USDA Natural Resources Conservation Service

Ecological site R077CY026TX
High Lime 16-21" PZ

Last updated: 9/11/2023
Accessed: 05/11/2025

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.

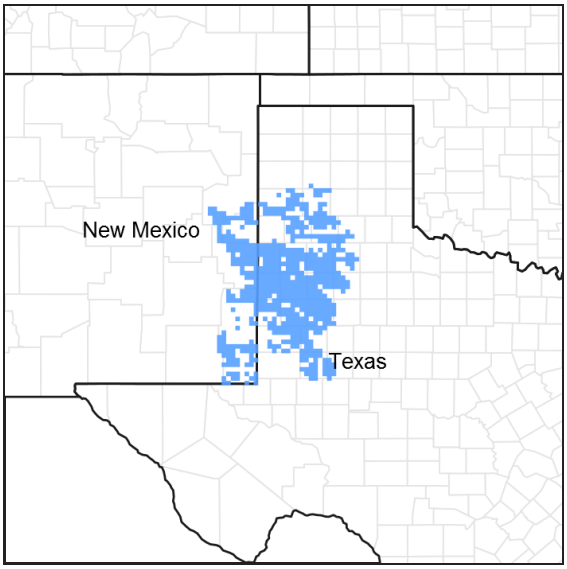


Figure 1. Mapped extent

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): 077C–Southern High Plains, Southern Part

MLRA 77C is characterized by nearly level plains with numerous playa depressions, moderately sloping breaks along drainageways, and a steep escarpment along the eastern margin. From southwest to northeast, soils grade from coarse-textured to fine-textured. Soils are generally deep and occur in a thermic soil temperature regime and ustic soil moisture regime bordering on aridic. Current land use is dominantly cropland.

Classification relationships

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

Ecological site concept

This site occurs on very deep, calcareous, loamy soils on uplands. Due to the high calcium carbonate content, production is limited. The reference vegetation consists of midgrasses and shortgrasses tolerant of the limy soils. Some forbs and few woody species populate the site. Abusive grazing practices can lead to a shift in the plant community. Without fire or other brush management, woody species may increase across the site.

Associated sites

R077CY027TX	**Playa 16-21" PZ** The Playa site is on the floor of playas. These sites are on lower landscape positions and collect runoff moisture from surrounding side slopes and plains. Midgrasses, shortgrasses, and forbs dominate these sites.
R077CY022TX	**Deep Hardland 16-21" PZ** The Deep Hardland site is on plains, playa slopes, and playa steps. This site is on similar or higher landscape positions. Shortgrasses and Midgrasses dominate on these sites.
R077CY036TX	**Sandy Loam 16-21" PZ** The Sandy Loam site is on plains, playa slopes, and playa steps. This site is on similar or higher landscape positions. Midgrasses and shortgrasses dominate on these sites.

Similar sites

R077BY722TX	**High Lime 12-17" PZ** This site occurs on calcareous, loam and clay loam soils on uplands. The reference plant community consists of midgrasses and shortgrasses with a few forbs and shrubs. Plants adapted to high lime soil conditions dominate the site.
R077CY028TX	**Limy Upland 16-21" PZ** These sites occur on calcareous, loamy soils on uplands. The reference vegetation consists of midgrasses and shortgrasses with few forbs and very few shrubs. Plants adapted to high lime soil conditions dominate the site.
R077DY040TX	**High Lime 12-17" PZ** These sites occur on calcareous, sandy loam soils with linear dune-like topography. The reference plant community consists of midgrasses and shortgrasses with a few forbs and shrubs. Plants adapted to high lime soil conditions dominate the site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Yucca* (2) *Atriplex canescens*
Herbaceous	(1) *Sporobolus airoides* (2) *Bouteloua gracilis*

Physiographic features

The High Lime ecological site consists of very deep, gently sloping to strongly sloping calcareous loamy soils with light colored surfaces and moderately permeable clay loam to sandy clay loam subsoils. Slopes dominantly range from 3 to 12 percent. Due to the slope these sites typically generate runoff and these sites are susceptible to both wind and water erosion if adequate vegetative cover is not present. The site is used almost entirely as a rangeland.

Land Form:
(1) Convex, linear, and curvilinear dunes on the leeward (eastern) margin of playa or salt lake basins to nearly level to very gently sloping playa terraces
(2) Interdunes within dune complexes on the leeward side of playa basins or saline lake basins.

Table 2. Representative physiographic features

Landforms	(1) Plateau > Playa dune (2) Plateau > Playa step (3) Plateau > Interdune
Runoff class	Negligible to high
Flooding frequency	None
Ponding frequency	None

Elevation	3,000–5,100 ft
Slope	0–30%
Water table depth	80 in
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

Climate is semi-arid dry steppe. Summers are hot with winters being generally mild with numerous cold fronts that drop temperatures into the single digits for 24 to 48 hours. Temperature extremes are the rule rather than the exception. Humidity is generally low and evaporation high. Wind speeds are highest in the spring and are generally southwesterly. Canadian and Pacific cold fronts come through the region in fall, winter and spring with predictability and temperature changes can be rapid. Most of the precipitation comes in the form of rain and during the period from May through October. Snowfall averages around 15 inches but may be as little as 8 inches or as much as 36 inches. Rainfall in the growing season often comes as intense showers of relatively short duration. Long-term droughts occur on the average of once every 20 years and may last as long as five to six years (during these drought years, moisture during the growing season is from 50 to 60 percent of the mean). Based on long term records, approximately 60 percent of the years are below the mean rainfall and approximately 40 percent are above the mean. May, June and July are the main growth months for perennial warm-season grasses. Forbs make their growth somewhat earlier.

Table 3. Representative climatic features

Frost-free period (characteristic range)	154-189 days
Freeze-free period (characteristic range)	188-205 days
Precipitation total (characteristic range)	19-21 in
Frost-free period (actual range)	148-198 days
Freeze-free period (actual range)	184-211 days
Precipitation total (actual range)	18-23 in
Frost-free period (average)	173 days
Freeze-free period (average)	198 days
Precipitation total (average)	20 in

Climate stations used

- (1) CAMERON [USC00291332], Grady, NM
- (2) PORTALES [USC00297008], Portales, NM
- (3) BIG SPRING [USW00023041], Big Spring, TX
- (4) AMARILLO [USW00023047], Amarillo, TX
- (5) DENVER CITY [USC00412408], Denver City, TX
- (6) CROSBYTON [USC00412121], Crosbyton, TX
- (7) CLAUDE [USC00411778], Claude, TX
- (8) LAMESA 1 SSE [USC00415013], Lamesa, TX
- (9) PLAINS [USC00417074], Plains, TX

Influencing water features

Water features are not an influencing factor in this site.

Wetland description

N/A

Soil features

These soils are calcareous (limy) throughout and the water holding capacity is moderate to low. The high calcium carbonate content limits the plant community to tolerant plant species. Plant roots will easily penetrate the soil if not severely compacted. Fertility is low these soils have a moderate permeability rate. They yield water to plants readily. If vegetative cover is poor and runoff is excessive, significant wind and water erosion can occur.

Major Soil Taxonomic Units correlated to this site include: Arch clay loam, Arch loam, Arch fine sandy loam, Drake clay loam, Drake loam, and Drake fine sandy loam.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–limestone and sandstone (2) Lacustrine deposits–metamorphic and sedimentary rock
Surface texture	(1) Clay loam (2) Loam (3) Fine sandy loam
Family particle size	(1) Fine-loamy
Drainage class	Well drained
Permeability class	Moderate
Soil depth	80 in
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3.8–5.9 in
Calcium carbonate equivalent (0-40in)	3–60%
Electrical conductivity (0-40in)	0–6 mmhos/cm
Sodium adsorption ratio (0-40in)	0–13
Soil reaction (1:1 water) (0-40in)	7.4–8.8
Subsurface fragment volume <=3" (0-40in)	0–14%
Subsurface fragment volume >3" (0in)	0%

Ecological dynamics

The reference plant community developed under the prevailing climate and conditions over time. This site is not generally a preferred site for grazing by livestock or wildlife due to lower plant palatability influenced by the limy nature of the soil. The high lime content limits the plant community to tolerant plant species. There are only minimal acres of the High Lime site in MLRA-77C of the Texas Panhandle and is considered a minor component of this MLRA. This site developed from the prevailing winds and wind blown deposits on the east and northeastern side of ancient playas and large basins. These playas were flooded periodically and served as temporary watering sites for large numbers of bison and resident pronghorn antelope. Occasional trampling and overgrazing likely occurred. Periodic droughts, fire, and grazing by resident wildlife prevalent in the area as well as nomadic creatures such as bison did influence the plant community.

The resulting Midgrass/Shortgrass Community (1.1) is a mixture of midgrass and shortgrass species with a few tallgrass species that can tolerate the limy nature of the soils. On some high lime sites, salinity can have a major influence on plant community composition. Only a few forbs and woody plants are typically found on this site. The

dominant grasses are sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), vine mesquite (*Panicum obtusum*), western wheatgrass (*Pascopyrum smithii*), and alkali sacaton (*Sporobolus airoides*). Small amounts of little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*) and sand bluestem (*Andropogon hallii*) can be found scattered throughout the site. Typical associated forbs include plains blackfoot daisy (*Melampodium leucanthum*), curlycup gumweed (*Grindelia squarrosa*) and dotted gayfeather (*Liatris punctata*) as well as numerous other annual and perennial forbs. Yucca (*Yucca glauca*), plains pricklypear (Opuntia spp.), and fourwing saltbush (*Atriplex canescens*) are often present with a few cholla cactus (*Cylindropuntia imbricata*) on parts of the site.

Periodic overgrazing and trampling by migrating herds of bison and resident herds of pronghorn antelope probably occurred only during wet periods when the playas and basins accumulated run-off water. This provided ideal watering and loafing areas for large numbers of herbivores. However, once the playas dried up, the herds would move out of the area. Long rest periods followed until the next big rainfall event. These rest periods allowed the vegetation to recover and maintain its historic climax plant community structure.

Fire has also played a part in the ecology of this site as with all plains sites. The main effect of fire on the High Lime site was to reduce old decadent plant cover from previous years, stimulate new shoots and increase diversity. Fire thus aided the nutrient cycle. Fire may have also helped in favoring the perennials over the annual species.

The major forces influencing transition away from the reference plant community are continued overgrazing by livestock and the decrease in the frequency and intensity of fire. As livestock and wildlife numbers increase and grazing use exceeds a plant’s ability to withstand defoliation, the more palatable and generally more productive species decline in stature, productivity, and density.

If excessive grazing continues, ecological retrogression occurs. As retrogression proceeds, this will bring about the Shortgrass/Midgrass/Annuals Community (1.2) with decreased amounts of low vigor sideoats grama and blue grama. Less palatable species such as alkali sacaton will increase along with inland saltgrass (*Distichlis spicata*), dropseed species (Sporobolus spp.) and perennial three-awn species (Aristida spp.). The better quality perennial forbs will be replaced with less desirable annual and perennial forbs.

The Shortgrass/Midgrass/Annuals Community (1.2) is reversible with proper grazing management and prescribed burning. The primary benefit of prescribed burning would be to reduce the excessive biomass of alkali sacaton and inland saltgrass and promote new sideoats grama and blue grama seedlings. Woody shrub canopies have generally not increased to the point where brush management is needed. Some areas may need selective brush management by chemical or mechanical means. There will be an increase in the percent bare ground scattered throughout the site.

If long-term heavy grazing continues, a threshold will be crossed to a Shrubs/Shortgrass/Annuals Community (2.1). This site will develop bare areas (>50 percent bare ground) and an increase in annuals. Some high lime sites may be invaded by broom snakeweed (*Gutierrezia sarothrae*) and mesquite (*Prosopis glandulosa*). Once established, these woody plants can increase to the point of domination. High Lime sites in the southern portion of MLRA 77C may be dominated by four-wing saltbush with heavy densities of mesquite scattered throughout the site. Salinity and lime content of the soil influences the woody invasion more than any other factor. Western ragweed (*Ambrosia psilostachya*) and sagewort (Artemesia spp.) may increase in some areas. The short and midgrass species that do remain will be in low vigor. The plant community is so degraded that it cannot reverse retrogression without extensive energy and management inputs. Restoration will require prescribed grazing with rest periods during the growing season, re-seeding bare areas with adapted native grass species, and chemical brush and pest management. Full recovery and maintenance of the reference community requires continued proper grazing management as well as occasional brush and pest management. Prescribed burning is also a useful tool in managing the reference community if adequate fine fuel is available to carry out an effective burn.

As mentioned earlier, this site is not preferred by livestock for grazing. The low palatability of the forage is influenced by the limey nature of the soil. Therefore, if livestock are being forced to overgraze this less preferred site, then there is obviously a grazing management problem on the surrounding associated sites. Livestock generally will not frequent this site unless all other available forage in the pasture has been removed.

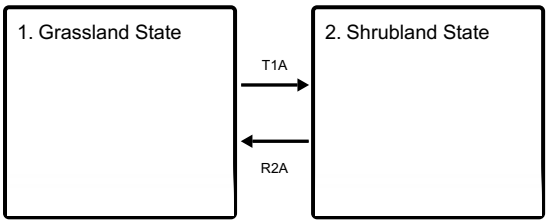
NOTE: Rangeland Health Reference Worksheets have been posted for this site on the Texas NRCS website (www.tx.nrcs.usda.gov) in Section II of the eFOTG under (F) Ecological Site Descriptions.

STATE AND TRANSITIONAL PATHWAYS
Narrative:
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 and/or natural occurrences. At some point thresholds are crossed as indicated by the lined box on the State and Transition Diagram. This suggests that once changes have progressed to a certain point, the plant community has been altered to the extent that a return to the former state is not possible unless some form of energy is applied. These changes take place on all ecological sites. Some sites support communities that are more resistant to change than others. Also, some sites are more resilient and can 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. An example of energy input might be the implementation of chemical brush management to decrease the amount of woody/cacti 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 the desired result.

State and transition model

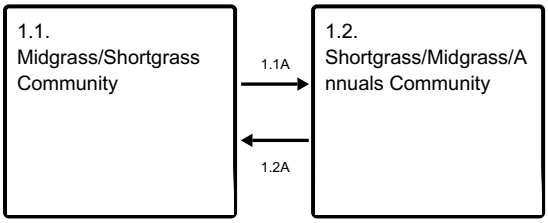
Ecosystem states



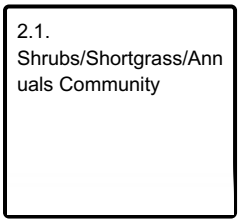
T1A - Absence of disturbance and natural regeneration over time, may be coupled with excessive grazing pressure

R2A - Adequate rest from defoliation and removal of woody canopy, followed by reintroduction of historic disturbance regimes

State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Grassland State

The Midgrass/Shortgrass plant community is a mixture of high vigor mid and shortgrasses with a few tallgrass species present. Small amounts of woody plants and forbs are scattered throughout the site. The plants found on this site are tolerant of the limy nature of the soil. If excessive grazing continues, ecological retrogression occurs. This will bring about the Shortgrass/Midgrass/Annuals Community (1.2) with decreased amounts of low vigor sideoats grama and blue grama. Less palatable species such as alkali sacaton will increase along with inland

saltgrass, dropseed species and perennial three-awn species. The better quality perennial forbs will be replaced with less desirable annual and perennial forbs.

Dominant plant species

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

Community 1.1
Midgrass/Shortgrass Community

Figure 8. 1.1 Midgrass/Shortgrass Community

This site usually occurred on the east side of ancient playa lakes and lakebed basins, as well as on the side slopes of some of the major draws. The interpretive or "reference" plant community for this site is a mixture of high vigor mid and shortgrasses with a few tallgrass species present. Small amounts of woody plants and forbs are scattered throughout the site. The plants found on this site are tolerant of the limey nature of the soil. In some areas of this site increased salinity can dramatically influence the plant community. Grasses include sideoats grama, blue grama, vine mesquite, western wheatgrass and alkali sacaton. Little bluestem, switchgrass and sand bluestem were minor tallgrass components of the plant community. Yucca, cholla cactus, pricklypear, fourwing saltbush and a good variety of forb species are often present in small amounts (see plant species composition and plant group annual production section below). The community's ecological processes are in balance with the environment. Most energy and nutrient cycling is contained in the narrow grass/soil interface and the scant rainfall is used efficiently.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1350	1508	1665
Forb	75	84	93
Shrub/Vine	75	83	92
Tree	0	0	0
Microbiotic Crusts	0	0	0
Total	**1500**	**1675**	**1850**

Figure 10. Plant community growth curve (percent production by month). TX1023, Midgrass Dominant Community. Growth is predominantly mid and shortgrasses from April through October with a peak growth occurring from May through July..

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

Community 1.2

Shortgrass/Midgrass/Annuals Community

Figure 11. 1.2 Shortgrass/Midgrass/Annuals Community

This community represents the first phase in the transition of the low vigor Shortgrass/ Midgrass/ Annuals Community (1.2) towards the Shrub/ Shortgrass/ Annuals Community (2.1). Sideoats grama and blue grama decrease and lose vigor under continued heavy grazing. Alkali sacaton, inland saltgrass, dropseeds and perennial three-awns increase. Bare areas start to show up throughout the site. There will be an increase in some of the woody shrubs, if broom snakeweed gains a foothold on this site, it may increase to the point of domination. Nutrient and energy cycling, and water use efficiency change for the worse. Proper grazing use and growing season deferment can transition the site back towards the reference community. Prescribed burning may be necessary if a large amount of biomass is present from the increase in alkali sacaton and inland saltgrass. Selective brush management on some sites may be needed.

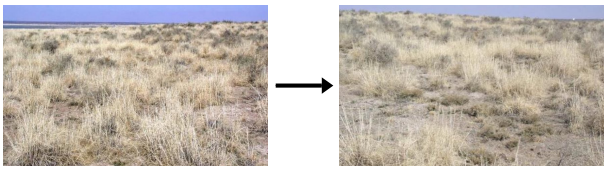
Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	990	1265	1320
Forb	99	110	132
Shrub/Vine	88	99	110
Tree	0	0	0
Microbiotic Crusts	0	0	0
Total	**1177**	**1474**	**1562**

Figure 13. Plant community growth curve (percent production by month). TX1020, Shortgrass/BroomSnakeweed/Annual Forbs Community. Growth is predominately low vigor shortgrasses from April to October with peak growth from May to July. There are also encroaching shrubs and annual forbs..

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



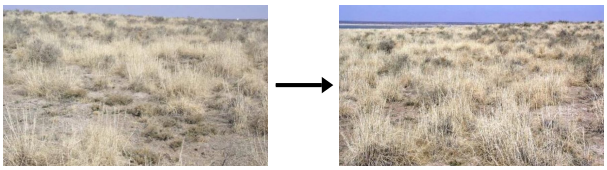
Midgrass/Shortgrass Community

Shortgrass/Midgrass/Annuals Community

Due to heavy continuous grazing, brush invasion, and no fires, the Midgrass/Shortgrass Community will begin a

shift to the Shortgrass/Midgrass/Annuals Community.

Pathway 1.2A
Community 1.2 to 1.1



Shortgrass/Midgrass/Annuals Community

Midgrass/Shortgrass Community

With conservation practices implemented such as Prescribed Grazing, Prescribed Burning, and Brush Management, the Shortgrass/Midgrass/Annuals Community can revert back to the Midgrass/Shortgrass Community.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

State 2
Shrubland State

This site will develop bare areas (>50 percent bare ground) and an increase in annuals. Some high lime sites may be invaded by broom snakeweed and mesquite. Once established, these woody plants can increase to the point of domination. This community may also be dominated by four-wing saltbush with heavy densities of mesquite scattered throughout the site. Salinity and lime content of the soil influences the woody invasion more than any other factor. Western ragweed and sagewort may increase in some areas. The short and midgrass species that do remain will be in low vigor.

Dominant plant species

- broom snakeweed (*Gutierrezia sarothrae*), shrub
- honey mesquite (*Prosopis glandulosa*), shrub

Community 2.1
Shrubs/Shortgrass/Annuals Community

Figure 14. 2.1 Shrubs/Shortgrass/Annuals Community

This plant community will be dominated by woody shrubs with lesser amounts of all grass functional groups. The vigor of the grasses present is low. Few if any of the reference community grasses and forbs will be present. Annual

grasses and forbs provide a large portion of the forage resource. Herbaceous forage production is less than half that of the reference community. The hydrological cycle has been adversely affected and there is very little rainfall penetrating the ground. Large bare areas occur with overland flow while erosion from wind and water has increased. Large blowout areas may develop from excessive wind erosion, once this occurs, re-vegetating these areas will be difficult. The high lime content of the soils, and on some sites, highly saline conditions, will limit the invasion of some woody plant species. In extreme cases, some of the high lime sites in the southern portion of MLRA 77C have developed high densities of four-wing saltbush, mesquite and broom snakeweed. These plants have increased to the point of domination. This is a transitional phase that has crossed a major threshold. Changes in management practices alone, such as grazing techniques, will not be sufficient to restore former plant communities. Major energy and economic inputs will be necessary to restore the plant community to near reference conditions. One is to re-seed bare areas to adapted native grass species. In this phase, prescribed burning is generally not effective due to limited fine fuel and large bare areas. Chemical brush and pest management will be needed to decrease the amount of undesirable forbs and woody/cacti species and increase the amount of desirable grasses and forbs. Prescribed grazing will be essential in maintaining the restored plant community. The amount of energy required to bring about a change in the plant community balance may vary a great deal depending on the present state and desired results.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	400	500	600
Grass/Grasslike	220	330	440
Forb	165	220	330
Microbiotic Crusts	0	0	0
Tree	0	0	0
Total	**785**	**1050**	**1370**

Figure 16. Plant community growth curve (percent production by month). TX1021, Broom Snakeweed/Annual Forb Dominant Community. Growth is predominately shrubs and forbs from April to October with a peak growth from April to June..

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

With heavy continuous grazing, brush invasion, no brush management, no fires, and no pest management, this site will transition from the Grassland State to the Shrubland State.

Restoration pathway R2A
State 2 to 1

With the application of various conservation practices including Prescribed Grazing, Brush Management, Pest Management, Prescribed Burning, and Range Planting, the Shrubland State can be restored to the Grassland State.

Conservation practices

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

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Midgrass**			600–740	
	alkali sacaton	SPAI	*Sporobolus airoides*	600–740	–
2	**Mid/Shortgrasses**			450–555	
	sideoats grama	BOCU	*Bouteloua curtipendula*	200–450	–
	blue grama	BOGR2	*Bouteloua gracilis*	200–450	–
3	**Midgrasses**			150–185	
	vine mesquite	PAOB	*Panicum obtusum*	100–150	–
	western wheatgrass	PASM	*Pascopyrum smithii*	100–150	–
4	**Mid/Shortgrasses**			75–90	
	threeawn	ARIST	*Aristida*	20–50	–
	buffalograss	BODA2	*Bouteloua dactyloides*	20–50	–
	tumble windmill grass	CHVE2	*Chloris verticillata*	20–50	–
	saltgrass	DISP	*Distichlis spicata*	20–50	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	20–50	–
	creeping muhly	MURE	*Muhlenbergia repens*	20–50	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	20–50	–
5	**Tallgrasses**			75–90	
	sand bluestem	ANHA	*Andropogon hallii*	50–90	–
	switchgrass	PAVI2	*Panicum virgatum*	50–90	–
	little bluestem	SCSCS	*Schizachyrium scoparium var. scoparium*	50–90	–
Forb					
6	**Forbs**			75–93	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	20–60	–
	bush morning-glory	IPLE	*Ipomoea leptophylla*	20–40	–
	trailing krameria	KRLA	*Krameria lanceolata*	20–40	–
	dotted blazing star	LIPU	*Liatris punctata*	20–40	–
	plains blackfoot	MELE2	*Melampodium leucanthum*	20–40	–
	grassland blazingstar	MEST3	*Mentzelia strictissima*	20–40	–
	evening primrose	OENOT	*Oenothera*	20–40	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	20–40	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	20–40	–
	rose heath	CHER2	*Chaetopappa ericoides*	20–40	–
	golden prairie clover	DAAU	*Dalea aurea*	20–40	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	20–40	–
	Rocky Mountain zinnia	ZIGR	*Zinnia grandiflora*	20–40	–
	Canada wildrye	ELCA4	*Elymus canadensis*	27–35	–
	Forb, annual	2FA	*Forb, annual*	0–30	–

	stiff greenthread	THFI	*Thelesperma filifolium*	10–20	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	10–20	–
Shrub/Vine					
8	**Shrubs/Cacti**			75–92	
	fourwing saltbush	ATCA2	*Atriplex canescens*	50–85	–
	yucca	YUCCA	*Yucca*	30–75	–
	tree cholla	CYIMI	*Cylindropuntia imbricata var. imbricata*	30–50	–
	hairspine pricklypear	OPPOP	*Opuntia polyacantha var. polyacantha*	30–50	–

Animal community

Native animals that utilize 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 with very little woody cover surrounding playas and large basins. 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.

Hydrological functions

This site consists of deep, gently sloping to moderately sloping soils with moderately permeable loam to clay loam subsoils. Runoff from the site supplies the playa lakes and basins with water. With good cover, runoff contains low sediment. Infiltration is moderately slow and evaporation rate is moderate. If cover is poor, very little water gets into the soil.

Recreational uses

Hunting, Camping, Hiking, Bird watching, 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 site locations for support documentation.

Inventory Data References (documents):

NRCS FOTG – Section II - Range Site Descriptions
NRCS eFOTG - Section III – Electronic Range Health Worksheets
NRCS Clipping Data summaries over a 20 year period

Other references

Clint Rollins, USDA-NRCS Rangeland Management Specialist, Amarillo, TX

Thomas C. Byrd, USDA-NRCS Soil Scientist, Lubbock, TX
NRCS- Range Site Descriptions
USDA-NRCS - Soil Surveys & Website soil database
North Rolling Plains RC&D, NRCS, 2006. Common Rangeland Plants of the Texas Panhandle, Revision 2006.
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, 9/11/2023

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	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:** Slight to moderate.

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

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 30-40%.

5. **Number of gullies and erosion associated with gullies:** Slight.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Slight to moderate.

7. **Amount of litter movement (describe size and distance expected to travel):** Slight to moderate.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Moderate resistance to surface erosion; primarily wind erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Calcareous loamy (limy) soils with low 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 large interspaces make rainfall impact moderate. This site has moderately permeable soils, runoff is slow to medium, and available water holding capacity is moderate to low.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Warm-season midgrasses >

    Sub-dominant: Warm-season shortgrasses >

    Other: Cool-season midgrasses > Warm-season tallgrasses > Forbs > Shrubs/Vines

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Grasses due to their growth habit will exhibit some mortality and decadence, though minimal.

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1,400 to 1,750 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, cholla, and pricklypear can become invasive.

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