

Ecological site R070BY664TX Red Shale 12-18" 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.

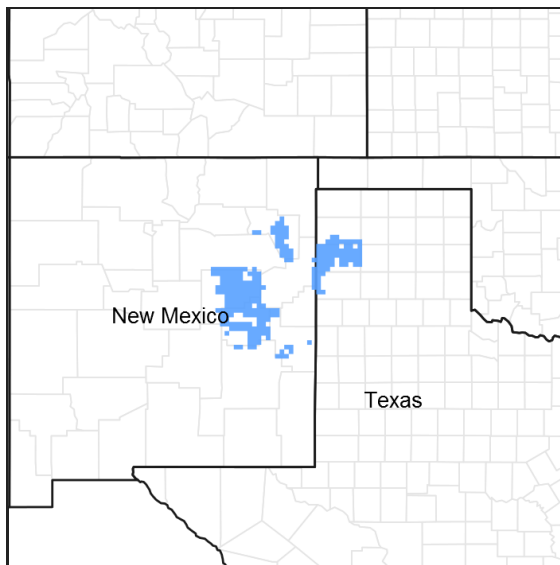


Figure 1. Mapped extent

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): 070B–Pecos and Canadian River Basins

MLRA 70B is characterized by broad, rolling piedmonts, plains, and tablelands broken by drainageways and tributaries of the Pecos River. Native vegetation is mid- to short-grass prairie species in the lowlands, with pinyon and juniper in the higher elevations and on steeper north-facing slopes. Current land use is predominantly livestock grazing. The soils formed in material weathered from sedimentary rocks of Cretaceous age.

Ecological site concept

This site occurs on soils that are shallow to red shale bedrock. Surfaces are often littered with shale fragments.

Associated sites

R070BY661TX	Breaks 12-18" PZ Generally associated with red shale sites as an upslope site. Sediment from adjoining Rough Breaks sites contribute to the development of the red shale site.
R070BY665TX	Shallow Sandstone 12-18" PZ May be at adjoining site at slightly higher elevations. Shallow sandstone will have exposed sandstone rock with increase in woody shrubs. Higher overall production, less exposed bare soil.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

The Red Shale site occurs as outwash plains or alluvial fans at the foot of escarpments or mesas in the Triassic and/or Permian geology in MLRA 70B. There are small drainages and areas of deposition throughout the site. Gullies of shallow to moderate depth are common. The site is a product of erosion and sedimentation and the soil formation processes are still active. Small hillocks of more erosion resistant clayey material occur within the site, along with occasional small outcrops of sandstone. Shale, siltstone, and sandstone fragments are common on the soil surface. Bare soil composes up to 30 percent of the site area.

Table 2. Representative physiographic features

Landforms	(1) Erosion remnant (2) Ridge (3) Divide
Flooding frequency	None
Ponding frequency	None
Elevation	975–1,219 m
Slope	1–15%
Water table depth	152 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate of this area can be classified as “semi-arid continental”. 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. Canadian and Pacific cold fronts come through the region in fall, winter, and spring, and resulting temperature changes can be rapid.

Total annual precipitation averages 12 to 18 inches. Most of the precipitation comes in the form of rain during the period from May through October. Snowfall averages around 20 inches but ranges from 10 to 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 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 perform their growth somewhat earlier.

Low air temperatures vary from a monthly mean of 20 degrees F in January to 64 degrees F in July. Mean daily maximum temperatures average in the upper 80's and low 90's during the summer months. Winter minimum temperatures fall below the freezing mark much of the time from November through March, with daily lows sometimes reaching 10 degrees F in December and January. Dates of the last killing frost may vary from April 15 to April 22, and the first killing frost from October 15 to October 24.

Winds prevail from the south and southwest, with an average velocity of 12 miles per hour. Generally, March is the windiest month. Strong winds during the spring cause rapid drying of the soil surface.

Table 3. Representative climatic features

Frost-free period (average)	200 days
Freeze-free period (average)	205 days
Precipitation total (average)	457 mm

Influencing water features

None.

Soil features

These alluvial soils are shallow, clayey, calcareous, and somewhat poorly developed. Shale and sandstone rock fragments are common on the soil surface, and occur throughout the profile. Surface layers are clay loam or silty clay. Shale usually occurs at a depth of about 15 inches. Geologic erosion and sedimentation is ongoing. Outcrops of partially weathered clayey parent material occur randomly near the mesas and escarpments. The underlying parent material is silty and clayey redbed deposits. Water holding capacity is low to moderate and inherent fertility is low. Plant growth and production is affected by shallow rooting depth and poor infiltration.

Major Soil Taxonomic Units correlated to this site include Glenrio clay.

Table 4. Representative soil features

Parent material	(1) Alluvium–shale
Surface texture	(1) Clay loam (2) Silty clay (3) Clay
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow to slow
Soil depth	25–51 cm
Surface fragment cover ≤3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.08–11.43 cm
Calcium carbonate equivalent (0-101.6cm)	5–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–8
Soil reaction (1:1 water) (0-101.6cm)	7.9–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The site occurs as outwash fans at the foot of mesas and escarpments in the plains country. The soils are generally

shallow and infiltration limited. Vegetation is somewhat sparse in many portions of the site with more plant cover occurring in areas of deposition. Geologic erosion is continually at work within the site. Runoff is moderately rapid, infiltration limited, and evaporation high. Soils are somewhat alkaline in nature. These soil and hydrologic factors combine to create a harsh set of conditions for plant establishment and growth. The historical climax plant community (HCPC) is generally one of mid- and short-grasses, a few deep-rooted perennial forbs and a few short shrubs.

Scattered juniper is the only tree present. Isolated pockets of tallgrasses can be found, but not frequently. Deep-rooted perennial plants that can withstand these harsh conditions populate the site. This site has limited vegetative production potential, but can produce moderate amounts of grass, especially in the areas of deeper soil. Forbs and shrubs afford some grazing and browsing for mule deer and pronghorn. Climate, hydrology, and geologic erosion forces have a marked effect on plant community development and productive potential. While vegetation is somewhat sparse on portions of the site, it appears that a stable plant community can establish and persist.

The HCPC for this site is a mixture of mid- and short-grasses with a limited compliment of forbs and short shrubs. Trees occur only occasionally. Vegetation overall is somewhat sparse with more plant cover existing on areas within the site which have more depth of soil. The more common grasses are sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), hairy grama (*Bouteloua hirsuta*), galleta (*Pleuraphis jamesii*), alkali sacaton (*Sporobolus airoides*), sand dropseed (*Sporobolus cryptandrus*), Wright three-awn (*Aristida wrightii*), and little bluestem (*Schizachyrium scoparium*). Forbs include plains actinea (*Tetraneuris scaposa*), dotted gayfeather (*Liatis punctata*), broom snakeweed (*Gutierrezia sarothrae*), woolly paperflower (*Psilostrophe villosa*), rayless goldenrod (*Isocoma wrightii*), antelope buckwheat (*Eriogonum wrightii*), baby white aster (*Symphotrichum ericoides*), sand lily (*Mentzelia nuda*), and numerous annual forbs. Shrubs include winterfat (*Krascheninnikovia lanata*), rabbitbrush (*Chrysothamnus visidiflorus*), yucca (*Yucca glauca*), cholla (*Cylindropuntia imbricata* var. *imbricata*), pricklypear (*Opuntia phaeacantha*), catclaw mimosa (*Mimosa aculeaticarpa* var. *biuncifera*), and scattered mesquite (*Prosopis glandulosa*). Oneseed juniper (*Juniperus monosperma*) and an occasional hackberry (*Celtis laevigata* var. *reticulata*) are the only trees present. The production varies from moderate to low. Overall, this site has a somewhat droughty appearance.

Careful management of grazing is necessary to ensure that the existing perennial grasses are maintained in good vigor, and that excessive animal traffic does not contribute to an increase in erosion rates. The stability of the site is somewhat precarious and good management is essential. Continuous selective grazing by livestock can result in a reduction of many of the desirable mid-grasses. Limited periodic grazing will be desirable to stimulate grass vigor and reduce the number of moribund plants. Occasional light disturbance from hoof action may actually aid in covering some grass seed with soil, possibly resulting in some increased seedling establishment. In short, if a livestock enterprise is the intended use, then a planned grazing approach will be essential to maintain site stability. Frequent deferment periods and light utilization will improve the vegetative cover on the site. Techniques of livestock handling that prevent animal concentration will be helpful. Maintaining the maximum vegetative cover possible will improve the hydrology of the site and aid in improving infiltration, which is one of the most limiting factors to overall plant growth. A high percentage of the site is prone to surface erosion, especially when cover is poor.

Natural fire was definitely part of the plains ecology and was instrumental in shaping grassland communities. As fire relates to the ecology of this particular site, it is questionable as to whether it was a major ecological driver. There are a few definitive reasons why this may be so. First, the potential for a fuel load that would carry a fire in this landscape is hindered by areas of sparse vegetation, gullies, and bare soil areas adjoining the site. Fire could occur in some parts of the site in particular, but it likely would be restricted by the above mentioned factors. There are enough natural barriers to fire present in the overall landform of the region to prevent tremendously large acreages being burned, as opposed to other sites in this MLRA; and in contrast more especially, to sites on the Llano Estacado. That fire was an influencing factor in plant community development cannot be denied, but the extent of that influence differs from one site to another throughout the MLRA. There are accounts of fires that burned hundreds of thousands of acres on the Staked Plains. These could occur largely because the landscape afforded no real natural barriers to fire and there existed a continuous fine fuel load of grass.

In the more broken terrain below the plains escarpment, there were more barriers present in the form of gullies, creeks, bare soil areas, and sparse vegetation sites which made large fires more difficult naturally. Fire occurred in this MLRA on sites that produced sufficient fuel. The main influence of natural fire was to hold in check the proliferation of some of the woody plants, especially juniper and cactus species. In general, the grasses present were not harmed by fires. The possible exception is fire followed by an extended drought period.

Large herbivores were present in this MLRA in pre-settlement times and were also an influence on plant communities. Bison migrated across the area in huge herds and grazed certain areas heavily. These herds might not return to the same exact location for months or even years, depending on the seasons and the rainfall distribution. Closely grazed grasslands had ample recovery time. The soil disturbance caused by these great herds passing may have actually resulted in seral stages of annual forbs occurring for a season or two. These benefited the large herbivores as well as smaller mammals by increasing the vegetative diversity. Elk and pronghorn also occurred in the plains region and migrated according to rainfall patterns. These animals moved about according to their own biological clocks and never remained in one place long enough to irreparably damage native plant communities. There was probably a greater influence of bison on the Llano Estacado and east to the Texas Rolling Plains than in areas to the west because of more limited water sources. With present day operations where livestock are confined to specific locations, animal influences are different. Fencing confines animals in a given area for much longer periods of time. More managerial effort is necessary to ensure that plant communities are not abused and recovery from grazing can occur. With proper grazing techniques, including carefully established stocking rates and planned grazing and recovery periods, the rangeland resource can be sustained and even improved. It is important to realize that grasslands developed under a grazing ecology and grazing can be an important tool in sustaining them.

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.

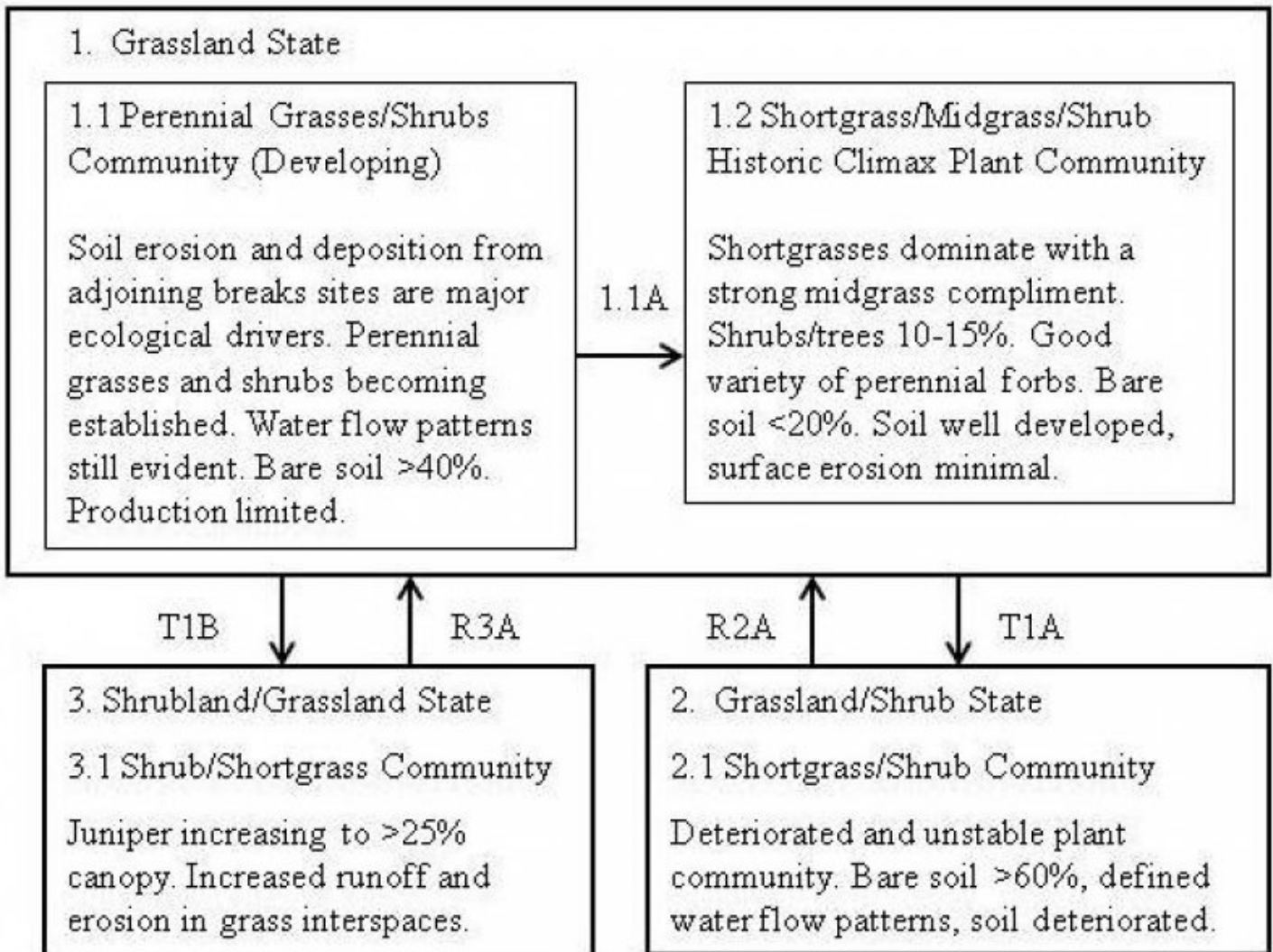
STATE AND TRANSITIONAL PATHWAYS : (DIAGRAM)

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.

State and transition model

Red Shale 12-18" PZ
R070BY664TX



LEGEND

- 1.1A - Increased soil depth and stability from grass plant establishment (>10 years).
- T1A - Heavy Continuous Grazing, No Fire, Long-term Drought (>5 yrs), Accelerated erosion.
- R2A - Prescribed Grazing, Growing Season Rest, Brush Management, Range Planting.
- T1B - Heavy Continuous Grazing, No Fire, Invasion.
- R3A - Prescribed Grazing, Brush Management, IPT, Prescribed Burning

**State 1
Grassland State**

This state is generally characterized by mid- and short-grasses, a few deep rooted perennial forbs, and a few short shrubs. Scattered juniper is the only tree present. Isolated pockets of tallgrasses can be found, but not frequently. Deep-rooted perennial plants that can withstand these harsh conditions populate the site. This site has limited vegetative production potential, but can produce moderate amounts of grass especially in the areas of deeper soil. The Shortgrass/Shrub Community consists of dominant shortgrasses with a strong mid-grass component. Shrubs/trees approach 10 to 15 percent canopy cover. There is also a good variety of perennial forbs. Bare soil approaches 20 percent. Soil is well-developed and surface erosion is minimal.

**Community 1.1
Perennial Grasses/ Shrubs Community (Developing)**



Figure 4. 1.1 Perennial Grasses/ Shrubs Community (Developi

The Perennial Grass/Shrubs Community (1.1) is a developing plant community on alluvial and colluvial soils, which are products of erosion and deposition. This site occurs at the foot of mesas and low escarpments which yield significant runoff and deposition. Perennial vegetation is sparse, runoff is moderately rapid, evaporation is very high, and bare ground is often in excess of 40 percent. The site is developing within the confines of a harsh semi-arid climate. Herbivory on this site is a less important driver in plant community development than soils and hydrology. Wildfires are not a major influence due to sparseness of vegetation. Principal plants are short- and mid-grass species such as galleta, blue grama, alkali sacaton, and sideoats grama. Perennial forbs are infrequent and short shrubs scattered. Principal shrubs are winterfat and rabbitbrush. The presence of annual forbs is completely moisture-dependent. The Perennial Grass/Shrub Community (1.1) production is low, ranging from 200 to 400 pounds of biomass per acre annually, consisting mainly of perennial grasses, which account for greater than 90 percent of production. Due to sparse cover, rapid runoff, and low infiltration, the hydrological cycle is not functioning effectively. As deposition increases, plant cover will also increase, as well as infiltration. Plant residues will eventually begin to accumulate. It may take many years for the natural processes to develop and improve before the HCPC begins to be manifested.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	224	336	448
Shrub/Vine	11	22	34
Forb	11	22	34
Microbiotic Crusts	–	–	6
Tree	–	–	1
Total	246	380	523

Figure 6. Plant community growth curve (percent production by month). TX0254, Shortgrasses/Midgrasses/Grasses/Shrubs Community. Warm-season mid and shortgrasses, forbs and shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	5	9	20	25	8	5	11	9	4	1

Community 1.2 Shortgrass/Midgrass/Shrub Community



Figure 7. 1.2 Shortgrass/Midgrass/Shrub Community

The Shortgrass/Midgrass/Shrub (HCPC) Community (1.2) is the interpretive plant community for the Red Shale Ecological Site. This community is a short-/mid-grass phase with a few trees and scattered shrubs. Soils are shallow to moderately deep. Production is above average for this site. Principal plant species are blue grama, sideoats grama, and galleta. Perennial forbs include plains actinia, dotted gayfeather, scarlet globemallow, and plains zinnia. Shrubs include mesquite, winterfat, rabbitbrush, and pricklypear. Oneseed juniper is the principal tree species. Heavy continuous grazing accompanied by long-term drought will result in a reduction in mid-grasses and an increase in bare soil, causing a transition toward the Shortgrass/Shrub Community (2.1). Lack of fire may have contributed in the transition toward the Shrub/Shortgrass Community (2.2). Natural fire may have suppressed woody plants in areas where fine fuel loads were sufficient to carry fire.

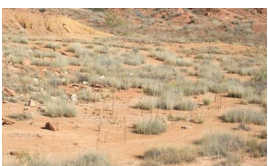
Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	448	673	785
Forb	78	78	90
Shrub/Vine	45	78	78
Tree	–	22	22
Microbiotic Crusts	–	6	6
Total	571	857	981

Figure 9. Plant community growth curve (percent production by month). TX0254, Shortgrasses/Midgrasses/Grasses/Shrubs Community. Warm-season mid and shortgrasses, forbs and shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	5	9	20	25	8	5	11	9	4	1

Pathway 1.1A Community 1.1 to 1.2



Perennial Grasses/ Shrubs Community (Developing)



Shortgrass/Midgrass/Shrub Community

Over time (more than ten years), soil depth has increased and stability from grass establishment has allowed the plant community to shift from a developing perennial grasses/shrub community to a shortgrass/midgrass/shrub community.

State 2

Grassland/Shrub State

The Shortgrass/Shrub Community (2.1) shows the effects of grazing pressure, lack of fire, and long-term drought. Cover is reduced and erosion is accelerated. Heavy continuous grazing has reduced plant cover, litter, and mulch. There are defined water flow patterns resulting from increased runoff. Productivity has decreased. Site stability is impaired. Principal grass species are sideoats grama, blue grama, and black grama. Increase in woody shrubs and broom snakeweed. The primary half shrub is broom snakeweed with smaller amounts of mesquite and yucca. Percentage of bare ground is approaching >60%. Annual production ranges from 380 to 640 pounds per acre annually.

Community 2.1

Grassland/Shrub Community



Figure 10. 2.1 Grassland/Shrub Community

The Shortgrass/Shrub Community (2.1) shows the effects of grazing pressure, lack of fire, and long-term drought. Cover is reduced and erosion is accelerated. Heavy continuous grazing has reduced plant cover, litter, and mulch. There are defined water flow patterns resulting from increased runoff. Productivity has decreased. Site stability is impaired. Principal grass species are sideoats grama, blue grama, and black grama. There has been an increase in woody shrubs and broom snakeweed. The primary half-shrub is broom snakeweed, with smaller amounts of mesquite and yucca. Percentage of bare ground is approaching >60%. Annual production ranges from 380 to 640 pounds per acre annually. At this phase, a threshold has been crossed, and major energy inputs will be required to move this site toward the HCPC. Prescribed grazing with growing season rest, selective brush management, and range planting will be necessary.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	392	504	616
Forb	22	50	67
Shrub/Vine	11	17	22
Tree	–	–	6
Microbiotic Crusts	–	6	6
Total	425	577	717

Figure 12. Plant community growth curve (percent production by month). TX0254, Shortgrasses/Midgrasses/Grasses/Shrubs Community. Warm-season mid and shortgrasses, forbs and shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	5	9	20	25	8	5	11	9	4	1

State 3

Shrubland/Grassland State

The Shrub/Shortgrass Community (3.1) shows the effects of heavy, continuous grazing and lack of fire. Oneseed juniper has increased to approximately 25 percent canopy cover with numerous seedlings present. Heavy, continuous grazing has reduced mid-grass cover and increased bare soil where juniper is thick. Dominant grasses are short-grass species such as blue grama and galleta. Some increase in runoff is evident. Production is less than in the HCPC. Site is still relatively stable.

Community 3.1

Shrubland/Grassland Community



Figure 13. 3.1 Shrub/Shortgrass Community

The Shrub/Shortgrass Community (3.1) shows the effects of heavy, continuous grazing and lack of fire. Oneseed juniper has increased to approximately 25 percent canopy cover with numerous seedlings present. Heavy, continuous grazing has reduced mid-grass cover and increased bare soil where juniper is thick. Dominant grasses are short-grass species such as blue grama and galleta. Some increase in runoff is evident. Production is less than in the HCPC. Site is still relatively stable. At this phase a threshold has been crossed, and major energy inputs will be required to move this site toward the HCPC. Prescribed grazing with growing season rest, selective brush management, and prescribed burning would be necessary.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	336	504	673
Tree	112	168	336
Forb	34	45	56
Shrub/Vine	11	22	34
Microbiotic Crusts	–	6	6
Total	493	745	1105

Figure 15. Plant community growth curve (percent production by month). TX0252, Shrub/Shortgrass Community. Warm-season shrubs and shortgrasses..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	5	8	18	22	8	5	11	15	4	1

Transition T1A

State 1 to 2

With Heavy, Continuous Grazing, Lack Of Fire, Long-term Drought (greater than five years), and accelerated erosion, the Shortgrass/Midgrass/Shrub Community will transition into the Shortgrass/Shrub Community.

Transition T1B

State 1 to 3

With Heavy, Continuous Grazing, Lack Of Fire, and Brush Invasion of juniper, the Shortgrass/Midgrass/Shrub Community will transition into the Shrub/Shortgrass Community.

Restoration pathway R2A

State 2 to 1

With the implementation of conservation practices such as prescribed grazing with growing season rest, brush management, and range planting, the shortgrass/shrub community can be restored back to the shortgrass/midgrass/shrub community.

Conservation practices

Brush Management
Prescribed Grazing
Range Planting

Restoration pathway R3A

State 3 to 1

With the implementation of various conservation practices such as prescribed grazing, brush management, Individual Plant Treatment, and Prescribed Burning, the Shrub/Shortgrass Community can be restored to the Shortgrass/Midgrass/Shrub Community.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

Additional community tables

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Midgrasses			140–224	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	101–168	–
	little bluestem	SCSCS	<i>Schizachyrium scoparium</i> var. <i>scoparium</i>	39–56	–
2	Shortgrasses			146–280	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	112–224	–
	hairy grama	BOHIH	<i>Bouteloua hirsuta</i> var. <i>hirsuta</i>	34–56	–
3	Midgrasses			84–112	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	56–78	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	28–34	–
4	Shortgrasses			78–168	

	sand bluestem	ANHA	<i>Andropogon hallii</i>	6-17	-
	Wright's threeawn	ARPUW	<i>Aristida purpurea</i> var. <i>wrightii</i>	6-17	-
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	6-17	-
	black grama	BOER4	<i>Bouteloua eriopoda</i>	6-17	-
	silver beardgrass	BOLAT	<i>Bothriochloa laguroides</i> ssp. <i>torreyana</i>	6-17	-
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	6-17	-
	ear muhly	MUAR	<i>Muhlenbergia arenacea</i>	6-17	-
	Hall's panicgrass	PAHA	<i>Panicum hallii</i>	6-17	-
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	6-17	-
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	6-17	-
	slim tridens	TRMU	<i>Tridens muticus</i>	6-17	-

Forb

5	Forbs			78-90	
	Forb, annual	2FA	<i>Forb, annual</i>	3-4	-
	yellow sundrops	CASE12	<i>Calylophus serrulatus</i>	3-4	-
	nineanther prairie clover	DAEN	<i>Dalea enneandra</i>	3-4	-
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	3-4	-
	bastardsage	ERWR	<i>Eriogonum wrightii</i>	3-4	-
	spurge	EUPHO	<i>Euphorbia</i>	3-4	-
	beeblossom	GAURA	<i>Gaura</i>	3-4	-
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	3-4	-
	collegeflower	HYFL	<i>Hymenopappus flavescens</i>	3-4	-
	southern goldenbush	ISPL	<i>Isocoma pluriflora</i>	3-4	-
	trailing krameria	KRLA	<i>Krameria lanceolata</i>	3-4	-
	Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	3-4	-
	dotted blazing star	LIPU	<i>Liatris punctata</i>	3-4	-
	bractless blazingstar	MENU	<i>Mentzelia nuda</i>	3-4	-
	Roemer's mimosa	MIRO6	<i>Mimosa roemeriana</i>	3-4	-
	evening primrose	OENOT	<i>Oenothera</i>	3-4	-
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	3-4	-
	James' nailwort	PAJA	<i>Paronychia jamesii</i>	3-4	-
	woolly paperflower	PSTAC	<i>Psilostrophe tagetina</i> var. <i>cerifera</i>	3-4	-
	slimflower scurfpea	PSTE5	<i>Psoralidium tenuiflorum</i>	3-4	-
	white heath aster	SYERE	<i>Symphyotrichum ericoides</i> var. <i>ericoides</i>	3-4	-
	stemmy four-nerve daisy	TESC2	<i>Tetraeneuris scaposa</i>	3-4	-

Shrub/Vine

6	Shrubs/Vines			45-78	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	4-9	-
	tree cholla	CYIMI	<i>Cylindropuntia imbricata</i> var. <i>imbricata</i>	4-9	-
	Christmas cactus	CYLE8	<i>Cylindropuntia leptocaulis</i>	4-9	-

	featherplume	DAFO	<i>Dalea formosa</i>	4-9	-
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa var. biuncifera</i>	4-9	-
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	4-9	-
	honey mesquite	PRGL2	<i>Prosopis glandulosa</i>	4-9	-
	soapweed yucca	YUGL	<i>Yucca glauca</i>	4-9	-
Tree					
7	Trees			0-22	
	netleaf hackberry	CELAR	<i>Celtis laevigata var. reticulata</i>	0-11	-
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	0-11	-

Animal community

Mule deer and scaled quail utilize the site as they forage across the landscape. There is little cover available to attract wildlife. Predators such as the coyote and bobcat will cross the site hunting for small mammals. Reptiles such as rattlesnakes and various species of lizards frequent the site. The value of the site for wildlife habitat is not as high as in sites with more plant cover.

Plant preference by animal kind:

These preferences are somewhat general in nature as the preferences for plants is dependent upon grazing experience, time of year, availability of choices, and total forage supply. 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 preferences for food and plant suitability for cover are rated.

Preferred – Percentage of plant in animal diet is greater than it occurs on the land.

Desirable – Percentage of plant in animal diet is similar to the percentage composition on the land.

Undesirable – Percentage of plant in animal diet is less than it occurs on the land.

Not Consumed – Plant would not be eaten under normal conditions; only consumed when other forages not available.

Toxic – Rare occurrence in diet and, if consumed in any tangible amounts results in death or severe illness in animal.

Hydrological functions

This site has moderately rapid runoff and limited capacity for infiltration. Plant cover is generally somewhat limited and evaporation high. Water moves off this site to lower-lying, flatter areas where infiltration is greater. Erosion occurs especially where cover is poor. Small gullies are common within the site. Sedimentation is evident where flatter slopes occur. Once perennial grass cover becomes established and litter begins to accumulate, erosion rates decrease. Species diversity will increase as the site becomes more stable.

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.

Inventory Data References (documents) :

NRCS FOTG – Section II - Range Site Descriptions
NRCS Clipping Data summaries over a 20 year period

Other references

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 (Ecological Checklist)
Texas A&M Exp. Station, College Station, Texas
Texas Tech University – Range, Wildlife & Fisheries Dept. (Verbal Conversations with Dr. Ronald Sosebee, and others)
Wester, David B., The Southern High Plains: A History of Vegetation, 1540 to Present; USDA-Forest Service, RMRS, 2007.

Contributors

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Approval

Kendra Moseley, 9/12/2023

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	12/21/2007
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Moderate

-
2. **Presence of water flow patterns:** Moderate
-
3. **Number and height of erosional pedestals or terracettes:** Moderate
-
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20 to 25% bare ground.
-
5. **Number of gullies and erosion associated with gullies:** Moderate.
-
6. **Extent of wind scoured, blowouts and/or depositional areas:** None to Slight.
-
7. **Amount of litter movement (describe size and distance expected to travel):** None to Slight.
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Moderately resistant to erosion.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Clay surface, low soil organic matter.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Basal cover somewhat sparse, rainfall impact is significant. This site has moderately slow permeability, runoff is moderate, and available water holding capacity is moderately 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 shortgrasses >>
- Sub-dominant: Warm-season midgrasses >
- Other: Forbs > Shrubs > Cool-season grasses
- Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal mortality and decadence.

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

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 510 to 875 lbs per acre.

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:** Broom snakeweed, pricklypear.

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