Ecological site R085AY479TX
Loamy Swale
30-38

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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): 085A–Grand Prairie

The Grand Prairie MLRA is characterized by predominately loam and clay loam soils underlain by limestone and shale. Topography transitions from steeper ridges and summits of the Lampasas Cut Plain on the southern end to the more rolling hills of the Fort Worth Prairie to the north. The Arbuckle Mountain area in Oklahoma is also within this MLRA.

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 moderately deep and deep, slightly calcareous clay loams soils over limestone. The reference vegetation consists of native tallgrasses with scattered forbs and few woody species. In the absence of fire or other brush management, woody species may increase and dominate the site. Many of these sites have been cultivated for crop production. Some have been planted back to introduced species. * This site was formerly correlated to the Clay Loam ecosite. During the provisional ESD project of 2018 it was identified that the soils associated with the clay loam ecosite warranted additional investigations as there was multiple differences(soil texture, landscape position, production potential, etc.). In order to prioritize these sites for future data collection projects, they were separated into Clayey Slope, Clayey Swale, Loamy Slope and Loamy Swale. The production and plant composition details of this report may be altered pending future investigations.

Associated sites

R085AY185TX	**Shallow 30-38" PZ** Located upslope from the clay loam site and contributes runoff to the clay loam site.

Similar sites

R085AY185TX	**Shallow 30-38" PZ** The shallow site yields similar vegetation but with a low yield due to a more shallow soil than the clay loam.

Table 1. Dominant plant species

Tree	(1) *Quercus fusiformis*

Shrub	Not specified
Herbaceous	(1) *Andropogon gerardii* (2) *Schizachyrium scoparium*

Physiographic features

This site occurs on drainageways, treads of stream terraces or base slopes of hillslopes in the Grand Prairie. This site is characteristically a water receiving site. Slopes are typically 3 percent or less.

Table 2. Representative physiographic features

Landforms	(1) Hills > Drainageway (2) Alluvial plain > Stream terrace (3) Hills > Hillslope
Runoff class	Negligible to medium
Elevation	150 – 580 m
Slope	0 %
Aspect	Aspect is not a significant factor

Climatic features

The climate is subhumid subtropical and is characterized by hot 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 should occur around November 5 and the last freeze of the season should occur around March 19.

The average relative humidity in mid-afternoon is about 60 percent. 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 south and highest windspeeds occur during the spring months.

Approximately two-thirds of annual rainfall occurs during the April to September period. Rainfall during this period generally falls during thunderstorms, and fairly large amounts of rain may fall in a short time. The driest months are usually July and August.

Table 3 Representative climatic features

Frost-free period (characteristic range)	190-210 days
Freeze-free period (characteristic range)	220-240 days
Precipitation total (characteristic range)	810-970 mm

Frost-free period (actual range)	190-210 days
Freeze-free period (actual range)	210-250 days
Precipitation total (actual range)	790-990 mm
Frost-free period (average)	200 days
Freeze-free period (average)	230 days
Precipitation total (average)	890 mm

- (1) BENBROOK DAM [USC00410691], Fort Worth, TX
- (2) CLEBURNE [USC00411800], Cleburne, TX
- (3) WHITNEY DAM [USC00419715], Clifton, TX
- (4) DENTON MUNI AP [USW00003991], Ponder, TX
- (5) DECATUR [USC00412334], Decatur, TX
- (6) EVANT 1SSW [USC00413005], Evant, TX
- (7) BROWNWOOD 2ENE [USC00411138], Early, TX
- (8) LAMPASAS [USC00415018], Lampasas, TX

Influencing water features

These sites receive some run off from adjacent sites upslope and shed some water to lowland sites. The presence of deep rooted tallgrasses helps to facilitate infiltration of rainwater into the soil profile. These sites are not typically associated with wetlands.

Wetland description

NA

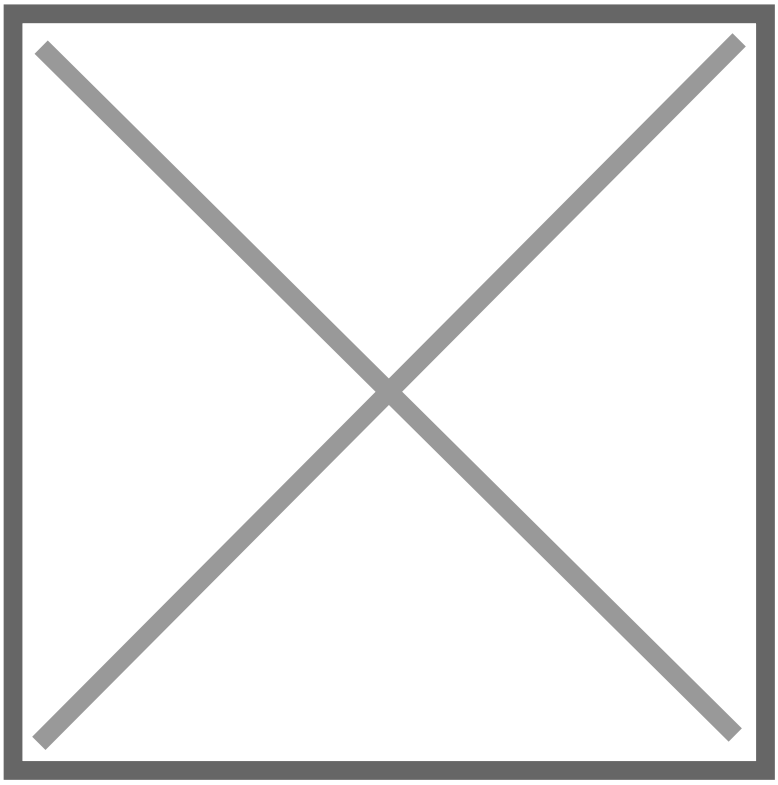

Figure 7.

Soil features

Representative soil components for this ecological site include: Abilene, Blanket, Lewisville, Luckenbach, Sunev, and Venus

The site is characterized by very deep, moderately permeable, loamy soils on drainageways and ancient stream terraces.

Subsurface may be loamy or clayey.

Table 4. Representative soil features

Parent material	(1) Alluvium – limestone (2) Alluvium – mudstone
Surface texture	(1) Clay loam (2) Loam
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	150 cm
Surface fragment cover <=3"	Not specified

Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	22.86 – 27.94 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 60 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 20 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The reference plant community for the Loamy Swale site is a tallgrass prairie plant community. The grasses are primarily little bluestem (Schizachyrium scoparium), Indiangrass (Sorghastrum nutans), big bluestem (Andropogon gerardii) and eastern gamagrass (Tripsacum dactyloides). Little bluestem, big bluestem, and Indiangrass are the most commonly occurring grass species for this site. Smaller amounts of switchgrass (Panicum virgatum), and sideoats grama (Bouteloua curtipendula) occur as well. Very few shrubs and trees were present in the reference community. The woody component consisted of live oak (Quercus fusiformis), Texas red oak (Quercus buckleyi), elm species (Ulmus spp.), plum species (Prunus spp.), hackberry (Celtis occidentalis) and bumelia (Sideroxylon lanuginosum). Most woody plants tended to be more confined to areas along drainages, areas where soil is somewhat deeper, and along the cedar breaks, which are found along the edges of the Major Land Resource Area (MLRA) 85.

To a large extent, the way the site changes depend on the location related to the distance from the West Cross Timbers MLRA 84C. Generally, sites located within a short distance from the MLRA 84C tend to change in the absence of fire toward a mesquite/juniper brushland community while sites located some distance away from the resource area will shift toward a pricklypear cactus / shrubland community. Woody plants have increased over the past 100 to 150 years on virtually all of the sites located nearest to the West Cross Timbers. Where there is a seed source close by, Ashe juniper (Juniperus ashei), Eastern redcedar (Juniperus virginiana) and mesquite (Prosopis glandulosa) will readily invade the site. The juniper first occurs under fences, trees and other places where songbirds tend to rest. Fences have aided in the spread of juniper. Mesquite seedpods are relished by livestock and the seed passes through the digestive tract intact and may be moved considerable distance. This places the pods in an ideal medium for germination and establishment when moisture conditions are right. Mesquite tends to be more of an invader species than juniper on this site. Pre-European settlement grazers included bison and deer. The tall and midgrasses are palatable and nutritious and the site can provide year round grazing. The most limiting soil factor for production is soil depth. During very dry periods, the soils can appear rather droughty. When good rainfall is

received, the site produces tremendous annual forage production.

Fire has played a major 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. In the absence of fire, brush can invade regardless of the grazing management.
Climate and soils are the most important and limiting factors affecting grass vegetation on the site. 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. Forbs also need spring moisture which is perhaps the major factor in creating diversity in the plant community. Prescribed fire is sometimes used as a tool to promote diversity, mainly for wildlife. Fire will usually not produce much mortality in older woody plants. After brush has been controlled with herbicides or mechanically, fire can be used effectively to suppress regrowth. Small juniper can be killed by fire. Fuel loads are often the most limiting factor for the effective use of prescribed fire on this site. In general, the use of fire on mature (larger) or dense stands of woody plants does not result in the same positive effects that burning has in tallgrass prairie communities. Woody plant suppression using safe approved herbicides is generally more practical, although prescribed fire has a place.

With abusive grazing practices, the vigorous Indiangrass, eastern gamagrass and big bluestem will become lower in vigor while little bluestem will increase then secondary successional species such as silver bluestem (Bothriochloa laguroides) will begin to increase along with an increase of woody plants. Eastern gamagrass is the first species to disappear. Little bluestem is 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 setigerus), and cool-season annuals will quickly invade if the principal species are in a weakened condition. The seed of many woody species is consumed by birds and when passed through the digestive system and excreted in the manure, the seed find an excellent seedbed complete with moisture and nutrients. Grazing management with cattle alone probably has minimal effect on the proliferation of woody plants, but a good cover of perennial grasses likely minimizes the seed to soil contact the mesquite needs to establish. Grazing plays a major role in brush encroachment by removing grass that could be used as fuel to burn. Prescribed fire provides a good method to control the spread of woody plants. Selective individual plant removal of mesquite and/or juniper is easy and economical when a few plants begin to show up on the site. When the increase of number of plants occurs fairly rapidly, the number of woody plants per acre will soon become too numerous for a successful and feasible individual plant control. Prescribed grazing, applied with a reasonable stocking rate, can sustain the grass species composition and annual forage production near reference community levels. The site can be abused to the point that the perennial warm-season grasses thin out and the 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, when coupled with abusive grazing. Short-term droughts are common and usually do not have a lasting effect in changing stable plant communities, although annual production will be affected. The effects of seasonal moisture and short-term dry spells may become more pronounced after the site crosses thresholds to other vegetative states. Plant communities that consist of warm-season perennial grasses, such as little bluestem and associated species of the reference community, are able to persist and withstand climatic extremes with only minor shifts in the overall plant community. When a brush canopy becomes established which shades the ground sufficiently, cool-season annual species tends to be favored. Once a state of brush and cool-season annuals is reached, recovery to a good perennial warm-season grass cover is unlikely without major input with brush management and reseeding.

In summary, the change in states of vegetation depend on the type of grazing management, prescribed fire, and brush management applied over many years, and the rate of invasion and establishment of woody species.

This site historically, was inhabited by grassland wildlife species such as bison, grassland birds and small mammals. Deer and turkey were mostly found along the wooded streams adjacent to this site, occasionally feeding on the open prairie. Large predators such as wolves, coyotes, mountain lions and black bear roamed throughout the area. 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. Woody plants for browse and mast are important for deer. It should be noted that managing for some vegetative communities may meet some wildlife species requirements but will not be as productive for livestock grazing purposes. Also, these communities may not satisfy important ecological functions such as nutrient cycling, hydrologic protection, plant community stability or soil protection.

Hydrologically, the site contributes runoff to the down-slope 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 entering into the soil profile means a healthier and more productive plant community. Due to the clayey soil underlain with limestone, there is limited deep infiltration. More perennial grass cover means less runoff may result; but the runoff that may occur carries less sediment. Overall, watershed protection and nutrient cycling are enhanced by a healthy grassland community, such as the Tallgrass Prairie Community.

State and Transitional Pathways (S&T): Narrative

The following diagram suggests some pathways that the vegetation on this site might take in response to the various conservation treatments or natural stimuli that may occur over time. There may be other states which may occur that are not shown on this diagram. This S & T Model was developed to show various changes in the plant community that can occur due to management and natural factors. The communities can be manipulated by implementing certain practices. The plant communities described in the S &T Model are

commonly observed on this site in the MLRA 85. Before making plans for plant community manipulation for specific purposes, consult local professionals.

As a site changes in plant community makeup, the changes may be due to many factors. Change may occur slowly or in some cases, fairly quickly. As vegetative changes occur, certain thresholds can be crossed. This means that once a certain point is reached during the transition of one community to another, a return to the first state may not be possible without the input of some form of energy. This required input often means intervention with practices that are not part of the natural processes. An example might be the application of herbicide to control some woody species in order to reduce the density and canopy cover and to encourage more grass and forbs growth. Merely adjusting grazing practices would probably not accomplish any significant change in a plant community once certain thresholds are crossed. The amount of energy required to effect change in community would depend on the present vegetative state and the plant community desired by the landowner.

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 (%)
Grass/Grasslike					
1	**Tallgrass**			1524-3049	
	little bluestem	SCSC	*Schizachyrium scoparium*	1524-3049	–
2	**Tallgrasses**			1031-2062	
	big bluestem	ANGE	*Andropogon gerardii*	258-2062	–
	switchgrass	PAVI2	*Panicum virgatum*	258-2062	–
	Indiangrass	SONU2	*Sorghastrum nutans*	258-2062	–
	eastern gamagrass	TRDA3	*Tripsacum dactyloides*	258-2062	–
3	**Midgrass**			258-516	
	sideoats grama	BOCU	*Bouteloua curtipendula*	258-516	–
4	**Midgrasses**			258-516	
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	129-516	–
	Texas cupgrass	ERSE5	*Eriochloa sericea*	129-516	–
5	**Cool-season grasses**			258-516	
	Canada wildrye	ELCA4	*Elymus canadensis*	85-516	–
	Virginia wildrye	ELVI3	*Elymus virginicus*	85-516	–
	Texas wintergrass	NALE3	*Nassella leucotricha*	85-516	–
6	**Mid/Shortgrasses**			258-516	
	purple threeawn	ARPUP9	*Aristida purpurea var. perplexa*	0-516	–
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	0-516	–
	buffalograss	BODA2	*Bouteloua dactyloides*	0-516	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0-516	–
	tall grama	BOHIP	*Bouteloua hirsuta var. pectinata*	0-516	–
	fall witchgrass	DICO6	*Digitaria cognata*	0-516	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	0-516	–
	seep muhly	MURE2	*Muhlenbergia reverchonii*	0-516	–
	vine mesquite	PAOB	*Panicum obtusum*	0-516	–
	Drummond's dropseed	SPCOD3	*Sporobolus compositus var. drummondii*	0-516	–
	slim tridens	TRMU	*Tridens muticus*	0-516	–
Forb					
7	**Forbs**			448-897	

	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0-897	–
	white sagebrush	ARLUM2	*Artemisia ludoviciana ssp. mexicana*	0-897	–
	yellow sundrops	CASE12	*Calylophus serrulatus*	0-897	–
	American star-thistle	CEAM2	*Centaurea americana*	0-897	–
	whitemouth dayflower	COER	*Commelina erecta*	0-897	–
	croton	CROTO	*Croton*	0-897	–
	prairie clover	DALEA	*Dalea*	0-897	–
	purple prairie clover	DAPU5	*Dalea purpurea*	0-897	–
	Illinois ticktrefoil	DEIL2	*Desmodium illinoense*	0-897	–
	blacksamson echinacea	ECAN2	*Echinacea angustifolia*	0-897	–
	Engelmann's daisy	ENPE4	*Engelmannia peristenia*	0-897	–
	Leavenworth's eryngo	ERLE11	*Eryngium leavenworthii*	0-897	–
	snow on the mountain	EUMA8	*Euphorbia marginata*	0-897	–
	beeblossom	GAURA	*Gaura*	0-897	–
	hoary false goldenaster	HECA8	*Heterotheca canescens*	0-897	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	0-897	–
	bluet	HOUST	*Houstonia*	0-897	–
	coastal indigo	INMI	*Indigofera miniata*	0-897	–
	trailing krameria	KRLA	*Krameria lanceolata*	0-897	–
	dotted blazing star	LIPU	*Liatris punctata*	0-897	–
	Nuttall's sensitive-briar	MINU6	*Mimosa nuttallii*	0-897	–
	yellow puff	NELU2	*Neptunia lutea*	0-897	–
	cobaea beardtongue	PECO4	*Penstemon cobaea*	0-897	–
	groundcherry	PHYSA	*Physalis*	0-897	–
	rhynchosida	RHYNC5	*Rhynchosida*	0-897	–
	prairie coneflower	RUFUP	*Rudbeckia fulgida var. palustris*	0-897	–
	pitcher sage	SAAZG	*Salvia azurea var. grandiflora*	0-897	–
	amberique-bean	STHE9	*Strophostyles helvola*	0-897	–
	false gaura	STLI2	*Stenosiphon linifolius*	0-897	–
	white heath aster	SYERE	*Symphyotrichum ericoides var. ericoides*	0-897	–
Shrub/Vine					
8	**Shrubs/Vines**			280-560	
	catclaw acacia	ACGR	*Acacia greggii*	0-560	–
	stretchberry	FOPU2	*Forestiera pubescens*	0-560	–
	fragrant sumac	RHAR4	*Rhus aromatica*	0-560	–
	winged sumac	RHCO	*Rhus copallinum*	0-560	–
Tree					
9	**Trees**			168-336	
	hackberry	CELTI	*Celtis*	0-336	–
	plum	PRUNU	*Prunus*	0-336	–
	Texas red oak	QUBU2	*Quercus buckleyi*	0-336	–
	Texas live oak	QUFU	*Quercus fusiformis*	0-336	–
	bully	SIDER2	*Sideroxylon*	0-336	–
	Hercules' club	ZACL	*Zanthoxylum clava-herculis*	0-336	–

Table 6. Community 1.2 plant community composition

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

Table 7. Community 2.1 plant community composition

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

Table 8. Community 3.1 plant community composition

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

Table 9. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	**Small Grains**			3587-7173	
2	**Forage Sorghum**			3587-7173	

Table 10. Community 4.2 plant community composition

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

Table 11. Community 4.3 plant community composition

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

Animal community

The historic tallgrass prairie was habitat to migratory bison herds. White-tailed deer, turkey, bobcats and coyotes along with resident and migratory birds and small mammals find suitable habitat today. Domestic livestock are the dominant grazer of the site today. As the prairie changes through the various vegetative states towards the shrubland, the quality of the habitat may improve for some species such as songbirds, deer and goats and decline for others such as cattle. It is often the objective of many land owners to manage for a plant community that wildlife species can exist along with domestic livestock. This can be done with a carefully planned grazing and brush management program. Management practices such as brush management, prescribed burning and prescribed grazing will be required in order to maintain the vegetative state that provides the most 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 deep. Periods of 60 plus days of little or no rainfall during the growing season are common. During periods of good rainfall with good grass cover, water infiltrates to the limestone rock below and moves to lower elevations and emerges as seeps and springs. The hydrology of this site may be manipulated with management to yield higher runoff volumes or greater infiltration.. Management for less herbaceous cover will favor higher surface runoff while dense herbaceous cover favors deeper infiltration. Potential movement of soil due to erosion, pesticides and both organic and inorganic nutrients (fertilizer) should always be considered when managing for higher volumes of surface runoff.

Recreational uses

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

Wood products

None

Other products

None

Other information

None

Inventory data references

Information presented here has been derived from NRCS clipping data and field observations of range trained personnel: James Luton RMS, Montague; William Donham, DC, Weatherford; Kent Ferguson RMS, Weatherford; Dan Caudle

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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.

Author(s)/participant(s)	Lem Creswell, Zone RMS, NRCS, Weatherford Texas
Contact for lead author	817-596-2865
Date	03/01/2006
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** **None. Current or past formation of rills are not present.**

2. **Presence of water flow patterns:** None. This site rarely has flow patterns. Some are expected around surface obstacles.

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3. **Number and height of erosional pedestals or terracettes:** None. Some minor pedestalling may occur in the shallow lower production portions of the site. Rarely should they be over 1/4 inches height.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 0 to 10 percent bare ground. Small and non-connected areas.

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5. **Number of gullies and erosion associated with gullies:** Drainages are represented as natural stable channels, vegetation common and no signs of erosion.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.

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7. **Amount of litter movement (describe size and distance expected to travel):** Minimal and short. Less than 6 inches. Only associated with water flow patterns following extremely high intensity rainfall.

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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):** Stable. No reduction in soil stability in plant interspaces or slight reduction throughout the site. Stabilizing agents as expected.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Grayish brown clay loam surface 6 to 16 inches thick with subrounded to angular pebbles, cobbles, and stones and strong granular / moderately blocky structure. Soil Organic Matter is 1 to 4 percent.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** High canopy, basal cover, and density with small interspaces make rainfall impact negligible. This site has well drained soils, slowly permeable with 1 to 12 percent slopes which allows negligible runoff and erosion.

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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):** None to minimal, not restrictive to water movement and root penetration.

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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: Warm-season tallgrasses >>

    Sub-dominant: Warm-season midgrasses >

Other: Forbs > Shrubs/Vines = Trees > Warm-season shortgrasses > Warm-season sodgrasses

Additional:

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

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14. **Average percent litter cover (%) and depth (in):** **Litter is dominantly herbaceous and covers almost all plant and rock interspaces.**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** **4000 to 8000 #/acre. 4000 pounds in below average years, 6000 pounds in normal years and 8000 pounds in above average years.**

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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:** **Ashe juniper, pricklypear, mesquite and King Ranch bluestem are the primary invaders.**

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17. **Perennial plant reproductive capability:** **Only drought, natural herbivory and/or wildfires decrease reproductive capability of any functional groups in the HCPC state.**
