USDA Natural Resources Conservation Service

Ecological site R077EY061TX
Mixedland Slopes 16-24" 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.

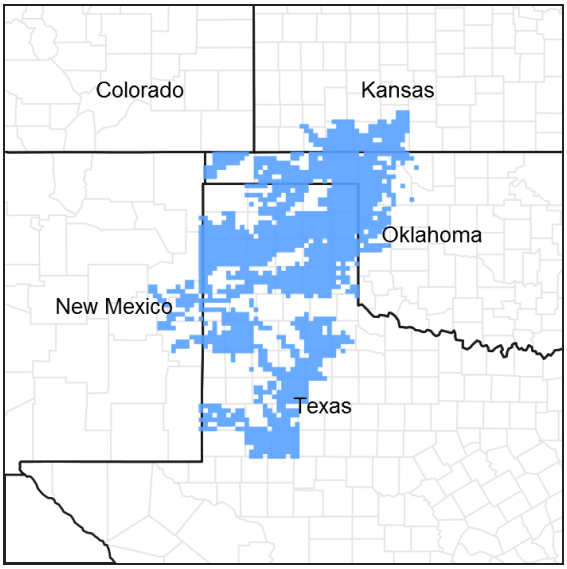


Figure 1. Mapped extent

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): 077E–Southern High Plains, Breaks

MLRA 77E occurs along moderately sloping breaks and steep escarpments associated with dissecting river systems and erosional margins of the Southern High Plains. Soil temperature regime is thermic and soil moisture regime is ustic bordering on aridic. Loamy and sandy soils are generally well drained, range from shallow to deep, and developed in Ogallala Formation sediments.

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

These sites occur on very deep sandy loam soils on uplands. The reference vegetation includes tallgrasses, midgrasses, forbs, and few shrub species. In the absence of periodic fire, woody canopy cover may increase and compete with the herbaceous plant community for resources. Continuous abusive grazing practices may also lead to a shift in plant community composition with less palatable species increasing in abundance.

Associated sites

R077EY051TX	**Clay Loam 16-24" PZ** Nearly level to gently sloping plains, divides, side slopes and upland terraces with very deep clay loam soils. Short grasses and midgrasses with scattered forbs and few shrubs.
R077EY053TX	**Gravelly 16-24" PZ** Gently sloping to steep hillslopes, very deep gravelly loams and gravelly sandy loam soils on adjacent positions. Up to 35% of the soil surface covered with gravels. Intermixed midgrasses and shortgrasses and forbs with occasional tallgrasses.
R077EY055TX	**Hardland Slopes 16-24" PZ** Nearly level to moderately steep fine-loamy calcareous soils on higher side slope positions. Dominantly shortgrass community with some midgrasses, forbs, and few woody species.
R077EY056OK	**Loamy Upland 16-24" PZ** Nearly level to sloping very deep fine-loamy and fine-silty soils on stream terraces, remnant stream terraces, paleoterraces, and aggraded hillslopes. Mid and tallgrass with forbs and very few woody species
R077EY057TX	**Limy Upland 16-24" PZ** Gently sloping to moderately sloping loamy soils with highly calcareous subsoils on higher hillslopes. Short and mid-grass dominate and with few tall grasses, perennial and annual forbs, and few woody species present.
R077EY064TX	**Sandy 16-24" PZ** Undulating to rolling loamy sand soils on adjacent positions. Dominantly tallgrasses, forbs, and few shrubs.
R077EY066TX	**Sandy Loam 16-24" PZ** Nearly level to hummocky sandy loam soils on adjacent positions. Mainly midgrass species with some tallgrasses, forbs, and scattered shrubs

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia filifolia*
Herbaceous	(1) *Schizachyrium scoparium* (2) *Andropogon hallii*

Physiographic features

This site is an upland with very deep, coarse-loamy calcareous soils and very gently to moderately steep sloping topography. It occurs as moderately long to long slopes averaging 1 to 20 percent and is a transitional site between the level portion of the high plains and the rolling terrain below. Cross slopes are gentle and the site may appear as a low ridges, slightly concave or convex areas, or as alluvial fans and benches incised by U-shaped gullies. The site is formed in exposed lower Ogallala sediments and slopes are generally in the direction of the major draws or streams. The position on the landscape is that of erosional slopes below high plains escarpments and above major drainages.

Table 2. Representative physiographic features

Landforms	(1) Plains > Hillslope (2) Plains > Ridge (3) Plains > Alluvial fan
Runoff class	Very low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	2,000–4,500 ft
Slope	1–20%
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Very low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	2,000–4,500 ft
Slope	0–45%

Climatic features

Climate is a cold semi-arid steppe (Koppen-Geiger classification BSk). Summers are hot and winters are cold. Temperature extremes are common. Humidity is generally low, evaporation is high, and short-term droughts are common. Average annual wind speed is 12 mph with highest winds in early spring. The prevailing wind direction is south. Summertime brings strong high pressure systems that build into heat domes with highs in the upper 90 to mid-100 degree F range. Evaporation in summer is high and open pan evaporation exceeds 6 feet per year. Early autumn temperatures are mild, with Canadian and Pacific cold fronts bringing cold air in mid-autumn throughout winter. Arctic air can settle in and dominate for several weeks during winter with very cold air in place for 2 to 3 weeks at a time.

Most of the precipitation comes in the form of rain from May through September. Rainfall events often occur as intense showers of relatively short duration. Snowfall average is about 17 inches but is also variable from 8 to 36 inches annually. Long term droughts are likely to occur every 15 to 20 years and may last 4 to 5 years. Mean precipitation is around 21 inches but varies significantly from year to year. Rainfall amounts over the last 100 years have varied from as little as 9 inches to as much as 37 inches. The probability is about 70% that precipitation will fall between 14 to 24 inches. Growing season averages 190 days. Average first frost is around October 22, and the last freeze of the season occurs around April 15.

Table 4. Representative climatic features

Frost-free period (characteristic range)	146-164 days
Freeze-free period (characteristic range)	184-194 days
Precipitation total (characteristic range)	20-24 in
Frost-free period (actual range)	144-176 days
Freeze-free period (actual range)	180-198 days
Precipitation total (actual range)	19-26 in
Frost-free period (average)	156 days
Freeze-free period (average)	189 days
Precipitation total (average)	22 in

Climate stations used

- (1) GATE [USC00343489], Gate, OK
- (2) FOLLETT [USC00413225], Follett, TX
- (3) CANADIAN [USC00411412], Canadian, TX
- (4) SANFORD DAM [USC00418040], Fritch, TX
- (5) GUYMON MUNI AP [USW00003030], Guymon, OK
- (6) BEAVER [USC00340593], Beaver, OK
- (7) MEADE [USC00145171], Meade, KS
- (8) BOYS RANCH [USC00411000], Vega, TX
- (9) CLARENDON [USW00023072], Clarendon, TX
- (10) LIPSCOMB [USC00415247], Booker, TX
- (11) CHANNING 2 [USC00411649], Channing, TX

- (12) MIAMI [USC00415875], Miami, TX
- (13) COLDWATER [USC00141704], Coldwater, KS
- (14) REYDON 2SSE [USC00347579], Reydon, OK

Influencing water features

Although infiltration on this site is moderate, the moderate to moderately steep slopes generate a significant amount of runoff. If good ground cover is present the runoff causes minimal erosion, but if ground cover is poor, gullies will develop. There are no surface water features present on this upland site other than some intermittent drainage ways that carry away runoff water during major rainfall events.

Wetland description

Soils in this ecological site are not part of wetland ecosystems.

Soil features

Soils are mapped for each county within the MLRA. Mapunits are representations of the major soil series component(s) and named accordingly. Each Mapunit is spatially represented on a digital soils map as polygons of different shapes and sizes. Within these Mapunits, there are often minor soil series components included. These minor components are soils that occur within a Mapunit polygon but are of small extent (15% or less of the Mapunit area). However, it is difficult to separate these minor soils spatially due to the scale of soil mapping.

Ecological sites are correlated at the component level of the soil survey. Therefore, a single Mapunit may contain multiple Ecological Sites just as it may contain multiple soil components. This is important to understand when investigating soils and Ecological Sites. A soil survey Mapunit may be correlated to a single Ecological Site based on the major component; however, there may be inclusions of areas of additional Ecological Sites which are correlated to the minor components of that particular soil Mapunit.

The Mixedland Slopes ecological site has nearly level to moderately steep slopes with deep, calcareous fine sandy loam soils. They infiltrate water relatively well, but have only moderate water storage capacity. Maximum amounts of water are available for plant use. Plant roots easily penetrate the subsoil. Fertility is moderate to moderately low. There is no evident accumulation of clay in the subsoil. The soils are highly susceptible to both wind and water erosion when devoid of cover.

Representative soil components for this site include: Alopark and Mobeetie. Older surveys may include the Otero series.

Table 5. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Fine sandy loam (2) Sandy loam (3) Loamy fine sand
Family particle size	(1) Coarse-loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	60–80 in
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0–2%
Available water capacity (0-40in)	3.8–7.6 in
Calcium carbonate equivalent (0-40in)	1–30%

Electrical conductivity (0-40in)	0–1 mmhos/cm
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (0-40in)	0–7%
Subsurface fragment volume >3" (0-40in)	0–2%

Ecological dynamics

The information contained in the State and Transition Diagram (STD) and the Ecological Site Description was developed using archeological and historical data, professional experience, and scientific studies. The information presented is representative of a very complex set of plant communities. Not all scenarios or plants are included. Key indicator plants, animals and ecological processes are described to inform land management decisions.
The reference plant community for this site is a mixture of tallgrasses, midgrasses, perennial forbs and a small amount of woody shrubs. It is a very diverse site and is capable of relatively high production when well managed. Plant available water is high due to moderately coarse soils and the lime content seems to favor plants like little bluestem (*Schizachyrium scoparium*) and sideoats grama (*Bouteloua curtipendula*). The other major grass species include sand bluestem (*Andropogon hallii*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), and assorted midgrass species. There are many perennial forb species present, including prairie clovers (Dalea spp.), daleas (Daleas spp.), Engelmann's daisy (*Engelmannia peristenia*), scurfpea (Psoralidium teniuflorum), sensitive briar (Mimosa spp.), gaura (Gaura spp.), bush morning-glory (*Ipomoea leptophylla*), spiderwort (Tradescantia spp.), dayflower (Commelina spp.) and many others. The main shrubs found on the site are sand sagebrush (*Artemisia filifolia*) and skunkbush sumac (Rhus tribolata). Infrequent sand plum (*Prunus angustifolia*) thickets and scattered yucca (Yucca spp.) also occur. Occasionally leadplant (*Amorpha canescens*) and inland ceanothus (*Ceanothus herbaceus*) can be found on well-managed sites. Trees are scarce but occasional hackberry (Celtis spp.), cottonwood (Populus spp.), and western soapberry (*Sapindus saponaria*) may be observed. The production and variety make this site excellent habitat for quail, deer, prairie chicken, and pronghorn and a preferred grazing site for domestic livestock, especially cattle.

Natural fires played a major role in the development and maintenance of the tallgrasses and generally helped keep woody shrubs suppressed. In the total absence of fire, shrubs tend to increase although slowly. With grazing abuse, exacerbated by weather extremes and absence of fire the shrub encroachment is more rapid. Generally this site in good ecological condition will produce enough fine fuel for fires to offer considerable suppression to woody vegetation.

All sites in this region developed under a fire/grazing interaction ecology. Large herbivores grazed the grasslands, especially following burns, and moved on seeking fresh forage. Recovery took place naturally because it is anticipated that sufficient recovery time usually took place before the animals returned to graze the same area again. Prescribed grazing techniques can somewhat simulate this natural process.

This is a preferred site for domestic livestock and overgrazing can easily occur. If the tallgrasses and palatable forbs are pressured for several years, plant succession will trend more toward midgrasses and shrubs. In instances of prolonged, severe grazing abuse, the site will revert to moderate canopies of sand sagebrush and short grass species. This site is diverse and productive, but perhaps not as resistant to ecological shifts in vegetation as the shortgrass sites that are associated with it. If the tallgrasses decline, midgrasses increase and shrub encroachment begins, the balance can be influenced toward the reference community by planned rest periods and the use of prescribed fire. In the absence of prescribed fire, the application of judicious chemical brush management can often produce similar results. The time period necessary to affect these kinds of vegetative changes is usually 3 to 4 years. Once midgrasses and a significant canopy of sagebrush dominate the site, a return to tallgrass dominance will seldom happen without brush management and growing season rest. This process may take as much as 5 to 6 years with careful grazing management. If the vegetative state reaches the sagebrush - shortgrass dominance, it is certainly indicative of severe grazing abuse for many years. The site may remain stable in the sagebrush-shortgrass state, but it is neither productive nor diverse. Restoring a tall and midgrass community may be difficult once the vegetation reaches the shortgrass shrub state. Reseeding may be feasible in some cases, but success depends on environmental conditions at the time, and the subsequent control of competing vegetation.

In the more diverse vegetative states, a variety of wildlife utilizes this site. The diversity of plant species makes this good habitat for quail, deer, pronghorn and lesser prairie chicken. Cover may be somewhat deficient for deer, but other sites in close proximity of this site may provide ample cover of woody vegetation. The quality of habitat is generally better for most species if the site is maintained as a tall and midgrass community. An exception to this might be quail, which prefer a lower ecological condition with more annual forbs as long as other habitat components exist on adjacent sites. Domestic livestock performance is much better if the tall and midgrass community is maintained. Ecological processes such as the nutrient cycle and the hydrological cycle are enhanced by the maintenance of a diverse, higher producing plant community.

State and Transition Diagram:
A State and Transition Diagram for the Mixedland Slopes (R077EY061TX) site is depicted below. Thorough descriptions of each state, transition, and pathway follow the model. Experts base this model on available experimental research, field observations, professional consensus, and interpretations. It is likely to change as knowledge increases.
Plant communities will differ across the MLRA because of the natural variability in weather, soils, and aspect. The Reference Plant Community is not necessarily the management goal; other vegetative states may be desired plant communities as long as the Range Health assessments are in the moderate and above category.

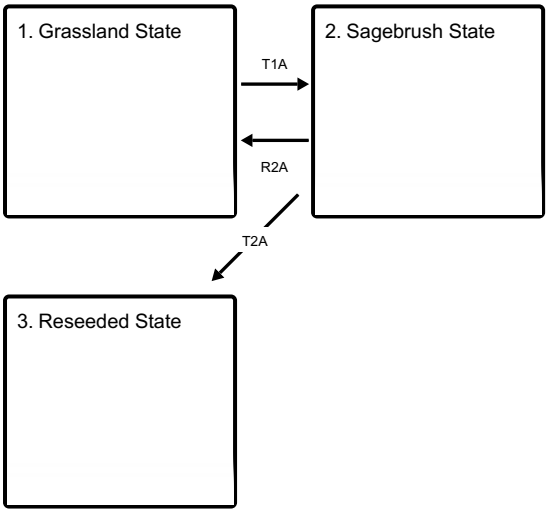
The biological processes on this site are complex. Therefore, representative values are presented in a land management context. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

Composition by dry weight and percent canopy cover are provided to describing the functional groups. Most observers find it easier to visualize or estimate percent canopy for woody species (trees and shrubs).

The following diagram suggests some pathways that the vegetation on this site might take. There may be other states not shown on the diagram. This information is intended to show what might happen in a given set of circumstances. It does not mean that this would happen the same way in every instance. Local professional guidance should always be sought before pursuing a treatment scenario.

State and transition model

Ecosystem states

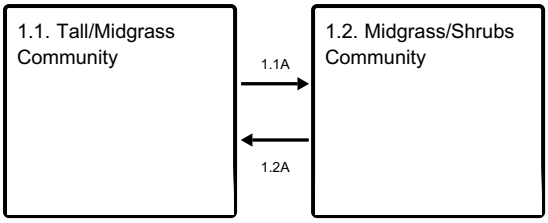


T1A - Absence of disturbance and natural regeneration over time, may be coupled with excessive grazing

R2A - Reintroduction of historic disturbance return intervals

T2A - Extensive soil disturbance followed by rangeland seeding

State 1 submodel, plant communities



State 2 submodel, plant communities

State 1
Grassland State

This is the reference or diagnostic community for the site. The description is based on early range site descriptions, clipping data, professional consensus of experienced range specialists, and analysis of field work.

Dominant plant species

- sand sagebrush (*Artemisia filifolia*), shrub
- little bluestem (*Schizachyrium scoparium*), grass
- big bluestem (*Andropogon gerardii*), grass

Community 1.1
Tall/Midgrass Community

Figure 8. 1.1 Tall/Midgrass Community

The reference plant community for the Mixedland Slopes ecological site is a Tall/Midgrass Community having a variety of tallgrasses, midgrasses, perennial forbs and few woody shrubs. Tallgrasses dominate the site with a lesser component of midgrasses present. Perennial forbs are common with diverse species. Major shrubs are yucca, sand sagebrush, and skunkbush sumac with smaller amounts of sand plum. Some buildup of old plant material can occur on this site without prescribed burning or grazing pressure.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1280	1920	2400
Forb	180	285	360
Shrub/Vine	80	145	190
Microbiotic Crusts	20	30	30
Tree	20	20	20
Total	**1580**	**2400**	**3000**

Figure 10. Plant community growth curve (percent production by month). TX1512, HCPC - Warm Season Natives. "Historic Climax Plant Community with warm season natives, scattered forbs and woody species.".

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	4	7	19	23	17	8	12	5	2	1

Community 1.2
Midgrass/Shrubs Community

Figure 11. 1.2 Midgrass/Shrubs Community

This plant community is dominated by midgrasses with 10 – 15% sand sagebrush. Some tallgrass species remain. Western ragweed has increased. This vegetative state can be reverted to the Tall/Midgrass Community with brush management and growing season rest followed by prescribed grazing. A tall and midgrass community can probably be restored within 4 to 5 years. After restoration, prescribed fire and prescribed grazing are practices needed to sustain the tall grass dominance.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	900	1400	1700
Shrub/Vine	150	250	350
Forb	150	220	250
Tree	20	20	20
Microbiotic Crusts	5	5	10
Total	**1225**	**1895**	**2330**

Figure 13. Plant community growth curve (percent production by month). TX1527, Mixed grasses (Shortgrass Dominant) and shrubs (Sand sage). Shortgrass dominant with shrubs..

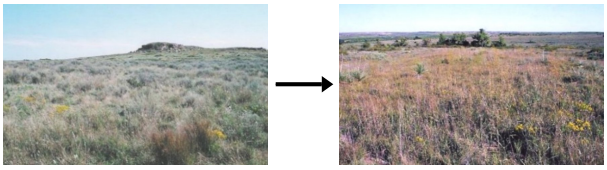
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	6	10	20	18	16	10	10	6	2	0

Pathway 1.1A
Community 1.1 to 1.2

Tall/Midgrass Community | Midgrass/Shrubs Community

Heavy continuous grazing and no fire over a fifteen to twenty-five year period can lead to a shift from a Tall/Midgrass Community to a Midgrass/Shrubs Community.

Pathway 1.2A
Community 1.2 to 1.1



Midgrass/Shrubs Community | Tall/Midgrass Community

The implementation of various conservation practices would benefit the Tall/Midgrass Community from the Midgrass/Shrubs plant community. Such practices include Prescribed Grazing, Brush Management, and Prescribed Burning over a five to six year period.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

State 2
Sagebrush State

Dominant plant species

- sand sagebrush (*Artemisia filifolia*), shrub
- skunkbush sumac (*Rhus trilobata*), shrub
- little bluestem (*Schizachyrium scoparium*), grass

Community 2.1
Sagebrush/Shortgrass Community

Figure 14. 2.1 Sagebrush/Shortgrass Community

This community is dominated by shortgrasses and sand sagebrush. Shortgrasses include blue grama along with buffalograss and perennial three-awn. Sand sagebrush is increasing in size and density. The productive capacity is greatly reduced from that of the reference plant community. Infiltration is much less, runoff greatly accelerated, and the ecological processes are not operating efficiently. The community is lacking in diversity and the quality of wildlife habitat and the grazing resource is much less than the original tall and midgrass community. It is questionable whether or not it can be restored to the Tall/Midgrass Community (1.1) because of the lack of tallgrass seed source and the dominance of a sod forming, grazing tolerant species such as blue grama. Brush management by herbicide application and light stocking in winter plus two years of complete rest in the growing season will improve the ecological condition to the point that midgrasses such as sideoats grama, and possibly some tallgrasses, are more abundant and production is greater. This management scenario will shift the plant community closer to plant community 1.2.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	600	1000	1100
Shrub/Vine	200	250	300
Forb	50	100	200
Tree	20	20	20
Microbiotic Crusts	5	5	10
Total	**875**	**1375**	**1630**

Figure 16. Plant community growth curve (percent production by month). TX1748, Shortgrass/Shrubs. Shortgrasses dominate with some shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	6	11	22	20	10	8	10	6	4	1

State 3
Reseeded State

This state has been reseeded with native species that were present in the reference state. However, the resulting plant community may be highly variable based on seed mixtures, weather patterns, and other management practices.

Transition T1A
State 1 to 2

With the continuation of heavy grazing and no fires, the Grassland State will transition into the Sagebrush State.

Restoration pathway R2A
State 2 to 1

With the use of the following conservation practices (Prescribed Grazing, Brush Management, and Prescribed Burning), the Sagebrush State can be restored back to the Grassland State.

Conservation practices

Brush Management
Prescribed Grazing
Range Planting
Integrated Pest Management (IPM)

Transition T2A
State 2 to 3

With the use of Prescribed Grazing, Brush Management, Range Planting, and Pest Management conservation practices, the Sagebrush State will transition into the Reseeded State.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Midgrass**			200–375	
	sideoats grama	BOCU	*Bouteloua curtipendula*	200–375	–
2	**Tallgrasses**			600–1125	
	little bluestem	SCSC	*Schizachyrium scoparium*	600–1125	–
	sand bluestem	ANHA	*Andropogon hallii*	200–375	–
3	**Tallgrasses**			200–375	
	switchgrass	PAVI2	*Panicum virgatum*	0–190	–
	Indiangrass	SONU2	*Sorghastrum nutans*	0–190	–
4	**Coolseason grasses**			130–240	
	Canada wildrye	ELCA4	*Elymus canadensis*	0–80	–
	Texas wintergrass	NALE3	*Nassella leucotricha*	0–80	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–80	–
5	**Midgrasses/Shortgrasses**			260–500	
	purple threeawn	ARPU9	*Aristida purpurea*	0–125	–
	buffalograss	BODA2	*Bouteloua dactyloides*	0–125	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–125	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–125	–
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	0–125	–
	hooded windmill grass	CHCU2	*Chloris cucullata*	0–125	–
	fall witchgrass	DICO6	*Digitaria cognata*	0–125	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0–125	–
	sand lovegrass	ERTR3	*Eragrostis trichodes*	0–125	–
	Hall's panicgrass	PAHAH	*Panicum hallii var. hallii*	0–125	–

	Drummond's dropseed	SPCOD3	*Sporobolus compositus var. drummondii*	0–125	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–125	–
Forb					
6	**Forbs**			180–360	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–90	–
	blue wild indigo	BAAUM	*Baptisia australis var. minor*	0–90	–
	lyreleaf greeneyes	BELY	*Berlandiera lyrata*	0–90	–
	yellow sundrops	CASE12	*Calylophus serrulatus*	0–90	–
	rose heath	CHER2	*Chaetopappa ericoides*	0–90	–
	partridge pea	CHFA2	*Chamaecrista fasciculata*	0–90	–
	whitemouth dayflower	COER	*Commelina erecta*	0–90	–
	prairie clover	DALEA	*Dalea*	0–90	–
	bundleflower	DESMA	*Desmanthus*	0–90	–
	Engelmann's daisy	ENGEL	*Engelmannia*	0–90	–
	buckwheat	ERIOG	*Eriogonum*	0–90	–
	tall buckwheat	ERTEP	*Eriogonum tenellum var. platyphyllum*	0–90	–
	shaggy dwarf morning-glory	EVNU	*Evolvulus nuttallianus*	0–90	–
	beeblossom	GAURA	*Gaura*	0–90	–
	gilia	GILIA	*Gilia*	0–90	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	0–90	–
	stiffleaf false goldenaster	HEST3	*Heterotheca stenophylla*	0–90	–
	Venus' pride	HOPUP3	*Houstonia purpurea var. purpurea*	0–90	–
	bush morning-glory	IPLE	*Ipomoea leptophylla*	0–90	–
	trailing krameria	KRLA	*Krameria lanceolata*	0–90	–
	dotted blazing star	LIPU	*Liatris punctata*	0–90	–
	hoary blackfoot	MECIR	*Melampodium cinereum var. ramosissimum*	0–90	–
	plains blackfoot	MELE2	*Melampodium leucanthum*	0–90	–
	grassland blazingstar	MEST3	*Mentzelia strictissima*	0–90	–
	Nuttall's sensitive-briar	MINU6	*Mimosa nuttallii*	0–90	–
	beebalm	MONAR	*Monarda*	0–90	–
	Trans-Pecos stinkleaf	NEFO	*Nectouxia formosa*	0–90	–
	prairie goldenrod	OLAL2	*Oligoneuron album*	0–90	–
	James' nailwort	PAJA	*Paronychia jamesii*	0–90	–
	Fendler's penstemon	PEFE	*Penstemon fendleri*	0–90	–
	white milkwort	POAL4	*Polygala alba*	0–90	–
	James' holdback	POJA5	*Pomaria jamesii*	0–90	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	0–90	–
	pitcher sage	SAAZG	*Salvia azurea var. grandiflora*	0–90	–
	Drummond's skullcap	SCDR2	*Scutellaria drummondii*	0–90	–
	ragwort	SENEC	*Senecio*	0–90	–
	diamondflowers	STNIN	*Stenaria nigricans var. nigricans*	0–90	–
	queen's-delight	STSY	*Stillingia sylvatica*	0–90	–

	[illegible]		[illegible]	[illegible]	
	Virginia tephrosia	TEVI	*Tephrosia virginiana*	0–90	–
	stiff greenthread	THFI	*Thelesperma filifolium*	0–90	–
	prairie spiderwort	TROC	*Tradescantia occidentalis*	0–90	–
Shrub/Vine					
7	**Shrubs**			80–190	
	California amaranth	AMCA	*Amaranthus californicus*	0–40	–
	sand sagebrush	ARFI2	*Artemisia filifolia*	0–40	–
	Jersey tea	CEHE	*Ceanothus herbaceus*	0–40	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–40	–
	Oklahoma plum	PRGR	*Prunus gracilis*	0–40	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–40	–
	yucca	YUCCA	*Yucca*	0–40	–
Tree					
8	**Trees**			20	
	hackberry	CELTI	*Celtis*	0–10	–
	cottonwood	POPUL	*Populus*	0–10	–
	western soapberry	SASAD	*Sapindus saponaria var. drummondii*	0–10	–

Animal community

The animals that use the site as habitat are mainly small mammals, songbirds, with species such as white-tailed deer, mule deer, pronghorn, bobwhite quail and lesser prairie chicken. Predators such as coyote and bobcat hunt prey on this site and will bed down during the day. If the tall and midgrass and forb community exists, this diversity makes the site suitable habitat for all species with the possible exception of quail, which prefer a lower ecological condition with more annual forb species. If the site is abused and becomes short grass dominated, then wildlife numbers will be considerably less.

Hydrological functions

If this site is managed at near the reference plant community, runoff is reduced and infiltration is high. If the site is abused and shortgrasses prevail, then infiltration is low and runoff is increased. It should be noted that if blue grama is growing in a bunchgrass form, then infiltration could slightly increase. The diversity of plants in the reference plant community improves the nutrient cycling process as well as the hydrologic cycle. The site is an upland and has no surface water features itself but due to landscape position, it is important from a watershed standpoint.

Recreational uses

Hunting, camping, hiking, birdwatching, 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.

NRCS FOTG – Section II - Range Site Descriptions
NRCS – NRI 417 data
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 (An Ecological Checklist)
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Approval

Bryan Christensen, 9/12/2023

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.

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	Bryan Christensen
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):** Resistant to surface erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Fine sandy loam; friable; medium 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 will make rainfall impact minimal. This site is moderately permeable soil, runoff is medium and available water holding capacity is medium.

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 tallgrasses >>

    Sub-dominant: Warm-season midgrasses > Shrubs/Vines >

    Other: Cool-season midgrasses > Forbs > Trees

    Additional:

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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 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):** 1,600 - 3,000 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:** Yucca, sand sagebrush, and sand shinoak can be 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.
