USDA Natural Resources Conservation Service

Ecological site R083AY021TX
Sandy

Last updated: 9/19/2023
Accessed: 05/13/2025

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.

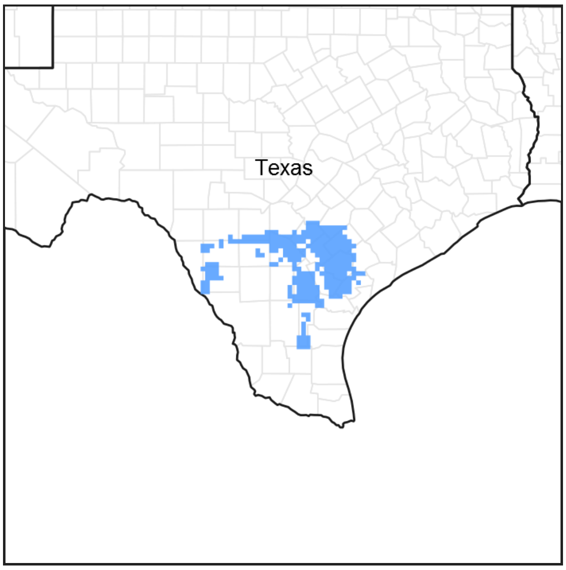

Figure 1. Mapped extent

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): 083A–Northern Rio Grande Plain

This area is entirely in Texas and south of San Antonio. It makes up about 11,115 square miles (28,805 square kilometers). The towns of Uvalde, Cotulla, and Hondo are in the western part of the area, and Beeville, Goliad, and Kenedy are in the eastern part. The town of Alice is just outside the southern edge of the area. Interstate Highways 35 and 37 cross this area. This area is comprised of inland, dissected coastal plains.

Classification relationships

USDA-Natural Resources Conservation Service, 2006.
-Major Land Resource Area (MLRA) 83A

Ecological site concept

The Sandy ecological sites are very deep and are moderately well to excessively drained. Soils typically have a thick sandy surface from 40 to 80 inches with a loamy or clayey subsoil.

Associated sites

R083AY023TX	**Sandy Loam**
R083AY024TX	**Tight Sandy Loam**
R083AY022TX	**Loamy Sand**

Similar sites

R083CY021TX	**Sandy**
R083EY021TX	**Sandy**

Table 1. Dominant plant species

Tree	(1) *Quercus virginiana*
Shrub	Not specified
Herbaceous	(1) *Schizachyrium scoparium* (2) *Sorghastrum nutans*

Physiographic features

The Sandy ecological sites are found on nearly level to gently sloping stream terraces of the Coastal Plains. The soils developed in fine sands and loamy fine sands, presumably of recent eolian origin over loamy sediments. The sediments were formed from the Carrizo Sand geologic formation. Slopes range from 0 to 5 percent. Elevation ranges from 200 to 1,000 feet. This area is comprised of inland, dissected coastal plains.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Stream terrace
Runoff class	Negligible to medium
Elevation	23–305 m
Slope	0–5%
Aspect	Aspect is not a significant factor

Climatic features

MLRA 83A is subtropical, subhumid on the western boundary and subtropical humid on the eastern boundary. Winters are dry and mild and the summers are hot and humid. Tropical maritime air masses predominate throughout spring, summer, and fall. Modified polar air masses exert considerable influence during winter, creating a continental climate characterized by large variations in temperature. Average precipitation for MLRA 83A is 20 inches on the western boundary and 35 inches on the eastern boundary. Peak rainfall, because of rain showers, occurs late in spring and a secondary peak occurs early in fall. Heavy thunderstorm activities increase in April, May, and June. July is hot and dry with little weather variations. Rainfall increases again in late August and September as tropical disturbances increase and become more frequent. Tropical air masses from the Gulf of Mexico dominate during the spring, summer, and fall. Prevailing winds are southerly to southeasterly throughout the year except in December when winds are predominately northerly.

Table 3. Representative climatic features

Frost-free period (characteristic range)	225-251 days
Freeze-free period (characteristic range)	263-365 days
Precipitation total (characteristic range)	635-813 mm
Frost-free period (actual range)	216-263 days
Freeze-free period (actual range)	254-365 days
Precipitation total (actual range)	610-940 mm

Frost-free period (average)	237 days
Freeze-free period (average)	311 days
Precipitation total (average)	737 mm

Climate stations used

- (1) BEEVILLE 5 NE [USC00410639], Beeville, TX
- (2) CHEAPSIDE [USC00411671], Gonzales, TX
- (3) CUERO [USC00412173], Cuero, TX
- (4) GOLIAD [USC00413618], Goliad, TX
- (5) NIXON [USC00416368], Stockdale, TX
- (6) CARRIZO SPRINGS 3W [USC00411486], Carrizo Springs, TX
- (7) FOWLERTON [USC00413299], Fowlerton, TX
- (8) HONDO [USC00414254], Hondo, TX
- (9) KARNES CITY 2N [USC00414696], Karnes City, TX
- (10) PEARSALL [USC00416879], Pearsall, TX
- (11) CHARLOTTE 5 NNW [USC00411663], Charlotte, TX
- (12) MATHIS 4 SSW [USC00415661], Mathis, TX
- (13) TILDEN 4 SSE [USC00419031], Tilden, TX
- (14) UVALDE 3 SW [USC00419268], Uvalde, TX
- (15) CROSS [USC00412125], Tilden, TX
- (16) DILLEY [USC00412458], Dilley, TX
- (17) FLORESVILLE [USC00413201], Floresville, TX
- (18) LYTLE 3W [USC00415454], Natalia, TX
- (19) PLEASANTON [USC00417111], Pleasanton, TX
- (20) HONDO MUNI AP [USW00012962], Hondo, TX
- (21) CALLIHAM [USC00411337], Calliham, TX

Influencing water features

Many sites are somewhat excessively drained in the surface until the water contacts the argillic, where it becomes a very slow to moderately permeable layer. Some soils may exhibit a perched water table after very heavy rains for a short duration.

Wetland description

N/A.

Soil features

The soils in this site are very deep, moderate to excessively drained, with moderate or moderately slow permeability in the subsoil. Ochric epipedons range from 40 to 80 inches over a loamy subsoil. Other features include sandy surface textures, little to no salinity or sodicity, and moderately acid to slightly alkaline soil reaction. Soil series correlated to this site include: Antosa, Bobillo, Nusil, Rhymes, and Ruiz.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone
Surface texture	(1) Fine sand (2) Loamy fine sand
Family particle size	(1) Loamy
Drainage class	Moderately well drained to somewhat excessively drained
Permeability class	Very slow to moderately rapid
Surface fragment cover <=3"	0%

Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.08–10.16 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–8
Soil reaction (1:1 water) (0-101.6cm)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–1%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

The plant communities of this site are dynamic and community composition may vary dramatically in annual rainfall, grazing, and fire. The site is subject to extreme variation in rainfall. During the years 1900 to 1983, 36 percent were drought years and 34 percent were wet years. During dry periods the amount of bare ground increases. Bare ground may predominate during droughts. Shortgrasses such as hairy grama (*Bouteloua hirsuta*), thin paspalum (*Paspalum setaceum*), fringed signalgrass (Brachiaria ciliatissima), red lovegrass (*Eragrostis secundiflora*), sandbur (Cenchrus spp.), and forbs increase in abundance at the expense of the taller grasses. During wet years, tallgrasses such as big bluestem (*Andropogon gerardii*) increase in importance. The shortgrasses and forbs occur as an understory component forming a multi-layered community.

Early explorers provide some insight into the general landscape but most lack site-specific information. Their observations do provide useful information into the general aspect of the landscape. In some cases the exact position of the explorers can be determined. In 1821, Stephen F. Austin crossed the San Antonio River to Cabeza Creek in Goliad County. He observed the area to be sandy in places and there was not too much mesquite and underbrush. In 1846, Sitgreaves crossed Karnes County and stated that the whole distance was over dry, sandy, rolling prairie covered with mesquite. He reported timber was more abundant. Ponce de Leon in 1689 observed in the common county corners of La Salle, Frio, Atascosa and McMullen counties, describing the country as level, with fine pasturage, very pleasant glades, and occasionally, little mottes of oak. Overall the upland country was described with small amounts of brush or mottes interspersed in the prairie. The increase of brush generally coincides with settlement.

Historically, fire was an important factor in the ecology of this site. Native Americans set periodic fires for hunting and reducing insects. Fires reduced woody plant cover, kept oak mottes scattered and isolated, and maintained the open stretches of grassland witnessed by Berlandier. Wildfires are common on this site at present. White-tailed deer (Odocoileus virginianus) and pronghorns (Antilocarpa americana) were significant herbivores on this site at the time of colonization by Europeans. The extent to which bison (Bos bison) utilized the site is uncertain. The reports of bison were not nearly as abundant as farther north in the southern plains region.

The reference plant community is a grassland with scattered live oak mottes and occasional mesquite trees. Little bluestem (*Schizachyrium scoparium*) was the prevailing dominant species. Other important associated grasses include big bluestem, brownseed paspalum (*Paspalum plicatulum*), Indiangrass (Sorghastrum spp.), switchgrass (*Panicum virgatum*), tanglehead (*Heteropogon contortus*), and thin paspalum. The reference plant community supports a diverse understory community of perennial legumes and other forbs.

Continued overuse by livestock results in a decline of little bluestem and other perennial grasses and an increase in forbs, particularly camphor daisy (*Rayjacksonia phyllocephala*), partridgepea (Chamaecrista fasciculate) and Crotons (Croton spp.). Pan-American balsamscale, three-awns (Aristida spp.), and thin paspalum increase in abundance with heavy grazing but decline on severely grazed rangeland. On severely grazed rangeland, little bluestem is virtually absent. Sandbur, fringed signalgrass, red lovegrass, camphor daisy, and other forbs dominate severely grazed sites. Severe overuse results in a large amount of bare ground. The oak colonies can become thicketized, and take on a low stature with high stem density rather than forming large, single-trunked trees. Mesquite increases once established. After the mesquites reach sufficient size, understory shrubs including granjeno (Celtis pallida), brasil (*Condalia hookeri*), and lime prickly-ash (*Zanthoxylum fagara*) establish beneath them, forming brush mottes.

State and transition model

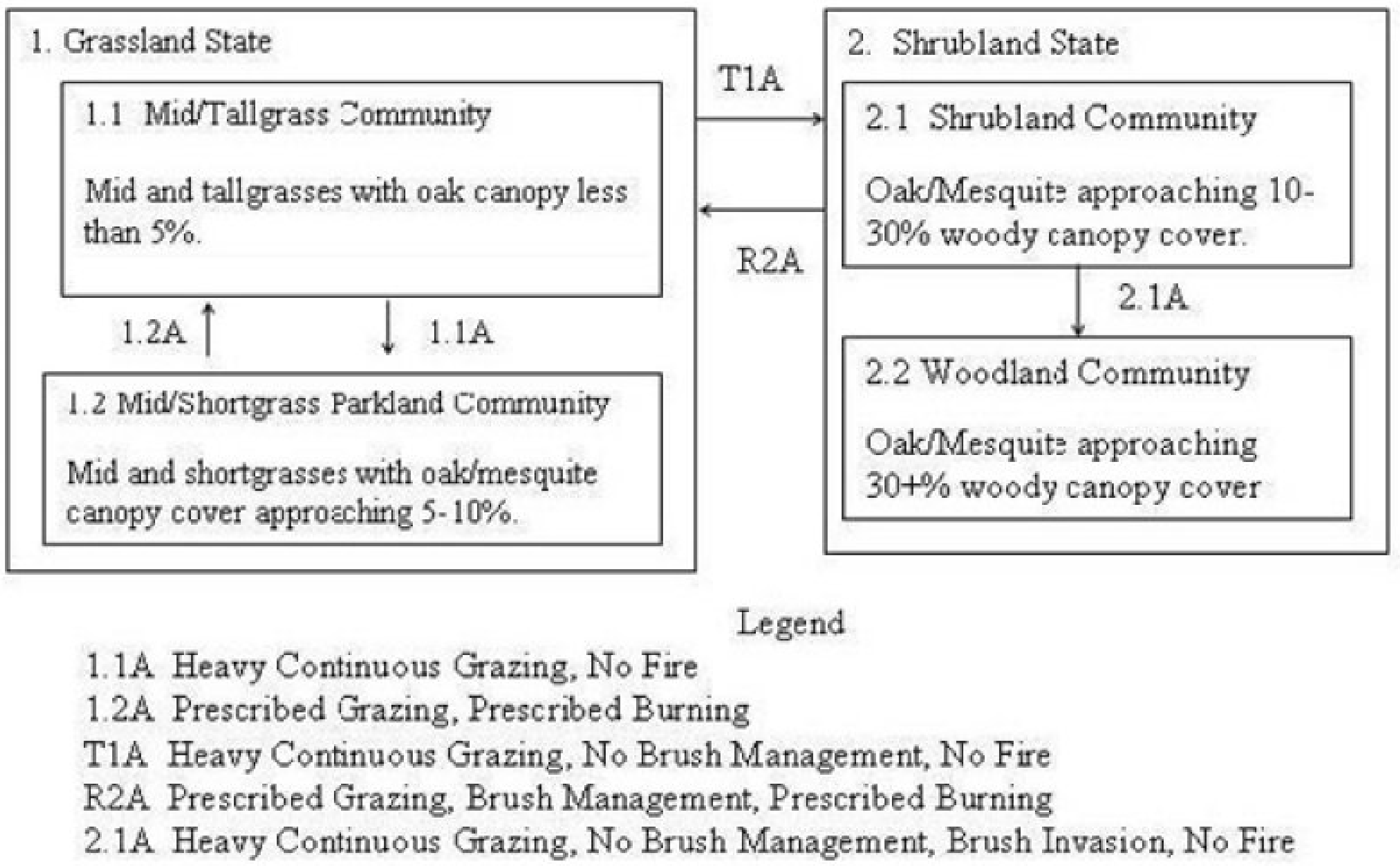

Figure 8. STM

State 1
Grassland

Dominant plant species

- little bluestem (*Schizachyrium scoparium*), grass

Community 1.1
Mid/Tallgrass

The reference plant community for this site is an open grassland composed of mid and tallgrasses with scattered live oaks. Live oaks shade less than five percent of the community and little bluestem is the dominant grass. Historically, recurrent fire was a natural process that maintained the community. Today, application of prescribed fire at appropriate intervals and proper grazing management can maintain the open grassland community. Heavy grazing and elimination of fire results in a change in plant community composition from an open, tall and midgrass-dominated grassland with scattered live oaks to a mesquite parkland with mid and shortgrasses. Mesquite will continue to increase with continued heavy grazing and absence of periodic fire, eventually resulting in a transition to mesquite woodland. Drought will hasten the process by creating more bare ground for woody seedlings to establish without the competition from grasses.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	2018	3531	5044
Shrub/Vine	112	196	280
Tree	112	224	280
Forb	112	196	280
Total	**2354**	**4147**	**5884**

Figure 10. Plant community growth curve (percent production by month). TX4537, Mid/Tallgrass Community. Mid and tallgrasses dominant with less than 5% woody canopy species..

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

Community 1.2
Midgrass/Shortgrass Parkland

The oak or mesquite parkland community results from expansion of oak mottes or increased density of mesquite triggered by the heavy grazing and elimination of fire. Perhaps one major influence of heavy grazing is the removal of grass fuel and the opportunity to use fire. The dominant grass species include midgrasses, particularly little bluestem, Pan American balsamscale, and shortgrasses, including sandbur, fringed signalgrass, red lovegrass, and thin paspalum. Forbs are an important component, particularly camphor daisy, partridge pea, and crotons. Bare ground increases under heavy grazing. Implementation of proper grazing management and prescribed burning at periodic intervals of time will reduce or maintain woody canopy cover and shift the community back toward open grassland. Continued heavy grazing and absence of fire allows the expansion of live oaks mottes and establishment of mesquite, eventually triggering a transition to the Shrubland State (2). Once this transition has occurred, prescribed grazing alone will not halt the increase of brush. Brush management and prescribed grazing are required to initiate a transition back to the Grassland State (1). Fire can help maintain the community.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1793	3138	4483
Shrub/Vine	224	392	560
Forb	224	392	560
Tree	–	–	–
Total	**2241**	**3922**	**5603**

Figure 12. Plant community growth curve (percent production by month). TX4538, Mid/Shortgrasses/Parkland Community. Mid and shortgrasses dominant in a parkland community..

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

Pathway 1.1A
Community 1.1 to 1.2

The reference community (1.1) will transition to the Mid/Shortgrass Parkland Community (1.2) with lack of fire, continued overgrazing, insufficient rest cycles, and/or natural disturbances, like prolonged drought.

Pathway 1.2A
Community 1.2 to 1.1

This phase can still be managed back to the Mid/Tallgrass Community (1.1) if desired. It will take the reintroduction of fire to the ecosystem or some method of brush management that allows selective removal of the plants. A prescribed grazing plan will be essential to reverse the trend toward the Shrubland State. Increasing the desired grasses in the plant community over an extended time will take the application of sound grazing management principles.

State 2
Shrubland

Dominant plant species

- camphor daisy (*Rayjacksonia phyllocephala*), other herbaceous
- threeawn (*Aristida*), other herbaceous

Community 2.1
Shrubland

The Shrubland Community (oak or mesquite) is a transition from the open Grassland State (1) to a new state dominated by woody plants. A threshold is crossed through expansion and coalescence of live oak mottes and establishment of mesquite and associated woody species. Live oak will exist as a tree or a thicketized growth form. Sandbur, fringed signalgrass, red lovegrass, thin paspalum, camphor daisy, partridgepea, and crotons are the major herbaceous species in the Shrubland Community. A considerable amount of bare ground is present. Brush management followed by prescribed grazing is necessary to shift the oak or mesquite woodland back to open grassland or oak or mesquite parkland. Prescribed fire can help maintain the parkland.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1569	2746	3923
Shrub/Vine	448	785	1121
Forb	224	392	560
Tree	–	–	–
Total	**2241**	**3923**	**5604**

Figure 14. Plant community growth curve (percent production by month). TX4546, Shrubland Community. Shrubs increase while mid and shortgrasses are in decline..

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

Community 2.2
Woodland

Figure 15. 2.2 Woodland Community

Grazing management has little influence on the woody plants once the threshold is crossed into the Woodland Community (2.2). Live oak with high stem densities composes a significant portion of the woody cover. Mesquite density increases and mottes with an understory of subordinate shrubs, such as granjeno, brasil, and lime prickly-ash have developed. Brush management is necessary to shift the oak or mesquite woodland back to a grassland or parkland. Herbaceous vegetation is scant, and is composed of short grasses and early successional forbs. Prescribed grazing with continued selective brush management and fire will be needed to maintain the parkland.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	673	1849	2354
Shrub/Vine	673	1009	1345
Forb	336	504	785
Tree	–	–	–
Total	**1682**	**3362**	**4484**

Figure 17. Plant community growth curve (percent production by month). TX4540, Oak/Mesquite 30+% Woodland Community. Woodland Community of Oaks and Mesquite..

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

Pathway 2.1A
Community 2.1 to 2.2

Continued heavy grazing coupled with lack of fire will cause this community to transition to the Woodland Community (2.2). Brush density and height will continue to increase and shade the ground.

Transition T1A
State 1 to 2

The transition from the Grassland State (1) to the Shrubland (2) can happen within 5 to 10 years. This transition can be driven by persistently dry weather conditions, grazing management, and the lack of fire and brush management practices. Overstocking the site with grazing animals will put pressure on the herbaceous plant component of the community. This will create a more favorable environment with bare ground and open spaces for woody plants to germinate and grow. If the woody component is not managed it will begin to dominate the landscape and out-compete grasses and forbs for water, sunlight, and other resources.

Restoration pathway R2A

State 2 to 1

Major inputs, both chemical and mechanical, are required to restore the Shrubland State (2) to the Grassland State (1). Often with this community, mechanical means such as rootplowing and raking are utilized along with dozing and grubbing. Species like mesquite will re-sprout if not removed completely from the ground. Chaining and rollerchopping are mechanical practices which will be short lived and will typically result in thicker, harder to manage brush stands that will encourage brush seedlings. Follow-up conservation practices such as Individual Plant Treatment (IPT) for woody re-growth and new seedlings and prescribed grazing will be necessary for several years after the initial brush management to maintain an improved plant community. Depending on local conditions, it may also be necessary to prepare an appropriate seedbed and re-introduce a seed source for desired native plant species through range planting.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tallgrass**			1121–2522	
	little bluestem	SCSC	*Schizachyrium scoparium*	1121–2522	–
2	**Midgrass**			112–336	
	brownseed paspalum	PAPL3	*Paspalum plicatulum*	112–336	–
3	**Tallgrasses**			224–560	
	Indiangrass	SONU2	*Sorghastrum nutans*	112–392	–
	crinkleawn grass	TRACH2	*Trachypogon*	112–392	–
	switchgrass	PAVI2	*Panicum virgatum*	112–336	–
4	**Midgrass**			112–448	
	tanglehead	HECO10	*Heteropogon contortus*	112–448	–
5	**Midgrass**			112–252	
	fringed signalgrass	URCI	*Urochloa ciliatissima*	112–252	–
6	**Midgrasses**			112–252	
	balsamscale grass	ELION	*Elionurus*	56–140	–
	purple dropseed	SPPU3	*Sporobolus purpurascens*	56–140	–
	Texasgrass	VAMU	*Vaseyochloa multinervosa*	56–140	–
7	**Shortgrasses**			112–224	
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	56–112	–
	hooded windmill grass	CHCU2	*Chloris cucullata*	56–112	–
8	**Shortgrasses**			224–448	
	sand crabgrass	DIAR7	*Digitaria arenicola*	56–112	–
	fall witchgrass	DICO6	*Digitaria cognata*	56–112	–
	gulfdune paspalum	PAMO4	*Paspalum monostachyum*	56–112	–
Forb					
9	**Forbs**			67–151	
	Texas bullnettle	CNTE	*Cnidoscolus texanus*	28–84	–
	coastal indigo	INMI	*Indigofera miniata*	28–84	–
	dotted blazing star	LIPU	*Liatris punctata*	28–84	–
	sensitive plant	MIMOS	*Mimosa*	28–84	–
	snoutbean	RHYNC2	*Rhynchosia*	28–84	–
10	**Forbs**			45–129	

	Forb, annual	2FA	*Forb, annual*	0–112	–
	partridge pea	CHFA2	*Chamaecrista fasciculata*	28–84	–
	croton	CROTO	*Croton*	28–84	–
	snakecotton	FROEL	*Froelichia*	28–84	–
	lantana	LANTA	*Lantana*	28–84	–
	beebalm	MONAR	*Monarda*	28–84	–
Shrub/Vine					
11	**Shrubs**			0–280	
	mesquite	PROSO	*Prosopis*	0–280	–
Tree					
12	**Trees**			112–280	
	live oak	QUVI	*Quercus virginiana*	112–280	–

Animal community

As a historic tall/midgrass prairie, this site was occupied by bison, antelope, deer, quail, turkey, and dove. This site was also used by many species of grassland songbirds, migratory waterfowl, and coyotes. This site now provides forage for livestock and is still used by quail, dove, migratory waterfowl, grassland birds, coyotes, and deer.

Feral hogs (Sus scrofa) can be found on most ecological sites in Texas. Damage caused by feral hogs each year includes, crop damage by rutting up crops, destroyed fences, livestock watering areas, and predation on native wildlife, and ground-nesting birds. Feral hogs have few natural predators, thus allowing their population to grow to high numbers.

Wildlife habitat is a complex of many different plant communities and ecological sites across the landscape. Most animals use the landscape differently to find food, shelter, protection, and mates. Working on a conservation plan for the whole property, with a local professional, will help managers make the decisions that allow them to realize their goals for wildlife and livestock.

Grassland State (1): This state provides the maximum amount of forage for livestock such as cattle. It is also utilized by deer, quail and other birds as a source of food. When a site is in the reference plant community phase (1.1) it will also be used by some birds for nesting, if other habitat requirements like thermal and escape cover are near.

Shrubland State (2): This state can be maintained to meet the habitat requirements of cattle and wildlife. Land managers can find a balance that meets their goals and allows them flexibility to manage for livestock and wildlife. Forbs for deer and birds like quail will be more plentiful in this state. There will also be more trees and shrubs to provide thermal and escape cover for birds as well as cover for deer.

This rating system provides general guidance as to animal preference for plant species. It also indicates possible competition between kinds of herbivores for various plants. Grazing preference changes from time to time, especially between seasons, and between animal kinds and classes. Grazing preference does not necessarily reflect the ecological status of the plant within the plant community. For wildlife, plant preferences for food and plant suitability for cover are rated. Refer to habitat guides for a more complete description of a species habitat needs.

Hydrological functions

Water infiltration is rapid in the fine sands of the site. Therefore, runoff and soil erosion from water is seldom a problem.

Recreational uses

Hunting, birdwatching, and eco-tourism are common uses.

Inventory data references

Information presented was derived from the revised Range Site, literature, limited NRCS clipping data (417s), field observations, and personal contacts with range-trained personnel.

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Approval

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	05/13/2025
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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

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

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

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

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

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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

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

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

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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:**

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17. **Perennial plant reproductive capability:**
