

Ecological site R084BY175TX

Tight Sandy Loam

29-33" PZ

Last updated: 9/21/2023
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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): 084B–West Cross Timbers

MLRA 84B is characterized by nearly level to strongly sloping, dissected plains with narrow valleys that deepen eastward. Soils are generally deep and formed in sediments of Cretaceous age. Average annual precipitation is 25 to 35 inches, and elevation ranges from 1000 to 1300 feet.

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 on soils with a sandy loam surface and a clay loam subsoil. The reference vegetation is a post/blackjack oak savannah with native tallgrasses dominating the plant community. Forbs and shrubs also occur scattered across the site. In the absence of fire or other brush management, woody species may dominate the site. This site is especially susceptible to mesquite invasion.

Associated sites

R084BY174TX	Sandy Loam 29-33" PZ Sandy loam soils on uplands.
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Similar sites

R084BY174TX	Sandy Loam 29-33" PZ Sandy loam savannah site. Lacks clay/clayloam subsoil.
R084BY168TX	Claypan 29-33" PZ Dense clay subsoils over shale.

Table 1. Dominant plant species

Tree	(1) <i>Quercus stellata</i> (2) <i>Quercus marilandica</i>
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Shrub	Not specified
Herbaceous	(1) <i>Schizachyrium scoparium</i> (2) <i>Sorghastrum nutans</i>

Physiographic features

This site occurs on interfluvies, crests and side slopes of hillslopes in the West Cross Timbers. This site is characteristically a water shedding site. Slopes are typically less than 8 percent.

Table 2. Representative physiographic features

Landforms	(1) Hills > Ridge (2) Hills > Hillslope
Runoff class	Medium to high
Elevation	200 – 640 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Low to high
Elevation	Not specified
Slope	Not specified

Climatic features

Precipitation varies from an average of 33 inches in the eastern part of the Cross Timbers to 29 inches in the western part. The climate is subtropical. Large variations in temperature sometime accompany polar air masses in the winter. Tropical maritime air masses control the weather during the spring, summer, and fall. The prevailing winds are southerly throughout the year, even in the winter months.

Table 4 Representative climatic features

Frost-free period (characteristic range)	190-200 days
Freeze-free period (characteristic range)	220-230 days
Precipitation total (characteristic range)	790-840 mm

Frost-free period (actual range)	190-200 days
Freeze-free period (actual range)	220-230 days
Precipitation total (actual range)	710-860 mm
Frost-free period (average)	200 days
Freeze-free period (average)	220 days
Precipitation total (average)	810 mm

- (1) PUTNAM [USC00417327], Baird, TX
- (2) RISING STAR 1S [USC00417633], Rising Star, TX
- (3) PROCTOR RSVR [USC00417300], Comanche, TX
- (4) MINERAL WELLS AP [USW00093985], Millsap, TX
- (5) BRIDGEPORT [USC00411063], Bridgeport, TX

Influencing water features

A stream or wetland does not influence the plant communities of this site.

The site may receive run off water from adjacent sites as well as shed some water to sites lower on the landscape. The presence of a good cover of tallgrasses helps to facilitate infiltration into the soil.

Wetland description

NA

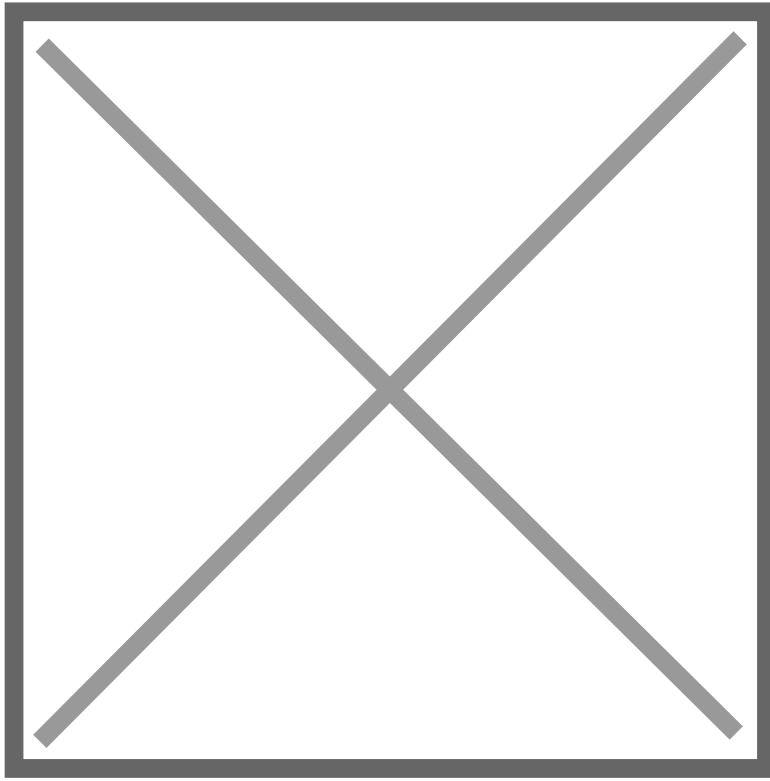


Figure 7.

Soil features

Representative soil components for this ecological site include: Keeter, Pedernales, and Windthorst

The site is characterized by soils with an abrupt textural change from the loamy surface horizon to a clayey subsoil in the upper part of the argillic horizon. Water has difficulty permeating the subsoil when the soil is dry or when deep rooted plants are absent.

Table 5. Representative soil features

Parent material	(1) Residuum – sandstone and siltstone
Surface texture	(1) Stony fine sandy loam (2) Very fine sandy loam (3) Sandy clay loam
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow
Soil depth	50 – 150 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	0 – 10 %

Available water capacity (0-101.6cm)	22.86 – 27.94 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	5.1 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

Ecological dynamics

The Tight Sandy Loam ecological site evolved and was maintained by the grazing and herding effects of native wild large and small ungulates, extreme climatic fluctuations, and periodic fires. The reference plant community for this site is a post oak savannah with a tallgrass understory. If oaks are removed, open areas are often invaded by mesquite (*Prosopis glandulosa*). The herbaceous understory is dominated by tallgrasses such as little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*) and small amounts midgrasses such as sideoats grama (*Bouteloua curtipendula*). With continuous heavy grazing on perennial grasses (decreasers) such as Indiangrass and little bluestem, tallgrasses will decrease and be replaced by increasers such as silver bluestem, sideoats grama, Texas wintergrass (*Nassella leucotricha*) and sand dropseed (*Sporobolus cryptandrus*). Further regression will cause undesirable grasses, or invaders, such as three-awns (*Aristida* spp.) and annual grasses to increase. Forbs will make up a larger percentage of the plant composition and grasses would make up a smaller percentage.

Fire played a role in the ecology of the site as is true for most of the grasslands. The main effect of fire on this site was to hold woody shrubs and cactus in check. The grass species such as little bluestem and Indiangrass are considered fire neutral as far as their response to fire. Climate and soils are the most important and limiting factors affecting grass vegetation on the site. Fire stimulated forbs growth if the timing was right and the fires of pre-settlement days were probably more severe due to more fuel being available which could have been more damaging to woody plants. Fire usually creates more diversity in this site for a year or two post-burn. Fire will usually not produce much mortality in older woody plants. After brush has been controlled with herbicides or mechanically, fire can sometimes be used effectively to suppress regrowth. Small juniper (*Juniperus* spp.) can be killed by fire. Fuel loads are often the most limiting factor for the effective use of prescribed fire on this site.

Since this site is much preferred as a grazing resource, it has a tendency to be abused perhaps more than some other associated sites. With abusive grazing practices, the vigorous Indiangrass and big bluestem (*Andropogon gerardii*) will become lower in vigor while little bluestem will increase then secondary successional species such as sand dropseed and silver bluestem (*Bothriochloa laguroides*) will begin to increase along with an increase of woody plants. The little bluestem is a tough, resistant grass species tolerant of some fairly

heavy grazing for long periods, but at some point, a threshold is crossed and the ground cover is opened up resulting in bare places where weedy species can establish. Western ragweed (*Ambrosia psilostachya*), crotons (*Croton* spp.), and cool-season annuals will quickly invade if the principal species are in a weakened condition. Mesquite when present will usually increase on this site but it is slowed by good management.

The greatest contributor to the increase of mesquite is the domestic cow. The seed is consumed by animals after the seed pods ripen in late summer and when passed through the digestive system and excreted in the manure, the seed finds an excellent seedbed complete with moisture and nutrients. Some wildlife species rely heavily on mesquite beans and juniper berries for food and contribute to the spread of these species. It is possible for mesquite beans to lay dormant in the soil for many years and then germinate when ideal conditions occur. Grazing management probably has minimal effect on the proliferation of mesquite and other woody plants, but a good cover of perennial grasses likely minimizes the seed to soil contact the mesquite needs to establish. Prescribed fire where it can be safely carried out provides a much better method to control the spread of woody plants. Selective individual removal of mesquite and/or juniper is easy and economical when a few plants begin to show up on the site, but the increase of number of plants can be fairly rapid and the number of woody plants per acre will soon become too numerous for individual control to be feasible. Prescribed grazing with a reasonable stocking rate can sustain the grass species composition and production at a near historic climax level until the brush canopy is so dense that the shade starts to interfere with photosynthesis. The Sandy Loam site can be abused to the point that the perennial warm-season grasses thin out and lower successional grasses along with annual forbs begin to dominate. This process of degradation usually takes many years and is further exacerbated by summer drought and above average winter moisture.

Long-term droughts that occur only three to four times in a century can effect some change in plant communities. Short-term droughts are common and usually do not have a lasting effect in changing stable plant communities, although production will be affected. When a brush canopy becomes established which shades the ground sufficiently it tends to favor cool-season annual species. Once a plant community consisting of brush and cool-season annuals is reached, recovery to a good perennial grass cover is unlikely without major input with brush management and reseeding. In summary, the change in various plant communities of vegetation depend on the type of grazing management applied over many years and the rate of invasion and establishment of woody species. The effects of seasonal moisture and short-term dry spells become more pronounced after the site crosses thresholds to a lower ecological condition. Plant communities that consist of warm-season perennial grasses such as little bluestem and the associated species of the reference community are able to persist and withstand climatic extremes with only minor shifts in the overall plant community.

This site was inhabited by grassland wildlife species such as bison, grassland birds and small mammals. Over the years, as the site has changed to a more mixed grass and shrub community, more wildlife species have come to utilize it for habitat. Woody plants provide cover for white tailed deer and bob white quail. These wildlife species have both increased along with the brushy plants due to the cover that these plants provide. More forbs are needed to meet these species food requirements and woody plants for browse are important for deer. It is often the objective of many land owners to strike a balance in plant community so that these wildlife species can exist along with domestic livestock. This can be accomplished by a carefully thought out grazing and brush management program. It must be realized that managing at a lower successional level may meet some wildlife species requirements very well, but may not be nearly as productive for grazing purposes, and may not be as capable of satisfying functions such as nutrient cycling, hydrologic protection, plant community stability or soil protection. A proper balance can be achieved with careful planning that considers all resources.

Hydrologically, the site contributes runoff to the various draws, creeks, and streams that are common in the MLRA. If the perennial grass cover is maintained in good vigor, then maximum infiltration occurs and runoff is reduced. More water getting into the ground means a healthier, more productive plant community. If infiltration is minimal, then the effect is an artificially shallow soil with plant roots retreating to near the soil surface. More perennial grass cover means less runoff may result; but the runoff that does occur is less laden with sediment. Overall watershed protection is enhanced by a healthy grassland community, as is nutrient cycling.

State and transition model

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Tallgrass			785-1121	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	785-1121	–
2	Tallgrass			196-364	
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	196-364	–
3	Midgrass			420-476	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	420-476	–
4	Midgrass			196-336	

	silver beardgrass	BOLAT	<i>Bothriochloa laguroides ssp. torreyana</i>	196-336	–
5	Cool Season Grass			84-224	
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes var. scribnerianum</i>	84-224	–
6	Cool Season Grasses			112-280	
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	28-140	–
	Texas wintergrass	NALE3	<i>Nassella leucotricha</i>	28-140	–
	Texas bluegrass	POAR	<i>Poa arachnifera</i>	28-140	–
7	Mid/Shortgrasses			112-280	
	threeawn	ARIST	<i>Aristida</i>	0-50	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0-50	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0-50	–
	fall witchgrass	DICO6	<i>Digitaria cognata</i>	0-50	–
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	0-50	–
	crowngrass	PASPA2	<i>Paspalum</i>	0-50	–
	composite dropseed	SPCOC2	<i>Sporobolus compositus var. compositus</i>	0-50	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0-50	–
	white tridens	TRAL2	<i>Tridens albescens</i>	0-50	–
	purpletop tridens	TRFL2	<i>Tridens flavus</i>	0-50	–
8	Midgrasses			112-280	
	hooded windmill grass	CHCU2	<i>Chloris cucullata</i>	0-50	–
	cylinder jointtail grass	COCY	<i>Coelorachis cylindrica</i>	0-50	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	0-50	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	0-50	–
	coral bristlegrass	SEMA4	<i>Setaria macrosperma</i>	0-50	–
	Drummond's dropseed	SPCOD3	<i>Sporobolus compositus var. drummondii</i>	0-50	–
Forb					
9	Forbs			336-504	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0-50	–
	sagebrush	ARTEM	<i>Artemisia</i>	0-50	–
	aster	ASTER	<i>Aster</i>	0-50	–
	Berlandier's sundrops	CABE6	<i>Calylophus berlandieri</i>	0-50	–
	whitemouth dayflower	COER	<i>Commelina erecta</i>	0-50	–
	prairie clover	DALEA	<i>Dalea</i>	0-50	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	0-50	–
	Illinois ticktrefoil	DEIL2	<i>Desmodium illinoense</i>	0-50	–
	ticktrefoil	DESMO	<i>Desmodium</i>	0-50	–
	purple coneflower	ECHIN	<i>Echinacea</i>	0-50	–
	Engelmann's daisy	ENGEL	<i>Engelmannia</i>	0-50	–
	beeblossom	GAURA	<i>Gaura</i>	0-50	–
	Maximilian sunflower	HEMA2	<i>Helianthus maximiliani</i>	0-50	–
	trailing krameria	KRLA	<i>Krameria lanceolata</i>	0-50	–
	lespedeza	LESPE	<i>Lespedeza</i>	0-50	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	0-50	–
	sensitive plant	MIMOS	<i>Mimosa</i>	0-50	–
	yellow puff	NELU2	<i>Neptunia lutea</i>	0-50	–
	amberique-bean	STHE9	<i>Strophostyles helvola</i>	0-50	–

Shrub/Vine					
10	Shrubs/Vines			34-101	
	acacia	ACACI	<i>Acacia</i>	0-22	–
	stretchberry	FOPU2	<i>Forestiera pubescens</i>	0-22	–
	algerita	MATR3	<i>Mahonia trifoliolata</i>	0-22	–
	fragrant sumac	RHAR4	<i>Rhus aromatica</i>	0-22	–
	roundleaf greenbrier	SMRO	<i>Smilax rotundifolia</i>	0-22	–
	coralberry	SYOR	<i>Symphoricarpos orbiculatus</i>	0-22	–
	grape	VITIS	<i>Vitis</i>	0-22	–
	yucca	YUCCA	<i>Yucca</i>	0-22	–
	Hercules' club	ZACL	<i>Zanthoxylum clava-herculis</i>	0-22	–
	lotebush	ZIOBO	<i>Ziziphus obtusifolia</i> var. <i>obtusifolia</i>	0-22	–
Tree					
11	Trees			392-504	
	blackjack oak	QUMA3	<i>Quercus marilandica</i>	56-196	–
	post oak	QUST	<i>Quercus stellata</i>	56-196	–
	bully	SIDER2	<i>Sideroxylon</i>	0-45	–
	cedar elm	ULCR	<i>Ulmus crassifolia</i>	0-45	–
	hackberry	CELT1	<i>Celtis</i>	0-45	–
	plum	PRUNU	<i>Prunus</i>	0-45	–

Table 7. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 12. Community 4.1 plant community composition

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

The historic Tallgrass/Midgrass/Oak Savannah community was habitat to migratory bison herds, antelope, deer, turkey, migratory birds and large predators such as wolves, coyotes, mountain lions, and black bear. White-tail deer, turkey, bobcats, and coyotes along with resident and migratory birds and small mammals find suitable habitat today. Domestic livestock and white-tail deer are the dominant grazers and browsers of this site today. As the savannah changes through the various vegetative states towards post oak/mesquite woodland, the quality of the habitat may improve for some species and decline for others. Management must be applied to maintain a vegetative state in optimum habitat quality for the desired animal species.

Hydrological functions

Peak rainfall periods occur in April, May, June, September, and October. Rainfall amounts may be high (3 to 10 inches per event) and events may be intense. The soils of this site are very susceptible to erosion and severe erosion occurs where adequate herbaceous cover is not maintained and on heavy use areas such as roads, and livestock trails. Periods of 60 plus days of little or no rainfall during the growing season are common. The hydrology of this site may be manipulated with management to yield higher runoff volumes or greater infiltration to groundwater. Management for less herbaceous cover will favor higher surface runoff while dense herbaceous cover favors ground water recharge. Potential movement of soil (erosion), pesticides and both organic and inorganic nutrients (fertilizer) should always be considered when managing for higher volumes of surface runoff.

Recreational uses

Hunting, camping, equestrian, bird watching, hiking, and off road vehicle use.

Wood products

Oaks and mesquite are used for firewood. Mesquite is also used for furniture and barbecue wood.

Other products

Mistletoe is harvested from mesquite in the fall for the holiday season. Quality and Quantity of water yield.

Other information

None.

Inventory data references

The only records found for Tight Sandy Loam were recorded by the Eastland County Field Office.

References

. 2021 (Date accessed). **USDA PLANTS Database**. <http://plants.usda.gov>.

Other references

White-tailed deer, Their foods and management in the Cross Timbers by Kenneth L. Gee, Michael D. Porter, Steve Demarais, Fred C. Bryant, and Gary Van Vreede. A Samuel Roberts Noble Foundation Publication, 1991.

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Approval

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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.

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Date	01/23/2018
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.

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

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

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.

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

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

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.
-
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): A--0 to 4 inches; brown (10YR 5/3) very fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure
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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 perennial tall and midgrasses help to facilitate percolation into the soil. Some runoff expected on steeper slopes during moderate precipitation events.
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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: Tallgrasses (group 1,2)
- Sub-dominant: Midgrasses (3,4) Trees (11) Forbs (9)
- Other: All other groups
- Additional:
-
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 3110 lb/acre. Ranging from 2090 to 4240 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 (ashe juniper/eastern redcedar) most common invaders.

17. **Perennial plant reproductive capability:** Plants should be capable of reproducing every year with exception of prolonged growing season drought.
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