

Ecological site R083BY018TX

Clay Flat

Last updated: 9/19/2023
Accessed: 09/03/2026

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

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

Ecological site concept

The Clay Flat is characterized by heavy clay soils on nearly level slopes. Sites are productive, but can be droughty due to their high clay content and available moisture to plants.

Associated sites

R083BY003TX	Gravelly Ridge
R083BY015TX	Saline Clay
R083BY016TX	Saline Clay Loam
R083BY010TX	Vega
R083BY019TX	Gray Sandy Loam

Table 1. Dominant plant species

Tree	(1) <i>Prosopis glandulosa</i>
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Shrub	(1) <i>Celtis ehrenbergiana</i> (2) <i>Ziziphus obtusifolia</i>
Herbaceous	(1) <i>Sporobolus airoides</i> (2) <i>Tridens albescens</i>

Physiographic features

These nearly level soils are on smooth uplands and occasionally flooded drainageways on the inland, dissected Coastal Plains. Slopes range from 0 to about 1. Elevation is 200 to 600 feet.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Drainageway (2) Coastal plain > Flat
Runoff class	High
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to occasional
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) CRYSTAL CITY [USC00412160], Crystal City, TX
- (3) FALCON DAM [USC00413060], Roma, TX
- (4) LAREDO 2 [USC00415060], Laredo, TX
- (5) ZAPATA 1 S [USC00419976], Zapata, TX
- (6) DEL RIO INTL AP [USW00022010], Del Rio, TX
- (7) CATARINA [USC00411528], Asherton, TX
- (8) DEL RIO 2 NW [USC00412361], Del Rio, TX

Influencing water features

Water enters the soil rapidly when it is cracked, but very slow when the soil is moist and cracks are closed. Some map units are occasionally flooded for brief durations.

Wetland description

N/A

Soil features

The soils are very deep, moderately well drained with very slow permeability. They were formed in alkaline clayey alluvium. Surface color is dark gray or gray. The profile is effervescent throughout. Gilgai relief, in undisturbed areas, has microhighs 5 to 12 feet in diameter and 3 to 12 inches higher than the microlows. The soil series correlated to this site is the Monwebb series.

Table 4. Representative soil features

Parent material	(1) Alluvium – sedimentary rock
Surface texture	(1) Clay
Family particle size	(1) Fine

Drainage class	Moderately well drained
Permeability class	Very 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 – 40 %
Electrical conductivity (0-101.6cm)	0 – 20 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 40
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The Clay Flats are a productive plant community, but this is a droughty site due to heavy clay soils with high shrink/swell properties. If this site is denuded by excessive grazing, extended long-term drought, or some other catastrophic event and perennial grasses are lost, the site will be slow to recover. The plant communities found on this site are dominated by midgrasses with occasional shrubs throughout. The dominant midgrasses include alkali sacaton (*Sporobolus airoides*), vine mesquite (*Panicum obtusum*), false Rhodesgrass (*Trichloris crinita*), white tridens (*Tridens albescens*), silver bluestem (*Bothriochloa laguroides*), Arizona cottontop (*Digitaria californica*), and plains bristlegrass (*Setaria vulpiseta*). Shortgrasses such as curly-mesquite (*Hilaria belangeri*), Hall's panicum (*Panicum halli*), and buffalograss (*Bouteloua dactyloides*) were common to the site but made up a small percentage of the total herbaceous production. The woody plant

community on this site is sparse and scattered and contain honey mesquite (*Prosopis glandulosa*), lotebush (*Ziziphus obtusifolia*), wolfberry (*Lycium berlandieri*), whitebrush (*Aloysia gratissima*) and prickly pear (*Opuntia* spp.). Forbs common to the site include jicamilla (*Jatropha cathartica*), low wild mercury (*Argythamnia humilis*), Texas varilla (*Varilla texana*), hairy tubetongue (*Justicia pilosella*), and prostrate bundleflower (*Desmanthus glandulosus*).

Historically, the plant community was maintained by periodic grazing of roaming herds of wildlife, such as bison (*Bos bison*), and numerous fires that were set by lightning and Native Americans. Likely, this was a shifting mosaic over time over the landscape consisting of burned/grazed and unburn/ungrazed portions. The site was very productive and maintained a high percentage of ground cover with forage production. Runoff of rainfall was slow allowing the soil profile to fill to capacity. The fertility of the site was high.

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.

State and transition model

Figure 7. 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	Midgrasses			560-2074	
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	448-1121	–
	large-spike bristlegrass	SEMA5	<i>Setaria macrostachya</i>	336-897	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	224-448	–
	false Rhodes grass	TRCR9	<i>Trichloris crinita</i>	112-448	–
2	Midgrasses			280-1037	
	Texas bristlegrass	SETE6	<i>Setaria texana</i>	168-448	–
	white tridens	TRAL2	<i>Tridens albescens</i>	224-448	–
	silver beardgrass	BOLAT	<i>Bothriochloa laguroides</i> ssp. <i>torreyana</i>	84-168	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	56-168	–
3	Short/Midgrasses			168-622	
	hooded windmill grass	CHCU2	<i>Chloris cucullata</i>	84-168	–
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	0-140	–
	plains lovegrass	ERIN	<i>Eragrostis intermedia</i>	0-112	–
	whiplash pappusgrass	PAVA2	<i>Pappophorum vaginatum</i>	22-112	–

	purple threeawn	ARPU9	<i>Aristida purpurea</i>	11-84	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	11-56	–
4	Shortgrasses			112-415	
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	112-224	–
	Hall's panicgrass	PAHAH	<i>Panicum hallii</i> var. <i>hallii</i>	56-168	–
	Madagascar dropseed	SPPY2	<i>Sporobolus pyramidatus</i>	6-112	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0-112	–
	Texas grama	BORI	<i>Bouteloua rigidiseta</i>	0-34	–
	red grama	BOTR2	<i>Bouteloua trifida</i>	0-22	–
	fall witchgrass	DICO6	<i>Digitaria cognata</i>	0-22	–
Forb					
5	Forbs			28-112	
	Drummond's goldenbush	ISDR	<i>Isocoma drummondii</i>	6-112	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0-56	–
	Texas varilla	VATE2	<i>Varilla texana</i>	0-56	–
	Berlandier's nettlespurge	JACA3	<i>Jatropha cathartica</i>	6-22	–
	wealeaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	6-22	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	6-22	–
	low silverbush	ARHU5	<i>Argythamnia humilis</i>	1-11	–
	prairie broomweed	AMDR	<i>Amphiachyris dracunculoides</i>	0-11	–
	Gregg's tube tongue	JUPI5	<i>Justicia pilosella</i>	6-11	–
	sensitive plant	MIMOS	<i>Mimosa</i>	2-11	–
	silverleaf nightshade	SOEL	<i>Solanum elaeagnifolium</i>	0-11	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	2-11	–
	haplopappus	HAPLO11	<i>Haplopappus</i>	2-6	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0-6	–
	fanpetals	SIDA	<i>Sida</i>	2-6	–
	Forb, annual	2FA	<i>Forb, annual</i>	1-6	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	1-6	–
	Rio Grande stickpea	CACO	<i>Calliandra conferta</i>	1-6	–
	glandular bundleflower	DEGL8	<i>Desmanthus glandulosus</i>	2-6	–
Shrub/Vine					
6	Shrubs/Vines			112-196	
	pricklypear	OPUNT	<i>Opuntia</i>	11-56	–
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	17-56	–
	spiny hackberry	CEEH	<i>Celtis ehrenbergiana</i>	11-45	–
	Texas lignum-vitae	GUAN	<i>Guaiacum angustifolium</i>	22-45	–
	crown of thorns	KOSP	<i>Koeberlinia spinosa</i>	6-22	–
	Berlandier's wolfberry	LYBE	<i>Lycium berlandieri</i>	11-22	–
	catclaw acacia	ACGRG3	<i>Acacia greggii</i> var. <i>greggii</i>	6-22	–
	catclaw acacia	ACGRW	<i>Acacia greggii</i> var. <i>wrightii</i>	6-22	–
	Schaffner's wattle	ACSCB	<i>Acacia schaffneri</i> var. <i>bravoensis</i>	6-22	–
	whitebrush	ALGR2	<i>Aloysia gratissima</i>	6-22	–
	Texan goatbush	CAERT	<i>Castela erecta</i> ssp. <i>texana</i>	6-22	–
	jointfir	EPHED	<i>Ephedra</i>	6-17	–
	leatherstem	JADI	<i>Jatropha dioica</i>	6-11	–

	Christmas cactus	CYLE8	<i>Cylindropuntia leptocaulis</i>	6-11	–
Tree					
7	Trees			168-252	
	honey mesquite	PRGL2	<i>Prosopis glandulosa</i>	168-252	–

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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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 (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. Seeded 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

The grassland and the grassland/shrubland communities on this site use all the water from rainfall events that occur. Research has shown that the evapotranspiration rate on the grassland and the grassland/shrubland is nearly the same. Very little water could be harvested from this site if the woody plant community is replaced by a grass-dominated community.

Recreational uses

White-tailed deer, quail, javelina, and feral hogs are hunted on the site. Bird watching is also common.

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

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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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Contact for lead author	361-241-0609
Date	04/25/2008
Approved by	
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 except following extremely high intensity storms when short flow patterns may appear.

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):
0 to 3 percent bare ground with small and non-connected areas.

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): Minimal and short.

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

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): A-horizon is 0 to 7 inches of gray clay with medium subangular blocky to moderate very fine granular structure. Surface horizons are hard, firm, very sticky, very plastic with common medium tubular pores. Some surfaces have few fine krotovinas with snail shell fragments. They have violent effervescence and are moderately alkaline.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: High canopy, basal cover, and density with small interspaces should make rainfall impact negligible. This site has very deep, well drained soils with nearly level slopes but have high runoff due to the high clay content.

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 midgrasses >>

Sub-dominant:

Other: Warm-season shortgrasses > Cool-season midgrasses > Perennial forbs > Trees > Shrubs/Vines

Additional: Forbs make up 5% species composition while trees and shrubs/vines compose trace percent species composition.

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):
Grasses will exhibit some mortality and decadence, though very slight.

14. Average percent litter cover (%) and depth (in): Litter is primarily herbaceous.

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):
1,275 to 4,000 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: Mesquite, prickly pear, golden weed, and white brush are primary invaders.

17. Perennial plant reproductive capability: All species should be capable of plant reproduction, except during periods of prolonged drought conditions, heavy natural herbivory, or wildfires.
