

Ecological site R150AY543TX Sandy Prairie

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

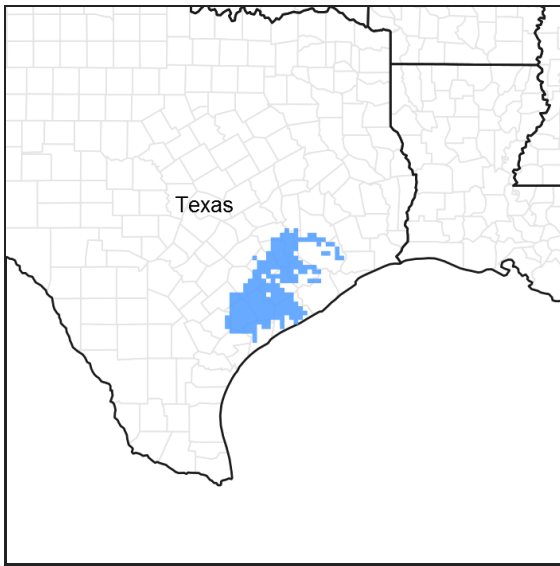


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 150A–Gulf Coast Prairies

MLRA 150A is in the West Gulf Coastal Plain Section of the Coastal Plain Province of the Atlantic Plain in Texas (83 percent) and Louisiana (17 percent). It makes up about 16,365 square miles (42,410 square kilometers). It is characterized by nearly level plains that have low local relief and are dissected by rivers and streams that flow toward the Gulf of Mexico. Elevation ranges from sea level to about 165 feet (0 to 50 meters) along the interior margin. It includes the towns of Crowley, Eunice, and Lake Charles, Louisiana, and Beaumont, Houston, Bay City, Victoria, Corpus Christi, Robstown, and Kingsville, Texas. Interstates 10 and 45 are in the northeastern part of the area, and Interstate 37 is in the southwestern part. U.S. Highways 90 and 190 are in the eastern part, in Louisiana. U.S. Highway 77 passes through Kingsville, Texas. The Attwater Prairie Chicken National Wildlife Refuge and the Fannin Battleground State Historic Site are in the part of the area in Texas.

Classification relationships

USDA-Natural Resources Conservation Service, 2006.
-Major Land Resource Area (MLRA) 150A

Ecological site concept

The Sandy Prairie has very deep sandy soils on uplands. The sands are generally greater than 20 inches deep before reaching a sandy clay loam subsurface horizon.

Associated sites

R150AY535TX	Southern Loamy Prairie This site has a loamier texture than the sandy prairie site.
R150AY542TX	Sandy Loam This site has a sandy loam soil versus a loamy fine sand texture.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

The site was formed in thick beds of unconsolidated sandy and loamy sediments of Pleistocene age or the Willis Formation of the late Pliocene age. These nearly level to gently sloping soils are on terraces of the Coastal Plains. Slopes are convex and generally less than 2 percent but range from 0 to 8 percent. Elevation ranges from 50 to 250 feet.

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Coastal plain
Flooding frequency	None
Ponding frequency	None
Elevation	50–250 ft
Slope	0–8%
Water table depth	60 in
Aspect	Aspect is not a significant factor

Climatic features

The climate of MLRA 150A is humid subtropical with mild winters. The average annual precipitation in the northern two-thirds of this area is 45 to 63 inches. It is 28 inches at the extreme southern tip of the area and 30 to 45 inches in the southwestern third of the area. The precipitation is fairly evenly distributed, but it is slightly higher in late summer and midsummer in the western part of the area and slightly higher in winter in the eastern part. Rainfall typically occurs as moderate intensity, tropical storms that produce large amounts of rain during the winter. The average annual temperature is 66 to 72 degrees F. The freeze-free period averages 325 days and ranges from 290 to 365 days, increasing in length to the southwest.

Table 3. Representative climatic features

Frost-free period (characteristic range)	231-258 days
Freeze-free period (characteristic range)	239-365 days
Precipitation total (characteristic range)	43-50 in
Frost-free period (actual range)	218-263 days
Freeze-free period (actual range)	205-365 days
Precipitation total (actual range)	42-54 in

Frost-free period (average)	241 days
Freeze-free period (average)	316 days
Precipitation total (average)	48 in

Climate stations used

- (1) HOUSTON HOOKS MEM AP [USW00053910], Tomball, TX
- (2) HOUSTON SUGARLAND MEM [USW00012977], Sugar Land, TX
- (3) ANGLETON 2 W [USC00410257], Angleton, TX
- (4) NEW GULF [USC00416286], Boling, TX
- (5) BAY CITY WTR WKS [USC00410569], Bay City, TX
- (6) EL CAMPO [USC00412786], El Campo, TX
- (7) COLUMBUS [USC00411911], Columbus, TX
- (8) VICTORIA RGNL AP [USW00012912], Victoria, TX
- (9) PORT LAVACA [USC00417183], Port Lavaca, TX

Influencing water features

Runoff is negligible on slopes of 0 to 1 percent. It is low and medium on slopes 1 to 5 percent. Water perches on top of the argillic horizon for short periods of time following extended heavy rains.

Soil features

This site consists of very deep, moderately well and well drained, very slowly to moderately rapidly permeable soils. The surface is typically loamy fine sand. Generally, the soils are taxonomically classified as Arenic, but other classifications may be present. The argillic horizon textures range from fine sandy loam to clay loam. Argillic horizons exhibit redoximorphic features and even include plinthite in some pedons. A perched water table on top of the argillic can result following periods of heavy rain events. Soils correlated to this site include: Cheetham, Fordtran, Garcitas, Milby, and Monaville.

Table 4. Representative soil features

Surface texture	(1) Loamy fine sand (2) Gravelly loamy fine sand (3) Sand
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to moderately rapid
Soil depth	80 in
Available water capacity (0-40in)	4-6 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0-2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5-6.5
Subsurface fragment volume <=3" (Depth not specified)	0-10%

Ecological dynamics

The historic prairie was influenced by bison grazing and fire. The natural high-intensity, low-frequency grazing by bison might have left the area deferred for months or years. Long deferments allowed the late-maturing tallgrasses to recover and set seed following short-intense grazing by bison. Recurrent, natural fires helped maintain the prairie and had an important influence on plant community structure. Woody invasions would have been suppressed by repeated fires, probably every 2 to 5 years. The periodic droughts of the region would have suppressed the more mesic species to the advantage of the more xeric species held in dynamic equilibrium. In this high rainfall area, mulch cover may be continuous over the entire area.

The reference tallgrass prairie community included big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), yellow Indiangrass (*Sorghastrum nutans*), eastern gamagrass (*Tripsacum dactyloides*), Florida paspalum (*Paspalum floridanum*), and switchgrass (*Panicum virgatum*). Live oak (*Quercus virginiana*) was present as widely distributed, large trees with occasional mottes in the draws. Low successional plants occurred in heavily used localities where bison congregated repeatedly and created blowout areas. Sand dunes, some of which can still be identified today, formed in the blowout areas during dry cycles.

With the arrival of European man and large herds of domestic livestock, conditions that maintained the historic prairie were altered. Heavy, continuous livestock grazing has removed tallgrasses from most of the site. Low successional, unpalatable grasses, forbs, and running live oak replaced most of the more highly productive plant species. At lower successional stages plant productivity declines resulting in lower organic matter production. Low soil organic matter necessitates a lengthy recovery period to regain the tallgrass prairie. Native herbaceous plant diversity declines with community degradation. Native species will return to the site under proper stocking, prescribed grazing, and prescribed fire. Where running live oak has invaded, herbicides must be used so fine fuel can be grown to carry a fire.

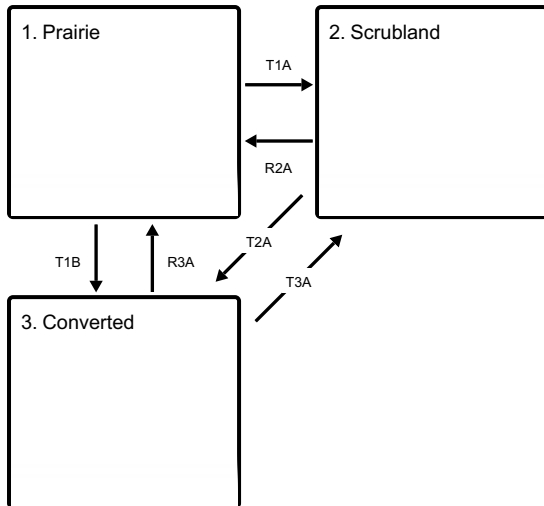
As a result of overgrazing, big bluestem, switchgrass, yellow Indiangrass, eastern gamagrass, and little bluestem decrease. Increasers include brownseed paspalum (*Paspalum plicatulum*), fringleaf paspalum (*Paspalum setaceum*), low panicums, threeawns, and others. Continued overgrazing usually results in a community consisting of fall witchgrass (*Leptoloma cognatum*), low panicums, fringleaf paspalum, knotgrass (*Setaria firmula*), western ragweed (*Ambrosia cumanensis*), Texas croton (*Croton texensis*), woolly croton (*Croton capitatus*), and snow-on-the-prairie (*Euphorbia bicolor*).

In this area, warm-season plants dominate, and cool-season plants are scarce. However, in this prairie community several valuable cool-season species exist, including Canada wildrye (*Elymus canadensis*) and Virginia wildrye (*Elymus virginicus*). These species can be maintained under good management. In transitional states, this site supports the invader, rescuegrass (*Bromus unioloides*), which provides an important forage at a critical time of the year. Gulf Coastal Prairie plant communities were comprised of many more tropical and subtropical species, which in the Poaceae (grasses) are represented by species in the Eragrostoideae (lovegrass), Chloroideae (windmillgrass), and Panicoideae (*Panicum*) subfamilies.

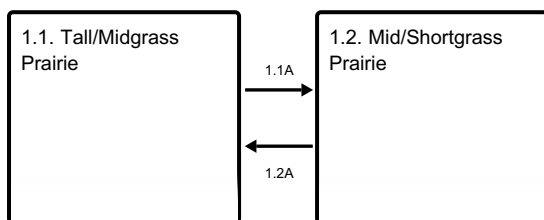
The site can become dominated by running live oak. Once established, running live oak can invade to the exclusion of all other species. The scattered clumps, or mottes, of live oak, then expand and merge until they eventually cover the whole area. As the canopy of live oak rises and thickens, it becomes a monospecific overstory with only the most shade-tolerant species underneath. Herbicides may be used successfully to remove, or greatly reduce, running live oak; however, the restored prairie must be maintained through judicious use of prescribed fire and prescribed grazing management.

State and transition model

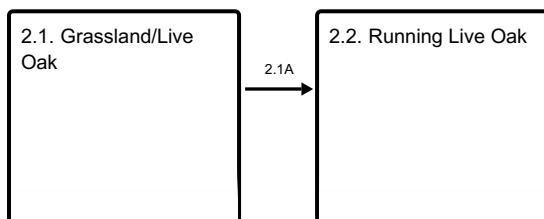
Ecosystem states



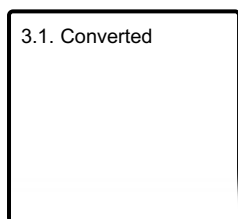
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1 Prairie

Community 1.1 Tall/Midgrass Prairie

The reference plant community is a tall/midgrass prairie. It is a fire-maintained, bunchgrass prairie composed of primarily warm-season, tall and midgrasses with a few warm-season perennial forbs and cool-season grasses and forbs. Recurrent fire, primarily during the summers and periodic grazing by bison were natural processes, which maintained this plant community. Under continuous, heavy livestock grazing the taller, more palatable bunchgrasses such as big bluestem, yellow Indiangrass, Florida paspalum, and switchgrass decrease and are replaced by mid and shortgrasses. Subsequently, with the resulting reduced fuel loads, fire frequency and intensity decreased. As the process continued, these plants were replaced by even less palatable, less productive midgrasses, shortgrasses, and forbs.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	6080	7600	9040
Forb	320	400	480
Tree	0	250	480
Shrub/Vine	0	0	0
Total	6400	8250	10000

Figure 9. Plant community growth curve (percent production by month). TX7606, Tall/Midgrass Prairie Community. Prairie Community composed of warm-season tall and midgrasses..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	4	12	24	23	8	5	12	4	3	2

Community 1.2 Mid/Shortgrass Prairie

The Mid/Shortgrass Prairie Community for the still exhibits a prairie aspect, but tallgrasses have been removed by excessive grazing. It may be dominated by little bluestem and/or brownseed paspalum, but if grazing has been continuously heavy, it may be a brownseed paspalum-dominated grassland. Perennial and annual forbs comprise an increasing percentage of the herbaceous vegetation as the grass canopy is opened, allowing more sunlight to be captured by these more aggressive, short-lived species. This assemblage of plants remains highly productive for livestock. This community can be restored to tall and midgrasses through prescribed grazing and prescribed burning.

Pathway 1.1A Community 1.1 to 1.2

Heavy continuous grazing and lack of fire will transition the site to Community 1.2.

Pathway 1.2A Community 1.2 to 1.1

Prescribed grazing and return of natural fire intervals will restore Community 1.2 back to reference conditions.

State 2 Scrubland

Community 2.1 Grassland/Live Oak

This is a grassland community with interspersions of live oak comprising 15 percent or more of woody canopy. Running live oak increases aggressively, is heavily rhizomatous, and spreads rapidly once established. Although the mechanism of live oak establishment is not well understood, encroachment may begin at any time in the life cycle of any of the previously described states. As live oak invades, it does so at the exclusion of grasses through overstory dominance and shading. This community can be returned to the original prairie state through prescribed grazing, prescribed burning, and the use of the chemical brush management to remove the running live oak.

Community 2.2 Running Live Oak

In this community, the open prairie aspect has been replaced by running live oak with a canopy cover greater than 50 percent. It is not uncommon to find a 100 percent canopy of live oak. Because of its growth form and competition for sunlight and moisture, running live oak has the ability to almost totally exclude herbaceous vegetation. When this

occurs, fire is excluded from the community as a result of the absence of fine fuel. Restoration to the Grassland Prairie State (1) using brush management with herbicides, prescribed grazing, and prescribed burning take large inputs of capital and labor.

Pathway 2.1A Community 2.1 to 2.2

Lack of brush control for live oak will transition the site to Community 2.2.

State 3 Converted

Community 3.1 Converted

Some of the sites have been converted to pasture. Heavy equipment is required with replanting to remove brush. When converting, this site is typically sprigged to coastal bermudagrass (*Cynodon dactylon*). The plants are usually maintained through fertilization and herbicidal weed control. When management practices are interrupted for extended periods of time the site will move toward the Scrubland State (2). Restoration back to the Grassland Prairie (2) requires removal of planted species, removal of brush, and reseeding back to native species. Depending on the degradation of soil health, it may be impossible for full restoration.

Transition T1A State 1 to 2

Continuous heavy grazing, lack of fire, and lack of brush management will transition the site to State 2.

Transition T1B State 1 to 3

Establishment of tame grasses for use as pasture causes the transition to State 3.

Restoration pathway R2A State 2 to 1

Removal of live oak through appropriate brush management practices, along with prescribed grazing and return of fire will restore the site to reference conditions.

Transition T2A State 2 to 3

Establishment of tame grasses for use as pasture causes the transition to State 3.

Restoration pathway R3A State 3 to 1

Removal of pasture grasses and reseeding reference species will restore the community back to reference conditions. Pasture grasses are often hard to control and full restoration may be very difficult.

Transition T3A State 3 to 2

If live oak is not kept under control, the brush can take over and transition to the Scrubland State (2).

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Tallgrasses			4690–7080	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	2500–4000	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	1280–1920	–
	crinkleawn grass	TRACH2	<i>Trachypogon</i>	1280–1920	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	1280–1920	–
	Florida paspalum	PAFL4	<i>Paspalum floridanum</i>	640–960	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	640–960	–
	eastern gamagrass	TRDA3	<i>Tripsacum dactyloides</i>	640–960	–
2	Mid/Shortgrasses			1390–1960	
	threeawn	ARIST	<i>Aristida</i>	200–960	–
	brownseed paspalum	PAPL3	<i>Paspalum plicatulum</i>	640–800	–
	knot grass	SEREF	<i>Setaria reverchonii ssp. firmula</i>	300–600	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	300–500	–
	marsh bristlegrass	SEPA10	<i>Setaria parviflora</i>	300–500	–
	flatsedge	CYPER	<i>Cyperus</i>	300–500	–
	fimbry	FIMBR	<i>Fimbristylis</i>	300–500	–
	rush	JUNCU	<i>Juncus</i>	300–500	–
	gulfhairawn muhly	MUFI3	<i>Muhlenbergia filipes</i>	200–500	–
	gulfdune paspalum	PAMO4	<i>Paspalum monostachyum</i>	300–500	–
	Virginia wildrye	ELVI3	<i>Elymus virginicus</i>	100–400	–
	longspike tridens	TRST2	<i>Tridens strictus</i>	250–400	–
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	200–300	–
	panicgrass	PANIC	<i>Panicum</i>	100–300	–
	fall witchgrass	DICO6	<i>Digitaria cognata</i>	100–300	–
	red grama	BOTR2	<i>Bouteloua trifida</i>	100–300	–
	coastal sandbur	CESP4	<i>Cenchrus spinifex</i>	100–200	–
3	Tall/Midgrasses			0–1	
	Pan American balsamscale	ELTR4	<i>Elionurus tripsacoides</i>	0–1	–
	Texasgrass	VAMU	<i>Vaseyochloa multinervosa</i>	0–1	–
Forb					
4	Forbs			256–384	
	Maximilian sunflower	HEMA2	<i>Helianthus maximiliani</i>	25–200	–
	prairie sunflower	HEPE	<i>Helianthus petiolaris</i>	25–100	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	25–100	–
	dense blazing star	LISP	<i>Liatris spicata</i>	25–100	–
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa var. biuncifera</i>	25–100	–
	yellow puff	NELU2	<i>Neptunia lutea</i>	25–100	–
	American snoutbean	RHAM	<i>Rhynchosia americana</i>	25–100	–
	Texas snoutbean	RHSE4	<i>Rhynchosia senna</i>	25–100	–
	squarebud daisy	TETE2	<i>Tetragonotheca texana</i>	25–100	–

	bundleflower	DESMA	<i>Desmanthus</i>	25–100	–
5	Forbs			64–96	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	25–50	–
	partridge pea	CHFA2	<i>Chamaecrista fasciculata</i>	25–50	–
	hogwort	CRCA6	<i>Croton capitatus</i>	25–50	–
	Texas croton	CRTE4	<i>Croton texensis</i>	25–50	–
	snow on the prairie	EUBI2	<i>Euphorbia bicolor</i>	25–50	–
	beeblossom	GAURA	<i>Gaura</i>	25–50	–
6	Forbs			0–1	
	huisache daisy	AMSE	<i>Amblyolepis setigera</i>	0–1	–
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0–1	–
	Texas tickseed	COLI5	<i>Coreopsis linifolia</i>	0–1	–
	Indian blanket	GAPU	<i>Gaillardia pulchella</i>	0–1	–
	camphorweed	HESU3	<i>Heterotheca subaxillaris</i>	0–1	–
	bluet	HOUST	<i>Houstonia</i>	0–1	–
	Texas bluebonnet	LUSU	<i>Lupinus subcarnosus</i>	0–1	–
	phlox	PHLOX	<i>Phlox</i>	0–1	–
	Texas star	SACA3	<i>Sabatia campestris</i>	0–1	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–1	–
Tree					
7	Trees			0–480	
	live oak	QUVI	<i>Quercus virginiana</i>	0–480	–

Animal community

The Coastal Prairie communities support a wide array of animals. Cattle and many species of wildlife make extensive use of the site. White-tailed deer may be found scattered across the prairie and are found in heavier concentrations where woody cover exists. Feral hogs are present and at times abundant. Coyotes are abundant and fill the mammalian predator niche. Rodent populations rise during drier periods and fall during periods of inundation. Attwater's pocket gophers are abundant and have an important impact on the ecology of the site. The badger is present but not abundant in locations at the southern extent of the site. Locally unique species alligators and bullfrogs.

The region is a major flyway for waterfowl and migrating birds. Hundreds of thousands of ducks, geese, and sandhill cranes abound during winter. Two important endangered species occur in the area, the whooping crane and Attwater's prairie chicken. Many other species of avian predators including northern harriers, ferruginous hawks, red-tailed hawks, white-tailed kites, kestrels, and, occasionally, swallow-tailed kites utilize the vast grasslands. Many species of grassland birds use the site, including blue grosbeaks, dickcissels, eastern meadowlarks, several sparrows, including, vesper sparrow, lark sparrow, savannah sparrow, grasshopper sparrow, and Le Conte's sparrow.

Inventory data references

Existing NRCS Range Site Descriptions and SCS-417 data were used to obtain vegetative information for this site. Nine SCS-417's were available from two different counties. Existing plant communities were ascertained through fieldwork on private ranches.

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Contributors

Lynn Drawe, Director, Welder Wildlife Refuge, Sinton, TX

Approval

Acknowledgments

Reviewer:

Tim Reinke, RMS, NRCS, Victoria, TX

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)	Mike Stellbauer, Zone RMS, NRCS, Bryan, TX
Contact for lead author	
Date	06/08/2004
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None.

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

3. **Number and height of erosional pedestals or terracettes:** Should not occur under reference conditions.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Less than 20 percent bare ground randomly distributed throughout.

5. **Number of gullies and erosion associated with gullies:** None.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Small to medium-sized litter may move during short distances during intense storms.

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

values): Soil surface is resistant to erosion. Soil stability class range is expected to be 3 to 5.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is 40 to 80 inches thick with colors from brown to very pale brown and generally single grained loose structure. SOM is less than 1 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This true tallgrass prairie site along with adequate litter and little bare ground provides for maximum infiltration and little runoff under normal rainfall events.

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

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

Dominant: Warm-season tallgrasses

Sub-dominant: Warm-season midgrasses Warm-season perennial forbs

Other: Annual warm-season grasses Annual warm-season forbs

Additional:

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

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

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 5,000 pounds per acre for below average moisture years to 8,000 pounds per acre for above average moisture years.

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:** Potential invasive species include Chinese tallow, huisache, common bermudagrass, bahiagrass, and Macartney rose.

17. **Perennial plant reproductive capability:** All perennial plants should be capable of reproducing except for periods of prolonged drought conditions, heavy natural, herbivory or intense wildfires.
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