Ecological site R083CY003TX
Gravelly Ridge

Last updated: 9/19/2023
Accessed: 05/11/2025

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.

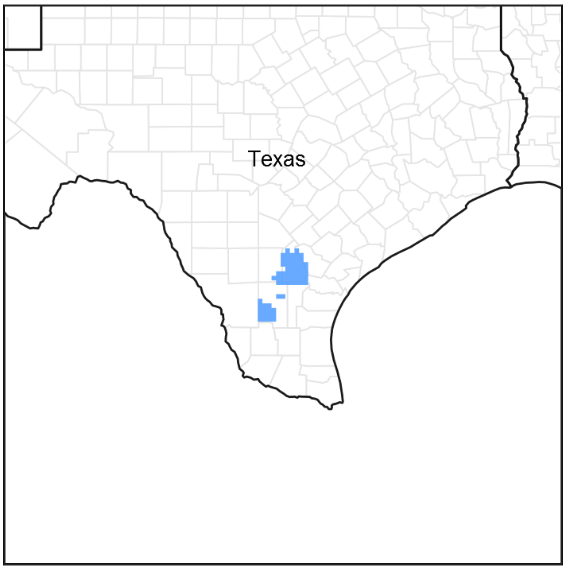

Figure 1. Mapped extent

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): 083C–Central Rio Grande Plain

Major Land Resource Area (MLRA) 83C makes up about 4,275 square miles (11,075 square kilometers). The towns of Freer, George West, and Hebbronville are in this area. The town of Alice is on the east edge of the area. U.S. Highways 59 and 281 cross the area. This area is comprised of inland, dissected coastal plains.

Classification relationships

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

Ecological site concept

The Gravelly Ridge sites get their name from the gravels that reside in the soil profile. Sites can be shallow to very deep located on uplands and ridges.

Associated sites

R083CY002TX	**Shallow Ridge**
R083CY004TX	**Shallow Sandy Loam**
R083CY023TX	**Sandy Loam**

Similar sites

R083AY003TX	**Gravelly Ridge** MLRA 83A
R083BY003TX	**Gravelly Ridge** MLRA 83B
R083DY003TX	**Gravelly Ridge** MLRA 83D

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Acacia berlandieri* (2) *Celtis ehrenbergiana*
Herbaceous	(1) *Bouteloua curtipendula* (2) *Tridens eragrostoides*

Physiographic features

These nearly level to strongly sloping soils are on uplands and ridges. Slope ranges from 0 to 8 percent. This area is comprised of inland, dissected coastal plains.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Paleoterrace (2) Coastal plain > Interfluve
Runoff class	High to very high
Flooding frequency	None
Ponding frequency	None
Elevation	200–800 ft
Slope	1–8%
Aspect	Aspect is not a significant factor

Climatic features

MLRA 83C 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. 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)	255-291 days
Freeze-free period (characteristic range)	365 days

Precipitation total (characteristic range)	23-26 in
Frost-free period (actual range)	255-347 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	21-26 in
Frost-free period (average)	283 days
Freeze-free period (average)	365 days
Precipitation total (average)	25 in

Climate stations used

- (1) CHOKE CANYON DAM [USC00411720], Three Rivers, TX
- (2) FREER [USC00413341], Freer, TX
- (3) MCCOOK [USC00415721], Edinburg, TX
- (4) CALLIHAM [USC00411337], Calliham, TX
- (5) HEBBRONVILLE [USC00414058], Hebbronville, TX

Influencing water features

Water from streams or wetlands do not influence this site.

Wetland description

N/A.

Soil features

Soils are moderately deep to a petrocalcic. They are well drained, moderately slowly permeable, and formed in residuum derived from deposits of the Uvalde Gravel over the Goliad Formation. The Grava, Maverick, and Duvert soil series are correlated to this site.

Table 4. Representative soil features

Parent material	(1) Alluvium–conglomerate
Surface texture	(1) Very gravelly sandy clay loam
Family particle size	(1) Clayey-skeletal
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	30–80 in
Surface fragment cover <=3"	15–60%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	2 in
Calcium carbonate equivalent (0-40in)	0–55%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–3
Soil reaction (1:1 water) (0-40in)	6.1–8.4

Subsurface fragment volume <=3" (Depth not specified)	35–80%
Subsurface fragment volume >3" (Depth not specified)	0–40%

Ecological dynamics

Climatic variation and topoedaphic heterogeneity interact to influence vegetation responses to disturbances such as fire and grazing. Plants of the reference plant community evolved with and are generally well adapted to grazing and fire. Prior to European settlement, fires would likely have been frequent, between 5 and 10 years. These fires would have resulted from lightning during the hot, dry summer months or were set by Native Americans. The occurrence of fire promotes grasses while making it difficult for woody plants to achieve dominance. During the Pleistocene, there were significant populations of large-bodied grazers and browsers. Most of these went extinct, so that by the Holocene (about 10,000 years ago) only bison (Bos bison), white-tailed deer (Odocoileus virginianus), and antelope (Antilocapra americana) remained. Archeological evidence indicates that bison occurred in the region, but there is also evidence of centuries of absence. In addition, their numbers may have varied seasonally as herds migrated. When present, bison may have grazed certain areas heavily, but then moved on. Activities of other native herbivores (termites, cutter ants, soil nematodes, kangaroo rats (Dipodomys spp.)) also influenced vegetation productivity and dynamics.

Accounts of earlier explorers and settlers suggest the Rio Grande Plains was likely a mosaic of grasslands, savannahs, shrublands, and woodlands. Historical photographs suggest the nature of the vegetation structure likely varied from place-to-place depending on topography, soil properties and time since the last major disturbances (such as drought or fire). However, the occurrence of extensive grasslands and grassland fauna (antelope, for example) is mentioned in numerous historical accounts. Plants likely at the time of European settlement included little bluestem (*Schizachyrium scoparium*), false Rhodes grass (Chloris crinata), and multiflower false Rhodes grass (Chloris pluriflora), Arizona cottontop (*Digitaria californica*), plains bristlegrass (*Setaria vulpiseta*), and pink pappusgrass (*Pappophorum bicolor*). The composition and productivity of grass communities would have varied with annual rainfall, soil depth and the extent of argillic horizon development. Many sites are now dominated by mesquite (*Prosopis glandulosa*), various acacias (Acacia spp.), granjeno (Celtis pallida), condalia (Condalia obovata), lime prickly ash, and prickly pear (Opuntia spp.). These woody plants are not new arrivals, but are native to the region and have increased in size and abundance within their historic ranges.

Grazing and fire are two factors that critically influence the relative abundance of grasses and woody plants through time. By the early 1800’s cattle and sheep numbers appear to have been quite high in the Rio Grande Plains, resulting in heavy, year-round grazing. The resulting reduction in abundance of late seral grasses lead to a decline in soil organic matter, a reduction in fire frequency/intensity (due to lack of fine fuels), and a shift from midgrass domination to shortgrass, like hooded windmill grass (*Chloris cucullata*), three-awns (Aristida spp.) and forbs, like orange zexmenia (Wedelia hispida), and croton (Croton spp.). These changes would have favored woody plants, most of which are unpalatable to livestock, and enabled them to establish and attain dominance. This would be especially true for leguminous shrubs such as mesquite, whose seeds are widely spread by livestock.

The shift from grass to woody plant domination became the impetus for brush management practices. By the 1950’s, large-scale mechanized clearing was common and by the 1970’s, aerial herbicide applications were widespread. However, by the 1980’s it was clear that brush management practices were often treating symptoms rather than underlying problems and having undesirable environmental consequences, including adverse effects on wildlife populations. Sites cleared of brush regenerated rapidly and often formed thickets that were denser and of lower diversity than the original stands. This realization, coupled with the fact that brush management treatments were typically short-lived, lead to the development of Integrated Brush Management Systems (IBMS). The IBMS approach takes a holistic, large-scale, long-term, whole-farm, ecosystem-based approach to brush management and recognizes multiple-use options for rangeland resources. Shrublands developing on former grasslands have other potential socioeconomic values that should be considered when contemplating brush management. These include alternate classes of livestock, lease hunting, deer and exotic game ranching, and ecotourism.

While shrublands have traditionally been viewed as degraded from a livestock production standpoint, it is important to recognize that they are not necessarily degraded from the ecological perspectives of primary productivity, nutrient cycling and biodiversity. The productivity of shrublands may be comparable to the grassland they replaced.

In addition, shrubs modify soils and microclimate to increase levels of organic matter and nutrients in the upper four inches of the soil profile. This nutrient enrichment by shrubs can offset grazing-induced losses of soil nutrients and contribute to enhance grass production when shrub cover is reduced by natural or management-induced means. While the development of shrub communities may have adverse impacts on grasses and grassland fauna, other plants and animals may benefit. Thus, while ecosystem biodiversity certainly changes, it does not necessarily decrease with a shift from grass to woody plant domination.

State and transition model

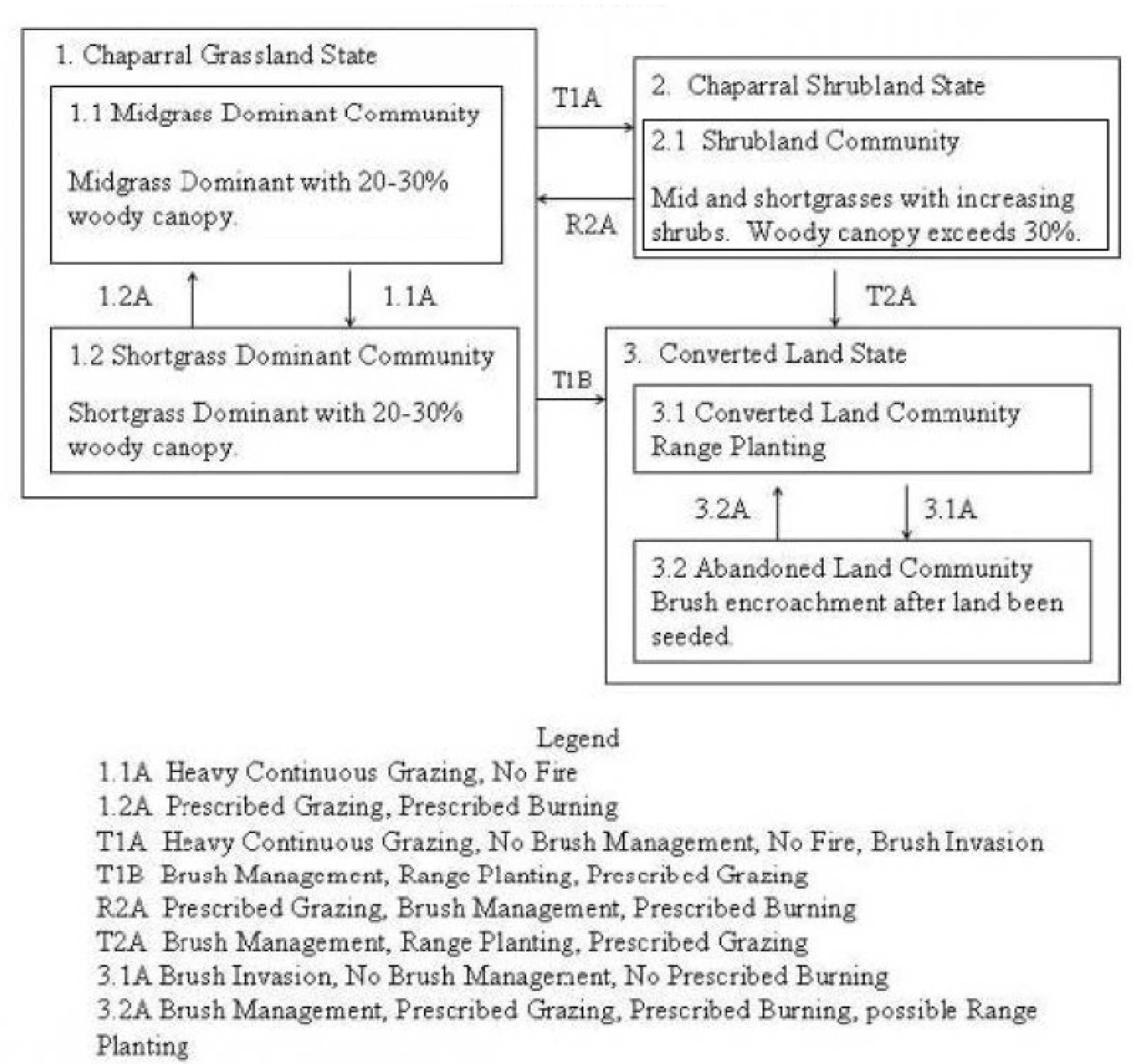

Figure 8. STM

State 1
Chaparral Grassland

Dominant plant species

- guajillo (*Acacia berlandieri*), shrub
- spiny hackberry (*Celtis ehrenbergiana*), shrub
- sideoats grama (*Bouteloua curtipendula*), grass

Community 1.1
Midgrass Dominant

This community represents the reference plant community. Fire did not play as important a role on this site as on deeper more productive sites. The primary reason is that the inherent grass production on this site is too low for extensive fires except when favorable rainfall provided a surplus of grass fuel. Guajillo is the dominate species of a wide variety of woody shrubs. The predominant grasses for this site are sideoats grama, feather bluestem, bristlegrass species, and Arizona cottontop (*Digitaria californica*). Arizona cottontop and plains bristlegrass (*Setaria macrostachya*) are the more opportunistic species on this site and respond quickly to timely rainfall.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	910	1530	2160
Shrub/Vine	400	520	600
Forb	70	120	200
Tree	20	30	40
Total	**1400**	**2200**	**3000**

Figure 10. Plant community growth curve (percent production by month). TX4541, Midgrass Dominant Community, 15-30% Canopy. Midgrasses dominate the site with 15-30% woody canopy..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	5	10	18	15	5	9	15	9	5	5

Community 1.2
Shortgrass Dominant

This phase of the Chaparral Grassland State (1) still exhibits a chaparral plant structure with the woody species canopy as high as 30 percent. Heavy continuous grazing takes many of the midgrasses out of the site and they are replaced by shortgrasses such as slim tridens, threeawn, red grama, and curlymesquite (*Hilaria belangeri*).

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	400	700	1100
Shrub/Vine	400	520	600
Forb	80	120	170
Tree	20	30	30
Total	**900**	**1370**	**1900**

Figure 12. Plant community growth curve (percent production by month). TX4542, Shortgrass Dominant Community, 15-30% canopy. Shortgrasses dominate after midgrasses decline. Woody canopy approaches 15-30%..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	5	10	18	15	5	9	15	9	5	5

Pathway 1.2A
Community 1.2 to 1.1

This phase can still be managed back to the Midgrass Dominant Community (1.1). A prescribed grazing plan, which includes proper stocking rates, will be essential to reverse the trend toward the Shrubland Community (2.1). Once the midgrass species begin to respond, it is possible to use fire when the conditions are right to suppress the brush species. Grazing management alone may not fully restore the reference plant community but can provide one reasonably close.

State 2
Chaparral Shrubland

Dominant plant species

- blackbrush acacia (*Acacia rigidula*), shrub
- guajillo (*Acacia berlandieri*), shrub

Community 2.1
Shrubland

This plant community is a result of a transition from the Chaparral Grassland State (1) to the Chaparral Shrubland State (2). The herbaceous understory is very limited in production due to the competition for sunlight, water, and nutrients. There is an increase of woody shrubs generally dominated by blackbrush and guajillo. Other woody plants are spiny hackberry (Celtis pallida), guayacan (Guaiacum augustifolium), kidneywood (*Eysenhardtia texana*), and other acacia species. Water infiltration does occur directly under some of the woody species. Energy flow and nutrient uptake is predominantly through the shrubs. Cool-season annual forbs and grasses are produced by fall and winter rains.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	250	600	800
Shrub/Vine	500	600	650
Forb	60	100	160
Tree	20	30	30
Total	**830**	**1330**	**1640**

Figure 14. Plant community growth curve (percent production by month). TX4544, Shrubland Community, 30+% woody canopy. Shrubs dominate the site with heavy continuous grazing and no brush management. Woody canopy exceeds 30%. Grasses are in further decline..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	5	10	18	15	5	9	15	9	5	5

State 3
Converted Land

Dominant plant species

- buffelgrass (*Pennisetum ciliare*), grass

Community 3.1
Converted Land

This plant community is developed by applying brush management and seeding. The conversion can actually come from any community where brush needs to be reduced and a seed source added to establish a desired plant community. The area can be seeded to grasses, forbs, or a mix of both. The most common introduced grass species are buffelgrass (Cenchrus ciliaris), kliengrass (*Panicum coloratum*), and Wilmann lovegrass (*Eragrostis superba*). It may be desirable to include forbs in these seedings. The decision of species to seed is a management decision based on clearly defined goals for livestock and wildlife. The use of introduced species does provide good forage for cattle and can provide some habitat for wildlife. However, once these species are introduced, it is difficult to remove them should objectives change.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	900	1720	2400
Shrub/Vine	400	430	600
Forb	80	120	170
Tree	20	30	30
Total	**1400**	**2300**	**3200**

Figure 16. Plant community growth curve (percent production by month). TX4531, Converted Land - Introduced Grass Seeding. Seeding Coverted Land into Introduced grass 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 3.2
Abandoned Land

This plant community develops from the Converted Land Community (3.1). Without follow-up brush management, seedlings of shrubs establish themselves and spread. The role of prescribed grazing is to retain grass vigor to compete against seedling establishment and preserve fuel for maintenance burns. Production of the plant types depends on the grazing management that has been applied since seeding, and the canopy of the shrubs invading or spreading on the site. As the canopy of the shrubs expands, grass and forb production will be reduced.

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	600	1200	1800
Shrub/Vine	500	600	700
Forb	80	120	170
Tree	20	30	30
Total	**1200**	**1950**	**2700**

Figure 18. Plant community growth curve (percent production by month). TX4534, Converted Land - Woody Seedlings Encroachment. Woody seedling encroachment on converted lands such as abandoned cropland, native seeded land, and introduced seeding lands..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	5	10	18	15	5	9	15	9	5	5

Pathway 3.2A
Community 3.2 to 3.1

In order to transition back to Converted Land Community (3.2), control of the brush species is required. Options include mechanical control or chemical brush removal.

Transition T1A
State 1 to 2

If heavy continuous grazing occurs, the plant community will transition to the Chaparral Shrubland State (2) with a woody canopy greater than 30 percent. When this occurs, a threshold has been crossed.

Transition T1B
State 1 to 3

The Chaparal Grassland State (1) can be changed into the Converted Land State (3) by controlling the brush and seeding to native or introduced grasses. Due to the gravelly soils of this site, care should be taken in the selection of soil disturbance equipment. Removing the brush and reseeding represents the crossing of a threshold.

Restoration pathway R2A
State 2 to 1

Full restoration back to the Chaparral Grassland is difficult and requires high energy inputs. Mechanical or chemical brush control is required to remove the woody species that have invaded the site. Range seeding may be necessary if the seed bank has been severely reduced.

Transition T2A
State 2 to 3

The Shrubland Community (2.1) can be changed into the Converted Land State (3) by controlling the brush and seeding to native or introduced grasses. Due to the gravelly soils of this site, care should be taken in the selection of soil disturbance equipment. Removing the brush and reseeding represents the crossing of a threshold.

Additional community tables

Table 10. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Midgrasses**			560–1200	
	sideoats grama	BOCU	*Bouteloua curtipendula*	100–400	–
	beardgrass	BOTHR	*Bothriochloa*	100–400	–
	Arizona cottontop	DICA8	*Digitaria californica*	100–400	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	100–400	–
	Texas bristlegrass	SETE6	*Setaria texana*	100–200	–
2	**Midgrasses**			140–300	
	lovegrass tridens	TRER	*Tridens eragrostoides*	100–200	–
	slender grama	BORE2	*Bouteloua repens*	100–200	–
	green sprangletop	LEDU	*Leptochloa dubia*	100–200	–
3	**Shortgrasses**			210–450	
	hooded windmill grass	CHCU2	*Chloris cucullata*	100–200	–
	fall witchgrass	DICO6	*Digitaria cognata*	100–200	–
	Hall's panicgrass	PAHA	*Panicum hallii*	100–200	–
4	**Shortgrasses**			70–150	
	threeawn	ARIST	*Aristida*	50–90	–
	slim tridens	TRMU	*Tridens muticus*	50–90	–
Forb					
5	**Forbs**			70–150	
	prairie clover	DALEA	*Dalea*	50–100	–
	awnless bushsunflower	SICA7	*Simsia calva*	50–100	–
	beeblossom	GAURA	*Gaura*	25–75	–
	snoutbean	RHYNC2	*Rhynchosia*	25–75	–
	Forb, annual	2FA	*Forb, annual*	25–75	–
Shrub/Vine					
6	**Shrubs**			280–600	
	guajillo	ACBE	*Acacia berlandieri*	200–500	–
	blackbrush acacia	ACRI	*Acacia rigidula*	200–500	–
7	**Shrubs**			70–150	
	mouse's eye	BEMY	*Bernardia myricifolia*	50–100	–
	spiny hackberry	CEEH	*Celtis ehrenbergiana*	50–100	–
	Texas lignum-vitae	GUAN	*Guaiacum angustifolium*	50–100	–
	pricklypear	OPUNT	*Opuntia*	50–100	–
	live oak	QUVI	*Quercus virginiana*	50–100	–

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.

Tree/Shrubland (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.

Converted Land State (3): The quality of wildlife habitat this site will produce is extremely variable and is influenced greatly by the timing of rain events. This state is often manipulated to meet landowner goals. If livestock production is the main goal, it can be converted to pastureland. It can also be planted to a mix of grasses and forbs that will benefit both livestock and wildlife. A mix of forbs in the pasture could attract pollinators, birds and other types of wildlife. Food plots can also be planted to provide extra nutrition 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

Peak rainfall periods occur in May and June from thunderstorms and in September and October from tropical systems. Rainfall events may be high (3 to 5 inches per event) and intense. Extended periods (45 to 60 days) of little to no rainfall during the growing season are common. Because of the flat topography of this site, erosion is minimal, however on more sloping aspects (greater than three percent), erosion may be very significant. This site provides little water for aquifer recharge because when wet, infiltration is very slow.

Recreational uses

Hunting and photography are common activities.

Wood products

In the Grassland State, no wood products are available. In a Shrubland State, the site may produce many large mesquite trees and these are often cut for firewood and barbecue.

Inventory data references

The data contained in this document is derived from analysis of inventories, clipping studies, and ecological interpretation from field evaluations.

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Approval

Bryan Christensen, 9/19/2023

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	05/11/2025
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):**

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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:

    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:**
