

Ecological site R077DY048TX

Shallow 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 MLRA 77D 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 midgrasses and sandy sites support tallgrasses 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 shallow, calcareous soils on uplands. The reference vegetation consists of primarily shortgrasses with midgrasses, few forbs, and very few shrubs. Abusive grazing practices can lead to a shift in the plant community. Removal of fire from the ecosystem can lead to an increase in woody plant cover.

Associated sites

R077DY042TX	Limy Upland 12-17" PZ Shallow sites can be found adjacent to Limy Upland sites, MLRA 77D. The Limy Upland sites occur as gently undulating soils that occur on broad upland plains. Midgrasses dominate but there is a good mixture shortgrasses on this site. Production is higher on the Limy Upland sites.
R077DY047TX	Sandy Loam 12-17" PZ Sandy loam sites, MLRA 77D, occur adjacent to Shallow sites as deeper soils on nearly level plains. Midgrasses dominate but some tallgrasses and shortgrasses can occur on this site. Production is higher on the Sandy Loam sites.
R077DY049TX	Very Shallow 12-17" PZ Very Shallow sites, MLRA 77D, occur adjacent to Shallow sites as shallower soils on nearly level plains. Shortgrasses dominate but a good mixture of midgrasses occur on this site. Production is often lower on the Very Shallow sites.

Similar sites

R077CY037TX	Very Shallow 16-21" PZ Very Shallow sites, MLRA 77C, have similar forage plant communities with higher production potential due to higher annual precipitation (16 to 21 inches).
R077EY068TX	Very Shallow 16-24" PZ Very Shallow sites, MLRA 77E, have similar forage plant communities with higher production potential due to higher annual precipitation (16 to 24 inches).
R077DY047TX	Sandy Loam 12-17" PZ Sandy loam sites, MLRA 77D, have similar forage plant communities with higher production potential.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Acacia greggii</i>
Herbaceous	(1) <i>Bouteloua eriopoda</i> (2) <i>Bouteloua dactyloides</i>

Physiographic features

Soils correlated in the MLRA 77D Shallow ecological site are shallow to a petrocalcic horizon. They were formed in moderately fine textured eolian sediments of the Blackwater Draw Formation of Pleistocene age. These soils are typically on gently sloping plains, narrow ridges, and side slopes along draws. Slope ranges from 0 to 15 percent.

The landforms for the Shallow site include Plains and Ridges.

Table 2. Representative physiographic features

Landforms	(1) Plateau > Plain (2) Plateau > Ridge
Runoff class	Medium to high
Flooding frequency	None
Ponding frequency	None
Elevation	460 – 1,620 m
Slope	0 – 20 %

Water table depth	200 cm
Aspect	W, NW, N, NE, E, SE, S, SW

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

The soils of this site are very shallow to shallow well drained, calcareous, gravelly soils. Permeability is moderate and runoff is low to medium. Parent material is a thin mantle of medium to moderately coarse textured eolian sediments over an indurated layer.

Major Soil Taxonomic Units correlated to this site include: Blakeney soils, Conger soils, Slaughter soils and Tonuco soils.

Table 4. Representative soil features

Parent material	(1) Eolian deposits – igneous, metamorphic and sedimentary rock
Surface texture	(1) Clay loam (2) Gravelly loam (3) Loam (4) Fine sandy loam (5) Loamy fine sand
Family particle size	(1) Clayey (2) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to rapid
Depth to restrictive layer	30 – 50 cm
Soil depth	30 – 50 cm
Surface fragment cover <=3"	0 – 10 %

Surface fragment cover >3"	Not specified
Available water capacity (0-50.8cm)	2.54 – 7.62 cm
Calcium carbonate equivalent (0-50.8cm)	0 – 60 %
Electrical conductivity (0-50.8cm)	Not specified
Sodium adsorption ratio (0-50.8cm)	Not specified
Soil reaction (1:1 water) (0-50.8cm)	7.4 – 8.4
Subsurface fragment volume <=3" (0-50.8cm)	0 – 40 %
Subsurface fragment volume >3" (0-50.8cm)	Not specified

Ecological dynamics

The Reference Plant Community of the Shallow Ecological Site was a Shortgrass/Midgrass Community (1.1). Few if any tallgrass species could be found. Grass species accounted for 90 percent of the total site production. A wide variety of forbs are produced on this site with scattered woody shrubs equally accounting for 10 percent of the total annual production. This site occurs on gently to moderately sloping upland areas. Slopes typically range from 1 to 5 percent. The soils of the site vary from shallow fine sandy loams to loams with a depth of 12 to 20 inches over indurated caliche. The soils have good plant-soil-moisture relationships, but moisture-holding capacity is moderate, often limiting productivity.

The dominant shortgrass species is black grama (*Bouteloua eriopoda*), with lesser amounts of buffalograss (*Bouteloua dactyloides*) and Wright threeawn (*Aristida wrightii*). Trace amounts of Hall's panicum (*Panicum hallii*), blue grama (*Bouteloua gracilis*) and hairy grama (*Bouteloua hirsuta*) can be found on the site. The dominant midgrass species is sideoats grama (*Bouteloua curtipendula*) and plains bristleglass (*Setaria macrostachya*), with lesser amounts of cane bluestem (*Bothriochloa barbinodis*), Arizona cottontop (*Digitaria californica*), sand dropseed (*Sporobolus cryptandrus*), slim tridens (*Tridens muticus*), tobosagrass (*Pleuraphis mutica*), vine mesquite (*Panicum obtusum*), and Reverchon bristleglass (*Setaria reverchonii*). A good variety of forbs exist but the amount varies greatly from year to year depending on moisture. The more commonly found forbs are trailing ratany (*Krameria lanceolata*), orange zexmania (*Zexmania hispida*), bush sunflower (*Simsia calva*), dotted gayfeather (*Liatris punctata*), white prairie clover (*Dalea albiflora*), gaura spp. (*Gaura* spp.), plains blackfoot (*Melampodium leucanthus*), tansy aster (*Machaeranthera tanacetifolia*), Texas croton (*Croton texensis*), Texas sleepy daisy (*Xanthisma texanum*), western ragweed (*Ambrosia psilostachya*), *Oenothera* spp. (*Oenothera* spp.), yellow spiny daisy (*Haplappus spinulosus*), and desert holly (*Atriplex hymenelytra*). The major shrubs are catclaw acacia (*Acacia greggii*), vine ephedra

(Ephedra antisiphilitica), lotebush (Ziziphus obtusifolia), pricklypear spp. (Opuntia spp.), javalina bush (Condalia ericoides), and winterfat (Krascheninnikovia lanata).

Fire plays a role in the ecology of this site as well as most other high plains sites. The general role of fire was to sustain the natural grassland and suppress shrubby species. Fire helps to keep a balance between the grasses, forbs and shrubs. However, in the shortgrass region, fire was probably secondary to climate in shaping the reference vegetative state. A drier climate (

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	Shortgrass			140-420	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	140-420	–
2	Midgrass			112-336	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	112-336	–
3	Midgrasses			196-588	
	large-spike bristlegass	SEMA5	<i>Setaria macrostachya</i>	56-168	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	28-84	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	28-84	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	28-84	–
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	28-84	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	0-1	–
	slim tridens	TRMUE	<i>Tridens muticus var. elongatus</i>	0-1	–
4	Shortgrasses			56-168	
	Wright's threeawn	ARPUW	<i>Aristida purpurea var. wrightii</i>	28-84	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	28-84	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0-6	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0-6	–
	Hall's panicgrass	PAHA	<i>Panicum hallii</i>	0-6	–
Forb					
5	Forbs			28-84	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	2-6	–
	desertholly	ATHY	<i>Atriplex hymenelytra</i>	2-6	–
	Texas croton	CRTE4	<i>Croton texensis</i>	2-6	–
	whiteflower prairie clover	DAAL	<i>Dalea albiflora</i>	2-6	–
	beeblossom	GAURA	<i>Gaura</i>	2-6	–
	trailing krameria	KRLA	<i>Krameria lanceolata</i>	2-6	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	2-6	–
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	2-6	–
	tanseyleaf tansyaster	MATA2	<i>Machaeranthera tanacetifolia</i>	2-6	–
	plains blackfoot	MELE2	<i>Melampodium leucanthum</i>	2-6	–
	evening primrose	OENOT	<i>Oenothera</i>	2-6	–
	awnless bushsunflower	SICA7	<i>Simsia calva</i>	2-6	–
	Texas sleepydaisy	XATE	<i>Xanthisma texanum</i>	2-6	–
Shrub/Vine					
6	Shrubs			28-84	

	bigtooth maple	ACGRG	<i>Acer grandidentatum</i> var. <i>grandidentatum</i>	4-13	–
	catclaw acacia	ACGRG3	<i>Acacia greggii</i> var. <i>greggii</i>	4-13	–
	javelina bush	COER5	<i>Condalia ericoides</i>	4-13	–
	clapweed	EPAN	<i>Ephedra antisyphilitica</i>	4-13	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	4-13	–
	pricklypear	OPUNT	<i>Opuntia</i>	4-13	–
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	4-13	–

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

This site is inhabited by dove, quail, deer and pronghorn. Limited populations of pronghorn antelope frequent the site. The limited amount of woody plants does not provide good cover and food sources for deer.

Hydrological functions

These shallow soils have moderate to moderately low runoff potential due to slopes which range from 1 to 5 percent. These soils are fertile and absorb water at a moderate rate. Moisture storage is limited by the 12 to 20 inch depth to indurated caliche.

Recreational uses

This site has very little value from an aesthetic standpoint. The site is occupied almost exclusively by native short and midgrass species with few woody shrubs. Recreational activities could include bird hunting, camping, hiking, bird watching, photography, and 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

Reviewers and Technical Contributors:
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Other references: (List other references used in the description or correlation of this site.)

J.R. Bell, USDA-NRCS Rangeland Management Specialist (retired)

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USDA-Natural Resources Conservation Service - Soil Surveys & Website soil database

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Approval

Bryan Christensen, 9/11/2023

Acknowledgments

Site Development and Testing Plan Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document. Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team. Mark Moseley, RMS, NRCS, Boerne, Texas Justin Clary, RMS, NRCS, Temple, Texas Kelly Attebury, RSS, NRCS, Lubbock, Texas

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: Slight to moderate.

2. Presence of water flow patterns: Slight to moderate.

3. Number and height of erosional pedestals or terracettes: Slight to moderate.

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): 20-25% bare ground.

5. Number of gullies and erosion associated with gullies: Slight to moderate.

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): Slight to moderate.

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

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Shallow clays and clay loam surfaces; weak fine granular surface; hard; friable; few fine roots; calcareous; moderately alkaline; moderate permeability; well drained; good plant-soil moisture; moderate SOM.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Low vegetative cover and percent slopes makes this site susceptible to erosion. This site is a very slowly permeable soil, runoff is medium to high depending on slopes and available water holding capacity is moderate to 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 midgrasses > Warm-season shortgrasses>>

Sub-dominant:

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.
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- 14. Average percent litter cover (%) and depth (in):** Litter is dominantly herbaceous.
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- 15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
500 to 1500 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:** Mesquite, pricklypear, and broom snakeweed can become invasive.
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- 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.
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