USDA Natural Resources Conservation Service

Ecological site R083BY005TX
Shallow

Last updated: 9/19/2023
Accessed: 04/30/2024

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.

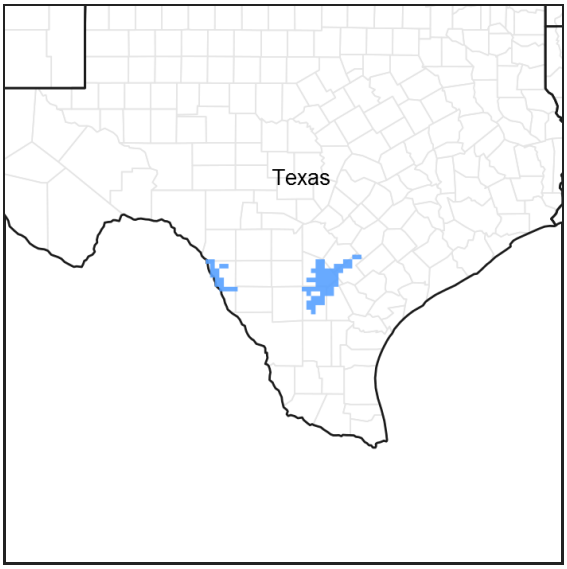


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

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

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

Ecological site concept

Shallow sites are very shallow to shallow with clay in the soil profile. The lack of depth coupled with the tight nature of the soils cause the community to be sparsely vegetated and droughty.

Associated sites

R083BY003TX	**Gravelly Ridge**
R083BY019TX	**Gray Sandy Loam**
R083BY025TX	**Clay Loam**

Similar sites

R083AY005TX	**Shallow**
R083CY005TX	**Shallow**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Prosopis* (2) *Tetrazygia urbanii*
Herbaceous	(1) *Pappophorum bicolor* (2) *Bouteloua curtipendula*

Physiographic features

Soils are on gently sloping summits and shoulders of ridges. Slopes range from 0 to 5 percent. This area is comprised of inland, dissected coastal plains.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Ridge
Runoff class	Medium to high
Elevation	61–305 m
Slope	0–5%
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)	231-321 days
Freeze-free period (characteristic range)	313-365 days
Precipitation total (characteristic range)	508 mm
Frost-free period (actual range)	214-365 days
Freeze-free period (actual range)	260-365 days
Precipitation total (actual range)	483-533 mm

Frost-free period (average)	270 days
Freeze-free period (average)	340 days
Precipitation total (average)	508 mm

Climate stations used

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

Influencing water features

Water features are not an influencing factor.

Wetland description

N/A

Soil features

The soils are shallow, well drained, and moderately to slowly permeable. They are 13 to 16 inches thick over densic bedrock or a petrocalcic horizon. Soil correlated to this site include: Darl and Fashing.

Table 4. Representative soil features

Parent material	(1) Alluvium–sedimentary rock
Surface texture	(1) Clay (2) Clay loam
Family particle size	(1) Clayey (2) Loamy
Drainage class	Well drained
Permeability class	Moderate to slow
Soil depth	25–51 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-50.8cm)	5.08–7.62 cm
Calcium carbonate equivalent (0-50.8cm)	0–40%
Electrical conductivity (0-50.8cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-50.8cm)	0–4
Soil reaction (1:1 water) (0-50.8cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–9%

Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

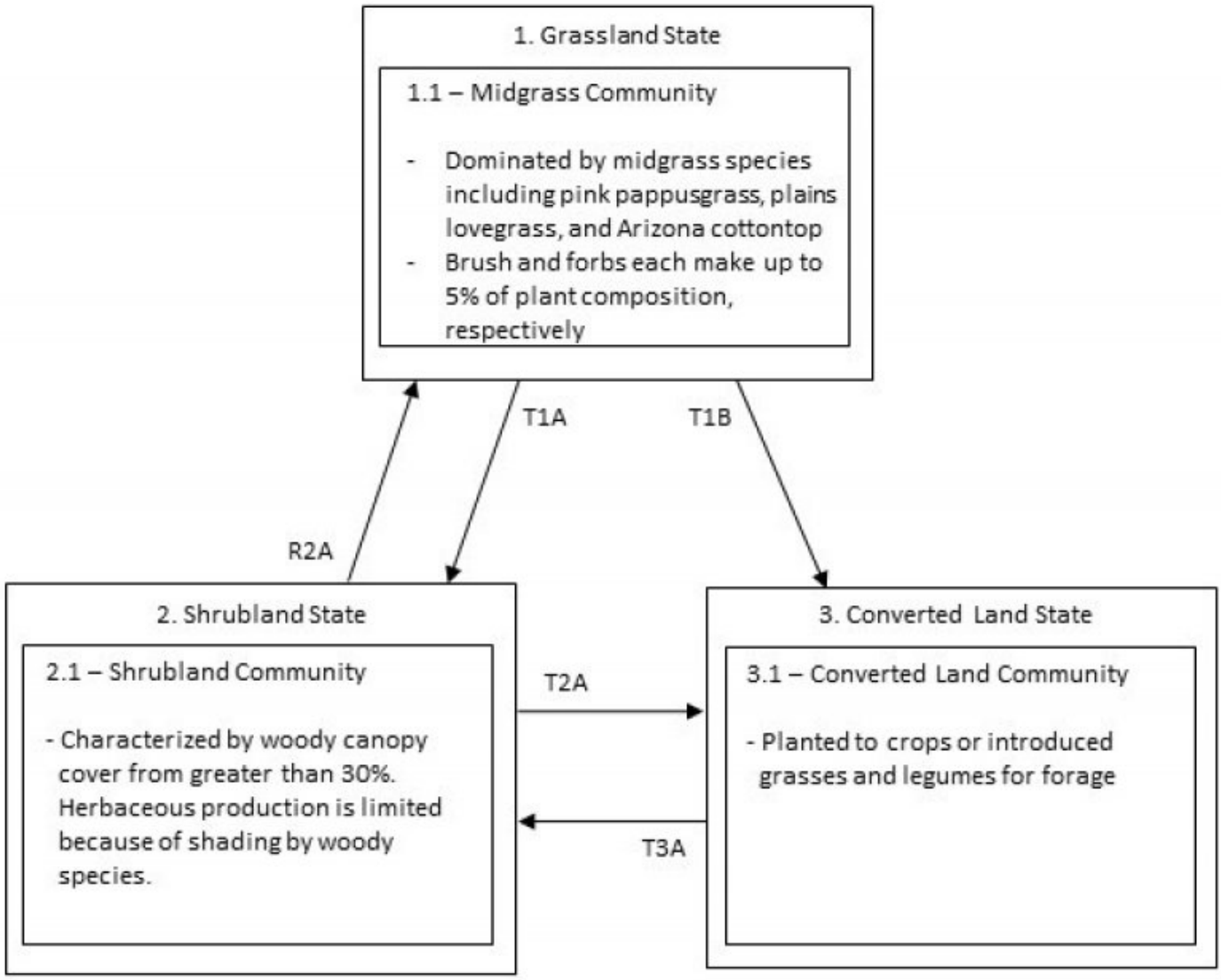
The accounts of early explorers and settlers suggest that the Rio Grande Plains was likely a vast mosaic of open grassland, savannah, and shrubland. While moving in 1691 out of Maverick County and into Zavala County, Don Domingo de Teran found after crossing the Nueces River “the country was level and 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).

State and transition model



Code	Practice
T1A, T3A	Heavy grazing, Fire suppression, Drought
T1B, T2A	Brush Management, Crop Cultivation, Pasture Planting
R2A	Prescribed grazing, Prescribed burning, Brush management

Figure 8. STM

State 1
Grassland

Community 1.1
Midgrass

The shallow, tight nature of the soils make this a sparsley vegetated community. The soils often cause droughty conditions quickly become hard. Grasses include pink pappusgrass (*Pappophorum bicolor*), sideoats grama (*Bouteloua curtipendula*), plains lovegrass (*Eragrostis intermedia*), Arizona cottontop (*Digitaria californica*), and slim tridens (*Tridens muticus*). Shrubs make up about five percent of the plant community and perennial forbs make up about five percent. Proper grazing management and regular fire intervals will keep the community intact.

State 2
Shrubland

Community 2.1

Shrubland

With heavy grazing pressure, lack of fire, and drought, plants such as red grama (*Bouteloua trifida*), threeawn (Aristida spp.), Hall's panicum (*Panicum hallii*), plains bristlegrass (Setaria vulpisea), and fall witchgrass (*Digitaria cognata*) increase or invade. Brush plants like mesquite (Prosopis spp.), guajillo (*Senegalia berlandieri*), cenizo (Tetrazygia urbannii), condalia (Condalia spp.), guayacan (*Guaiacum angustifolium*), agarito (Mahonia trifolioata) and pricklypear (Opuntia spp.) also increase and invade. Gray coldenia is a common forb. The woody vegetation is sparse in most places.

State 3
Converted Land

Community 3.1
Converted Land

Typically, rootplowing and raking is utilized to remove the woody vegetation. A seedbed is then prepared, and the area is planted into grass or crops. This site has historically been planted to buffelgrass, bermudagrass, or introduced bluestems. Now, because of the availability of seed, landowners can also replant with native species. To maintain this seeded state, herbicides must be used to control woody seedlings that invade as soon as the pasture is established. Not only is there a long-lived seed source of woody species, additional seeds are brought in by grazing animals and domestic livestock.

Transition T1A
State 1 to 2

Heavy continuous grazing, lack of fire, and drought will transition this site into a Shrubland State (2). The site is characterized by greater than 30 percent woody canopy cover.

Transition T1B
State 1 to 3

Land managers may wish to use this site as pasture, or less commonly cropland. If woody species are present, brush management is necessary to remove trees and shrubs. Seedbed preparation and pasture planting are the final steps needed.

Restoration pathway R2A
State 2 to 1

Prescribed grazing, prescribed burning, and brush management are required to restore the community back to a Grassland State (1). Removal of woody species below 30 percent allows more light and nutrients to herbaceous species. Reducing grazing pressure will allow plants to regain vigor and re-establish.

Transition T2A
State 2 to 3

Land managers may wish to use this site as pasture, or less commonly cropland. Brush management, followed by seedbed preparation and pasture planting are needed to create a successful pasture.

Transition T3A
State 3 to 2

Without brush management, woody species will encroach and grow into the overstory. The site will transition to a Shrubland State (2) once the woody canopy cover is greater than 30 percent.

Additional community tables

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.

Shrubland State (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.

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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Contributors

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Approval

Bryan Christensen, 9/19/2023

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.

Author(s)/participant(s)	
Contact for lead author	
Date	04/30/2024
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

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

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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):**

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:**

17. **Perennial plant reproductive capability:**