USDA Natural Resources Conservation Service

Ecological site R077AY001TX
Deep Hardland 16-22" PZ

Last updated: 9/11/2023
Accessed: 05/03/2024

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): 077A–Southern High Plains, Northern Part

MLRA 77A is characterized by nearly level plains with playa depressions and sloping breaks along rivers and creeks. Soils are generally deep, fine-textured, and occur in a mesic soil temperature regime.

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 over deep fine-textured soils on uplands. The reference vegetation consists of shortgrasses with some midgrasses and forbs. Woody species such as cactus and yucca may be present in small amounts. In the absence of fire, woody species may increase in density. Abusive grazing practices may lead to a decline in the more palatable midgrass species.

Associated sites

R077AY002TX	**Draw 16-22" PZ** Gently sloping loamy soils on lower positions that receive water run-on from adjacent sites. Due to increased water availability this site has higher production potential with tall and mid grasses.
R077AY006TX	**Limy Upland 16-22" PZ** 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.
R077AY015KS	**Loamy Upland 16-22" PZ** Nearly level to gently sloping soils on adjacent positions formed in mixed loamy and silty eolian deposits with subsoils of fine-loamy or fine-silty argillic horizons. Mixture of tall and mid grass species dominate with a few woody species present.
R077AY004OK	**Parna Dune 16-22" PZ** Gently to moderately sloping silty and loamy soils formed in calcareous parna on higher adjacent dune positions. Dominated by mid- and shortgrass species with very few woody species.
R077AY005TX	**Playa 16-22" PZ** Nearly level clayey soils with high shrink-swell potential on lower closed depression playa positions that intermittently pond water. Vegetation is variable and includes hydrophytes.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Bouteloua gracilis* (2) *Bouteloua dactyloides*

Physiographic features

This site is classified as an upland and consists of level to gently sloping smooth plains located on the High Plains north of the South Canadian River and south of the Cimarron River. Slopes range from 0 to 3 percent but average from 0.5 to 1.0 percent. Depressional basins known as playa lakes occur intermittently in an otherwise level landscape.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Talf
Landforms	(1) Plains > Plain (2) Plains > Interfluve
Runoff class	Medium to very high
Flooding frequency	None
Ponding frequency	None
Elevation	762–1,372 m
Slope	0–3%
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	701–1,521 m
Slope	0–5%

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, and short-term droughts are common. Humidity is generally low and evaporation high. 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 15 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 19 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 inches and 23 inches. Growing season averages 180 days. Average first frost is around October 17, and the last freeze of the season occurs around April 21.

Table 4. Representative climatic features

Frost-free period (characteristic range)	143-156 days
Freeze-free period (characteristic range)	175-190 days
Precipitation total (characteristic range)	457-533 mm
Frost-free period (actual range)	138-163 days
Freeze-free period (actual range)	169-194 days
Precipitation total (actual range)	457-559 mm
Frost-free period (average)	150 days
Freeze-free period (average)	182 days
Precipitation total (average)	483 mm

Climate stations used

- (1) ELKHART [USC00142432], Elkhart, KS
- (2) BOISE CITY 2 E [USC00340908], Boise City, OK
- (3) STRATFORD [USC00418692], Stratford, TX
- (4) GOODWELL 2 E [USW00003055], Goodwell, OK
- (5) HUGOTON [USC00143855], Hugoton, KS
- (6) LIBERAL [USC00144695], Liberal, KS
- (7) PERRYTON [USC00416950], Perryton, TX
- (8) SPEARMAN [USC00418523], Spearman, TX
- (9) DUMAS [USC00412617], Dumas, TX

Influencing water features

Well drained soils with medium to very high runoff. No influencing water features.

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 soils are very deep, fine textured soils with approximately 35-50 percent clay. They are slowly permeable, high in inherent fertility, high in water storage capacity with clay loam, silty clay loam, silty clay, and clay enriched subsoils. Infiltration rate is moderately slow to very slow depending on subsoil clay content. They yield water sparingly and the clayey subsoils can be somewhat restrictive to plant root growth. When dry these soils have a tendency to crack and appear drouthy although they may still have some stored water in the profile. Average depth to a calcic horizon from 40 to more than 60 inches with 50 inches being average. A major portion of these soils are in crop production.

Representative soil components for this site include: Balko, Gruver, Sherm, and Twichell.

Table 5. Representative soil features

Parent material	(1) Calcareous loess
Surface texture	(1) Clay loam (2) Silty clay loam (3) Loam (4) Silt loam
Family particle size	(1) Fine
Drainage class	Well drained
Permeability class	Very slow to moderately slow
Soil depth	152–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	11.43–16.51 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	6.9–7.2
Subsurface fragment volume <=3" (0-101.6cm)	0–1%
Subsurface fragment volume >3" (0cm)	0%

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 shortgrass dominated community with a few midgrasses present in small depressional areas, and a few forbs which are very moisture dependent. Very few, if any, woody plants are present. A few cholla cactus (*Cylindropuntia imbricata*), prickly pear (*Opuntia polyacantha*), or occasional yucca (Yucca spp.) will be present. The dominant species of grass is blue grama (*Bouteloua gracilis*) with a lesser amount of buffalograss (*Bouteloua dactyloides*). In low places that catch and hold a little more moisture, western wheatgrass (*Pascopyrum smithii*) and vine mesquite (*Panicum obtusum*) may occur. The major perennial forbs are scarlet globemallow (*Sphaeralcea coccinea*), chocolate daisy (*Berlandiera lyrata*), slimleaf scurfpea (*Psoralidium tenuiflorum*), prairie coneflower (*Ratibida columnifera*), and baby white aster (*Chaetopappa ericoides*). Annual forbs are more abundant in years of above average spring rainfall and consist of several different species. As a rule, forbs make up around 5 to 8 percent of the total production on the average. This site is not highly diverse. The clayey soils in concert with relatively low rainfall limit the range of species adapted to the site. The production potential of the soil is moderately high but its clayey nature causes plant available water to be limited. Drought tolerant species prevail. The species of plants present are in general very palatable to cattle, and were likewise palatable to bison historically. Although the production capability is only moderate, the accessibility due to flat terrain, and the high palatability and digestibility of forage make this a choice grazing site.

Natural fires played a major role in maintaining the plains grasslands. In general, woody plants were suppressed and grasses were perpetuated. When this site burned, forb growth was most likely more profuse for a year or two following the fire. This attracted animals that prefer forbs to grasses, such as the pronghorn. Although fire was a common occurrence on the shortgrass plains, it was probably more important to the maintenance of the tall and midgrass prairies further east. Climate was of greater importance in maintaining the shortgrass communities. Fire limited the encroachment of trees in the tall grass regions while dryness probably was more of a limiting factor in the shortgrass region. Fire also influenced grazing patterns as bison and pronghorn and other animals were attracted to the burned areas since the regrowth of herbage was more nutritious and more palatable than old growth. Most of the shortgrasses are considered fire neutral as to their response. Generally, this site does not produce the amounts of fine fuel needed to generate the amount of heat needed to kill woody vegetation. An exception to this may be plains prickly pear. The good palatability of the forage on this site makes it unnecessary to consider burning for improving forage quality. Prescribed fire is not often applicable as a management tool.

This site developed under a grazing regime, as did all sites in this region. This regime included bison, prairie dogs, antelope as well as smaller animals such as rodents and rabbits. Many ecologists consider the plant community of pre-settlement times to be a grazing dis-climax. Large herbivores grazed the grasslands and moved on seeking fresh forage. On the high plains plateau, the frequency of grazing was greatly influenced by availability of water. Animals could water in the rivers such as the Canadian most of the year but out on the plains, water was often scarce. Whether or not the playas contained water probably affected the movements of the grazers as well as whether or not the few major drainage ways had water holes available. When grazing did occur it was probably severe. But the recovery periods were likely long with the animals not returning to the same spot for as long as a year or even more. When overgrazing occurs and continues over a long period of time, the blue grama loses its bunch grass character and assumes a sod bound appearance because of grazing pressure. This leads to a low vigor plant community with lowered production potential. With the insufficient soil protection of low vigor grasses, the soil becomes more compacted, infiltration is reduced and runoff is increased. It forms a cycle that cannot be broken unless longer rest periods are reinstituted to restore vigor and grazing practices are moderated. With heavy grazing, western wheatgrass and vine mesquite will decrease over time. Long-term abuse coupled with drought can leave the turf open in places and invading species can gain a foothold. Broom snakeweed (*Gutierrezia sarothrae*) is an opportunistic species that will invade this site, especially if the grass cover is weak. Broom snakeweed is also cyclic. The shortgrass species are so resistant to grazing that it is not common for them to actually be killed out, but they can be weakened dramatically. Rest and possibly control of invading competition will usually restore this site within a few years provided that judicious grazing management is also applied. This site is perhaps one of the most resilient provided abuse is not prolonged.

Historically, this site made up a large percentage of the high plains grassland. Most of this land has been put to cultivation and it is rare to find more than a few hundred acres of contiguous hardland site. As is the case with all sites, a healthy vigorous plant community helps to insure that all the various ecological processes take place unimpeded. On this site, good plant cover is absolutely essential for the water cycle to function efficiently due to the high evaporation rates and the chance for overland runoff due to slow permeability of the soils.

Plant Communities and Transitional Pathways (diagram):
The following diagram suggests some pathways that the vegetation on this site might take. There may be other

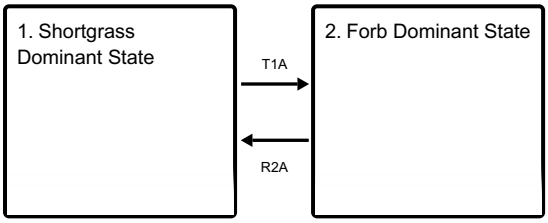
states not shown on the diagram. This information is intended to show what might happen in a given set of circumstances; it does not mean that this would happen the same way in every instance. Local professional guidance should always be sought before pursuing a treatment scenario.

Changes in the structure and composition of the plant community may be due to management, natural occurrences or both. At some point in time thresholds are crossed as indicated by the dark-lined box on the State and Transition Diagram. This suggests that once changes have progressed to a point, the community has been altered to the extent that a return to the former state is not possible unless accelerating practice is applied to make it happen. These changes take place on all ecological sites, but some sites support communities that are more resistant to change than other sites. Also, some sites are more resilient and heal or restore themselves more easily. Usually, changes in management practices alone, such as grazing techniques, will not be sufficient to restore former plant communities once the threshold has been crossed. An example of energy input might be the implementation of chemical brush management to decrease the amount of woody shrubs and increase the amount of grasses and forbs. This shift in community balance could not be brought about with grazing alone. The amount of energy required to bring about a change in plant community balance may vary a great deal depending on the present state and upon the desired result.

On this site, the shortgrass community is resilient and the blue grama and buffalograss are capable of standing a lot of grazing pressure without significant plant mortality. However, grazing abuse will lead to sod-bound, low producing plants. In addition, weedy and/or shrubby species such as broom snakeweed often increase when this situation prevails for a long period of time. Grazing management alone may correct the situation but it may also require control of the competitive shrubs. Once the turf of shortgrasses has been destroyed and halfshrubs and annuals completely dominate, reseeding may even be necessary.

State and transition model

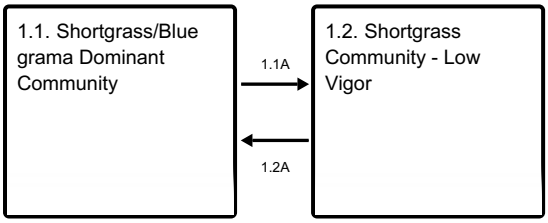
Ecosystem states



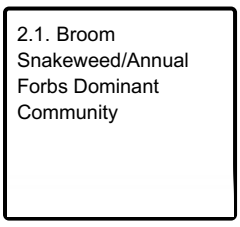
T1A - Absence of disturbance and natural regeneration over time, may be coupled with excessive grazing pressure

R2A - Reintroduction of historic disturbance regimes, may be coupled with rangeland seeding

State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Shortgrass Dominant State

The interpretive plant community for this site is the "reference" plant community or the Shortgrass/Blue grama

Dominant Community. It is a short grass dominated community with blue grama being the dominant grass. Buffalograss may make up as much as 20 percent of the total production. There are a few other species of short grasses present making up from 5 to as much as 10 percent of total production. Western wheatgrass and vine mesquite are often present in micro lows and on slopes above playa lakes. There are approximately 5 percent forbs and almost no woody shrubs or trees present. The Shortgrass (low vigor) plant community shows sod-bound blue grama and buffalograss. There is some invasion of annual forbs and broom snakeweed. Low vigor causes the production to be low. Grazing use has been excessive for several years.

Dominant plant species

- blue grama (*Bouteloua gracilis*), grass
- buffalograss (*Bouteloua dactyloides*), grass

Community 1.1
Shortgrass/Blue grama Dominant Community

Figure 8. 1.1 Shortgrass/Blue grama Dominant Community

This is a short grass dominated community with blue grama being the dominant grass. Buffalograss may make up as much as 20 percent of the total production. There are a few other species of shortgrasses present making up from 5 to as much as 10 percent of total production. Western wheatgrass and vine mesquite are often present in micro lows and on slopes above playa lakes. There are approximately 5 percent forbs and almost no woody shrubs or trees present. On this site, the shortgrass plant community is resilient and the blue grama and buffalograss are capable of standing a lot of grazing pressure without significant plant mortality. However, grazing abuse will lead to sod-bound low producing plants. In addition, invasion of weedy and/or shrubby species such as broom snakeweed often take place when this situation prevails for a long period of time. Grazing management alone may correct the situation or it may also require control of the competitive shrubs. In some cases, grazing land mechanical treatment has been used to break up the compacted soil and increase infiltration. Once the turf is lost, large areas of bare ground are present, and perennial three-awn and annuals have become dominant, it is not likely that the historic natural plant community can be restored without reseeding, weed control, and significant rest. There are approximately 5 percent forbs and almost no woody shrubs or trees present. This is a major site in the short grass plains country although a large portion of the historic vegetation has been plowed up and put into cultivation.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	897	1457	1905
Forb	45	112	135
Shrub/Vine	34	45	50
Microbiotic Crusts	17	22	28
Tree	–	–	–
Total	**993**	**1636**	**2118**

Figure 10. Plant community growth curve (percent production by month). TX0514, Shortgrass/Blue grama Dominant. Blue grama and buffalograss in good vigor having few forbs and occasional cholla plants..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	4	7	19	23	17	9	11	5	2	1

Community 1.2
Shortgrass Community - Low Vigor

Figure 11. 1.2 Shortgrass Community - Low Vigor

This plant community shows sod-bound blue grama and buffalograss. There is some invasion of annual forbs and broom snakeweed. Low vigor causes the production to be low. Grazing use has been excessive for several years. This community can be restored close to the reference community with growing season rest and prescribed grazing for several years. If the broom snakeweed continues to increase, some control may be needed to fully restore the plant community.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	448	560	729
Shrub/Vine	90	112	179
Forb	45	56	90
Microbiotic Crusts	6	11	22
Tree	–	–	–
Total	**589**	**739**	**1020**

Figure 13. Plant community growth curve (percent production by month). TX0515, Low vigor shortgrass with annual forbs. Low vigor shortgrasses encroached by broom snakeweed and annuals..

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

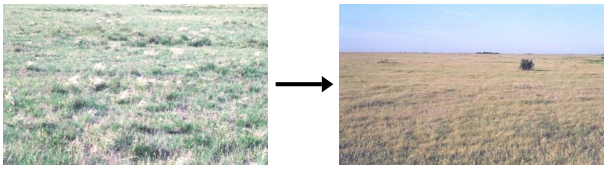
Pathway 1.1A
Community 1.1 to 1.2

Shortgrass/Blue grama Dominant Community

Shortgrass Community - Low Vigor

However, grazing abuse will lead to sod-bound low producing plants. In addition, invasion of weedy and/or shrubby species such as broom snakeweed often take place when this situation prevails for a long period of time. Grazing management alone may correct the situation or it may also require control of the competitive shrubs. In some cases, grazing land mechanical treatment has been used to break up the compacted soil and increase infiltration.

Pathway 1.2A
Community 1.2 to 1.1



Shortgrass Community - Low Vigor

Shortgrass/Blue grama Dominant Community

This Shortgrass (low vigor) Community can be restored close to the historic climax with brush management, prescribed burning, and growing season rest with prescribed grazing for several years.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

State 2
Forb Dominant State

With the insufficient soil protection of low vigor grasses, the soil becomes more compacted, infiltration is reduced and runoff is increased. It forms a cycle that cannot be broken unless longer rest periods are reinstituted to restore vigor and grazing practices are moderated. With heavy grazing, western wheatgrass and vine mesquite will decrease over time. Long-term abuse coupled with drought can leave the turf open in places and invading species can gain a foothold. Broom snakeweed is an opportunistic species that will invade this site, especially if the grass cover is weak. Broom snakeweed is also cyclic. The short grass species are so resistant to grazing that it is not common for them to actually be killed out, but they can be weakened dramatically. Rest and possibly control of invading competition will usually restore this site within a few years provided that judicious grazing management is also applied.

Dominant plant species

- broom snakeweed (*Gutierrezia sarothrae*), shrub

Community 2.1
Broom Snakeweed/Annual Forbs Dominant Community

Figure 14. 2.1 Broom Snakeweed

Blue grama and buffalograss are in low vigor with large amounts of bare ground. Broom snakeweed dominates the community. Production is low and community integrity has been compromised. Ecological processes are not functioning as needed. Runoff is increased and infiltration is low. This type of vegetative state is typical where considerable disturbance has occurred. Broom snakeweed and annuals dominate plant community. Some poor vigor shortgrass remains, bare ground is evident, and production of grass is low. Production of halfshrubs and annuals is greater than grass. This area is an abandoned prairie dog town. Severe grazing by prairie dogs over several years has caused sufficient soil disturbance to allow weedy species to proliferate. Severe and prolonged overgrazing by livestock can also bring about this state.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	280	336	448
Shrub/Vine	224	280	336
Forb	135	168	224
Microbiotic Crusts	22	45	56
Tree	–	–	–
Total	**661**	**829**	**1064**

Figure 16. Plant community growth curve (percent production by month). TX1749, Broom snakeweed and annuals Dominant. "Halfshrubs dominant, increase of annuals, and low vigor/production of shortgrasses.".

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	5	18	23	16	5	5	8	15	3	0

Transition T1A
State 1 to 2

Continuous Grazing, Brush Invasion, Drought, and No Fires have led a transition from a Shortgrass Dominant State to a Forb Dominant State.

Restoration pathway R2A
State 2 to 1

With the implementation of conservation practices such as Prescribed Grazing, Brush Management, and Pest Management, the Shortgrass Dominant State could be restored from the Forb Dominant State.

Conservation practices

Brush Management
Prescribed Grazing
Integrated Pest Management (IPM)

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Shortgrasses**			757–1625	
	blue grama	BOGR2	*Bouteloua gracilis*	588–1261	–
	buffalograss	BODA2	*Bouteloua dactyloides*	168–364	–
2	**Midgrasses**			39–90	
	vine mesquite	PAOB	*Panicum obtusum*	39–90	–
	western wheatgrass	PASM	*Pascopyrum smithii*	39–90	–
3	**Midgrasses**			78–168	
	purple threeawn	ARPU9	*Aristida purpurea*	78–168	–
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	78–168	–
	tumble windmill grass	CHVE2	*Chloris verticillata*	78–168	–
	gummy lovegrass	ERCU	*Eragrostis curtipedicellata*	78–168	–
	sand muhly	MUAR2	*Muhlenbergia arenicola*	78–168	–
	James' galleta	PLJA	*Pleuraphis jamesii*	78–168	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	78–168	–
Forb					
4	**Forbs**			45–135	
	Forb, annual	2FA	*Forb, annual*	45–135	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	45–135	–
	sagebrush	ARTEM	*Artemisia*	45–135	–
	lyreleaf greeneyes	BELY	*Berlandiera lyrata*	45–135	–
	rose heath	CHER2	*Chaetopappa ericoides*	45–135	–
	Engelmann's daisy	ENGEL	*Engelmannia*	45–135	–
	scarlet beeblossom	GACO5	*Gaura coccinea*	45–135	–
	dotted blazing star	LIPU	*Liatris punctata*	45–135	–
	Spach's evening primrose	OESP	*Oenothera spachiana*	45–135	–
	Fendler's penstemon	PEFE	*Penstemon fendleri*	45–135	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	45–135	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	45–135	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	45–135	–
	stemmy four-nerve daisy	TESC2	*Tetraneuris scaposa*	45–135	–
	stiff greenthread	THFI	*Thelesperma filifolium*	45–135	–
Shrub/Vine					
5	**Shrubs/Vines**			34–50	
	tree cholla	CYIMI	*Cylindropuntia imbricata var. imbricata*	34–50	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	34–50	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	34–50	–
	yucca	YUCCA	*Yucca*	34–50	–

Animal community

Native animals that occupy this site include scaled quail, pronghorn antelope, coyote, jackrabbit, swift fox, Texas horned lizard, prairie dogs and various small mammals and grassland birds. It is an open grassland site therefore, species that require cover will not be resident. For specific guidance on wildlife, Wildlife Habitat Appraisal Guides are available through NRCS for several species.

Plant preference by animal kind:
This rating system provides general guidance as to animal preference for plant species. It also indicates possible competition between kinds of herbivores for various plants. Grazing preference changes from time to time, especially between seasons, and between animal kinds and classes. Grazing preference does not necessarily reflect the ecological status of the plant within the plant community. For wildlife, plant preference for food and plant suitability for cover are rated.

Preferred (P) – Percentage of plant in animal diet is greater than it occurs on the land
Desirable (D) – Percentage of plant in animal diet is similar to the percentage composition on the land
Undesirable (U) – Percentage of plant in animal diet is less than it occurs on the land
Not Consumed (N) – Plant would not be eaten under normal conditions. It is only consumed when other forages not available.
Toxic (T) – Rare occurrence in diet and, if consumed in any tangible amounts results in death or severe illness in animal

Hydrological functions

This site is flat terrain so runoff is slow. Runoff from the site supplies the playa lakes with water or enters into major draws and streams that are associated sites. With good cover, runoff contains low sediment. Infiltration is moderately slow and evaporation relatively high. If cover is poor very little water gets into the soil.

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.

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)
Texas A&M Exp. Station, College Station, Texas
Texas Tech University – Range,Wildlife & Fisheries Dept.
Dr. Ron Sosebee, Dept. of Range, Wildlife & Fisheries - Texas Tech University, Lubbock, TX

Technical Review:

Mark Moseley, Oklahoma State Range Conservation NRCS
Homer Sanchez, State Rangeland Management Specialist
Tony Garcia, Zone Rangeland Management Specialist
Clint Rollins, Rangeland Management Specialist
Dr. Jack Eckroat, Grazing Lands Specialist Oklahoma NRCS
Justin Clary, Rangeland Management Specialist

Contributors

Clint Rollins, RMS, NRCS, Amarillo, Texas
J.R. Bell
Steven McGowen, MLRA Office Leader, NRCS, Woodward, OK

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.

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	05/13/2005
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):** 0 - 10%, small pockets of non-connected areas

---

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):** Very resistant to erosion.

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface 0-9"thick; brown loam to clay loam; moderate medium and fine granular structure; slightly hard; friable; many roots; non-calcareous; neutral Ph

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** High canopy basal cover and density with small interspaces should make rainfall impact minimal. This site has moderately permeable soils; runoff slow to moderate; available water capacity high; wind erosion low to moderate.

---

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: cool-season midgrasses > warm-season midgrasses = forbs >

    Other: shrubs

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Grasses will always have some mortality and decadence.

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1,300 to 1,700 lbs.

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:** Pricklypear, Yucca and Cholla. Broom snakeweed can become invasive.

17. **Perennial plant reproductive capability:** All plant species should be capable of reproduction.