USDA Natural Resources Conservation Service

Ecological site R081AY303TX
Loamy 14-19 PZ

Last updated: 9/19/2023
Accessed: 04/26/2024

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.

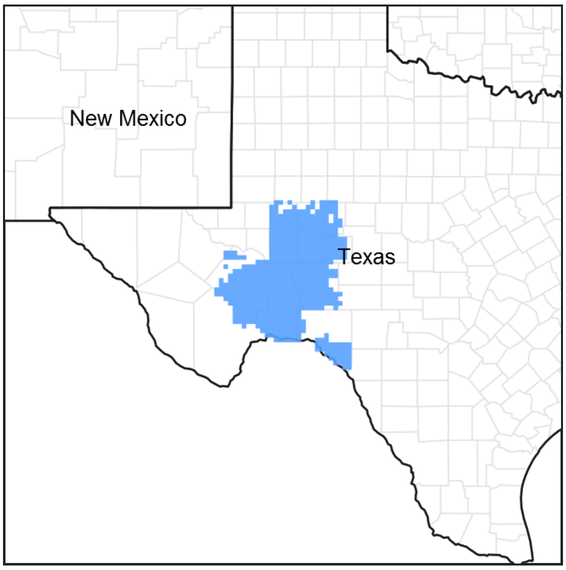


Figure 1. Mapped extent

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): 081A–Edwards Plateau, Western Part

This area is entirely in Texas. It makes up about 16,550 square miles (42,885 square kilometers). The cities of San Angelo and Fort Stockton and the towns of Big Lake, McCamey, Ozona, and Sheffield are in this MLRA. Interstate 20 crosses the northern part of the area, and Interstate 10 crosses the middle of the area. The eastern part of Amistad National Recreation Area is in this MLRA.

Classification relationships

USDA-Natural Resources Conservation Service, 2006.
-Major Land Resource Area (MLRA) 81A

Ecological site concept

The Loamy site occurs on uplands with deep soils. The soils are loamy textured, typically less than 35 percent clay.

Associated sites

R081AY309TX	**Low Stony Hill 14-19 PZ** The Low Stony Hill ecological site is higher in the landscape with shallow soils with gravels, cobbles, and stones.
R081AY566TX	**Limestone Hill 14-19 PZ** The Limestone Hill ecological site is higher in the landscape with shallow soils.
R081AY296TX	**Gravelly 14-19 PZ** The Gravelly ecological site is higher in the landscape with gravels.
R081AY311TX	**Shallow 14-19 PZ** The Shallow ecological site is shallower and not as productive.
R081AY291TX	**Clay Loam 14-19 PZ** The Clay Loam ecological site is lower in the landscape and developed from alluvial material.

Similar sites

R081AY291TX	**Clay Loam 14-19 PZ** The Clay Loam ecological site is on alluvial plains.

Table 1. Dominant plant species

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

Physiographic features

The loamy site is classified as an upland. Soils occur on nearly level to gently sloping valleys. Slopes range from 0 to 5 percent. Elevation ranges from 900 to 4000 feet above sea level. This site may receive runoff from Limestone Hill, Low Stony Hill, or Gravelly ecological sites that often occur along the site's boundary. Rainfall intake is negligible on nearly level sites and slow on gently sloping sites. Infiltration tends to decrease and runoff to increase if herbaceous ground cover diminishes.

Table 2. Representative physiographic features

Landforms	(1) Plateau > Ridge (2) Plateau > Plain (3) Piedmont slope > Alluvial flat
Runoff class	Negligible to low
Flooding frequency	None
Ponding frequency	None
Elevation	900–4,000 ft
Slope	0–5%
Aspect	Aspect is not a significant factor

Climatic features

The climate is semiarid and is characterized by hot summers and dry, relatively mild winters. The average relative humidity in mid-afternoon ranges from 25 to 50 percent. Humidity is higher at night, and the average at dawn is around 70 to 80 percent. The sun shines 80 percent of the time during the summer and 60 percent in winter. The prevailing wind is from the south-southwest. Approximately two-thirds of annual rainfall occurs during the May to October period. Rainfall during this period generally falls during thunderstorms, and fairly large amounts of rain may fall in a short time. The climate is one of extremes, which exert much more influence on plant communities than averages. Timing and amount of rainfall are critical. High temperatures and dry westerly winds have a tremendously negative impact on precipitation effectiveness, as well as length of time since the last rain. Records since the mid-1900’s, as well as geological and archaeological findings, indicate wet and dry cycles going back many thousands of years and lasting for various lengths of time with enormous influence on the flora and fauna of the area.

Table 3. Representative climatic features

Frost-free period (characteristic range)	210-240 days
Freeze-free period (characteristic range)	240-280 days
Precipitation total (characteristic range)	15-19 in
Frost-free period (actual range)	210-240 days
Freeze-free period (actual range)	240-280 days
Precipitation total (actual range)	15-23 in
Frost-free period (average)	225 days
Freeze-free period (average)	255 days
Precipitation total (average)	18 in

Climate stations used

- (1) PAINT ROCK [USC00416747], Paint Rock, TX
- (2) PANDALE 1 N [USC00416780], Comstock, TX
- (3) PANDALE 11 NE [USC00416781], Comstock, TX
- (4) SANDERSON [USC00418022], Dryden, TX
- (5) SHEFFIELD [USC00418252], Sheffield, TX
- (6) BAKERSFIELD [USC00410482], Iraan, TX
- (7) BIG LAKE 2 [USC00410779], Big Lake, TX
- (8) COPE RCH [USC00411974], Big Lake, TX
- (9) GARDEN CITY [USC00413445], Garden City, TX
- (10) MCCAMEY [USC00415707], Mc Camey, TX

Influencing water features

This is an upland site and not influenced by water from a wetland or stream.

Wetland description

N/A

Soil features

The soils of this site are deep to very deep, well-drained, moderately to slowly permeable calcareous loam, silty clay loam, silt loam, and some gravelly loam soils on uplands. In the profiles, maximum salinity ranges from none to slight and sodicity is none to moderate. Shrink-swell potential is low to moderate. These soils have a good soil-plant-water relationship with a moderate to high available water capacity. If unprotected by plant cover, the soils crust badly, inhibiting infiltration, contributing to high runoff, resulting in severe sheet and gully erosion. Soil series associated with this site include: Hodgins, Pandale, Reagan, and Valverde.

Table 4. Representative soil features

Parent material	(1) Alluvium–limestone
Surface texture	(1) Loam (2) Silty clay loam (3) Silt loam

Family particle size	(1) Fine-loamy (2) Fine-silty
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Depth to restrictive layer	40–80 in
Soil depth	40–80 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–1%
Available water capacity (0-40in)	2.4–7.9 in
Calcium carbonate equivalent (0-40in)	5–40%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–15
Soil reaction (1:1 water) (0-40in)	7.9–9
Subsurface fragment volume <=3" (4-40in)	0–10%

Ecological dynamics

The plant communities of this site are dynamic entities. In pre-settlement times, the site would most likely be a savannah dotted with mesquite trees, occasional shrubs and, in some areas, live oaks. The surface would be mostly covered by mid-size bunch grasses and perennial forbs. This reference plant community was greatly influenced by grazing, climate (including periodic extended periods of drought) and, to a lesser degree, fire.

Extensive herds of pronghorns, large towns of black tailed prairie dogs, as well as smaller populations of elk, white-tailed deer, and desert mule deer were present and had an impact on the plant community. Bison, a migratory herd animal, would come into an area, graze on the move, and not come back for many months or even years. This long deferment period allowed the plants to recover from the heavy grazing. Bison grazing on this site was probably intermittent, occurring during wetter periods. Very few bison were reported in the area after 1830. There were no recorded sightings after 1860. Fire has an influence on plant community structure and was probably a factor in maintaining the original savannah vegetation. Mesquite were present on the site, but not at the level seen today. Periodic fires may have helped keep mesquite as a scattered savannah and other woody species a small part of the composition. Grazing patterns by native herbivores and prairie dog activities were probably more significant factors in maintaining a well-balanced plant community.

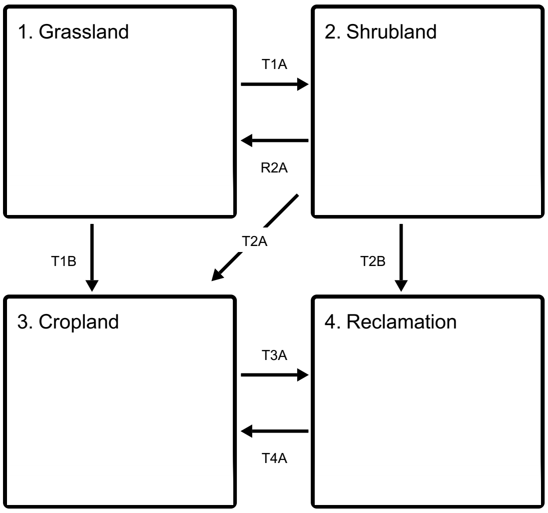
Reference community plants developed ways to withstand periods of drought. The midgrasses and forbs shaded the ground, reduced soil temperature, improved infiltration of what little moisture might fall and maintained soil moisture longer. Their roots reached deeper into the soil, utilizing deep soil moisture no longer available to short-rooted plants. In extreme cases many species could go virtually dormant, preserving the energy stored in underground roots, crowns and stems until wetter weather arrived. Their seeds could stay viable in the soil for long periods, sprouting when conditions improved.

While grazing is a natural component of this ecosystem, overstocking and thus overgrazing by domesticated animals has had a tremendous impact on the site. Early settlers, accustomed to farming and ranching in more temperate zones of the eastern United States or even Europe, misjudged the capacity of the site for sustainable production and expected more of the site than it could deliver. Moreover, there was a gap of time between the extirpation of bison and the introduction of domestic livestock which resulted in an accumulation of plant material. This may have given the illusion of higher production than was actually being produced. Overgrazing and fire suppression disrupted ecological processes that took hundreds or thousands of years to develop. Instead of grazing and moving on, domestic livestock were present on the site most of the time, particularly after the practice of fencing arrived. Another influence on grazing patterns was the advent of wells and windmills. They opened up large areas that were previously unused by livestock due to lack of natural surface water. The more palatable plants were selected repeatedly and eventually began to disappear from the ecosystem to be replaced by lower successional, less palatable species. As overgrazing continued, overall production of grasses and forbs declined, more bare ground appeared, soil erosion increased, and woody and succulent increasers began to multiply. The elimination of fire due to the lack of fine fuel or by human interference assisted the rapid encroachment of mesquite and other woody increasers and a concurrent reduction of usable forage.

The site had a positive influence on infiltration and percolation of rainfall into plant root zones. Loss of soil organic matter has a negative impact on infiltration and results in soil compaction. More rainfall is directed to overland flow, which increases soil erosion and decreases infiltration of moisture to plant roots. Pedestalling, terracetes, and water-flow patterns are range health indicators that will be present if the site begins to deteriorate. The mineral content and reaction of these soils enable the site to produce highly nutritious forage.

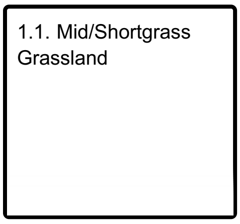
State and transition model

Ecosystem states

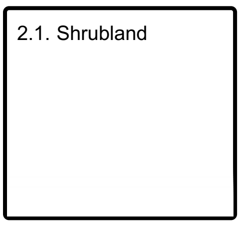


T1A - Absence of disturbance and natural regeneration over time coupled with excessive grazing pressure
T1B - Removal of woody species, extensive soil disturbance, followed by seeding
R2A - Absence of disturbance and natural regeneration over time
T2A - Removal of woody species, extensive soil disturbance, followed by seeding
T2B - Removal of woody canopy follow by range seeding
T3A - Removal of woody canopy follow by range seeding
T4A - Removal of woody species, extensive soil disturbance, followed by seeding

State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities

3.1. Cropland

State 4 submodel, plant communities

4.1. Reclaimed Grassland

State 1
Grassland

Dominant plant species

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

Community 1.1
Mid/Shortgrass Grassland

The reference plant community for this site is a grassland composed of mid and shortgrasses with scattered shrubs that evolved under the influence of grazing, fire, and fluctuations between wet and dry periods that often last for years at a time. Fire effects are limited to areas with a dominance of midgrasses and annual rainfall over 15 inches, generally increasing from west to east. The overstory shades less than five percent of the site and consists of occasional shrubs such as ephedra (Ephedra spp.), littleleaf sumac (Rhus spp.), condalia (Condalia spp.), fourwing saltbush (*Atriplex canescens*), javelinabush, and tarbush. Midgrasses such as sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), black grama (*Bouteloua eriopoda*), cane bluestem (Bothriochloa barbinoides), and tobosa (Pleuraphis muticus) along with short grasses such as buffalograss (Buchloe dactyloides) and burrograss (*Scleropogon brevifolius*) dominate the site. Other important grasses include Arizona cottontop (*Digitaria californica*), vine mesquite (*Panicum obtusum*), plains bristlegrass (*Setaria leucopila*), sand dropseed (*Sporobolus cryptandrus*), bush muhly (*Muhlenbergia porteri*), sand muhly (*Muhlenbergia arenicola*), slim tridens (Hilaria muticus), whiplash pappusgrass (*Pappophorum vaginatum*), and the threeawn (Aristida spp.) species. Perennial forbs such as awnless bushsunflower (*Simsia calva*), orange zexmenia (Wedelia hispida), and Indianmallow (Abiluton spp.) are a small but important component of the plant community. In wet years annual forbs produce significant herbaceous vegetation. Plants are vigorous and reproduction by rhizome, tiller or seed is rapid during wet weather. Bare ground is less than 25 percent. Interspaces between plants are slightly covered with litter. The soil surface is relatively cool, somewhat rich in humus, and hosts a microbe population actively decomposing organic matter. Soil erosion is insignificant. Infiltration is slow to moderate for most rainfall events and runoff occurs mostly during heavy rain. Concentrated water flow patterns are rare. Recurrent fire, climatic patterns, and grazing by herbivores are natural processes that maintain this plant community Interruption of the ecological processes of a site brings about change. The historic plant community included large populations of desirable grasses and smaller but highly important numbers of perennial forbs. Extended drought, continued overuse and elimination of fire result in their decline or disappearance from large portions of the site. Important grasses such as sideoats grama, black grama, blue grama, cane bluestem, plains bristlegrass, bush muhly, and Arizona cottontop decrease as do palatable perennial forbs such as awnless bushsunflower, orange zexmenia, Indianmallow, and low menodora (*Menodora heterophylla*). Less palatable or productive midgrasses such as tobosa, perennial threeawn (*Aristida purpurea*), sand dropseed, and slim tridens; short grasses like buffalograss and burrograss; and less desirable forbs such as croton (Croton spp.), ruellia (Ruellia spp.), globemallow (Sphaearalcea spp.), verbena (Verbena spp.) and annuals begin to increase, filling in for the declining species. Small tarbush, javelinabush, mesquite, juniper (Juniperus spp.), and prickly pear (Opuntia spp.) begin to appear. More bare ground is evident. If the process is not halted or reversed, the community shifts toward the Shrubland Community (2).

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	660	940	1220
Forb	35	45	55
Shrub/Vine	15	20	25
Tree	0	0	0
Total	**710**	**1005**	**1300**

Figure 9. Plant community growth curve (percent production by month). TX3251, Mid&Shortgrasses Grassland Community. Warm season mid and shortgrasses with shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	4	6	10	20	10	15	20	10	1	1

State 2
Shrubland

Dominant plant species

- sumac (*Rhus*), shrub
- fourwing saltbush (*Atriplex canescens*), shrub
- American tarwort (*Flourensia cernua*), shrub

Community 2.1
Shrubland

Long-term overgrazing, loss of topsoil, prolonged drought and an increase or invasion of mesquite, creosotebush and tarbush has led to the degradation on the site from a midgrass dominated grassland. The plant community can be restored to a community that somewhat resembles the reference plant community if retrogression is stopped before the midgrasses and better forbs and shrubs are eliminated. With continued retrogression and corresponding loss of topsoil, the midgrasses are replaced with burrograss, tarbush and large bare areas. Once degraded to this condition it becomes very difficult, if not impossible, to restore the site to the reference plant community. Reseeding of the site is possible, but the chance of establishing the seeded species is 10 percent or less because of the annual average rainfall for the area.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Tree	340	475	600
Shrub/Vine	200	300	400
Grass/Grasslike	100	150	200
Forb	60	80	100
Total	**700**	**1005**	**1300**

Figure 11. Plant community growth curve (percent production by month). TX3252, Shrubland Community. Invasion of mesquite, creosotebush and tarbush has led to a degraded site. Burrograss, Shrubs, and large bare areas are common..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	4	6	10	20	10	15	20	10	1	1

State 3
Cropland

Community 3.1
Cropland

The largest percentage of cropland in MLRA 81A is made up of soils of the loamy site. Most of the cropland, about 80,000 acres, is in Reagan and Upton counties. The annual production on dryland cropland in that area is very dependent upon timely rainfall. This MLRA could make a grazeable crop once out of 3 to 5 years due to droughts or sporadic rainfall events. Major crops include cotton, wheat, haygrazer, and some grain sorghum, both dryland and irrigated. Farming can cause destruction of soil structure as well as soil loss.

Figure 13. Plant community growth curve (percent production by month). TX3400, Small Grains. Cropland seeded into small grains such as wheat and oats..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	5	10	10	5	0	0	0	20	25	15	5

Figure 14. Plant community growth curve (percent production by month). TX3401, Forage & Grain Sorghum. Cropland seeded into haygrazer and grain sorghum..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	8	20	25	20	10	10	5	2	0	0

State 4
Reclamation

Community 4.1
Reclaimed Grassland

Most of the seeded grassland in this site is abandoned cropland. The seed of introduced species is most often used, frequently creating a monoculture of small benefit to wildlife. Due to the decreased soil fertility from cultivation and the paucity of rainfall, supplemental irrigation is usually necessary to get an established stand of grass. Once out of the Crop Reserve Program (CRP) and used for production, pasture management and, very likely, continued supplemental irrigation will be needed to maintain the stand. Encroachment by woody increasers/invaders will always be a problem. They can be controlled through good grazing management, chemical or mechanical individual plant treatment (IPT), and prescribed burning when practical. Without these conservation measures, the area will begin to revert back to the Shrubland Community (2.1).

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	600	800	1000
Forb	60	130	200
Shrub/Vine	40	70	100
Tree	0	0	0
Total	**700**	**1000**	**1300**

Figure 16. Plant community growth curve (percent production by month). TX3266, Reclaimed Grassland Community - Abandoned Cropland. Planted into pasture grass species or native range seed mixes. Growth depends on rainfall patterns, temperature changes and invasive plants..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3	6	6	9	12	13	12	8	12	10	6	3

Transition T1A
State 1 to 2

With heavy abusive grazing, no brush management, brush invasion, no fires, and drought conditions prevailing, the Grassland State will transition to the Shrubland State.

Transition T1B
State 1 to 3

With brush management, crop cultivation, and plowing, the Grassland State will be converted to the Cropland State.

Restoration pathway R2A
State 2 to 1

With the implementation of prescribed grazing, brush management, IPT, and prescribed burning conservation practices, the Shrubland State can be reverted back to the Grassland State.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing
Planned Grazing System

Transition T2A
State 2 to 3

With brush management, crop cultivation, and the use of the plow, the Shrubland State will be converted into the Cropland State.

Transition T2B
State 2 to 4

With prescribed grazing, brush management, range planting, and prescribed burning, the Shrubland State can be converted into the Reclamation State.

Transition T3A
State 3 to 4

With prescribed grazing and range planting, the Cropland State can be converted to the Reclamation State.

Transition T4A
State 4 to 3

With crop cultivation and plowing, the Reclamation State can be converted into the Cropland State.

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	**Midgrasses**			280–520	
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	280–520	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	280–520	–

	black grama	BOER4	*Bouteloua eriopoda*	280–520	–
	blue grama	BOGR2	*Bouteloua gracilis*	280–520	–
2	**Midgrasses**			70–130	
	Arizona cottontop	DICA8	*Digitaria californica*	70–130	–
	green sprangletop	LEDU	*Leptochloa dubia*	70–130	–
	streambed bristlegrass	SELE6	*Setaria leucopila*	70–130	–
3	**Shortgrass**			105–195	
	vine mesquite	PAOB	*Panicum obtusum*	105–195	–
	tobosagrass	PLMU3	*Pleuraphis mutica*	105–195	–
4	**shortgrasses**			70–130	
	sand muhly	MUAR2	*Muhlenbergia arenicola*	70–130	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	70–130	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	70–130	–
	slim tridens	TRMU	*Tridens muticus*	70–130	–
5	**shortgrass**			70–130	
	buffalograss	BODA2	*Bouteloua dactyloides*	70–130	–
6	**Shortgrasses**			50–90	
	threeawn	ARIST	*Aristida*	50–90	–
	fall witchgrass	DICO6	*Digitaria cognata*	50–90	–
	whiplash pappusgrass	PAVA2	*Pappophorum vaginatum*	50–90	–
	burrograss	SCBR2	*Scleropogon brevifolius*	50–90	–
7	**Shortgrasses**			15–25	
	Texas grama	BORI	*Bouteloua rigidiseta*	15–25	–
	red grama	BOTR2	*Bouteloua trifida*	15–25	–
	hairy woollygrass	ERPI5	*Erioneuron pilosum*	15–25	–
	Hall's panicgrass	PAHA	*Panicum hallii*	15–25	–
8	**Annual grasses**			5–10	
	Grass, annual	2GA	*Grass, annual*	5–10	–
Forb					
9	**Forbs**			30–50	
	Indian mallow	ABUTI	*Abutilon*	30–50	–
	low silverbush	ARHU5	*Argythamnia humilis*	30–50	–
	croton	CROTO	*Croton*	30–50	–
	prairie clover	DALEA	*Dalea*	30–50	–
	Gregg's tube tongue	JUPI5	*Justicia pilosella*	30–50	–
	low menodora	MEHE2	*Menodora heterophylla*	30–50	–
	evening primrose	OENOT	*Oenothera*	30–50	–
	wild petunia	RUELL	*Ruellia*	30–50	–
	awnless bushsunflower	SICA7	*Simsia calva*	30–50	–
	Texas nightshade	SOTR2	*Solanum triquetrum*	30–50	–
	globemallow	SPHAE	*Sphaeralcea*	30–50	–
	vervain	VERBE	*Verbena*	30–50	–
	creepingoxeye	WEDEL	*Wedelia*	30–50	–
10	**Annual forbs**			5–10	

10	**Annual forbs**			5–10	
	Forb, annual	2FA	*Forb, annual*	5–10	–
Shrub/Vine					
11	**Shrubs/Vines**			15–25	
	American tarwort	FLCE	*Flourensia cernua*	15–25	–
	littleleaf sumac	RHMI3	*Rhus microphylla*	15–25	–
	old man's beard	ARFA8	*Arthrostylidium farctum*	15–25	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	15–25	–
	javelina bush	COER5	*Condalia ericoides*	15–25	–
	snakewood	CONDA	*Condalia*	15–25	–
	jointfir	EPHED	*Ephedra*	15–25	–

Animal community

This site is suitable for the production of domestic livestock and to provide habitat for native wildlife. Cow-calf, stocker cattle, sheep, and goats can utilize this site. Carrying capacity has declined drastically over the past 100 years due to deterioration of the reference plant community. An assessment of vegetation is needed to determine the site’s current carrying capacity. Calculations used to determine livestock stocking rate should be based on forage production remaining after determining use by resident wildlife, then refined by frequent and careful observation of the plant community’s response to animal foraging.

A large diversity of wildlife is native to this site. In the historic plant community, migrating bison, grazing primarily during wetter periods, resident pronghorns, and smaller populations of white-tailed deer, desert mule deer, quail and prairie chickens were the more predominant species. With the subsequent transformation of the plant community, due primarily to the influence of man and climate change, the kind and proportion of wildlife species have been altered.

With the eradication of the screwworm fly, increase in woody vegetation, and man-suppressed natural predation, deer numbers have increased and are often in excess of carrying capacity. Where deer numbers are excessive, overbrowsing and overuse of preferred forbs causes deterioration of the plant community. Progressive management of deer populations through hunting can keep populations in balance and provide an economically important ranching enterprise. Achieving a balance between brushy cover and more open plant communities on this and adjacent sites is important to deer management. Competition among deer, sheep, and goats must be a consideration in livestock and wildlife management to prevent damage to preferred vegetation.

Smaller mammals include many kinds of rodents, jackrabbit, cottontail rabbit, raccoon, skunks, possum and armadillo. Mammalian predators include coyote, red fox, gray fox, bobcat, and mountain lion. Wolves were common in earlier times, bears resided in some areas and an occasional jaguar was encountered. Many species of snakes and lizards are native to the site.

Many species of birds are found on this site including game birds, songbirds and birds of prey. Major game birds that are economically important are bobwhite quail, scaled (blue) quail and mourning dove. Quail prefer a combination of low shrubs, bunch grass (critical for nesting cover), bare ground and low successional forbs. Turkeys visit the site to feed. The different species of songbirds vary in their habitat preferences. Habitat on this site that provides a large diversity of grasses, forbs and shrubs will support a good variety and abundance of songbirds. Birds of prey are important to keep the numbers of rodents, rabbits and snakes in balance.

Hydrological functions

The site is well drained with a moderate to high water holding capacity. Light showers are ineffective on this site, with insufficient infiltration to benefit the deeper-rooted midgrasses. Bare soils tend to crust badly and are infiltration is very slow when rain falls on dry soil. The reference community has a positive influence on the infiltration and percolation of rainfall to plant roots. Loss of vegetative cover, mulch, and soil organic matter has a negative impact on infiltration, as does compaction due to overgrazing. More rainfall is directed to overland flow, which causes increased soil erosion and flooding.

When heavy grazing or prolonged drought causes the loss or reduction of bunchgrasses, the water cycle becomes impaired. Infiltration is decreased, and runoff is increased due to poor ground cover, rainfall splash, soil capping, low organic matter, and poor structure. With a combination of a sparse ground cover and intensive rainfall, this site can contribute to increased frequency and severity of flooding within a watershed. Soil erosion is accelerated; quality of surface runoff is poor, and sedimentation is increased. Organic matter is lost from the site with surface runoff.

As the site becomes dominated by woody species, the water cycle is further altered. Interception of rainfall by shrub canopies increases, thereby reducing the amount of rainfall reaching the surface. However, stem flow is greater due to the funneling effect of the canopy, which increases soil moisture at the base of the shrub and infiltration under the canopy is increased due to the mulch effect of leaf litter if present in sufficient quantities. Increased transpiration, especially by evergreen species such as juniper, accelerates depletion of soil moisture. As woody species increase, grass cover declines, which causes some of the same results as heavy grazing. Brush management combined with good grazing management can help restore the natural hydrology of the site. Grass recovery, however, is very slow.

Recreational uses

This site has the appeal of the wide-open spaces and a wide variety of plant and animal life. In good years it is blanketed by colorful spring flowers. The area is also used for hunting, birding, and other eco-tourism related enterprises.

Inventory data references

Information provided here has been derived from limited NRCS clipping data, and from field observations of range trained personnel.

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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)	
Contact for lead author	
Date	04/26/2024
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. **Presence of water flow patterns:**

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

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

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

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

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

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

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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:**

17. **Perennial plant reproductive capability:**