Ecological site R083AY026TX
Eastern Clay Loam

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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): 083A–Northern Rio Grande Plain

This area is entirely in Texas and south of San Antonio. It makes up about 11,115 square miles (28,805 square kilometers). The towns of Uvalde, Cotulla, and Hondo are in the western part of the area, and Beeville, Goliad, and Kenedy are in the eastern part. The town of Alice is just outside the southern edge of the area. Interstate Highways 35 and 37 cross this area. This area is comprised of inland, dissected coastal plains.

Classification relationships

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

Ecological site concept

The Clay Loam ecological site has deep to very deep clay loam soils and has high vegetative production. The Eastern Clay Loams are more productive than the Western Clay Loam sites, with the separation line occurring in Atascosa County.

Associated sites

R083AY004TX	**Shallow Sandy Loam**
R083AY012TX	**Loamy Draw**
R083AY013TX	**Loamy Bottomland**
R083AY009TX	**Clayey Bottomland**

Similar sites

R083BY025TX	**Clay Loam**

R083CY025TX	**Clay Loam**
R083DY025TX	**Clay Loam**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Aloysia gratissima* (2) *Celtis ehrenbergiana*
Herbaceous	(1) *Bothriochloa barbinodis* (2) *Bouteloua dactyloides*

Physiographic features

These nearly level to gently sloping soils of the Clay Loam ecological site are on interfluves and draws on the Coastal Plains. Surfaces are typically slightly concave or linear. Grades are from 0 to 5 percent, but are mainly gradients less than 2 percent. This area is comprised of inland, dissected coastal plains.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Interfluve (2) Coastal plain > Draw (3) Coastal plain > Stream terrace
Runoff class	Negligible to very high
Elevation	20 – 460 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

Climatic features

MLRA 83A is subtropical, subhumid on the western boundary and subtropical humid on the eastern boundary. Winters are dry and mild and the summers are hot and humid. 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. Average precipitation for MLRA 83A is 20 inches on the western boundary and 35 inches on the eastern boundary. Peak rainfall, because of rain showers, occurs late in spring and a secondary peak occurs early in fall. Heavy thunderstorm activities increase in April, May, and June. 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. 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)	220-240 days
Freeze-free period (characteristic range)	260-370 days
Precipitation total (characteristic range)	710-910 mm
Frost-free period (actual range)	210-250 days
Freeze-free period (actual range)	260-370 days
Precipitation total (actual range)	640-940 mm
Frost-free period (average)	230 days
Freeze-free period (average)	310 days
Precipitation total (average)	810 mm

- (1) CHEAPSIDE [USC00411671], Gonzales, TX
- (2) CUERO [USC00412173], Cuero, TX
- (3) NIXON [USC00416368], Stockdale, TX
- (4) BEEVILLE 5 NE [USC00410639], Beeville, TX
- (5) CROSS [USC00412125], Tilden, TX
- (6) GOLIAD [USC00413618], Goliad, TX
- (7) FLORESVILLE [USC00413201], Floresville, TX
- (8) KARNES CITY 2N [USC00414696], Karnes City, TX
- (9) PLEASANTON [USC00417111], Pleasanton, TX
- (10) TILDEN 4 SSE [USC00419031], Tilden, TX

Influencing water features

Runoff is low to medium.

Wetland description

N/A.

Soil features

The soils in the Eastern Clay Loam ecological site are deep to very deep, well drained, and have moderate to very slow permeability. The soils formed in loamy alluvium of Pleistocene and Holocene age. A typical pedon will have a mollic epipedon, an argillic horizon starting within 10 inches of the surface, and secondary calcium carbonate beginning at about 30 inches. Soil reaction will typically range from neutral to moderately alkaline with percent calcium carbonate increasing with depth. Soil series correlated to this site include: Clareville, Coy, Cuero, Marcelinas, and San Antonio.

Table 4. Representative soil features

Parent material	(1) Alluvium – sedimentary rock (2) Residuum – sedimentary rock
Surface texture	(1) Clay loam (2) Sandy clay loam (3) Loam
Family particle size	(1) Fine (2) Fine-loamy
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderately slow
Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	17.78 – 25.4 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 20 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4

Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The Northern Rio Grande Plain MLRA was a disturbance-maintained system. Prior to European settlement (pre-1825), fire and grazing were the two primary forms of disturbance. Grazing by large herbivores included antelope, deer, and small herds of bison. The infrequent but intense, short-duration grazing by these species suppressed woody species and invigorated herbaceous species. The herbaceous savannah species adapted to fire and grazing disturbances by maintaining belowground tissues. Wright and Bailey (1982) report that there are no reliable records of fire frequency for the Rio Grande Plains because there are no trees to carry fire scars from which to estimate fire frequency. Because savannah grassland is typically of level or rolling topography, a natural fire frequency of three to seven years seems reasonable for this site.

The Clay Loam is a savannah ecological site of the Northern Rio Grande Plain MLRA. It is a fire-influenced midgrass plant community, interspersed with perennial forbs and shrubby woody species. Improper grazing management results in a reduction of midgrass dominance and an increase in composition of shortgrasses, unpalatable forbs, and woody species. Lack of brush control results in a shift in composition until shrubs and trees dominate and reach a near closed canopy woodland.

Continued degradation of the site results in crossing a threshold to the Shortgrass Community (1.2) characterized by shortgrasses, unpalatable grasses, and shrubs. Bare ground, erosion, and water flow patterns will increase, and forage production will decline. Over time, the size and amount of eroded areas will increase as the A-horizon erodes until the site transitions to a Sparsely Vegetated Community (3.1).

Precipitation patterns are highly variable. Long-term droughts, occurring three to four times per century, cause shifts in species composition by causing die-off of seedlings, less drought-tolerant species, and some woody species. Droughts also reduce biomass production and create open space, which is colonized by opportunistic species when precipitation increases. Wet periods allow midgrasses to increase in dominance.

Historical accounts prior to 1800 identify grazing by herds of wild horses, followed by heavy grazing by sheep and cattle as settlement progressed. Grazing on early ranches changed natural graze-rest cycles to continuous grazing and stocking rates exceeded the carrying capacity. These shifts in grazing intensity and the removal of rest from the system reduced plant vigor for the most palatable species, which on this site were mid-grasses and palatable forbs. Shortgrasses and less palatable forbs began to dominate the site. This shift resulted in lower fuel loads, which reduced fire frequency and intensity. The reduction in fires resulted in an increase in size and density of woody species.

Today, primarily beef cattle graze rangeland and pastureland. However, horse numbers are increasing rapidly on small acreage properties in the region. There are some areas where dairy cattle, poultry, goats, and sheep are locally important. Whitetail deer, wild turkey, bobwhite quail, and dove are the major wildlife species, and hunting leases are a major source of income for many landowners in this area.

During the late 1800’s, settlers plowed small areas of this site due to its fertile, productive soils. Introduced pasture has been established on many acres of old cropland and in areas with deeper soils. Buffelgrass is the most common introduced plant on the site and to a lesser extent bermudagrass, guineagrass (Urochloa maxima), and kleingrass, which are more commonly used for hay. Cropland is found in the valleys, bottomlands, and deeper upland soils. Wheat (Triticum spp.), oats (Avena spp.), forage and grain sorghum (Sorghum spp.), cotton (Gossypium spp.), and corn (Zea mays) are major crops in the region.

Introduced, invasive grass species are common on this site. Some of the common species include buffelgrass, guineagrass, Old World bluestem, and bermudagrass. These plants are highly adapted to this area and are highly productive. However, these invasive plants become a monoculture and reduce the native vegetation component of a site. The site is still able to function from a production standpoint, but once a herbaceous invasive plant has established or naturalized to a site controlling it becomes highly unlikely.

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**			2018-4371	
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	1681-3082	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	1681-3082	–
	little bluestem	SCSCS	*Schizachyrium scoparium var. scoparium*	841-3082	–
	false Rhodes grass	TRCR9	*Trichloris crinita*	1681-3082	–
	multiflower false Rhodes grass	TRPL3	*Trichloris pluriflora*	1681-3082	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	1121-2018	–
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	1121-2018	–
	pink pappusgrass	PABI2	*Pappophorum bicolor*	841-1401	–
	hooded windmill grass	CHCU2	*Chloris cucullata*	841-1401	–
	Arizona cottontop	DICA8	*Digitaria californica*	841-1401	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	841-1401	–
	southwestern bristlegrass	SESC2	*Setaria scheelei*	448-841	–
	big sandbur	CEMY	*Cenchrus myosuroides*	448-841	–
2	**Shortgrasses**			504-1093	
	buffalograss	BODA2	*Bouteloua dactyloides*	448-841	–
	curly-mesquite	HIBE	*Hilaria belangeri*	448-841	–
	red grama	BOTR2	*Bouteloua trifida*	224-392	–
	threeawn	ARIST	*Aristida*	224-392	–
3	**Cool-season grasses**			101-219	
	Texas wintergrass	NALE3	*Nassella leucotricha*	67-196	–
	Canada wildrye	ELCA4	*Elymus canadensis*	11-112	–
	Virginia wildrye	ELVI3	*Elymus virginicus*	11-112	–
4	**Grasslikes**			67-146	
	sedge	CAREX	*Carex*	11-129	–
	flatsedge	CYPER	*Cyperus*	11-129	–
Forb					
5	**Forbs**			168-729	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	84-168	–
	white sagebrush	ARLUM2	*Artemisia ludoviciana ssp. mexicana*	84-168	–
	croton	CROTO	*Croton*	84-168	–
	bundleflower	DESMA	*Desmanthus*	84-168	–
	Engelmann's daisy	ENPE4	*Engelmannia peristenia*	84-168	–
	sensitive plant	MIMOS	*Mimosa*	84-168	–
	awnless bushsunflower	SICA7	*Simsia calva*	84-168	–
	threeawn	ARIST	*Aristida*	56-112	–
	Forb, annual	2FA	*Forb, annual*	56-112	–
Shrub/Vine					
6	**Shrubs/Vines**			168-729	
	mesquite	PROSO	*Prosopis*	0-336	–
	Texas wintergrass	NALE3	*Nassella leucotricha*	0-224	–
	whitebrush	ALGR2	*Aloysia gratissima*	84-168	–

	spiny hackberry	CEEH	*Celtis ehrenbergiana*	84-168	–
	snakewood	CONDA	*Condalia*	84-168	–
	Texan hogplum	COTE6	*Colubrina texensis*	84-168	–
	Texas persimmon	DITE3	*Diospyros texana*	84-168	–
	vine jointfir	EPPE	*Ephedra pedunculata*	84-168	–
	Texas lignum-vitae	GUAN	*Guaiacum angustifolium*	84-168	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	84-168	–
	pricklypear	OPUNT	*Opuntia*	84-168	–
	oak	QUERC	*Quercus*	84-168	–
	western soapberry	SASAD	*Sapindus saponaria var. drummondii*	84-168	–
	desert yaupon	SCCU4	*Schaefferia cuneifolia*	84-168	–

Table 6. Community 1.2 plant community composition

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

Table 7. Community 2.1 plant community composition

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

Table 8. Community 2.2 plant community composition

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

Table 9. Community 3.1 plant community composition

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

Table 10. Community 4.1 plant community composition

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

Table 11. Community 4.2 plant community composition

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

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, and ground-nesting birds. 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. Savannah State: 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: 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: 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 Midgrass Community (1.1) water cycle functions well with good infiltration and deep percolation of rainfall. The water cycle functions best in the Midgrass Savannah Community (1.1) and changes as the vegetation community changes. Rapid rainfall infiltration, high soil organic matter, good soil structure and good porosity accompany high bunchgrass cover. Surface runoff quality will be high and erosion and sedimentation rates will be low. A shift to the Shortgrass Community (1.2) means reduced plant and litter cover, which impairs the water cycle. Infiltration will decrease and runoff will increase due to reduced ground cover, rainfall splash, soil capping, reduced organic matter, and poor structure. With a combination of a sparse ground cover and intensive rainfall, this site can contribute to an increased frequency and severity of flooding within a watershed. Soil erosion is accelerated, quality of surface runoff is poor, and sedimentation increases. Domination of the site by woody species, especially oaks, further changes the water cycle in the Shrubland State (2). Under the dense canopy of the shrubland, leaf litter builds up. This increases soil organic matter, builds structure, improves infiltration, and reduces surface erosion. These conditions improve the function of the water cycle compared to lower levels of canopy cover. Interception of rainfall by tree canopies increases, which reduces the amount of rainfall reaching the surface and being available to understory plants. However, increased stemflow, due to the funneling effect of the canopy, will increases soil moisture at the base of trees, especially on mesquite. Evergreen species, such as live oak, create increased transpiration, which provides less water for deep percolation. Moreover, as woody species increase, they sometimes have root systems that reach deeper in to the soil than do the grasses. Therefore, they can utilize soil moisture below the rooting depth of grasses, particularly those with grazing induced dwarf root systems. Increases in woody canopy create declines in grass cover, which creates similar impacts as those described for improper grazing above. Return of the Shrubland State (2) to the Midgrass Community (1.1) through brush management and good grazing management can help improve hydrologic function of the site. In the Sparsely Vegetated State (3), there is much less vegetation to intercept rainfall and that which strikes the ground may cause erosion due to increase in bare soil. Evaporation losses are higher in the Sparsely Vegetated State (3), which when combined with increased runoff and eroded soils, results in less moisture reaching the rooting zone.

Recreational uses

Recreational uses include hunting, hiking, camping, equestrian, and bird watching.

Wood products

Honey mesquite and some oak are used for posts, firewood, charcoal, and other specialty wood products.

Other products

Jams and jellies are made from many fruit bearing species. Many grasses and forbs are harvested by the dried-plant industry for sale in dried flower arrangements. Honeybees are utilized to harvest honey from many flowering plants, such as honey mesquite.

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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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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Date	06/04/2009
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):** Small and non-connected areas with zero to three percent bare ground.

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 under normal rainfall intensity.

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

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Very dark grayish brown clay loam from zero to five inches, moderate fine and medium subangular blocky structure, hard, friable, many fine roots, neutral, abrupt smooth boundary.

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 well drained soils, deep with level to gently sloping, zero to three percent, which produces negligible runoff and water erosion.

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

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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: Warm-season shortgrasses >

    Other: Forbs > Shrubs/Vines > Trees

    Additional: Forbs make up five percent species composition while shrubs and trees make up five5 percent.

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

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 3,000 to 5,750 pounds per acre.

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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:** Huisache is the primary invader.

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