

## Ecological site R077EY068TX Very Shallow 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.

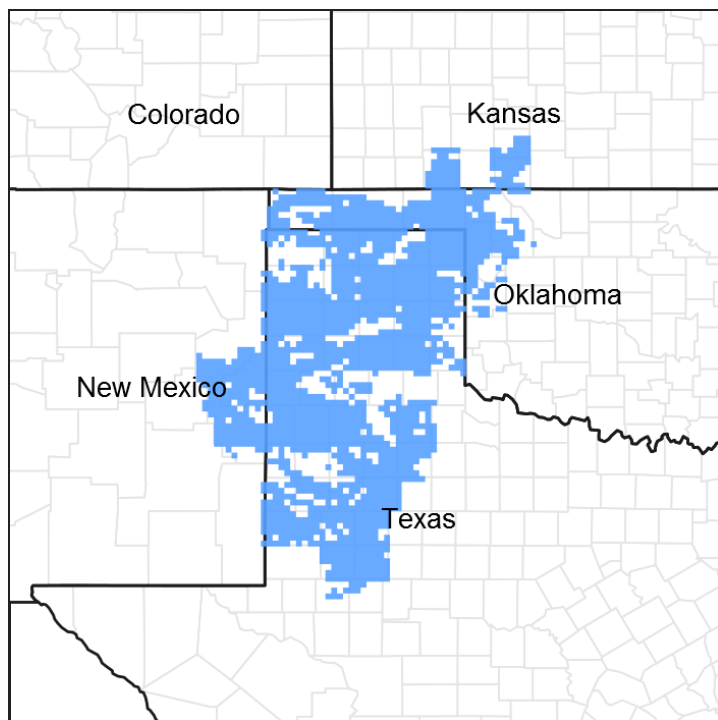


Figure 1. Mapped extent

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 shallow and very shallow soils on uplands. Reference vegetation consists of native tall, mid and shortgrasses with forbs and scattered shrubs. Without proper grazing management, the plant community may shift towards a shortgrass dominated site. Additionally, in the absence of periodic fire or brush management, woody species may increase in abundance.

## Associated sites

R077EY057TX	<b>Limy Upland 16-24" PZ</b> Gently sloping to moderately sloping loamy soils with highly calcareous subsoils on similar positions or slightly lower side slopes. Short and mid-grass dominate and with few tall grasses, perennial and annual forbs, and few woody species present.
R077EY062TX	<b>Breaks 16-24" PZ</b> Strongly sloping to very steep, shallow, loamy soils often intermixed with rock outcrops on higher positions. A mixture of grasses, forbs, shrubs, and a few trees with bare ground. Many rocks and cobbles on the surface.

## Similar sites

R077AY013TX	<b>Very Shallow 16-22" PZ</b> A similar site in MLRA 77A with soils formed in calcareous loess with petrocalcic horizons in a slightly cooler mesic soil temperature regime.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Dalea formosa</i>
Herbaceous	(1) <i>Bouteloua curtipendula</i> (2) <i>Bouteloua gracilis</i>

## Physiographic features

This is an upland site with very shallow soil over caliche or limestone. It occurs on ridges,

hills, structural benches, and along escarpments. Slopes are nearly level to steep. There are often rock fragments of caliche on the soil surface and occasionally bedrock will be showing as rock outcrops. The parent material may be very hard such as limestone or indurated caliche or it may be softer caliche of the upper Ogallala. The parent material is harder where it is exposed along escarpments.

**Table 2. Representative physiographic features**

Landforms	(1) Plains > Ridge (2) Plains > Escarpment (3) Plains > Structural bench (4) Plains > Hill
Runoff class	Medium to very high
Flooding frequency	None
Ponding frequency	None
Elevation	2,000–4,500 ft
Slope	1–45%
Aspect	Aspect is not a significant factor

**Table 3. Representative physiographic features (actual ranges)**

Runoff class	Medium to very high
Flooding frequency	None
Ponding frequency	None
Elevation	2,000–4,500 ft
Slope	1–45%

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

Overland flow from intense rains moves across the site to streams lower on the landscape.

## 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.

Soils are very shallow to shallow, well drained and calcareous. Geologic erosion has stripped away soil material along these erosional surfaces. The exposed sediments are of upper Ogallala origin. Some very shallow sites have leached carbonates which may form petrocalcic horizons. The soil may be loam, clay loam or sandy loam in texture and is usually rocky or gravelly in nature. Petrocalcic horizons and hard arenaceous limestone residuum are impermeable while the softer caliche residuum is moderately permeable. Available water holding capacity is low and fertility is low. Plant growth and production is limited due to shallow depth. Cracks in underlying bedrock can allow water to penetrate. Shrubs and grasses with deep root systems may be able to access some of this moisture.

Representative soil components for this site include: Potter and Laverne.

**Table 5. Representative soil features**

Parent material	(1) Residuum–arenaceous limestone
Surface texture	(1) Gravelly loam (2) Gravelly clay loam (3) Fine sandy loam (4) Loam (5) Clay loam
Family particle size	(1) Loamy (2) Loamy-skeletal
Drainage class	Well drained to somewhat excessively drained

Permeability class	Very slow to moderate
Depth to restrictive layer	0–20 in
Soil depth	0–20 in
Surface fragment cover ≤3"	1–25%
Surface fragment cover >3"	0–5%
Available water capacity (0-40in)	0.4–4.6 in
Calcium carbonate equivalent (0-40in)	5–80%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–1
Soil reaction (1:1 water) (0-20in)	7.4–8.4
Subsurface fragment volume ≤3" (0-20in)	4–65%
Subsurface fragment volume >3" (0-20in)	1–20%

## 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 is composed of mixed grasses, forbs and low growing shrubs. Vegetation is somewhat sparse compared to other sites with deeper soils. Bare soil with exposed rock is usually evident in this site. The soils are often limy in nature which, along with shallow soil depth, affects both quantity of vegetation and species composition. Production is limited and the limy nature of the soils has some influence on the palatability of some of the plant species. Usually, livestock will not graze this site as heavily as sites with more developed soils. Tall, mid and shortgrass species can be found on the site, with tall and midgrasses being dominant. A good variety of perennial forbs is usually present. Scattered low growing shrubs may make up 10% of the total vegetation.

The major grass species include: little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsuta*), black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), wright threeawn (*Aristida purpurea* var. *wrightii*),

and New Mexico feathergrass (*Hesperostipa neomexicana*) along with smaller amounts of big bluestem (*Andropogon gerardii*), and Indiangrass (*Sorghastrum nutans*). Major forbs include: plains actinea (*Tetaneuris scaposa*), longleaf buckwheat (*Eriogonum longifolium*), blackfoot daisy (*Melampodium leucanthum*), dotted gayfeather (*Liatris punctata*), trailing ratany (*Krameria lanceolata*), broom nailwort (*Paronychia jamesii*), baby white aster (*Chaetopappa ericoides*), halfshrub sundrop (*Calylophus serrulata*), skullcap (*Scutellaria drummondi*), and purple coneflower (*Echinacea angustifolia*). The most common low growing shrubs are: feather dalea (*Dalea formosa*) and catclaw mimosa (*Mimosa aculeaticarpa* var. *biuncifera*), with occasional plains greasebush (*Fosellesia plantierum*), mountain mahogany (*Cercocarpus montanus*) and skunkbush sumac (*Rhus trilobata*). Occasional one seeded juniper (*Juniperus monosperma*) and shrubby hackberry (*Celtis* spp.) occur locally.

Along with depth of soil, there are other factors affecting vegetation on the site. Natural fire very likely helped promote a grassland aspect and kept woody shrubs from dominating. Large herbivore grazers who visit the site then moved on kept grazing pressure limited. Dryness of the site probably played the greatest part in shaping the historic vegetation. This site may have changed less than many sites due to less inherent fertility, thus less grazing pressure from livestock. However, grazing abuse can occur and sites that have been protected usually have more of the tallgrass species present. If this site is abused, it will quickly give way to perennial three-awn and broom snakeweed; and in extreme cases, broom snakeweed and annuals can become dominant. When the site is extremely degraded, it is unlikely that the historic community can ever be approached again. While the very shallow site is generally a resistant site, severe abuse can lead to advanced surface erosion due to lack of protective plant cover.

#### State and Transition Diagram:

A State and Transition Diagram for the Very Shallow (R077EY068TX) 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.

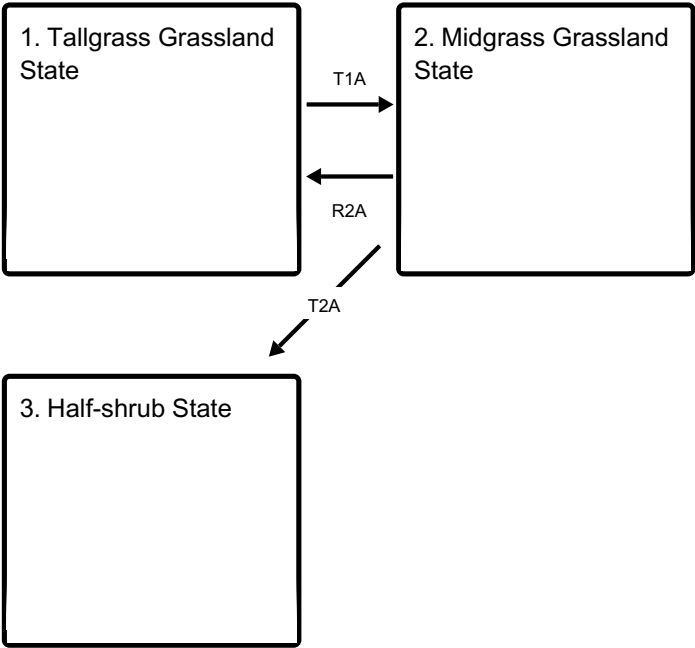
The biological processes on this site are complex. Therefore, representative values are presented in a land management context. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every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

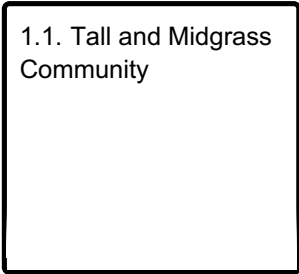
## State and transition model

### Ecosystem states



- T1A** - Absence of disturbance, natural regeneration over time, and excessive grazing pressure
- R2A** - Reintroduction of historic disturbance return intervals
- T2A** - Absence of disturbance, natural regeneration over time, and prolonged excessive grazing pressure

### State 1 submodel, plant communities



### State 2 submodel, plant communities



### State 3 submodel, plant communities

3.1. Half-shrub  
Dominant Community

## State 1

### Tallgrass 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

- featherplume (*Dalea formosa*), shrub
- sideoats grama (*Bouteloua curtipendula*), grass
- blue grama (*Bouteloua gracilis*), grass

## Community 1.1

### Tall and Midgrass Community



Figure 8. 1.1 Tall and Midgrass Community

The interpretive plant community for this site is the reference plant community. This community is a balanced mixture of tall, mid and short grasses, a variety of perennial forbs, and scattered short woody shrubs. Little bluestem, sideoats grama and New Mexico feathergrass are the dominant grass species. There are a few short shrubs, namely feather dalea and plains greasebush. Several perennial forbs are present in this plant

community such as plains actinea, echinacea, and primrose species.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	500	750	850
Forb	50	90	100
Shrub/Vine	50	60	90
Microbiotic Crusts	10	20	25
Tree	0	0	1
<b>Total</b>	<b>610</b>	<b>920</b>	<b>1066</b>

Figure 10. Plant community growth curve (percent production by month).  
TX1528, Mid and Tall grasses with forbs and low shrubs (good condition).  
Mid and tallgrasses with desirable forbs and low shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	4	6	10	20	24	10	5	10	7	2	1

## State 2

### Midgrass Grassland State

#### Dominant plant species

- sideoats grama (*Bouteloua curtipendula*), grass
- blue grama (*Bouteloua gracilis*), grass
- threeawn (*Aristida*), grass

## Community 2.1

### Mid/Shortgrass Community



Figure 11. 2.1 Mid/Shortgrass Community

Midgrasses are dominating the plant community with low growing shrubs. Sideoats grama, blue grama, and perennial three-awn are the major grasses found on the site. Increasing perennial three-awn and broom snakeweed.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	500	600	700
Forb	30	75	100
Shrub/Vine	50	70	85
Tree	0	0	0
Microbiotic Crusts	0	0	0
<b>Total</b>	<b>580</b>	<b>745</b>	<b>885</b>

Figure 13. Plant community growth curve (percent production by month). TX1530, Midgrass dominant with low growing halfshrubs. Warm season midgrasses dominating the plant community with low growing halfshrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	5	20	25	17	8	15	4	1	1

### State 3 Half-shrub State

#### Dominant plant species

- broom snakeweed (*Gutierrezia sarothrae*), shrub
- yucca (*Yucca*), shrub

### Community 3.1

#### Half-shrub Dominant Community



**Figure 14. 3.1 Half-shrub Dominant Community**

Low producing shortgrasses with broom snakeweed and increase of bare soil. No mid and tallgrasses are remaining in this plant community.

**Table 8. Annual production by plant type**

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	250	350	500
Shrub/Vine	375	400	450
Forb	30	40	50
Tree	0	5	5
Microbiotic Crusts	0	0	0
<b>Total</b>	<b>655</b>	<b>795</b>	<b>1005</b>

**Figure 16. Plant community growth curve (percent production by month). TX1529, Halfshrub Dominant with low producing shortgrasses. Warm and cool season halfshrubs dominating the plant community with scattered low producing shortgrasses..**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	8	16	25	5	5	10	16	8	3

### Transition T1A

#### State 1 to 2

With Heavy Continuous Grazing and No Fires, the Tallgrass Grassland State will transition to the Midgrass Grassland State.

## Restoration pathway R2A State 2 to 1

With Prescribed Grazing and Prescribed Burning conservation practices, the Midgrass Grassland State can be restored back to the Tallgrass Grassland State.

### Conservation practices

Prescribed Burning
Prescribed Grazing

## Transition T2A State 2 to 3

With heavy continuous grazing, brush invasion, no brush management, and no pest management, the Midgrass Grassland State will transition into the Half-shrub State.

## Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Midgrasses</b>			300–500	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	160–270	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	140–230	–
2	<b>Cool season Grass</b>			75–125	
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	75–125	–
3	<b>Midgrasses</b>			120–200	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	50–79	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	15–26	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	12–21	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	12–21	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	10–16	–
	slim tridens	TRMU	<i>Tridens muticus</i>	10–16	–
	silver beardgrass	BOLAT	<i>Bothriochloa laguroides</i>	6–11	–

			<i>ssp. torreyana</i>		
	hairy woollygrass	ERPI5	<i>Erioneuron pilosum</i>	6–11	–
4	<b>Tallgrasses</b>			50–75	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	20–40	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	20–40	–
<b>Forb</b>					
5	<b>Forbs</b>			50–100	
	Forb, annual	2FA	<i>Forb, annual</i>	0–25	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0–25	–
	yellow sundrops	CASE12	<i>Calylophus serrulatus</i>	0–25	–
	rose heath	CHER2	<i>Chaetopappa ericoides</i>	0–25	–
	Texas croton	CRTE4	<i>Croton texensis</i>	0–25	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–25	–
	longleaf buckwheat	ERLO5	<i>Eriogonum longifolium</i>	0–25	–
	warty spurge	EUSP	<i>Euphorbia spathulata</i>	0–25	–
	shaggy dwarf morning-glory	EVNU	<i>Evolvulus nuttallianus</i>	0–25	–
	rushpea	HOFFM	<i>Hoffmannseggia</i>	0–25	–
	collegeflower	HYFL	<i>Hymenopappus flavescens</i>	0–25	–
	trailing krameria	KRLA	<i>Krameria lanceolata</i>	0–25	–
	Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	0–25	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	0–25	–
	hoary blackfoot	MECI	<i>Melampodium cinereum</i>	0–25	–
	plains blackfoot	MELE2	<i>Melampodium leucanthum</i>	0–25	–
	grassland blazingstar	MEST3	<i>Mentzelia strictissima</i>	0–25	–
	evening primrose	OENOT	<i>Oenothera</i>	0–25	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–25	–
	yellow nailwort	PAVI4	<i>Paronychia virginica</i>	0–25	–
	Fendler's penstemon	PEFE	<i>Penstemon fendleri</i>	0–25	–
	curlytop knotweed	POLA4	<i>Polygonum lapathifolium</i>	0–25	–
	slimflower scurfpea	PSTE5	<i>Psoralidium tenuiflorum</i>	0–25	–

	stemmy four-nerve daisy	TESC2	<i>Tetrandeureis scaposa</i>	0–25	–
	branched noseburn	TRRA5	<i>Tragia ramosa</i>	0–25	–
<b>Shrub/Vine</b>					
6	<b>Shrubs/Vines</b>			50–90	
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	0–25	–
	featherplume	DAFO	<i>Dalea formosa</i>	0–25	–
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa</i> var. <i>biuncifera</i>	0–25	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–25	–
	fragrant sumac	RHAR4	<i>Rhus aromatica</i>	0–25	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–25	–
<b>Tree</b>					
7	<b>Trees</b>			0–10	
	hackberry	CELT1	<i>Celtis</i>	0–10	–
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	0–10	–

## Animal community

Pronghorn antelope, white-tailed deer and mule deer utilize the site for browsing. The site has little cover for bob-white quail but scaled quail frequent the site during feeding. The Texas horned lizard is often present along with several species of lizards and snakes. A few species of small mammals often find dens in rock crevices.

## Hydrological functions

Runoff water from the site will enter streams lower on the landscape. The site yields considerable runoff if the slope is more than 3% and if cover is poor.

## Recreational uses

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

## Wood products

None.

## Other products

On occasion, this site has been mined for calcium carbonate (caliche) for road construction material.

## **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. Several years of clipping data were surveyed.

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, RMS, NRCS, Amarillo, Texas (retired)

Natural Resources Conservation Service Range Site Descriptions

USDA-Natural Resources Conservation Service Soil Surveys

Rathjen, Frederick W., The Texas Panhandle Frontier, Rev. 1998, Univ. of Texas Press

Hatch, Brown and Ghandi, Vascular Plants of Texas (An Ecological Checklist), Texas

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## **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.

## Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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Contact for lead author	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:** Due to percent slopes, rills will be common.

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2. **Presence of water flow patterns:** Due to percent slopes, water flow patterns will be common.

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3. **Number and height of erosional pedestals or terracettes:** Due to percent slopes, pedestals and terracettes will be common.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 25-30% mineral soil, low percentage due to rock fragments scattered throughout the soil profile.
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5. **Number of gullies and erosion associated with gullies:** None to slight.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** None to slight.
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7. **Amount of litter movement (describe size and distance expected to travel):** None to slight.
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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Moderately resistant to surface erosion.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Loam; friable; low SOM.
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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 moderately permeable soil, runoff is medium, and available water holding capacity is very low.
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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:

Sub-dominant: Warm-season midgrasses = Warm-season tallgrasses > Warm-season shortgrasses = Cool-season midgrasses >

Other: Shrubs/Vines > 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):** 600 to 1,100 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, juniper and broom snakeweed 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.

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