

Ecological site R083BY011TX

Claypan Prairie

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 083B–Western Rio Grande Plain

Major Land Resource Area (MLRA) 83B It makes up about 9,285 square miles (24,060 square kilometers). The border towns of Del Rio, Eagle Pass, Laredo, and Zapata are in this MLRA. Interstate 35 crosses the area just north of Laredo. The Amistad National Recreation Area is just outside this MLRA, northwest of Del Rio, and the Falcon State Recreation Area is southeast of Laredo. Laughlin Air Force Base is just east of Del Rio. This area is comprised of inland, dissected coastal plains.

Classification relationships

Hierarchical Classification Relationships USDA-Natural Resources Conservation Service, 2006. -Major Land Resource Area (MLRA) 83B

Ecological site concept

The Claypan Prairie is a grassland site that occurs on nearly level, lower lying areas. Drainage in this site varies. The soils are characterized by a thin layer of fine sandy loam topsoil underlain by deep clay and clay loam subsoils.

Associated sites

R083BY015TX	Saline Clay
R083BY019TX	Gray Sandy Loam
R083BY025TX	Clay Loam
R083BY023TX	Sandy Loam

Similar sites

R083AY011TX	Claypan Prairie
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Table 1. Dominant plant species

Tree	(1) <i>Prosopis glandulosa</i>
Shrub	(1) <i>Acacia schaffneri</i> (2) <i>Ziziphus obtusifolia</i>
Herbaceous	(1) <i>Trichloris pluriflora</i> (2) <i>Setaria macrostachya</i>

Physiographic features

This site occurs in the nearly level to gently sloping interfluves of the Texas Western Rio Grande Plain. This site is well drained. Elevation ranges from 200 to 600 feet. This area is comprised of inland, dissected coastal plains.

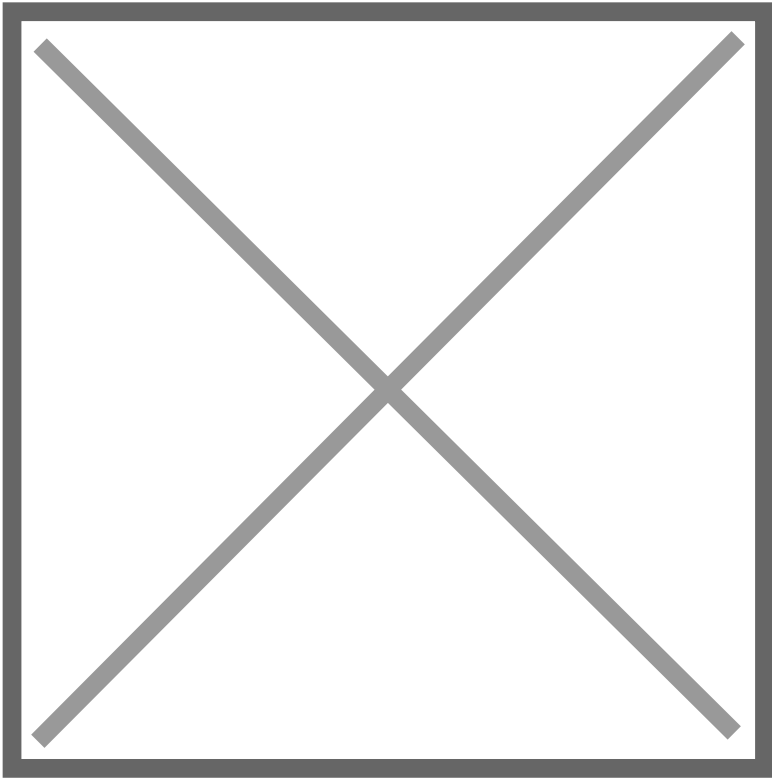


Figure 1.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Interfluve
Runoff class	Low to medium
Flooding frequency	None to rare
Ponding frequency	None
Elevation	60 – 180 m

Slope	0 %
Aspect	Aspect is not a significant factor

Climatic features

MLRA 83B mainly has a subtropical steppe climate along the Rio Grande River and subtropical subhumid climates in La Salle and McMullen counties. Winters are dry and mild and the summers are hot. Tropical maritime air masses predominate throughout spring, summer and fall. Modified polar air masses exert considerable influence during winter, creating a continental climate characterized by large variations in temperature. Peak rainfall occurs late in spring and a secondary peak occurs early in fall. Most heavy thunderstorm activities occur during the summer months. July is hot and dry with little weather variations. Rainfall increases again in late August and September as tropical disturbances increase and become more frequent as the storms dissipate. Tropical air masses from the Gulf of Mexico dominate during the spring, summer and fall. Prevailing winds are southerly to southeasterly throughout the year except in December when winds are predominately northerly.

Table 3 Representative climatic features

Frost-free period (characteristic range)	230-320 days
Freeze-free period (characteristic range)	310-370 days
Precipitation total (characteristic range)	510 mm
Frost-free period (actual range)	210-370 days
Freeze-free period (actual range)	260-370 days
Precipitation total (actual range)	480-530 mm
Frost-free period (average)	270 days
Freeze-free period (average)	340 days
Precipitation total (average)	510 mm

- (1) EAGLE PASS 3N [USC00412679], Eagle Pass, TX
- (2) FALCON DAM [USC00413060], Roma, TX
- (3) LAREDO 2 [USC00415060], Laredo, TX
- (4) ZAPATA 1 S [USC00419976], Zapata, TX
- (5) DEL RIO INTL AP [USW00022010], Del Rio, TX
- (6) CATARINA [USC00411528], Asherton, TX
- (7) CRYSTAL CITY [USC00412160], Crystal City, TX
- (8) DEL RIO 2 NW [USC00412361], Del Rio, TX

Influencing water features

Sites are located on drainageways and may rarely flood. Length of flooding depends on size of event and current saturation of soil.

Wetland description

N/A

Soil features

The soils are very deep, moderately well drained, very slowly permeable, and formed in clayey residuum from shale. Laparita is the only soil series correlated to the Claypan Prairie.

Table 4. Representative soil features

Parent material	(1) Residuum – shale
Surface texture	(1) Clay loam (2) Loam (3) Sandy clay loam
Family particle size	(1) Fine
Drainage class	Well drained
Permeability class	Very slow to slow
Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	10.16 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	0 – 20 mmhos/cm

Sodium adsorption ratio (0-101.6cm)	0 – 20
Soil reaction (1:1 water) (0-101.6cm)	6.1 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The accounts of early explorers and settlers suggest that the Rio Grande Plains was likely a vast mosaic of open grassland, savannah, and shrubland. While moving in 1691 out of Maverick County and into Zavala County, Don Domingo de Teran found after crossing the Nueces River “the country was level and covered with mesquites and cats’ claw.” In 1849, Michler described south Texas as “concerning the land both on the Frio and the Leona, from these rivers back, that it may be divided into four parallel strips-the first, next to the river, consisting of heavy timber, and a heavy black soil, the second, a mesquite flat, of small width, and the soil of a lighter nature, and very fertile; the third, a range of low hills, covered with loose stones, and thick chaparral; the fourth, a wide-open prairie.” Lehman indicates, “thus while it is quite true that the Rio Grande Plains once had fewer woody plants and more grass than now, it is also true that an ample seed stock of shrubs and trees has been widely distributed for as long as man has known.” The vegetation structure likely varied from place-to-place depending on topography, soil properties, and time since the last major disturbance.

Large numbers of domestic livestock grazed South Texas as early as the mid-1700’s. Formal deeds to properties from the Spanish and Mexican governments came in the late 1760’s with much larger blocks granted in the decades to follow. Lehman indicated, “in 1757, the official Spanish census showed residents of Camargo and Reynosa in the lower Rio Grande owning over 90,000 sheep and goats. By way of contrast, combined numbers of cattle, oxen, horses, mules and burros were less than 16,000.” By the mid-1800’s, according to Lehman’s figures from the U. S. Census of 1889, “there were a minimum of 1,644,268 sheep-fully 45 percent of Texas total population, grazing south of the Nueces River.” According to Inglis, “the Rio Grande Plains had the four-leading sheep producing counties in the state and ten of the top fifteen sheep producing counties were in South Texas. The peak decade was 1880 to 1890, at times exceeding two million head.” These domestic animals were in addition to bison, antelope, deer, and large herds of wild horses. It is obvious from early accounts, that much of the Rio Grande Plains was periodically grazed hard by both domestic animals and wild populations as early as the early to mid-1700’s. It may be that overgrazing by sheep and goats could have suppressed the many shrubs, reduced shrub canopy, and arrested shrub seedlings.

With the arrival of European man, the South Texas area was fenced and, in many instances, stocked beyond its capability to sustain forage. This overstocking led to a reduced fire frequency and intensity, creating an opportunity for woody shrubs to increase across the landscape. As the natural graze-rest cycles were altered and stocking rates continued to exceed the natural carrying capacity of the land, midgrasses were replaced by shortgrasses and the ground cover was opened so additional annual and perennial forbs also increased. Drought certainly enhanced this effect. As prolonged overgrazing continued, shrub cover increased. Shortgrasses became dominant and forage production decreased. This change in plant cover and structure further decreased fire frequency and intensity, favoring shrub establishment and dominance.

The plant communities of this site are dynamic varying in relation to fire, periodic drought, and wet cycles. Periodic fires were set by either Native Americans or started naturally by lightning. Fire did not play as important a role on this site as in deeper more productive sites due to lower production of grasses to burn. Because of large amounts of gravel in the soil, available water holding capacity is greatly reduced. This causes highly variable forage production and minimal grass production during dry years. The historic community of this site was influenced to some extent by periodic grazing by herds of buffalo and wild horses. Herds of buffalo and wild horses would come into an area, graze it down, and then not come back for many months or even years depending upon the availability of water. This long deferment period allowed recovery of the grasses and forbs which served as fuel load. More than likely, fire occurred following years of good rainfall followed by a dry season. The fire frequency for this area is interpreted to be four to six years (Frost, 1998).

While periodic grazing can be a natural component of the ecosystem, overstocking and overgrazing by domestic animals has an impact

on the site. With continuous abusive grazing, midgrasses tend to decrease and are replaced by shortgrasses and forbs such as red grama (*Bouteloua trifida*), purple threeawn (*Aristida purpurea*), slim tridens (*Tridens muticus*), curly mesquite (*Hilaria belangeri*), and oreja de perro (*Tiguilia canescens*). Heavy continuous grazing eliminates the possibility of fire. In this condition, a dense cover of brush dominated by blackbrush (*Acacia rigidula*), creosote (*Larrea tridentata*), cenizo (*Leucophyllum frutescens*), and guajillo (*Acacia berlandieri*) will occupy the site. In this condition, very few grasses or forbs will be visible on the site during dry periods. However, during periods of above average rainfall, a flush of annual forbs, annual grasses, and a few opportunistic perennial grasses will coexist with the dense brush. The specific species of plants that dominate this site will vary with the specific soil series present.

Presently, the Claypan Prairie is mostly a community of woody shrubs exceeding 50 percent canopy, with the interspaces dominated by shortgrasses such as common buffalograss (*Bouteloua dactyloides*), red grama (*Bouteloua trifida*), slim tridens (*Tridens muticus*), and lovegrass tridens (*Tridens eragrostoides*). If drought and/or grazing denude the site, soils will cap over and infiltration of rainfall will be reduced significantly. When in this condition, this site recovers very slowly, and mechanical manipulation will be required to reduce shrub canopy and break the soil crust.

State and transition model

Figure 8. STM

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Warm-season midgrasses			1345-2690	
	multiflower false Rhodes grass	TRPL3	<i>Trichloris pluriflora</i>	448-2690	–
	large-spike bristlegrass	SEMA5	<i>Setaria macrostachya</i>	448-1681	–
	pink pappusgrass	PABI2	<i>Pappophorum bicolor</i>	112-785	–
	hooded windmill grass	CHCU2	<i>Chloris cucullata</i>	112-560	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	0-560	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	0-560	–
	longspike beardgrass	BOLO	<i>Bothriochloa longipaniculata</i>	0-560	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	56-504	–
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	0-448	–
	Texas bristlegrass	SETE6	<i>Setaria texana</i>	56-336	–
	whiplash pappusgrass	PAVA2	<i>Pappophorum vaginatum</i>	0-280	–
	white tridens	TRAL2	<i>Tridens albescens</i>	0-280	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0-280	–
2	Warm season shortgrasses			336-673	
	red grama	BOTR2	<i>Bouteloua trifida</i>	0-224	–
	lovegrass tridens	TRER	<i>Tridens eragrostoides</i>	0-224	–
	slim tridens	TRMU	<i>Tridens muticus</i>	0-224	–
Forb					
3	Forbs			56-168	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0-56	–
	bundleflower	DESMA	<i>Desmanthus</i>	0-45	–
	dogfennel	DYSOD	<i>Dysodiopsis</i>	0-34	–
	Lindheimer's bladderpod	LELI2	<i>Lesquerella lindheimeri</i>	0-34	–
	pepperweed	LEPID	<i>Lepidium</i>	0-34	–
	plains dozedaisy	APRA	<i>Aphanostephus ramosissimus</i>	0-34	–
	wild petunia	RUELL	<i>Ruellia</i>	0-34	–
	vervain	VERBE	<i>Verbena</i>	0-34	–

	awnless bushsunflower	SICA7	<i>Simsia calva</i>	0-22	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	0-22	–
	fogfruit	PHYLA	<i>Phyla</i>	0-22	–
Shrub/Vine					
4	Shrubs/Vines			84-196	
	pricklypear	OPUNT	<i>Opuntia</i>	11-56	–
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	28-56	–
	desert yaupon	SCCU4	<i>Schaefferia cuneifolia</i>	0-34	–
	Texas lignum-vitae	GUAN	<i>Guaiaacum angustifolium</i>	0-34	–
	leatherstem	JADID	<i>Jatropha dioica</i> var. <i>dioica</i>	0-34	–
	blackbrush acacia	ACRI	<i>Acacia rigidula</i>	0-34	–
	Schaffner's wattle	ACSC2	<i>Acacia schaffneri</i>	11-34	–
	whitebrush	ALGR2	<i>Aloysia gratissima</i>	0-34	–
	Texan goatbush	CAERT	<i>Castela erecta</i> ssp. <i>texana</i>	0-34	–
	spiny hackberry	CEEH	<i>Celtis ehrenbergiana</i>	11-34	–
	Texas persimmon	DITE3	<i>Diospyros texana</i>	11-34	–
	pitaya	ECEN2	<i>Echinocereus enneacanthus</i>	0-22	–
	stretchberry	FOPU2	<i>Forestiera pubescens</i>	0-22	–
	Christmas cactus	CYLE8	<i>Cylindropuntia leptocaulis</i>	11-22	–
Tree					
5	Trees			11-45	
	honey mesquite	PRGL2	<i>Prosopis glandulosa</i>	11-45	–

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

As a historic tall/midgrass prairie, this site was occupied by bison, antelope, deer, quail, turkey, and dove. This site was also used by many species of grassland songbirds, migratory waterfowl, and coyotes. This site now provides forage for livestock and is still used by quail, dove, migratory waterfowl, grassland birds, coyotes, and deer. Feral hogs (*Sus scrofa*) can be found on most ecological sites in Texas. Damage caused by feral hogs each year includes, crop damage by rutting up crops, destroyed fences, livestock watering areas, and predation on native wildlife. Feral hogs have few natural predators, thus allowing their population to grow to high numbers. Wildlife habitat is a complex of many different plant communities and ecological sites across the landscape. Most animals use the landscape differently to find food, shelter, protection, and mates. Working on a conservation plan for the whole property, with a local professional, will help managers make the decisions that allow them to realize their goals for wildlife and livestock. Grassland State (1): This state provides the maximum amount of forage for livestock such as cattle. It is also utilized by deer, quail and other birds as a source of food. When a site is in the reference plant community phase (1.1) it will also be used by some birds for nesting, if other habitat requirements like thermal and escape cover are near. Tree/Shrubland (2): This state can be maintained to meet the habitat requirements of cattle and

wildlife. Land managers can find a balance that meets their goals and allows them flexibility to manage for livestock and wildlife. Forbs for deer and birds like quail will be more plentiful in this state. There will also be more trees and shrubs to provide thermal and escape cover for birds as well as cover for deer. Converted Land State (3): The quality of wildlife habitat this site will produce is extremely variable and is influenced greatly by the timing of rain events. This state is often manipulated to meet landowner goals. If livestock production is the main goal, it can be converted to pastureland. It can also be planted to a mix of grasses and forbs that will benefit both livestock and wildlife. A mix of forbs in the pasture could attract pollinators, birds and other types of wildlife. Food plots can also be planted to provide extra nutrition for deer. This rating system provides general guidance as to animal preference for plant species. It also indicates possible competition between kinds of herbivores for various plants. Grazing preference changes from time to time, especially between seasons, and between animal kinds and classes. Grazing preference does not necessarily reflect the ecological status of the plant within the plant community. For wildlife, plant preferences for food and plant suitability for cover are rated. Refer to habitat guides for a more complete description of a species habitat needs.

Hydrological functions

In the Shrubland State (2), annual evapotranspiration from shortgrass/forb herbaceous zones were comparable to those from woody plant patches. Surface runoff and deep drainage were only slightly higher in grass dominated patches (Weltz and Blackburn, 1995). Increasing water yield by converting shrub-dominated areas to grass domination is thus marginal and limited to years when winter and spring rainfall is high. There is little evidence that increases in percolation and surface runoff from converted communities could be reliably captured and dependably made available off-site. The main benefit of brush management is to release moisture in the soil profile to be utilized by herbaceous plants.

Recreational uses

Hunting and bird watching are common activities.

Inventory data references

Information presented was derived from the revised Range Site, literature, limited NRCS clipping data (417s), field observations, and personal contacts with range-trained personnel.

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Approval

Bryan Christensen, 9/19/2023

Acknowledgments

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills: None.

2. Presence of water flow patterns: None.

3. Number and height of erosional pedestals or terracettes: None.

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): None.

5. Number of gullies and erosion associated with gullies: None.

6. Extent of wind scoured, blowouts and/or depositional areas: None.

7. Amount of litter movement (describe size and distance expected to travel): Short, less than one foot except during overflow events.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Soil Stability Rating 5 to 6.

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Subangular blocky, A-horizon 1 to 12 inches and 1 to 1.5 percent SOM.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Tall and midgrasses reduce runoff to minimal amounts except in exceptional rainfall events.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): None.

12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):

Dominant: Warm-Season Grasses

Sub-dominant: Forbs

Other: Shrubs

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):
None

14. Average percent litter cover (%) and depth (in):

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):
1,600 to 3,400 air-dry pounds per acre.

16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: Hooded windmill, threeawn, King Ranch bluestem, lovegrass tridens, fall witchgrass, annual forbs, twisted acacia, mesquite, brasil, granjeno, and pear.

17. Perennial plant reproductive capability: All plants should reproduce each year.
