

# Echoes of the Chisholm Trail

## Texas: A Biological Crossroads

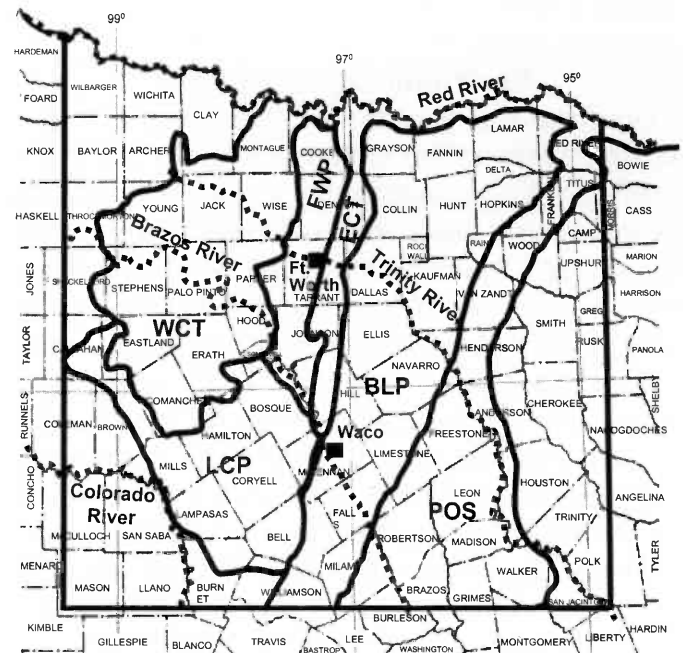
By Fred E. Smeins

**T**exas is a major biological crossroads of North America. It is the meeting ground and melting pot of the diverse flora and fauna of the eastern deciduous forest, the tall, mixed, short and desert grasslands, the southwestern deserts and the southern Tamaulipan shrublands, as well as having some of its own unique components (Gould 1975; Hatch et al. 1990; Schuster and Hatch 1990; Diggs et al. 1999).

This great diversity is the result not only of a biologically fortuitous geographic location but also of the great array of geologic, edaphic, topographic, and climatic environments. Overall climatic conditions vary from warm temperate in the north to subtropical in the south. Mean annual precipitation varies from nearly 60 inches in portions of the eastern Pineywoods region to less than 8 inches in the Chihuahuan Desert of West Texas, while annual temperature varies from 54°F in the northwest to 74°F in deep South Texas. The annual frost-free period is 180 days in the Amarillo area to over 330 days in the Rio Grande Valley. All these parameters experience considerable intra- and interannual variation. Precipitation is particularly variable, and any portion of the state can experience seasonal, annual, and multiyear droughts or above-normal precipitation. Notable statewide long-term droughts occurred from 1950 to 1956 and more recently from about 1995 to 2003. Four physiographic provinces converge in Texas: the Great Plains, the Central Lowlands, the Basin and Range, and the Coastal Plain. This environmental setting produces 11 major natural regions, several with fairly distinct subdivisions. Each region/sub-region is defined on the basis of its unique geologic, physiographic, edaphic, climatic, and biotic features.

### Chisholm Trail Rangelands

The north-central to northeast portion of Texas immediately south of the Red River consists of alternating, north/south trending belts of rolling prairies, savannas, woodlands, and forests. In the region around Fort Worth/Dallas, the main zones beginning on the east are the Post Oak Savanna/Woodland, the Blackland Prairie, the Eastern (Lower) Cross Timbers, and the Western (Upper) Cross Timbers (Fig. 1). While these zones are in places fairly distinct, the woodlands and prairies often intergrade with one another and often form a patchwork mosaic. This pattern captures the meaning of the French derived term "prairie," which implies a rolling grassland with woody plants



**Figure 1.** Natural regions of north-central Texas (WCT = Western Cross Timbers, FWP = Fort Worth Prairie, LCP = Lampasas Cut Plain, ECT = Eastern Cross Timbers, BLP = Blackland Prairie, POS = Post Oak Savanna)



*Mosaic of Grand Prairie grassland on shallow limestone soils and Cross Timbers woodland on sandy soils.*



*An excellent condition, frequently burned plant community (Historic Climax Plant Community) on a Sandy Loam Ecological Site in the Western Cross Timbers, dominated by little bluestem with scattered post oak trees.*

ever present or within visual range (Weniger 1984). To add to the ecological variety of the region, these zones are crossed generally from northwest to southeast by several major rivers and their tributaries, including the Red (northern boundary), Trinity, Brazos, and Colorado. These rivers in many places have broad floodplains that historically were variously forested or open savanna.

## Cross Timbers and Prairies

### Environment and History

Our focus here is on the area that occurs in north-central Texas in the vicinity of Fort Worth; that would include primarily the Grand Prairie (Fort Worth Prairie and Lampasas Cut Plain) and the Eastern and Western Cross Timbers, often referred to collectively as the Cross Timbers and Prairies (Fig. 1; Photograph 1). While each of these areas is internally homogeneous, each contains a great deal of climatic, topographic, geologic, and edaphic variation and the associated variations in plant and animal communities. Also, there is no complete agreement as to the geographic limits of these areas among various observers, which attests to the sinuous nature of the boundaries with other regions and the interdigitation of these regions with one another. For example, the extent of the Grand Prairie region is debated. Sometimes the Lampasas Cut Plain is considered a subregion of the Edwards Plateau (Fig.

1), while in others it is included as part of the Grand Prairie (eg, Major Land Resource Area 85).

The Cross Timbers and Prairies are historically noteworthy since they were routinely referred to by early travelers as they traversed the southern grassland/forest transition region on their way to the West and Southwest. The Cross Timbers formed the last major eastern forest type of vegetation before entering the vast grassland to the west and as a result drew attention both as a last glimpse of familiar eastern environments and sometimes as a source of trepidation due to, in places, their apparent impassibility. When the first Europeans described the region between 1840 and 1860, they noted places where travel was little influenced by the woody vegetation, while elsewhere it nearly prevented passage. Marcy (1866) observed,

At six different points that I have passed through it (Cross Timbers), I have found it characterized by the same peculiarities; the trees, consisting principally of post-oak and blackjack, standing at such intervals that wagons can without difficulty pass between them in any direction. The soil is thin, sandy and poorly watered.

On the contrary, Gregg (1844) suggests,

Most of the timber appears to be kept small by the continual inroads of the "burning prairies"; for, being almost killed almost annually, it is

constantly replaced by scions of undergrowth; so it becomes more and more dense every reproduction. In some places, however, the oaks are of considerable size, and able to withstand the conflagrations. The underwood is so matted in many places with grapevines, green-briars, etc., as to form almost impenetrable "roughs" which serve as hiding-places for wild beasts.

Washington Irving (1886) agrees: "I shall not easily forget the mortal toil and vexations of the flesh and spirit, that we underwent occasionally, in our wanderings through the Cross Timbers. It was like struggling through forests of cast iron."

While there are obvious differences between then and now, the Cross Timbers vegetation then exhibited both versions described previously, that is, relatively open tree savannas and woodlands with thickened understories; both versions exist today.

What of the Grand Prairie as viewed by earlier travelers? Kendall described the prairie as "a prairie region utterly destitute of timber" and "as far as the eye could reach ... nothing could be seen but a succession of smooth, gently undulating prairies." However, Smythe (1852) spoke of open prairie but also described "prairie, with an occasional strip of woodland," "beautiful groves of Live Oak ... crowning every hill" and "densely tangled cedar ravines."

Thus, while generally described as open grassland compared to the Cross Timbers, the Grand Prairie contained woody elements, and, of course, the river bottoms of both regions were typically forested or, at least in most places, had a major woody component (Kendall 1845).

Frequent fires and an abundance of bison along with whitetail deer, antelope, elk, and by the 1800s feral Spanish mustangs and cattle that grazed and browsed in the Cross Timber and Prairies were the major influences on vegetation structure and composition in presettlement times (Gregg 1844; Kendall 1845).

The region began to be settled from 1850 to 1860, and initially ranching was the primary activity followed later by cropland agriculture on favorable soils. During early settlement times and for some 20 years following the Civil War, the region witnessed the short-lived but famous trailing of thousands of

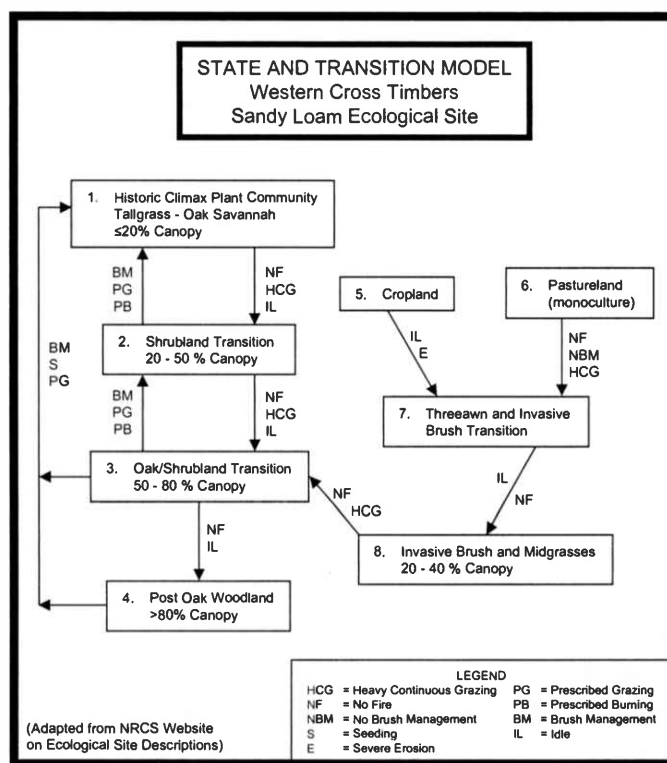


Figure 2. State and Transition Model for a Sandy Loam Ecological Site in the Western Cross Timbers region (from NRCS Website, Plants Database, Ecological Site Descriptions).

Table 1. Relative importance (% composition) of selected species or species groups in relict and current communities of upland sites of the Grand (Fort Worth) Prairie (adapted from Dyksterhuis 1946)

Species	Relict	Current (1940s)
Little bluestem	64.6	4.7
Perennial forbs	8.2	4.9
Sideoats grama	8.1	7.6
Indiangrass	5.1	0.4
Hairy grama	2.5	2.7
Annual forbs	2.3	7.3
Big bluestem	2.2	1.5
Tall dropseed	2.1	3.4
Threawns	1.8	6.0
Texas wintergrass	0.7	20.3
Sedges	0.7	1.0
Woody species	0.7	1.0
Annual grasses	0.7	11.3
Switchgrass	0.2	—

## Plant names

Common	Scientific
Little bluestem	<i>Schizachyrium scoparium</i>
Big bluestem	<i>Andropogon gerardii</i>
Yellow Indiangrass	<i>Sorghastrum nutans</i>
Switchgrass	<i>Panicum virgatum</i>
Sideoats grama	<i>Bouteloua curtipendula</i>
Texas wintergrass	<i>Stipa leucotricha</i>
Tall dropseed	<i>Sporobolus asper</i>
Silver bluestem	<i>Bothriochloa laguroides</i>
Hairy grama	<i>Bouteloua hirsuta</i>
Live oak	<i>Quercus virginiana</i>
Hackberry	<i>Celtis laevigata</i>
Mesquite	<i>Prosopis glandulosa</i> var. <i>glandulosa</i>
Shinoak	<i>Quercus sinuata</i> var. <i>sinuata</i>
Post oak	<i>Q. stellata</i>
Spanish oak	<i>Q. buckleyi</i>
Juniper	<i>Juniperus spp.</i>
King Ranch bluestem	<i>Bothriochloa ischaemum</i> var. <i>songarica</i>
Bermudagrass	<i>Cynodon dactylon</i>
Eastern red cedar	<i>J. virginiana</i>
Ashe juniper	<i>J. ashei</i>

Texas cattle to northern markets along the Chisholm and Shawnee cattle trails (Sheffield 2001).

What fundamentally distinguishes the Grand Prairie from the Cross Timbers in ecological terms? Geologic history and resultant landforms and soils have set the stage. This portion of Texas, as well as much of the state, has been variously under epicontinental seas that have produced a great variety of sandstone, limestone, and associated sedimentary substrates. The sandy substrates generally occur where the sea margin or coastline persisted for long periods and limestone developed in what were bays, lagoons, and other shallow-water environments (Hill 1887; Hill 1901). The Grand Prairie occurs today on those limy substrates and the Mollisols derived from them, while the Cross Timbers occur on sandy substrates over Alfisols (Godfrey et al. 1973). While this establishes the big picture, there are many local variants that add variety, not the least of which are the Pleistocene and Holocene alluvial deposits that form the floodplains of the river systems.

Thus, the result is a mosaic of prairies and woodlands/savannas, depending on the mix of geology and soils in an area.

## Vegetation/Land Use

The Grand Prairie is generally considered to be the southern extension of the True, Tallgrass, or Bluestem Prairie. The prairie occurs on limestone-derived Mollisols that are generally rather shallow, often rocky, and highly erosive. Late-successional communities are characterized by little bluestem, big bluestem, yellow Indiangrass, and switchgrass. Midgrasses including sideoats grama, Texas wintergrass, tall dropseed, silver bluestem, and hairy grama may be important on shallow soils or may increase as grazing intensity increases (Tables 1 and 2). These grasslands have a high diversity of perennial and annual

forbs and overall have high species richness. Woody species are usually in low abundance, particularly where fire is a frequent influence; however, live oak, hackberry, and mesquite are commonly found locally across the grassland. The grassland vegetation of both the Fort Worth and Lampasas Cut Plain (Fig. 1) is similar; however, the Lampasas Cut Plain, which is a highly dissected butte and mesa region with extensive lowlands, has greater landform and soils diversity, particularly more rocky soils and rocky escarpments, which tends to support more woody species, including live oak, shinoak, post oak, Spanish oak, and juniper. Of course, local variation in soil and topography results in compositional shifts and variation in productivity (Table 2).

Dyksterhuis (1946) provided a detailed assessment of the vegetation of the Fort Worth Prairie and concluded that by the 1940s, after nearly 100 years of overgrazing, the majority of the prairie was in a condition of greatly diminished abundance of the late-successional species and an increase in the

**Table 2. Percent composition based on weight of selected species or species groups for late-successional communities across a toposequence of four ecological sites in the Grand Prairie (Fort Worth) Region of Texas (adapted from Coburn et al. 1978)**

	Ecological Site			
	Shallow	Steep adobe	Clay loam	Loamy bottomland
Hairy grama	5	—	—	—
Hairy dropseed	5	—	—	—
Texas wintergrass	5	5	5	5
Silver bluestem	5	5	5	—
Sideoats grama	10	10	10	—
Tall grama	—	10	—	—
Slim tridens	—	5	—	—
Little bluestem	30	30	20	10
Yellow indiagrass	15	10	15	5
Big bluestem	10	—	10	10
Canada wildrye	—	—	5	5
Switchgrass	—	—	—	5
Tall dropseed	—	5	5	—
Vine-mesquite	—	—	—	10
Eastern gamagrass	—	—	—	5
Plains lovegrass	—	—	—	5
Cane bluestem	—	—	—	5
Southwestern bristlegrass	—	—	—	5
Other perennial grasses	—	—	5	10
Perennial forbs	5	5	15	5
Trees	5	15	5	15
Range in production (pounds/acre)	1,800/3,000	1,500/3,000	3,000/6,000	3,000/6,000

mid- and short-grasses as well as annual forbs (Table 1). This condition still persists over most of the prairie today, although some properties have experienced markedly improved condition through enlightened grazing and other management inputs. Much of the Grand Prairie remains in rangeland because of the relatively shallow soils, and even though the area has high mean annual precipitation, it is subject to periodic seasonal to multiyear droughts that make cropland agriculture risky and livestock production the preferred, more adaptable use of the land. Areas of cropland and tame pasture do occur.

The Cross Timbers are the southwestern extension of the oak–hickory forests of eastern North America. They have similar herbaceous vegetation to the Grand Prairie; little bluestem is the ubiquitous dominant across both regions and most ecological sites (Table 3). The Cross Timbers have more of a tree/shrub component because of the deeper loamy and sandy Alfisols that favor woody species

(Dyksterhuis 1948). Post oak and blackjack are the major tree species with the former being most abundant. The abundance of trees and shrubs is determined largely by local soil type, burning history, and grazing history (Dyksterhuis 1948).

Much of the Cross Timbers remains in rangeland; however, soil conditions are generally more favorable for tame pasture and crop production than the Grand Prairies. The soils are highly erodible, however, and much former cropland exists in a “go-back” state. Across the Cross Timbers and Prairies, herbivory, fire, past cultivation, and erosion create a dynamic model of vegetation dynamics as illustrated by the State and Transition Model of a Sandy Loam Ecological Site in the Western Cross Timbers (Fig. 2; Photograph 2). Grazing management and woody plant management are major land treatment inputs.

Invasive species are an issue in many areas. The exotic King Ranch bluestem and common bermudagrass are aggressive invaders of disturbed

**Table 3. Percent composition based on weight of selected species or species groups for late-successional communities across a toposequence of four ecological sites in the Western Cross Timbers Region of Texas (adapted from Coburn et al. 1978)**

	Ecological site			
	Tight sandy loam	Loamy sand	Sandy	Loamy bottomland
Sideoats grama	25	—	—	—
Vine-mesquite	10	—	—	—
Pinhole bluestem	10	—	—	—
Arizona cottontop	5	—	—	—
Texas wintergrass	5	—	—	—
Little bluestem	15	25	25	10
Yellow indiangrass	—	10	10	15
Big bluestem	—	10	10	25
Tall dropseed	—	5	5	5
Silver bluestem	—	5	5	—
Scribner panicum	—	5	5	—
Sand lovegrass	—	5	5	—
Purpletop tridens	—	5	5	—
Switchgrass	—	—	—	15
Eastern gamagrass	—	—	—	5
Beaked panicum	—	—	—	5
Sedges	—	—	—	5
Other perennial graminoids	10	10	5	—
Perennial forbs	5	5	5	10
Post oak	—	10	8	—
Blackjack oak	—	—	7	—
Other trees	10	5	5	5
Range in production (pounds/acre)	1,500/3,500	3,000/5,000	2,000/4,500	3,000/7,000

sites, particularly oldfields. Woody species are a continuing and increasing issue. Mesquite as well as eastern red cedar and Ashe juniper are increasing their geographic ranges and their abundances. Many other native and increasing numbers of exotic woody plants, forbs, and grasses create new plant communities because of new disturbances and alteration of the fire and grazing regime of the area.

Lease hunting, recreation uses of various kinds, and ecotourism are increasingly important land uses and sources of income. In many instances, this had led to new and different management strategies on these lands compared to traditional ranching. Traditional ranching is still a major feature of this region with both cow-calf and stocker operations with some sheep and goat production in southern parts. Livestock enterprises are often integrated with the previously mentioned land uses to generate a viable economic unit.

Perhaps the greatest change in the Cross Timbers and Prairies is the transition from a rural, largely agricultural environment to one with a great deal of urban sprawl and rural home development. Proximity to the Dallas/Fort Worth metroplex, of course, provides the impetus for these changes. This has led to the breakup and fragmentation of many but not all of the original large ranches that historically occupied the landscape. This process, which started over the past several decades, is gaining momentum and is forever changing the character of one of the most ecologically and historically unique and highly productive rangeland regions in North America. Whether these changes produce positive or negative consequences will be decided by posterity. Nonetheless, whatever the trend, professional land managers will continue to be essential players to protect and manage the soil, water, air, plants, and animals of these lands.

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## How Times Do Change

The increase in gasoline prices to over \$2 per gallon during the summer months was an eye-opener for most people. It just brought home how the prices have gone up on many of our normal living expenses. Another example of these price increases was brought out by a conversation recently overheard in the local barbershop.

Barber: "You know that little red minivan that I had?"

Customer: "Yeah, what happened?"

Barber: "Well it was stolen the other day."

Customer: "Did you get it back?"

Barber: "Naw, it wasn't worth much. The biggest loss was I had \$100 worth of groceries in the glove box."

## Joint Meeting with SRM Board of Directors and Advisory Council

The joint meeting of the Advisory Council and Board of Directors was called to order by Chair Sandy Fabritz. The following recommendations for the Board's consideration (Board action in bold):

Recommendation #1: The Advisory Council recommends that the Sections adopt a price of \$5 for section dues for the following categories: Student, Additional Family, and Institutional. **No action was necessary as Sections will address this issue.**

Recommendation #2: The Advisory Council recommends that the Board of Directors adopt the Position Statement on Sustainable Rangeland Management. **Action: The board accepted the Public Affairs Committee's recommendation to not adopt the Position Statement as written.**

Recommendation #3: The Advisory Council recommends that the Board of Directors direct staff to investigate the ability to provide electronic transfer of funds or electronic withdrawal as a method of

joining or renewing membership in SRM. **No action was necessary, as the headquarters staff are working on this project.**

Recommendation #4: Recommend the board accept the Resolution on Animal Health and take appropriate action on these issues as they arise. **Action: The board accepted the Public Affairs Committee's recommendation to not adopt the Position Statement as written.**

Recommendation #5: The Advisory Council recommends that the Board of Directors approve the revised Standards of Conduct for Public Service. **Action: This recommendation was referred back to the CPRM and CRMC Committees for further review.**

The Advisory Council requested that the board reconsider a name change for "Member Resource News." **Action: The decision was made to retain the name "Member Resource News" as the title of SRM's electronic newsletter.**

## Showing the Way

- ◆CRP Grasses
- ◆Sharpshooter  
Buffalograss
- ◆Native and  
Introduced  
Grasses
- ◆Custom Seed  
Mixes
- ◆Turf Grasses
- ◆Reclamation  
Grasses



- ◆Wildlife Mixes
- ◆Field Seeds
- ◆Certified Wheat
- ◆Hybrid Forage  
Sorghum
- ◆Sorghum  
Sudangrass  
Hybrids
- ◆Mult-Leaf  
Alfalfa
- ◆Wildflowers



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