

Native Vegetation of Texas

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In an article on native vegetation it would be ideal to emphasize what is actually there, not what might be or might have been. This makes it difficult because of the rapid changes that have taken place in our vegetation and the lack of timely and full-coverage studies. This is an article, then, less than ideal, that covers the broad picture of Texas vegetation with brief descriptions of characteristics communities and species and some of the changes which have occurred.

Physical Environment

Unless you are driving through it, it's hard to appreciate the vast length and breadth of Texas. From East to West it's 820 miles, from North to South it's 868 miles, and all the way around it's 4,137 miles. Within the boundary there are 267,339 square miles. Elevation varies from sea level along the 624 miles of coastline of the Gulf of Mexico to 8,751 feet above sea level on Guadalupe Peak in west Texas. There are 90 peaks over one mile high.

Annual precipitation varies from less than 10 inches in El Paso on the west to almost 60 inches in the southeast corner on the Louisiana border. It comes mostly as rain, with peaks in May and September, except for the far west where it often comes in summer thunderstorms. Temperatures vary from an average of 56° F in the upper panhandle to 74° C in the south. A better measure might be the number of frost-free days, ranging from averages of 180 to 320 per year from north to south.

A complex geologic history of uplifts, volcanic activity, invasion by seas, and the erosive energy of wind and water has resulted in a wide array of land forms, therefore developing a wide array of soils and vegetation. Seven of the ten orders now used in classifying soils occur in Texas, including Alfisols, Aridisols, Entisols, Inceptisols, Mollisols, Ultisols, and Vertisols.

Land Resource Areas

The natural regions of Texas, based on climate, soil, topography and vegetation, are usually grouped into 10 to 15 major regions. Most descriptions relate back to the revised checklist and ecological summary of Texas plants in 1969 by F.W. Gould.

Human impact has modified Texas vegetation in three basic ways; first—cutting timber and preparing land for cultivation; second—repressing wildfire, and third—grazing of livestock. This may not have shifted any regional boundaries, but human impact has transformed vegetation by inadvertently promoting the decrease or increase of woody plants. Roughly the eastern half of the state is forested with some management for commercial timber production, yet

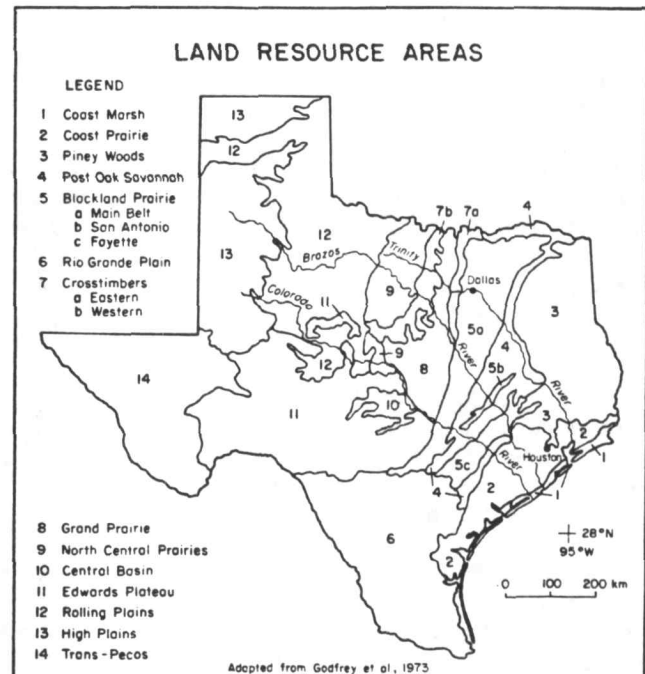


Fig. 1. Land Resource Areas of Texas showing numbered areas as modified by Smeins and Diamond in 1986.

much land has been cleared for cultivation and improved pastures for cattle. The western half of the state is grassland, with some of the area plowed for crop production. The rest of the area is largely covered by various densities of woody plants, with honey mesquite, a major problem species.

Piney Woods

This eastern-most region (area 3 in Figure 1) is characterized by extensive pine and mixed pine hardwood forests on gently rolling or hilly land with numerous small swamp,



Fig. 2. Piney Woods, (Land Resource Area 3 in Figure 1) showing commercial pine stand with understory of eastern little bluestem and young growth of sweetgum.

marsh, and bog areas. Rainfall averages 35 to 60 inches, uniformly distributed through the year. Pine forests are considered successional to hardwoods such as white oak, southern red oak, black hickory, and sweetgum. Longleaf pine, a classic example of a fire related species, once dominated the southeastern forests of this region. Major commercial timber species are loblolly pine, shortleaf pine, and longleaf pine.

Understory shrub species include flowering dogwood, American beautyberry, and yaupon. Grasses include eastern little bluestem, Virginia and Canada wild rye, blackseed needlegrass, and the ever-present representatives of *Dichanthelium*, once grouped in the genus *Panicum*. Bermuda grass, Dallis grass, carpet grass, and some other introduced grasses are now prevalent.

Coast Prairies and Marshes

This region is subdivided into Coast Prairie (area 2) on the slightly higher ground, less than 150 feet in elevation, and Coast Marsh (area 1), narrow belts of low wet marsh immediately adjacent to the coast. Average annual rainfall varies from 50 inches in the northeast part of the area to 20 inches in the southwest. Drainage is slow with numerous sluggish rivers, creeks, and sloughs. Historical vegetation of the prairie, once dominated by tall grass species, including little bluestem, big bluestem, yellow Indian grass, and switchgrass, has largely been replaced by cultivated land crops or dominated by woody plants such as honey mesquite, oaks, prickly pear, and several acacias.

Marshlands among shoreline sites and borders of brackish water are dominated by the cordgrasses, saltgrass, shoregrass and others. Most marshes are grazed by cattle in large land holdings.

Post Oak Savanna

Extending north westward from the coast and piney woods regions are strips of deciduous forest (area 4) dominated by oaks alternating with strips of prairie and oak savanna. Oak trees of short stature, often post oak and blackjack and



Post Oak Savanna, Lavaca County near southern extent of this type woodland, (Land Resource Area 4 in Figure 1) showing tendency of woody plants to fill in grassy openings. USDA-SCS photo by John McConnell in 1956.

hickory species are in association with tall grasses, such as little bluestem, yellow Indian grass, eastern gamagrass and switchgrass. Claypan soils are predominant. Topography is gently rolling to hilly with elevations ranging from 300 to 800 feet above sea level. Rainfall averages from 35 to 45 inches

with most precipitation occurring in May and June. Woody plant densities have greatly increased in the past 100 years.

Blackland and Grand Prairie

With gently rolling to nearly level topography and dark calcareous clay soils that developed under prairie vegetation, it's no wonder why most of this region has been brought under cultivation. Only small acreages of land remain in hay meadows or rangeland with tall grass vegetation. Dominant species include little bluestem, big bluestem, yellow Indian grass, switch grass, side-oats grama, hairy grama, tall dropseed, and silver bluestem. With heavy grazing, Texas wintergrass, buffalo grass, Texas grama, and many annual species become abundant.

Woody plants are abundant, especially along the streams, where pecan, cedar elm, bois d'arc, and oaks are common. Honey mesquite is common on many sites, and post oak and blackjack oak have increased on the sandier soils of upland sites.

The Blackland Prairie (area 5), in detail, may be divided into four bands of grassland separated by various mixtures of oak woodland. The San Antonio and Fayette Prairies extend southward with the main arm of the Blackland Prairie extending northward to the Red River Valley along the Oklahoma border. The Grand Prairie (area 8) is an arm that extends northward between narrow oak woodlands known as the East and West Crosstimbers.

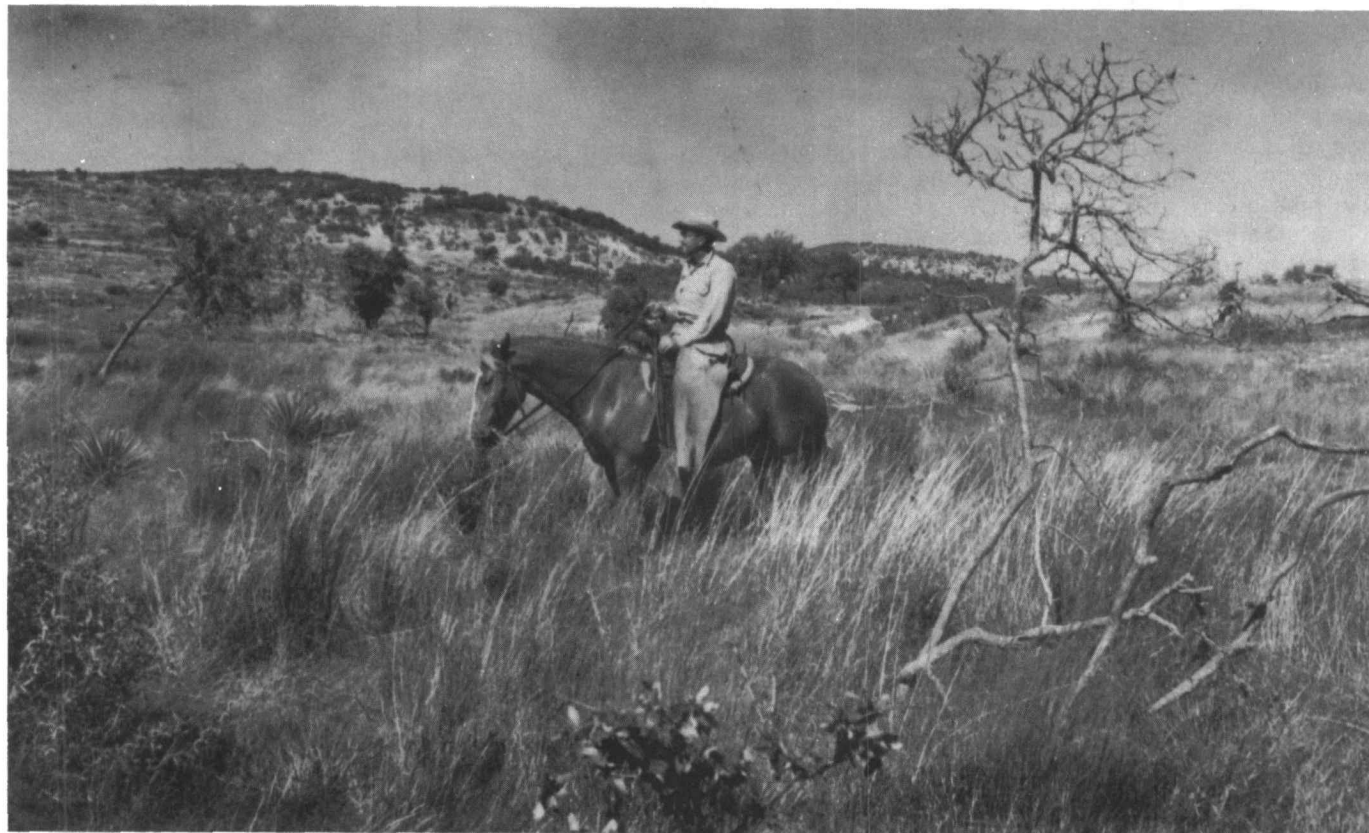
Crosstimbers

This region (area 7) comprises an area of closely associated prairie and oak woodland sites. The topography is rolling to hilly and deeply dissected with rapid surface drainage. The East and West Crosstimbers are dominated by drought resistant elements of the widespread oak-hickory forest of the east. They are connected northward along the Red River Valley with extensions of the post oak savanna and woodlands previously described. Sharp changes in vegetation occur as one moves westward from Blackland Prairie through East Crosstimbers, Grand Prairie, West Crosstimbers, into Rolling Plains, mainly a result of sharp changes in soil parent material. For example, the Grand Prairie has dark calcareous clays derived from limestone, whereas the East and West Crosstimbers have acidic or slightly acidic soils derived from sandstone.

Average annual rainfall is 25 to 40 inches with April, May, and June the high rainfall months. Honey mesquite is well distributed. Despite the wide variation in soils and dominant vegetation, the understory vegetation is rather uniform with many of the open grassland species most abundant including little bluestem, big bluestem, yellow Indian grass, switch grass, Canada wild rye, and side-oats grama. Heavy grazing has resulted in extensive changes in density of woody plants and composition of the understory.

Rio Grande Plains

Also known as the South Texas Plains, South Texas Brush County or Tamaulipan Brushlands, this region (area 6) is characterized by an extensive change from grassland-savanna to dense brushlands. Topography is level to rolling, with elevation ranging from sea level to 1,000 feet. Annual precipitation is 16 to 35 inches with May or June and September the highest rainfall months.



Edwards Plateau, Kimble County near central portion of this area, (Land Resource Area 11 in Figure 1) with David Schmidt on rangeland cabled for control of brush 5 years previously. USDA-SCS photo by Sam Coleman in 1955.

Woody species have steadily increased in abundance, including honey mesquite, which may be the first woody plant to initiate colonization of open grassland. Others include granjeno, lotebush, white brush, brasil, prickly pear, huisache, catclaw, black brush, and other small trees and shrubs in varying degrees of abundance and composition sometimes forming impenetrable thickets.

Large areas are in cultivation but most of the region is rangeland. Characteristic grasses of the sandy loam soils are seacost bluestem, big cenchrus, bristlegrasses, paspalums, finger grasses, and lovegrasses. The introduced buffel grass has become abundant in pastures, roadsides, and waste places. Grasses on clay loam soils include longspike silver bluestem, California cottontop, buffalo grass, common curly mesquite, bristlegrasses, and grama.

Edwards Plateau and Central Basin

Included in this "Hill Country" area is the Llano Uplift or Central Basin (area 10). It is a granitic uplift which has produced distinctive Alfisols on weathered granites, gneisses, and schists, compared with the Mollisols on the limestone of the Edwards Plateau (area 11). The semiarid Stockton Plateau is an extension of the area west of the Pecos River. On the east and south, the Balcones Escarpment forms a distinct boundary to the Edwards Plateau, but on the west the plateau blends into other regions. To the north it juts out as fingers or mesas into the Rolling Plains. Rainfall varies from 15 to 33 inches west to east, and extended droughts of several years are not uncommon. May and September are high rainfall months except in the west where summer months usually receive the most rainfall.

The Edwards Plateau and Central Basin are predominantly rangeland with sheep, goats, and cattle, with white tailed deer an abundant and valuable wildlife species. Rough rocky areas and shallow rocky soils typically support a woody



Rio Grande Plain, Dimmit County, on deep sand (Land Resource Area 6 in Figure 1) showing cluster of honey mesquite and other brush in background and native grasses in foreground including seacoast bluestem and tanglehead (*Heteropogon contortus*). USDA-SCS photo by John McConnell in 1956.

plant complex of live oak, Texas oak, shinnery oak, ashe juniper, redberry juniper, and honey mesquite. Honey mesquite often dominates the deeper soil of the flats throughout the plateau and is abundant westward with tobosa grass and sand dropseed. Short and mid-grasses are common although the tall grasses can often be found in sites protected from heavy grazing. Side-oats grama, buffalo grass, common curly mesquite, Texas wintergrass, little bluestem, and silver bluestem are the important grasses on reasonably managed rangeland. Forbs such as Englemann daisy, orange zexmenia, upright prairie coneflower, and many annuals such as Texas bluebonnet and Indian blanket can be seasonally very prominent. Prickly pear, honey, mesquite, juniper, and many other woody plants have become too abundant for comfort on range rangeland of the Edwards Plateau and Central Basin.

Rolling Plains and North Central Prairies

Situated north of the Edwards Plateau, this region (areas 9 and 12) has gently rolling to moderately rough topography with significant amounts of land in cultivation. Rainfall varies from 22 to 30 inches from west to east with May and September the high rainfall months. Rangeland may have remnant tall grasses, but the main ones are the short and mid-grasses similar to the Edwards Plateau. Blue grama, hooded windmill grass, western wheatgrass, tobosa, and threeawns are also common. Honey mesquite is a common woody species on all sites, but shinnery oak and sand sage are abundant on sand. Heavy grazing tends to increase woody plant species, as well as sand burs, hairy tridens, red grama, Texas grama, tumblegrass, gummy lovegrass, and many annual grasses and forbs.

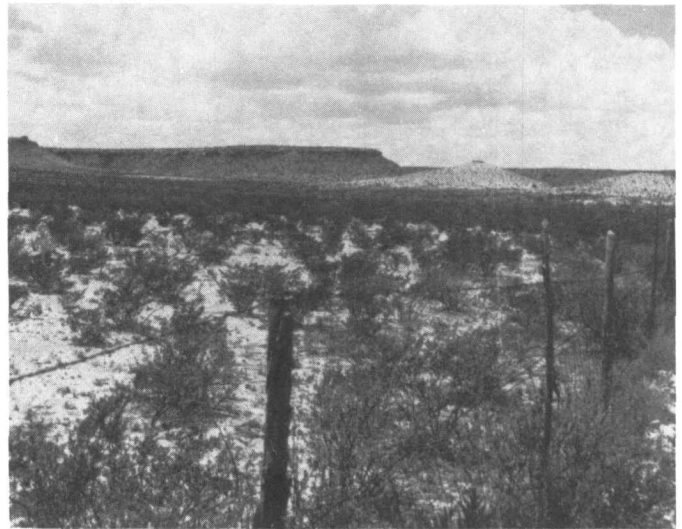
High Plains

Also known as the Staked Plains or Llano Estacado, this region (area 13) is part of the Great Plains which extends into Canada. It is a high flat plateau separated sharply from the Rolling Plains to the east by the Cap Rock Escarpment. It is dissected in the north by the Canadian River. Elevations are 3,000 to 4,500 feet with a gentle slope to the southeast. The surface is spotted with "playa lakes" which sometimes cover more than 40 acres with water several feet deep after heavy rains. Average annual rainfall is 15 to 21 inches with peaks in late spring and early autumn.

The area has been developed by extensive cropland based on deep aquifer irrigation. Much rangeland still persists with short and mid-grasses most abundant. The level, undissected portions are characteristically free of trees and shrubs, but sand sagebrush and honey mesquite are common, especially in the south. The most widespread grasses are buffalo grass, blue grama, side-oats grama, black grama, and little bluestem.

Trans-Pecos

This area (area 14) includes all the very diverse country west of the Pecos River except for the Stockton Plateau, which is usually grouped with Edwards Plateau. Elevations range from 2,500 feet to 8,500 feet. Average rainfall is as low as 8 inches at El Paso and as high as 18 inches in the high mountains where ponderosa pine and Douglas fir are growing. Pinyon pines, junipers and yuccas are common at medium elevations, and desert shrubs including creosote



Trans Pecos, Reeves County (Land Resource Area 14 in Figure 1) showing creosote bush desert at lower elevations. USDA-SCS photo by Bill Ray in 1961.

bush dominate the vegetation of valleys and basins.

The area could be subdivided into mountain ranges, desert grassland, desert shrub, salt basin and sand hill, each with characteristic soils and vegetation. The flora of the Trans-Pecos is rich and varied, with much of it rather localized. Many species, representative of the Southwest and Rocky Mountains, are not found elsewhere in Texas. Soils have developed from outwash materials from the mountains and are highly varied. Soils are usually basic with some areas showing high accumulations of alkali, salt, gypsum, etc.



Trans Pecos, Reeves County (Land Resource Area 14 in Figure 1) showing mountain grassland with scattered oaks and junipers at medium elevation. USDA-SCS photo by R.D. Pederson in 1966.

Cultivation is confined to the irrigated valleys with most of the land in native rangeland. National Parks are associated with the Guadalupe Mountains in the north and the Chisos Mountains in the Big Bend of the Rio Grande River.

References

The basic reference for this article was "Texas Plants—a checklist and ecological summary," by F.W. Gould, 1975 revision of MP-585, published by Texas Agricultural Experiment Station. Additional species are provided by the Introduction in the "Manual of the Vascular Plants of Texas," by D.S. Correll and M.C. Johnston, published in 1970 by Texas Research Foundation, Renner, Texas.

References on vegetation of Texas are summarized in "Natural Vegetation of Texas and Adjacent Areas—1675-1975 A Bibliography" by F.E. Smeins and R.B. Shaw published as MP-1399 in 1978 by the Texas Agricultural Experiment Station.

Soils and related information is available in "General Soil Map of Texas 1973" compiled by G.L. Godfrey, G.S. McKee and Harvey Oakes, published by the Texas Agricultural Experiment Station in

cooperation with the Soil Conservation Service.

Summaries of land resource areas of Texas are included in "Land Resource Regions and Major Land Resource Areas of the United States," Agriculture Handbook 296 revised December 1981, by the United States Department of Agriculture, Soil Conservation Service.

Grasses are well covered in "The Grasses of Texas" by F.W. Gould published in 1975 by Texas A&M University Press, College Station.

The Land Resource Areas in Figure 1 are modified from Godfrey's 1973 publication by Fred Smeins and David Diamond, pp. 381-394 in "Wilderness and Natural Areas in Eastern United States: A Management Challenge," edited by David L. Kulhavy and Richard N. Conner in 1986 and published by the Center for Applied Studies, School of Forestry, Steven F. Austin State University, Nacogdoches.

Wild Game in Texas

Jack M. Payne, Robert D. Brown, and Fred S. Guthery

Wildlife is a major natural resource in Texas. Its value is measured in economic, recreational, cultural, and social currencies. Wildlife is a commodity that successfully competes with other land uses. It is complementary to primary uses of the land and it is paying its way (Teer 1984).

A discussion of Texas wildlife would not be complete without some mention of fee and lease hunting. The commercial hunting system or leasing of land for hunting privileges began in Texas during the 1920's and has become the most developed commercial system of game harvest in North America. The roots of commercialization of hunting in Texas can be found in the lack of public lands to which the public has free access (97% of the land in Texas is privately owned); the trespass laws (which are strongly enforced), and the large amount of game on extensive rangelands in the state (Burger and Teer 1981). Estimates of wildlife value in Texas range from \$100 to \$300 million. Most of the income from wildlife enterprises is generated in the Edwards Plateau region of Central Texas, known as the "Hill Country", and in the Rio Grande Plains of South Texas, which is known as the "Brush Country" (Pope et al. 1983). Henson et al. (1977) reported that hunting leases in some areas of Texas brought up to \$10/acre; however, most leases were returning \$1 to \$3/acre. Today, in the South Texas brush country, it is not uncommon for some ranchers to receive from \$7 to \$9 an acre for a quail lease and \$2,000 to \$3,500 for a trophy white-tail deer. The average lease returns \$4 to \$5/acre.

Various hunting lease systems are used with much variation being found from ranch to ranch, primarily because each operator has developed a system that works for his particular situation. Four general types of leasing arrangements are commonly found: annual lease, day hunt lease,

packaged hunt, and a secondary lease to an outfitter or middleman. (Steinbach et al. 1986).

The income potential of wildlife in Texas provides a great incentive for producing wildlife on private lands. At one time the rancher managed domestic livestock to the detriment of game populations. Landowners sought to clear the ranges of all woody cover and destroy key habitat areas such as roost trees for turkeys (Burger and Teer 1981). Today, however, it is not unusual for wildlife to be the major income-producing enterprise on the ranch. The justification for selling hunting

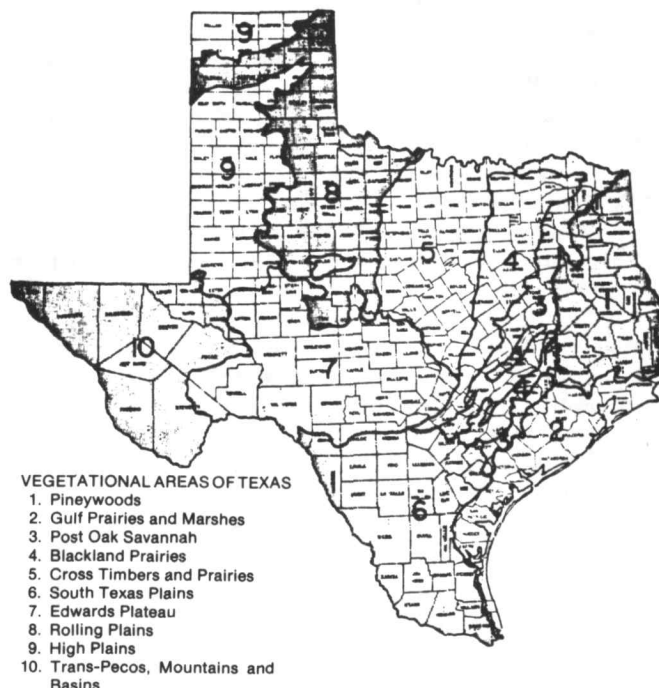


Fig. 1. Ecological regions of Texas.

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