

Ecological site R077DY038TX

Clay Loam 12-17" PZ

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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): 077D–Southern High Plains, Southwestern Part

This area is characterized by nearly level to gently undulating plains with scattered playa depressions. Soil temperature regime is thermic and soil moisture regime is aridic bordering on ustic. Sandy and loamy soils are generally well drained and range from shallow to deep and medium- to coarse-textured. Native vegetation is short- to mid-grasses and sandy sites support tall-grasses with sand shin oak and mesquite. Current land use is mainly rangeland, although irrigated cropland is expanding.

Classification relationships

This ecological site is correlated to soil components at the Major Land Resource Area (MLRA) level which is further described in USDA Ag Handbook 296.

Ecological site concept

This site occurs on gently sloping loam and clay loam soils on uplands. The reference community consists of midgrasses and shortgrasses with few forbs and very few shrubs. Due to the clay loam soils, these sites can be quite susceptible to drought conditions. Abusive grazing may also alter the species composition of the site.

Associated sites

R077DY049TX	Very Shallow 12-17" PZ Very shallow sites may occur within or adjoining Clay Loam sites and occur on sloping plains, narrow ridges, side slopes along draws, side slopes around playas and ridges along the edge of mesas. Shortgrasses dominate but there is a good mixture of midgrasses on this site. Production is less than the Clay Loam site.
R077DY040TX	High Lime 12-17" PZ High Lime sites sometimes adjoin Clay Loam sites and occur on dunes associated with playas. Midgrasses dominate but there is a good mixture of shortgrasses on this site. Production is less than the Clay Loam site.
R077DY042TX	Limy Upland 12-17" PZ Clay Loam sites are often associated with Limy Upland sites on nearly level to gently sloping plains and the slopes of adjoining playas. Midgrasses dominate but there is a good mixture of shortgrasses on this site. Production is often slightly higher than the Clay Loam site.

Similar sites

R077CY022TX	Deep Hardland 16-21" PZ Similar to Clay Loam sites in physiographic features and similar plant communities. The Mean Annual Precipitation is higher (16 to 21 inches). The overall production of the Deep Hardland site in MLRA 77C is higher than that of the Clay Loam site in MLRA 77D.
R077DY042TX	Limy Upland 12-17" PZ Similar to Clay Loam sites in physiographic features and similar plant communities. The overall production on Limy Upland sites will be slightly higher than Clay Loam sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Mimosa aculeaticarpa</i> var. <i>biuncifera</i> (2) <i>Prosopis juliflora</i>
Herbaceous	(1) <i>Bouteloua curtipendula</i> (2) <i>Bouteloua gracilis</i>

Physiographic features

The Clay Loam ecological site is comprised of nearly level to gently sloping plains, commonly found adjacent to relict drainageways, and were formed in calcareous, loamy eolian sediments and are underlain by cemented or indurated petrocalcic layers. Runoff is very low to medium. Loamy soils and water movement is dependent on amount of vegetative cover and intensity of precipitation events.

Landform: broad, smooth, nearly level to very gently sloping plains near natural drainageways.

Table 2. Representative physiographic features

Landforms	(1) Plateau > Plain (2) Plateau > Drainageway
Runoff class	Very low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	760 – 1,460 m
Slope	0 %
Water table depth	200 cm

Aspect	W, NW, N, NE, E, SE, S, SW
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Climatic features

Continental Steppe climate is prevalent in MLRA 77D. This climate type is typical of interiors of continents and is characterized by large variations in the magnitude of ranges in daily temperature extremes, low relative humidity, and irregularly spaced rainfall of moderate amounts. This climate regime is also known for being semi-arid with mild winters.

Droughts occur with monotonous frequency although there will be years having excessive precipitation resulting in large accumulations of water that little benefit is obtained from the rainfall events. If good rains occur in the spring and summer months, annual production will be favorable even if the remainder of the year is not favorable. Most of the annual precipitation occurs as a result from spring and early summer thunderstorms. Due to the fact that the area is mainly flat, local flooding may occur but only of short duration. There is very little precipitation and infrequent snowfall amounts in the winter.

During the late winter and early spring months, dust storms occur very frequently. The flat plains of the area contribute very little resistance to the strong winds. Dust in many of these storms remains in the air for several days after the storms have passed.

Daytime temperatures are warm in the summer but there is a large diurnal range and most nights are comfortable. In summers, the normal daily maximum temperatures are in the low to mid 90s and the normal minimum temperatures are in the upper 60s and low 70s. Even though the temperatures may be high, the low humidity and high evaporation rates create a cooling effect during the nighttime hours. Fall months exhibit extremely variable weather. Winters are mild and are characterized by frequent cold fronts accompanied by strong, gusty, northerly winds. Most of the cold fronts are dry as they pass through the area.

Table 3 Representative climatic features

Frost-free period (characteristic range)	150-190 days
Freeze-free period (characteristic range)	180-190 days
Precipitation total (characteristic range)	380-430 mm
Frost-free period (actual range)	150-200 days
Freeze-free period (actual range)	170-210 days
Precipitation total (actual range)	380-430 mm
Frost-free period (average)	170 days
Freeze-free period (average)	190 days
Precipitation total (average)	410 mm

- (1) MELROSE [USC00295617], Melrose, NM
- (2) ELIDA [USC00292854], Elida, NM
- (3) CROSSROADS 2 [USC00292207], Crossroads, NM
- (4) TATUM [USC00298713], Tatum, NM
- (5) CAPROCK [USC00291445], Caprock, NM

- (6) HOBBS 13W [USC00294030], Lovington, NM
- (7) ANDREWS [USC00410248], Andrews, TX
- (8) ODESSA SCHLEMEYER FLD [USW00003031], Odessa, TX
- (9) K-BAR RCH [USC00414710], Odessa, TX

Influencing water features

Water features are not an influencing factor in this site.

Wetland description

None.

Soil features

These moderately deep soils are developed from calcareous, loamy eolian sediments and are underlain by cemented or indurated petrocalcic layers. Slopes dominantly range from 0 to 3 percent. They are moderate in fertility, have a low level of water storage capacity due to the limited amount of soil material above the usually continuous cemented layer. These soils have a slow infiltration rate, depending on slope and vegetative cover. They yield water to plants readily and are subject to wind erosion without good cover. If cover is poor and runoff is excessive, significant water erosion can also occur. Plant roots easily penetrate these soils.

Major Soil Taxonomic Units correlated to this site include: Kenhill loam and Stegall loam.

Table 4. Representative soil features

Parent material	(1) Eolian deposits – igneous, metamorphic and sedimentary rock
Surface texture	(1) Loam (2) Clay loam (3) Sandy clay loam
Family particle size	(1) Fine-loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Depth to restrictive layer	50 – 100 cm
Soil depth	50 – 100 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	Not specified

Available water capacity (0-86.4cm)	7.62 – 15.24 cm
Calcium carbonate equivalent (0-86.4cm)	Not specified
Electrical conductivity (0-86.4cm)	Not specified
Sodium adsorption ratio (0-86.4cm)	Not specified
Soil reaction (1:1 water) (0-86.4cm)	6.6 – 8.4
Subsurface fragment volume ≤3" (0-86.4cm)	Not specified
Subsurface fragment volume >3" (0-86.4cm)	Not specified

Ecological dynamics

The Reference Plant Community for this ecological site is a Shortgrass/Midgrass Community (1.1) with less than 5 percent woody shrubs and only a limited variety of forbs. The heavy clay loam textured soils in a rainfall regime of less than 20 inches favor short and midgrasses. The dominant grasses are blue grama (*Bouteloua gracilis*), buffalograss (*Bouteloua dactyloides*), sideoats grama (*Bouteloua curtipendula*), plains bristlegrass (*Setaria macrostachya*), and tobosa (*Pleuraphis mutica*). Lesser amounts of black grama (*Bouteloua eriopoda*), sand dropseed (*Sporobolus cryptandrus*) and perennial threeawn (*Aristida* sp.) are scattered throughout the site. Other grass species that can be found in and around small depressional areas include vine mesquite (*Panicum obtusum*), Arizona cottontop (*Digitaria californica*) and cane bluestem (*Bothriochloa barbinodis*). The few major forb species present include gaura spp. (*Guara* spp.), croton spp. (*Croton* spp.), plains green thread (*Thelesperma filifolium*), western ragweed (*Ambrosia psilostachya*) and wooly plantain (*Plantago patagonica*). Shrub/half-shrub species lightly scattered (

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Shortgrasses			448-1121	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	269-673	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	179-448	–

2	Mid/Shortgrasses			269-673	
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	45-112	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	45-112	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	45-112	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	45-112	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	45-112	–
	large-spike bristlegrass	SEMA5	<i>Setaria macrostachya</i>	45-112	–
3	Mid/Shortgrasses			45-112	
	threeawn	ARIST	<i>Aristida</i>	22-56	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	22-56	–
4	Shortgrasses			78-168	
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	78-168	–
Forb					
5	Forbs			11-22	
	Forb, annual	2FA	<i>Forb, annual</i>	0-6	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0-6	–
	American star-thistle	CEAM2	<i>Centaurea americana</i>	0-6	–
	croton	CROTO	<i>Croton</i>	0-6	–
	beeblossom	GAURA	<i>Gaura</i>	0-6	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0-6	–
	stiff greenthread	THFI	<i>Thelesperma filifolium</i>	0-6	–
Shrub/Vine					
6	Shrubs/Vines			45-146	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	6-22	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	6-22	–
	Berlandier's wolfberry	LYBE	<i>Lycium berlandieri</i>	6-22	–
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa var. biuncifera</i>	6-22	–
	honey mesquite	PRGL2	<i>Prosopis glandulosa</i>	6-22	–
	yucca	YUCCA	<i>Yucca</i>	6-22	–
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	6-22	–

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 3.1 plant community composition

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

Woody plants provide cover for deer and quail. These wildlife species have both increased along with the brushy plants due to the cover that these plants provide. According to most wildlife biologists, both species prefer a lower successional plant community than was present in historic climax. More forbs are needed to meet these species food requirements and woody plants for browse are important for deer. It is often the objective of many land owners to strike a balance in plant community so that these wildlife species can exist along with domestic livestock. This can be accomplished by a carefully thought out grazing and brush management program. It must be realized that managing at a lower successional level may meet some wildlife species requirements very well, but may not be nearly as productive for grazing purposes. Lower successional levels may not be as capable of satisfying functions such as nutrient cycling, hydrologic protection, plant community stability or soil protection. A proper balance can be achieved with careful planning that considers

all resources.

Hydrological functions

Hydrologically, the site contributes runoff to the various draws, creeks, and streams that are common in the MLRA. If the perennial grass cover is maintained in good vigor, then maximum infiltration occurs and runoff is reduced. More water getting into the ground means a healthier, more productive plant community. If infiltration is minimal, then the effect is an artificially shallow soil with plant roots retreating to near the soil surface. More perennial grass cover means less runoff may result but the runoff that does occur is less laden with sediment. Overall watershed protection is enhanced by a healthy grassland community, as is nutrient cycling.

Recreational uses

Hunting, Camping, Hiking, Birdwatching, Photography, Horseback Riding

Wood products

None.

Other products

None.

Other information

None.

Inventory data references

NRCS FOTG – Section II of the FOTG Range Site Descriptions and numerous historical accounts of vegetative conditions at the time of early settlement in the area were used in the development of this site description. Vegetative inventories were made at several site locations for support documentation. Inventory Data References (documents): NRCS FOTG – Section II - Range Site Descriptions NRCS Clipping Data summaries over a 20 year period

Other references

J.R. Bell, USDA-NRCS Rangeland Management Specialist (retired)
Natural Resources Conservation Service - Range Site Descriptions
USDA-Natural Resources Conservation Service - Soil Surveys & Website soil database
Rathjen, Frederick W., The Texas Panhandle Frontier, Rev. 1998, Univ. of Texas Press
Hatch, Brown and Ghandi, Vascular Plants of Texas (Ecological Checklist)
Texas A&M Exp. Station, College Station, Texas
Texas Tech University – Range, Wildlife & Fisheries Department

Contributors

Clint Rollins, RMS, NRCS, Amarillo, Texas
Earl D. Archer
Todd Carr, SS, NRCS, Lubbock, Texas

Approval

Bryan Christensen, 9/11/2023

Acknowledgments

J.R. Bell, USDA-NRCS Rangeland Management Specialist (retired) Rathjen, Frederick W., The Texas Panhandle Frontier, Rev. 1998, Univ. of Texas Press

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)	Stan Bradbury, Zone RMS, NRCS, Lubbock, Texas
Contact for lead author	806-791-0581
Date	09/04/2007
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills: None to slight.

2. Presence of water flow patterns: None to slight.

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

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):
25-30% bare ground.

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

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

7. Amount of litter movement (describe size and distance expected to travel): None to slight.

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

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Loam to clay loam;
friable surface; high SOM.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on
infiltration and runoff: Basal cover and density with small interspaces should make rainfall impact minimal. This site has moderately
slow permeable soil; runoff is slow to medium; and available water holding capacity is high.

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 shortgrasses >>

Sub-dominant: Warm-season midgrasses > Cool-season midgrasses >

Other: Forbs > Shrubs/Vines

Additional:

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 minimal.

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

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):
800 to 2,000 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, pricklypear, yucca
and broom snakeweed can become invasive.

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