

# Ecological site R080BY147TX

## Claypan 26-33" PZ

Last updated: 9/19/2023  
Accessed: 05/29/2026

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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.

### MLRA notes

Major Land Resource Area (MLRA): 080B–Texas North-Central Prairies

MLRA 80B consists of gently rolling, dissected plains with very steep hillsides and sideslopes and narrow flood plains associated with small streams. Loamy and clayey soils range from very shallow to deep and developed in sandstones, shales, and limestones of Pennsylvanian age.

### Classification relationships

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

### Ecological site concept

These sites occur over loamy soils which have a dense clay subsoil on uplands. The reference vegetation includes native perennial midgrasses with numerous forbs and very few woody plants. Without fire or other brush management, woody species may increase and dominate the site, especially mesquite. The soils can be quite droughty due to the dense clay subsoils.

### Associated sites

<b>R080BY152TX</b>	<b>Loamy 26-33" PZ</b>  Loamy soils without restrictive clay layer. Higher productivity.
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### Similar sites

<b>R084BY168TX</b>	<b>Claypan 29-33" PZ</b>  Claypan site in MLRA 84B.
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Bouteloua curtipendula</i> (2) <i>Panicum obtusum</i>

## Physiographic features

This site occurs on linear base slopes and side slopes of hillslopes and ridges in the Texas North-Central Prairies. Slopes are typically less than 5 percent.

Table 2. Representative physiographic features

Landforms	(1) Hills > Hillslope (2) Hills > Ridge
Runoff class	High to very high
Elevation	230 – 730 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

## Climatic features

The climate is subtropical subhumid and is characterized by hot humid summers and relatively mild winters. Tropical maritime air controls the climate during spring, summer and fall. In winter and early spring, frequent surges of polar Canadian air cause sudden drops in temperatures and add considerable variety to the daily weather. The average first frost generally occurs about November 5 and the last freeze of the season usually occurs about March 19. The average frost free period ranges from 215 days in the northern counties, to 240 days in the south.

The average relative humidity in mid-afternoon is about 60 percent in the summer months. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 75 percent of the time possible during the summer and 50 percent in winter. The prevailing wind direction is from the southwest and highest windspeeds occur during the spring months.

Approximately 75% of annual rainfall occurs between April 1 and October 31. Rainfall during the months of April through September typically occurs during thunderstorms which tend to be intense and brief, resulting in large amounts of rain in a short time. The wettest months of the year are May, June, September, and October. The driest months during the growing season are July and August. The winter months of November, December, January, and February are the driest months overall.

Average annual precipitation for the entire MLRA is approximately 28 inches. There is a noticeable difference in the average annual precipitation in the northern counties in comparison to the southern and western counties of this Major Land Resource Area. Jack, Clay, Young, and Palo Pinto Counties all have an average annual precipitation of more than 31 inches. Stephens, Eastland, McCulloch, and San Saba Counties all have an average annual precipitation of less than 28 inches.

Winters tend to be mild, with occasional periods of very cold temperatures which can be accompanied by strong northerly winds and freezing precipitation. Snow is infrequent and significant accumulations are rare. These periods of very cold weather are generally short-lived. Summers tend to be hot and dry. Drought conditions are common during most summers. Air temperatures of more than 95oF are common from mid-June through September. In the northern counties nearest to the Red River, temperatures are generally slightly cooler during winter months and slightly warmer during summer months than in the other counties in the North Central Prairie.

Table 3 Representative climatic features

Frost-free period (average)	240 days
Freeze-free period (average)	270 days

Precipitation total (average)	840 mm
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**Influencing water features**

This being an upland site, it is not influenced by water from a wetland or stream. These site may shed water to adjacent areas downslope. Infiltration of rainwater may be restricted by the tight subsoils. However, the presence of herbaceous groundcover and deep rooted perennial plants can help increase infiltration.

**Wetland description**

NA

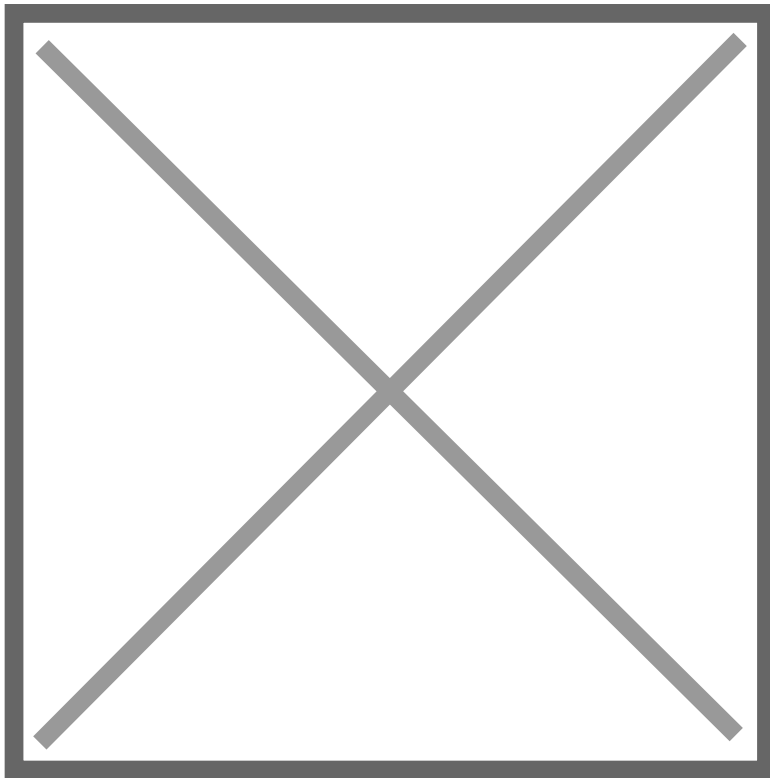


Figure 3.

**Soil features**

The soils that support this site are deep, with loamy top-soils and blocky clay sub-soils. The top-soils are very hard and crusty when dry. The substratum is calcareous shale or reddish clay and shale occasionally inter-bedded with sandstone. Air and water move through the subsoil very slowly and these soils tend to be droughty. During wet times, these soils often have a wet area above the clay. Fertility is medium to high.

Representative soil components for this ecological site include: Callahan, Thurber

The site is characterized by moderately deep to very deep hard setting soils.

Table 4. Representative soil features

Parent material	(1) Residuum – claystone (2) Slope alluvium – claystone
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Surface texture	(1) Loam (2) Clay loam (3) Fine sandy loam
Drainage class	Moderately well drained to well drained
Permeability class	Very slow
Soil depth	50 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	12.7 – 22.86 cm
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	6.1 – 8.4
Subsurface fragment volume <=3" (0-101.6cm)	0 – 10 %
Subsurface fragment volume >3" (0-101.6cm)	Not specified

### Ecological dynamics

The plant communities that can occur on this site range from a mid and short grass prairie; to a short grass prairie; to a mesquite (*Prosopis glandulosa* var. *glandulosa*) dominated mid-grass and/or short grass range; to a thick canopy mesquite/shrub short and annual grass, forb, bare ground community. This wide diversity of plant communities occurring on this site is in direct response to type of grazing management, reaction to fire regimes, extermination of the prairie dogs, the impacts of droughts on the different hydrology's associated with each of the vegetative states, and the inherent droughtiness of the soils.

The reference plant community is a mid and shortgrass prairie. Sideoats grama (*Bouteloua curtipendula* var. *curtipendula*) is the dominant grass making approximately 25 percent of the total production. Other midgrasses are Arizona cottontop (*Digitaria californica*) (a site indicator plant), vine mesquite (*Panicum obtusum*), tall dropseed (*Sporobolus asper* var. *asper*), meadow dropseed (*Sporobolus compositus* var. *drummondii*), silver bluestem (*Bothriochloa laguroides* ssp. *torreyana*), plains bristlegrass (*Setaria vulpiseta*), and white tridens (*Tridens albescens*). Shortgrasses include buffalograss (*Bouteloua dactyloides*), blue grama (*Bouteloua gracilis*), Texas wintergrass (*Nassella leucotricha*), Western wheatgrass (*Pascopyrum smithii*), purple three-awn (*Aristida purpurea* var. *purpurea*), Wright's threeawn (*Aristida purpurea* var. *wrightii*) sand dropseed (*Sporobolus cryptandrus*), hairy tridens (*Erioneuron pilosum*), hairy grama (*Bouteloua hirsuta*), Scribner's rosette grass (*Dichanthelium oligosanthes* var. *scribnerianum*) and sedges (*Carex* sp.). Numerous forbs are found on the site. They are heath aster (*Aster ericoides*), awnless bushsunflower (*Simsia calva*), dotted gayfeather (*Liatris punctata* var. *punctata*), englemann daisy (*Engelmannia peristena*), western ragweed (*Ambrosia psilostachya*), verbena (*Verbena* sp.), Louisiana sagewort (*Artemisia ludoviciana*), green thread (*Thelesperma simplicifolium*), Maximilian sunflower (*Helianthus maximiliani*), onion (*Allium* sp.), trailing ratany (*Krameria lanceolata*), tetraeneuris (*Tetraeneuris scaposa*), and catclaw sensitive briar (*Mimosa nuttallii*). There is only a small amount of shrubs and it is composed of condalia (*Condalia* sp.) and vine ephedra (*Ephedra antisiphilitica*).

In the reference plant community, the midgrasses tend to dominate the shortgrasses due to their ability to capture sunlight and shade them. The midgrasses also have deeper root systems that allow them to capture the deep moisture while the early successional shortgrasses have shorter root systems and can capture only the more shallow moisture. Many of the deep-rooted grasses also have more root hairs that allow them to be more efficient at extracting moisture from very dry soil. Due to these differences, midgrasses maintain their dominance over the shortgrasses as they can produce much more food and maintain a higher state of health and vigor even; in times of drought.

When European settlers arrived, the area was inhabited by bison, whitetail deer, turkey, quail, dove, many song birds, rabbits, squirrel, prairie dogs, lizards and snakes. Fire was a major factor in maintaining the site in the reference state. Lightning fires and fires set by Native Americans would burn for days with out stopping. Hundreds of thousands of acres would burn as there was nothing but wide spread rivers or a change in weather to stop them. This repeated burning, which was considered historically to be a 4 – 12 year interval, kept this site in an open prairie state. The fresh green growth of the grass and forbs made this site a sea of lush growth that attracted the grazing animals and provided them highly nutritious forage.

There were no fences. The bison were free to roam and migrate from south to north in the summer and north to south as the winter season was nearing. This area provided the winter grazing for the bison herds that had ventured north for the summer. They came by the thousands and grazed the range as they moved around and generally were presumed to follow the most recent burn having a significant short-term impact followed by extended rest periods. Antelope were on the range, and grazed and roamed at their desire, seeking the best nutrition they could find in the forbs and grasses. Prairie dogs lived in groups on the site. They kept the woody shrubs cut down as a means of protection from hawks, eagles, coyotes, bobcats, and cougars. Recent research has shown that they would not let a mesquite stand overnight that emerged in or around their town.

European settlers started settling this area in the early 1800's with a major thrust just before and after the civil war. The first settlers moved about from ranch to ranch as no one owned land. After the grass was grazed to a point of "being gone", they would move to another place where the grass was good and start another ranch. When the grass "came back" on the ranch they had left, a new rancher would move in and take over that ranch.

In 1880, barbed wire was introduced into this area. The land had also come under private ownership. The fencing stopped the open range where livestock had wandered to be guided only by the line riders. Now the forces of contained livestock grazing started to have its toll on the plant communities. The wild fires that once systematically burned over the land were either put out or burned with less intensity due to reduced fine fuel due to the heavier and continuous grazing.

Depending on how the rancher managed, the plant communities started to change. If the rancher allowed fire to continue to control the mesquite seedlings, they could manage this site to remain a mid and short grass prairie. If fire was not allowed to maintain the invading brush species, mesquite, prickly pear (*Opuntia macrorhiza*) and tasajillo (*Cylindropuntia leptocaulis*) would spread over the site. If the site was burned prior to the mesquite achieving approximately 6 feet in height (slick bark stage), fire could be used to manage the mesquite invasion. If the mesquite was allowed to exceed approximately 6 feet, then fire could no longer control the brush and the range entered a new vegetative state that would require more than fire to restore the reference plant community. The manager would have to use machinery or herbicide to manage the brush to a desired canopy.

Also, the manager would have to apply a well thought out prescribed grazing plan to maintain the vigor and health of the desired grasses and forbs. As the stocking rate exceeded the carrying capacity of the land and the natural graze-rest cycles were broken by continuous grazing, the palatable and highly selected midgrasses were grazed to the point that they could no longer produce sufficient food in their leaves to maintain their health and vigor. Records of stocking rates show that on much of the land, there was a cow to 2 acres. When the midgrasses were grazed to the point that they had little leaf area left, they stopped supplying the root system with food, as all available food produced was being used to grow more leaf area to enhance the food manufacturing process. If the overgrazing continued, the root system of the overgrazed plants was shrunk as energy consuming respiration continued in the root system. In time, with continued close grazing, the midgrasses would become not a deep rooted healthy plant, but a very shallow rooted, small leaf area, weak plant that was set up for doom during the next drought. This process was magnified due to the natural droughts that occur in the area as well as the natural droughtiness of the soil. This led to the demise of the midgrasses and the increase of shortgrasses. These shortgrasses were buffalograss, Texas wintergrass, purple threeawn, Wright's threeawn, hairy grama, hairy tridens, and scribner's rosettegrass. At the same

time this was occurring with the grasses, the palatable forbs were being overgrazed and killed out of the plant community.

If the new vegetative state of mesquite and mid/ short grasses was overgrazed and no brush was controlled, the site would change to a canopy of 30 to 50 percent with mainly buffalograss, Texas wintergrass and other shortgrasses in the understory. If this management continued, the site would change to a dense canopy of tall mesquite, prickly pear, tasajillo, Texas wintergrass, annual cool-season grasses, invading forbs such as annual broomweed (*Amphiachyris dracunculoides*) and much bare ground; especially during the dryer years.

A major characteristic of this ecological site is the droughtiness of the site. In all of the communities production of plant material is very limited to non-existent in drought years. But, it has been demonstrated that with good range management, the site can respond and recover to be very productive following drought. If the management is not designed to allow the plants to recover their health and vigor following drought, the site is very slow to recover.

Since the soils of this site are productive and fertile, much of this site has been converted into cropland. In many instances, this land has either been reseeded to native grasses or introduced grasses. It also has been left alone and is called Abandoned or "Go Back Land". After the land was planted to native or introduced grasses and forbs, management of the land to control the invasion of mesquite and pricklypear from neighboring lands is a must if the manager desires to keep the land open. This can be accomplished with prescribed burning or other means of brush management. Also, to maintain the stand of native or introduced grasses planted, a prescribed grazing plan must be designed and applied that meets the needs of the plants, the animals and the managers objectives.

STATE & TRANSITION DIAGRAM:

## State and transition model

## Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Midgrass</b>			420-981	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	420-981	–
2	<b>Midgrasses</b>			622-1451	
	silver beardgrass	BOLAT	<i>Bothriochloa laguroides ssp. torreyana</i>	0-364	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	0-364	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	0-364	–
	streambed bristlegrass	SELE6	<i>Setaria leucopila</i>	0-364	–
	composite dropseed	SPCOC2	<i>Sporobolus compositus var. compositus</i>	0-364	–
	Drummond's dropseed	SPCOD3	<i>Sporobolus compositus var. drummondii</i>	0-364	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0-364	–
	white tridens	TRAL2	<i>Tridens albescens</i>	0-364	–
3	<b>Shortgrasses</b>			252-588	
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0-146	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0-146	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0-146	–
	hairy woollygrass	ERPI5	<i>Erioneuron pilosum</i>	0-146	–
4	<b>Cool-season Grasses</b>			252-588	
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes var. scribnerianum</i>	0-196	–
	Texas wintergrass	NALE3	<i>Nassella leucotricha</i>	0-196	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0-196	–
5	<b>Shortgrasses</b>			34-78	
	purple threeawn	ARPUP6	<i>Aristida purpurea var. purpurea</i>	0-28	–
	Wright's threeawn	ARPUW	<i>Aristida purpurea var. wrightii</i>	0-28	–

	sedge	CAREX	<i>Carex</i>	0-28	-
<b>Forb</b>					
6	<b>Forbs</b>			84-196	
	onion	ALLIU	<i>Allium</i>	0-50	-
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0-50	-
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0-50	-
	aster	ASTER	<i>Aster</i>	0-50	-
	Engelmann's daisy	ENGEL	<i>Engelmannia</i>	0-50	-
	Maximilian sunflower	HEMA2	<i>Helianthus maximiliani</i>	0-50	-
	trailing krameria	KRLA	<i>Krameria lanceolata</i>	0-50	-
	dotted blazing star	LIPUP	<i>Liatis punctata var. punctata</i>	0-50	-
	Nuttall's sensitive-briar	MINU6	<i>Mimosa nuttallii</i>	0-50	-
	awnless bushsunflower	SICA7	<i>Simsia calva</i>	0-50	-
	fineleaf fournerved daisy	TELI3	<i>Tetaneuris linearifolia</i>	0-50	-
	stemmy four-nerve daisy	TESCS	<i>Tetaneuris scaposa var. scaposa</i>	0-50	-
	slender greenthread	THSI	<i>Thelesperma simplicifolium</i>	0-50	-
	vervain	VERBE	<i>Verbena</i>	0-50	-
<b>Shrub/Vine</b>					
7	<b>Shrubs</b>			17-39	
	clapweed	EPAN	<i>Ephedra antisiphilitica</i>	0-22	-
	lotebush	ZIOBO	<i>Ziziphus obtusifolia var. obtusifolia</i>	0-22	-

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 4.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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## Animal community

Bison and prairie dog were historical inhabitants of this site when the area was settled by European man. They have been mostly removed from the site. This site is used for the production of domestic livestock and to provide habitat for native wildlife. Cow-calf and stocker operations are the primary livestock enterprises. Sheep and goat operations have been used in the past, but currently there are very few. Sustainable stocking rates have declined over the years due to a change in the plant community to more brush. As the mid-grasses have been removed by continuous overgrazing and the invasion of mesquite and prickly pear, and the increase of lotebush, the production of plants desired by cattle have been drastically reduced. To determine the correct stocking rate, an on-site evaluation must be made. Forage production by the different plant species must be determined. When calculating stocking rates, calculate the forage used by the wildlife first and then calculate the stocking rate for the livestock based on what desired forage is left because wildlife move randomly. (See guidance in the NRCS National Range and Pasture Handbook on calculating safe starting stocking rates.) Consult a

rangeland management professional to assist with forage inventories. As the plant community changes, the stocking rate for one animal species may decrease while the amount of desired forage for other animals may increase. For instance, as grass production decreases, and the forbs and shrub/vine production increases, the production for food and cover for quail and whitetail deer are increasing. Therefore, the early stages of (3) Mid and Short Grass with mesquite, sideoats grama-buffalograss-Texas wintergrass-meadow dropseed-mesquite steady state may be outstanding for quail, turkey and deer. In the manager's goals he or she may desire to maintain all or part of their land in this steady state to meet their overall wildlife and domestic livestock plan. It should also be understood that wildlife species may use this site for only a portion of their habitat needs. For more specific guidance, consult a professional biologist or refer to a habitat appraisal guide for the desired management species. Smaller mammals on the site include rodents, jackrabbit, cottontail rabbit, raccoon skunks, opossum, and armadillo. Mammalian predators include coyote, red fox, gray fox, and bobcat. Species of snakes and lizards are native to the site. Many species of birds are found on this site including game birds, song birds and birds of prey. Major game birds that are economically important are Rio Grande turkey, bobwhite quail, and mourning dove. Turkey prefers plant communities with substantial amounts of shrubs and trees interspersed with grassland. Quail prefer plant communities with a combination of low shrubs, bunch grass, bare ground and low successional forbs. The different song birds vary in their habitat preferences. In general, habitat that provides a large variety of grasses, forbs, shrubs, vines and trees and a complex of grassland, savannah, shrubland and woodland 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. The different plant communities of the site will sustain different species of raptors. Feral hogs are present on this site in many instances. They can cause much damage to the site as they up root the desirable plants and spread prickly pear through droppings.

## Hydrological functions

The land form is a plain that ranges in elevation from 850 to 2300 feet above sea level. The hydrologic group is D and the runoff class is high to very high. The drainage class is well to moderately well-drained. Permeability class is very slow. There is no water table within 6 feet of the surface, except in the case of Hassee and Waurika soils. These soils during wet times have a water table from within 9 to 12 inches of the surface, respectively. Site does not pond water and the area does not flood. The Mid/Shortgrass Prairie steady state has a very favorable influence on the infiltration and deep percolation of rainfall. As the site is overgrazed there is a reduction in the mid-grasses. As this change occurs, organic matter in the soil is reduced. This has a negative impact on infiltration and water holding capacity of the soil. Research has shown that there is a marked difference in infiltration on Sideoats grama dominated sites as compared to buffalograss dominated sites. More runoff is generated from rainfall, and erosion becomes more evident. When the soil is dry, it cracks. This allows rapid infiltration at first, but as the cracks close, infiltration is greatly reduced. Light showers tend to be ineffective on this site. As the site is invaded by mesquite, the water cycle is further altered. Interception of rainfall by tree canopies is increased which reduces the amount of rainfall reaching the surface. Stem flow is increased due to the funneling effect of the canopy, which increases soil moisture at the base of the tree. Increased transpiration, especially when mesquite dominates, provides less chance for water storage for grass and forb growth. As woody species increase, grass cover decreases, which causes some of the same effects as overgrazing. During dryer years, there is little grass and forb production on this site exposing much bare ground. Brush management combined with good grazing management is essential to restore and maintain the natural hydrology of the site.

## Recreational uses

This site has the appeal of the wide open spaces. The abundant midgrasses, such as sideoats grama and Arizona cottontop, with the scattered condalia provides excellent fall color variations. This site produces a variety of plant communities, ranging from open prairie to dense mesquite. Therefore, it produces wildlife foods and cover in varying degrees, providing habitat for bird watching, viewing deer, turkey, and quail, as well as hunting.

## Wood products

Honey mesquite can be used for firewood and the specialty wood industry. Some larger mesquite can be found on this site, especially along water drainage ways.

## Other products

None.

## Other information

None.

## Inventory data references

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

## References

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## Other references

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## Contributors

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## Approval

Bryan Christensen, 9/19/2023

## 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)	Colin Walden, Soil Survey Region 9
Contact for lead author	colin.walden@ok.usda.gov
Date	02/13/2018
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

### Indicators

1. **Number and extent of rills:** Minimal evidence of current or past rill formation.

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2. **Presence of water flow patterns:** Few water flow patterns on steep areas. Short and stable, not incising.

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3. **Number and height of erosional pedestals or terracettes:** No pedestals or terracettes present.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**  
Bare ground less than 10 percent. Bare areas small and not connected.

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5. **Number of gullies and erosion associated with gullies:** No gullies present.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** No wind scoured areas.

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7. **Amount of litter movement (describe size and distance expected to travel):** Litter movement less than 3 feet. Vegetative cover should restrict litter movement over long distances. Only herbaceous litter less than .25 inches expected to move.

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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):** Soil stability scores of 5 or greater expected.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Callahan: Ap--0 to 7 inches; reddish brown (5YR 4/4) loam, dark reddish brown (5YR 3/4) moist; massive; hard, firm See official description for specific soil component.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Presence of native midgrasses and few tallgrasses allow for good infiltration across landscape. However, some runoff still expected due to the nature of the clay subsoils.
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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):** No compaction under reference conditions. Beware texture change of Bt horizon not product of compaction.
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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: Midgrasses (Group 1&2)
- Sub-dominant: Other grasses (3,4,5) Forbs (6)
- Other: Shrubs (7)
- Additional:
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Possible mortality only during prolonged drought. Less than 5%.
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14. **Average percent litter cover (%) and depth ( in):** Litter expected to be at 75% cover at average .25 inch depth.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production 2,500 lb/ac. Ranging from 1,500 to 3,500 lbs.
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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: Mesquite and Juniper(ashle juniper/eastern redcedar) most common invaders.**
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17. **Perennial plant reproductive capability:** Plants should be capable of reproducing every year with exception of prolonged growing season drought.
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