lulearn.net

Begin tour at **Texas Energy Museum** with an overview of the geologic ages of Southeast Texas. Explore this relationship with the fascinating world of petroleum science.

The **Tyrrell Library** is repository for historical and genealogical information related to Beaumont and Southeast Texas and has historical exhibits and archives. Read turn of the century newspapers here.

Walk the **boardwalk** for a scenic view of the Neches River and a glimpse of Port of Beaumont.

Off of Lucas at the end of Bigner Road, find the stocked pond and fish. There are picnic facilities, a walking trail and public restrooms. Bring your own canoe and launch at the public boat launch. The **Neches River Salt-water Barrier** insures freshwater is available for municipal, agricultural and industrial uses as well as for fish and wildlife habitat protection.

The typography and the vegetational cover of the land have resulted in the following general Habitats and Associations:

- Prairies
- Upland and Wetland Longleaf Pine Savannahs
- American Beech/ Southern Magnolia Forests
- Palmetto Hardwood Flats
- Bottomland Hardwood Forests
- Cypress Tupelo Swamps
- Baygalls
- Pitcher Plant Bogs

The **Traditional Big Thicket** lies in the bottom of a topographical basin. It is a wetland with titi, palmetto and dense thicket vegetation. It was almost impenetrable to early settlers, except by waterways. It became the last bastion of bears and a haven for feral hogs.

The **Ecological Big Thicket** is more expansive. It is an ecotonal complex, a meeting place between different biological communities. Mixtures of plants from the different hemispheres commingle. Once covering 3,500,000 acres, the remaining fragments represent many diverse forest associations and plant communities living in close proximity. As a result, plants hybridize and evolve into many species and varieties. Three major vegetation regions meet here: coastal wetlands, mixed grass prairies and the longleaf pine-bluestem range. Stream floodplains are divided into upper floodplain terraces and lower floodplains. Upper terraces include acid bog-baygall, hummock land and arid sandyland. In the lower, active, floodplain are oak and gum ridge-and-swale forests, cypress-tupelo sloughs and swamps, and palmetto-hardwood flats.

Ecological Succession

Geraldine Watson explains succession in her book Big Thicket Plant Ecology. Ecological succession is the tendency of plant communities to develop through stages to a climax condition in equilibrium with soils and climate. The plant associations on different geological formation surfaces appear developmentally related to one another in a way that parallels the increasing age of substrate from south to north. The second youngest formation, the Beaumont, is in the grass stage. The Bentley contains grassland, shrubs and forests. The Willis has savannah vegetation, hanging bogs and is entirely covered with trees and shrubs. Long leaf pine uplands are found in the older Bentley and Willis surfaces that are higher and well drained and on knolls in the younger, lower Montgomery.

Another type of succession, the gradual conversion of bodies of water to dry land, occurs in the many small ponds and lakes in the Big Thicket, especially the flatwood ponds of the pinelands and the abandoned channels of the floodplains. Streams constantly change course, leaving deep bends and some straight sections as abandoned channels. They are isolated from streams at different times so each is in a different stage of succession. These channels in the higher ancient floodplains, or terraces, that are no longer flushed by flooding streams have evolved a distinctly different biota and are called baygalls.

Succession plays an important role in the natural processes but another important factor is fire. Under natural conditions all land not protected by

Where is the Big Thicket?

Parks and Cory's Biological Survey of the East Texas Big Thicket Region published in 1936 included a map that encompassed about 29 counties. Claude McLeod in 1967 defined an "Upper" and "Lower" Thicket defined by the presence of the dominance of beech in climax forests in the Upper and the so-called absence of beech in the Lower Thicket. Geraldine Watson distinguished between a historical and an ecological Big Thicket, leaning heavily on geology, and regarded the Thicket as a topographical basin in the Neches River Watershed. Today the remnants protected in the Big Thicket National Preserve cover approximately 110,000 acres stretched across 7 East Texas counties- Hardin, Jefferson, Orange, Jasper, Liberty, Polk, and Tyler. The Preserve meanders through 250 miles of waterways with the Neches River as its eastern boundary.

My Favorites

Visiting the **Big Thicket National Preserve Visitor Center** seven miles north of Kountze is a must. The exhibits and film provide an overview and trail information is available. Be sure to sign the Guest Book and note the travelers from around the world who have toured the Big Thicket. The **Sundew Trail** is wheelchair accessible and is a great site to see insect eating plants- the sundew and the pitcher plant! Hike the one mile trail of the Nature Conservancy's **Roy E. Larsen Sandyland Sanctuary** to see an excellent example of the forces of geology and how it impacts the region's biology. One can see transitional forests dominated by American beech trees, southern magnolias and loblolly pines. Alongside **Village Creek** are arid sandylands formed from ancient alluvial deposits with desert vegetation. Baygall and bog communities and the lower floodplain forest stretch out along the creek banks. If at all possible, get on the water and marvel at the beauty of nature, particularly in the undisturbed areas. Whether on a creek or river, even within minutes of Beaumont's downtown, the Big Thicket is truly amazing!

The Big Thicket Today

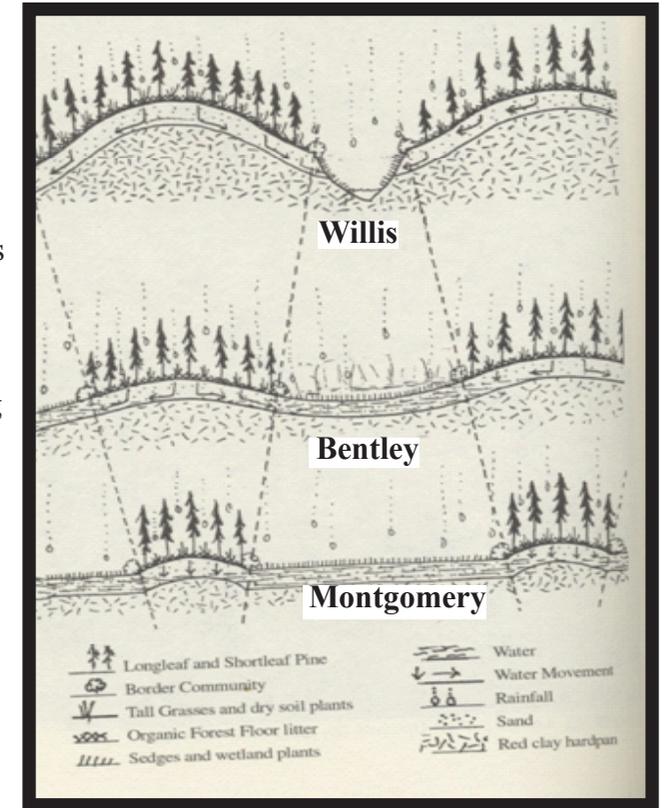
The father of the region's conservation movement was R. E. Jackson who organized the East Texas Big Thicket Association in 1927. His daily travels as a railroad conductor enabled him to see firsthand the changes to the terrain. A leading advocate today is the Big Thicket Association (BTA). The organization incorporated as a non-profit in 1964 and is committed to the preservation of flora and fauna of the Big Thicket area, its history and the conservation of its natural resources.

Chief among the BTA's accomplishments are the establishment of an 84,550 acre Big Thicket National Preserve in 1974 with the addition of 10,766 acres in 1993, the donation by Temple Eastex of the Roy E. Larsen Sandyland Sanctuary to The Nature Conservancy and the establishment of 2 state parks. Currently, the BTA is a coordinating partner in the Thicket of Diversity, All Taxa Biodiversity Inventory. This project ambitiously aspires to inventory all species in the Preserve and other areas across the region and input findings into a national database. The collection of baseline data is of critical importance to resource managers.

The BTA sponsored and served as treasurer for Big Thicket Science Conferences in 1996, 1999, 2003, 2007 and 2011 and co-publishes books with University of North Texas Press in a "Temple Big Thicket Series" facilitated by T.L.L. Temple grant funds. The latest (No. 6) was just released: Lorraine G. Bonney's The Big Thicket Guidebook; Exploring Backroads and History of Southeast Texas. It includes 15 tours across the region.

water barriers is swept by wildfires every few years. Fire suppression causes wetland savannahs to become thickly populated while uplands become dense thickets of yaupon and wax myrtle. Left unchecked invasive species such as the Chinese tallow encroach.

Most significant has been clear-cutting of virgin forests leading to the creation of artificial thickets. This was followed by overgrazing, overburning and the planting of pine farms. Man, rather than ecological succession, has caused the most radical changes in the Big Thicket.



Distribution of Longleaf Pine Wetland and Upland Communities as it relates to Geological Formations - GE Waston

Human Impact

Native Americans were the first human occupants of the Big Thicket followed by itinerant trappers, outlaws, runaway slaves and other persons on the run. Anglo-Saxon settlers entered in the 1830's. They settled on the outskirts of the deep woods but then entered the Thicket itself penetrating along waterways and settling in places with the fewest trees to cut such as hillocks, meadows and savannahs. Wealthier settlers with slaves were able to buy land and clear it. The early pioneers generally had little money and "squatted" without benefit of land titles. This cost dearly when lumber barons arrived a half century later.

Necessary for wilderness life were axes to clear land and build shelters and furniture and guns to hunt for meat, feathers and furs. Many early residents supplemented their small farm incomes by hunting, as there were no prohibitory laws at the time. Wild fowl, fish, venison and bear meat were abundant.

As railroads began to criss-cross the land and two industries- timber and petroleum emerged, the topography of Southeast Texas changed.

Logmen on Village Creek, as far up as the mouth of Beech Creek, are reported to have turned their logs loose.

Galveston Daily News, May 21, 1878

In the early days poor roads posed difficulties for the sale of timber. Thus, logs were floated downstream to Beaumont's market and logs were branded like cattle to designate ownership.

Jefferson County- Improvement is the order of the day and all about us we see signs of prosperity and thrift... The mill owners of Beaumont, Texas desire correspondence with a view of opening an export lumber and shingle trade... Our timber consists of the best quality of yellow pine, etc. Our supply of pine timber is inexhaustible, and we are not troubled with government lands or want of snow storms to supply our mills with logs.

Galveston Daily News, March 6, 1878

On January 10, 1901 the great Lucas Gusher commenced to produce oil three miles south of Beaumont. The boom at Spindletop spurred the search and later discoveries in Sour Lake, Batson, Saratoga and Humble. This began a new era in the oil business, launched financial empires, altered the landscape and ultimately changed the world.

Expansion continued in the timber industry as well. By 1934 the Texas lumber business had 799 manufacturing plants and employed 33.5% of all manufacturing employees of the state.

As our state varies greatly in climate and physiography, practically the whole range of forest trees found in the temperate zone, are found within our border. Of the four general lumber belts, East Texas is greater than all combined... Practically all logging and sawmills are in East Texas- from which is again seen that East Texas comprises all the most valuable forests of the state.

- John Henry Kirby, Historical Encyclopedia of Texas, 1934