USDA Natural Resources Conservation Service

Ecological site R083CY002TX
Shallow Ridge

Last updated: 9/19/2023
Accessed: 05/19/2024

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.

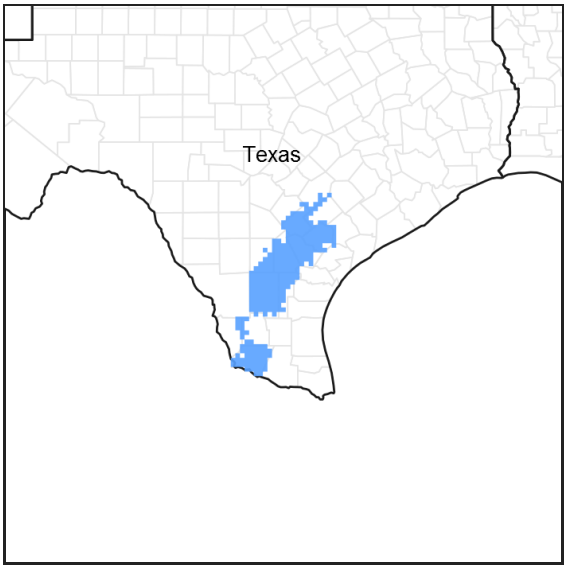

Figure 1. Mapped extent

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

Shallow Ridges are 8 to 18 inches of soil over a petrocalcic horizon. Gravels are located throughout the shallow to very shallow soils.

Associated sites

R083CY019TX	**Gray Sandy Loam**
R083CY025TX	**Clay Loam**
R083CY003TX	**Gravelly Ridge**
R083CY004TX	**Shallow Sandy Loam**
R083CY017TX	**Blackland**
R083CY023TX	**Sandy Loam**
R083CY024TX	**Tight Sandy Loam**

Similar sites

R083AY002TX	**Shallow Ridge** MLRA 83A
R083BY002TX	**Shallow Ridge** MLRA 83B

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Acacia berlandieri* (2) *Acacia rigidula*
Herbaceous	(1) *Pappophorum bicolor* (2) *Bothriochloa laguroides*

Physiographic features

Sites will be found on nearly level to undulating soils on summits of interfluves or ridges. Surfaces are convex and slopes range from one to eight percent. The runoff rate is medium to very high depending upon the slope. Elevation ranges from 100 to 1200 feet. No ponding or flooding occurs on this site. This area is comprised of inland, dissected coastal plains.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Ridge (2) Coastal plain > Interfluve
Runoff class	Medium to very high
Flooding frequency	None
Ponding frequency	None
Elevation	30–366 m
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)	584-660 mm
Frost-free period (actual range)	255-347 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	533-660 mm
Frost-free period (average)	283 days
Freeze-free period (average)	365 days
Precipitation total (average)	635 mm

Climate stations used

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

Influencing water features

Water from streams or wetlands do not influence this site.

Wetland description

N/A.

Soil features

The soils are very shallow to shallow, well drained with very slow permeability to impermeable. They formed in residuum derived from tuffaceous sediments of the Catahoula Formation and calcareous, loamy residuum of the Goliad Formation. Soil series correlated to this site include: Mirasol, Olmedo, Olmos, Sancajo, and Zapata.

Table 4. Representative soil features

Parent material	(1) Residuum–sedimentary rock (2) Alluvium–sedimentary rock
Surface texture	(1) Very gravelly fine sandy loam (2) Gravelly sandy loam (3) Very gravelly loam
Family particle size	(1) Loamy-skeletal
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	20–51 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–30%
Available water capacity (0-101.6cm)	2.54–5.08 cm
Calcium carbonate equivalent (0-101.6cm)	0–70%

Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–30%
Subsurface fragment volume >3" (Depth not specified)	0–45%

Ecological dynamics

The plant communities are dynamic and vary in relation to grazing and drought. The reference plant community was open grassland with scattered mottes of woody shrubs. The dominant grasses include pink pappusgrass (*Pappophorum bicolor*), false rhodesgrass (Chloris crinita) Texas bristlegrass (*Setaria texana*), Arizona cottontop (*Digitaria californica*), slim tridens (*Tridens muticus*), and perennial threeawn (Aristida spp.) The mixed brush is made up of scattered guajillo (*Acacia berlandieri*), false mesquite calliandra (*Calliandra conferta*), Texas kidneywood (*Eysenhardtia texana*), guayacan (*Guaiacum angustifolium*), and other woody shrubs. Grasses make up about 85 percent of the composition by weight of the reference plant community.

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. Grasses dominating the Shallow Ridges at the time of European settlement likely 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 Shallow Ridges 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

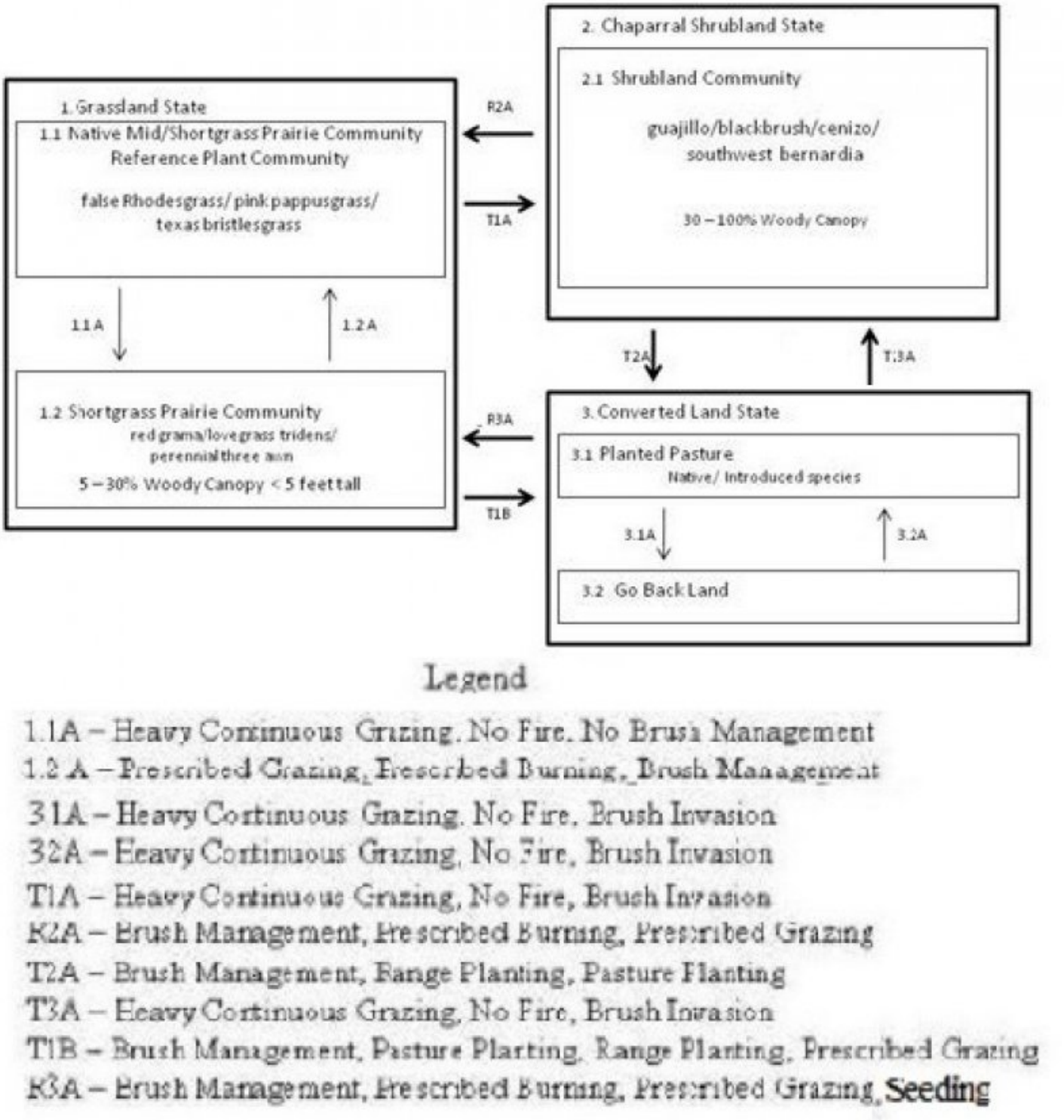

Figure 8. STM

State 1
Grassland

Dominant plant species

- guajillo (*Acacia berlandieri*), shrub
- blackbrush acacia (*Acacia rigidula*), shrub
- pink pappusgrass (*Pappophorum bicolor*), grass
- silver beardgrass (*Bothriochloa laguroides*), grass

Community 1.1
Native Mid/Shortgrass Prairie

This Mid/Shortgrass Prairie Community (1.1) developed under natural disturbance regimes spanning thousands of years. Fire may not have played as important a role on this site as others, because of its position at the top of the landscape and its relatively low fine fuel production. Composition of mid and shortgrasses makes up 85 percent of annual production by weight, forbs and shrubs make up the remainder. Annual forbs occur in varying amounts in response to grazing intensity, fire, drought, or excessive precipitation. Although this community has a low herbaceous production potential, healthy midgrass/shortgrass communities can remain stable and out-compete shrub species for water and nutrients. Maintaining adequate herbaceous canopy cover is key to properly functioning hydrologic and nutrient cycles. This plant community is not as resilient as others because of the shallow soils and convex, water-shedding positions. Slight disturbances that increase bare ground and decrease herbaceous production will favor a transition to the Chaparral Shrubland State (2). This difference in rainfall will cause subtle changes in plant community and overall productivity, which is displayed as high and low values, in the annual production tables. Although the values provided in this report are representative, doing an onsite inventory of plant community and production when planning management decisions will help land managers make sound decisions based on actual conditions on the ground.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	953	1681	2382
Shrub/Vine	112	196	280
Forb	56	101	140
Total	**1121**	**1978**	**2802**

Table 6. Ground cover

Tree foliar cover	0-1%
Shrub/vine/liana foliar cover	0-1%
Grass/grasslike foliar cover	70-90%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-25%
Surface fragments >0.25" and <=3"	1-5%
Surface fragments >3"	0-5%
Bedrock	0%
Water	0%
Bare ground	0-5%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	0-1%	10-40%	5-10%
>0.15 <= 0.3	–	0-1%	10-40%	5-10%
>0.3 <= 0.6	–	0-1%	40-100%	5-10%
>0.6 <= 1.4	–	0-1%	10-35%	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 10. Plant community growth curve (percent production by month). TX5125, Midgrass Grassland Community. Warm-season production from grass, forbs, and woody species..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	5	15	20	20	5	5	10	10	5	3

Community 1.2
Shortgrass Prairie

Figure 11. 1.2 Shortgrass Prairie Community

The Shortgrass Prairie Community (1.2) developed as a result of continued heavy grazing and an absence of the historic fire regime. This community is also driven by weather conditions and more common in areas of decreased rainfall. In comparison to the reference plant community (1.1), the Shortgrass Prairie Community (1.2) has reduced biomass production and canopy cover which causes subtle impacts to the water, mineral, and energy cycles. The loss of thermal protection and increased water runoff potential will start to negatively affect the plant available water in the soil. In this situation, reduced rainfall and prolonged droughts will begin to have more of an impact on plant production. As midgrasses, like false rhodesgrass and pink pappusgrass decrease, grasses such as slim tridens, threeawn species, and red grama will increase. Annual and perennial forbs often increase because of decreased competition for sunlight and moisture. Woody species such as blackbrush, guajillo, and cenizo will begin to establish dominance and as their canopy cover increases, herbaceous production will decrease making the transition to the Chaparral Shrubland State (2).

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	560	1009	1457
Shrub/Vine	448	785	1121
Forb	112	168	224
Total	**1120**	**1962**	**2802**

Figure 13. Plant community growth curve (percent production by month). TX5128, Shortgrass Dominant Community. Shortgrass dominates the site with decreasing midgrasses and increasing shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	5	15	20	21	5	5	10	10	5	2

Pathway 1.1A
Community 1.1 to 1.2

The midgrasses that dominate the landscape are highly preferred by livestock and are easily eliminated from the plant community with heavy continuous grazing and prolonged drought conditions. This is because less palatable plants are left ungrazed and will eventually be able to out-compete the dominant grasses for resources and space. The historic fire regime has also been changed, but weather and grazing pressure would play bigger roles in this plant communities transition from a Native Mid/Shortgrass Prairie Community (1.1) to a Shortgrass Prairie Community (1.2).

Pathway 1.2A
Community 1.2 to 1.1

The restoration to the Reference Plant Community (1.1) is achievable, and can be accomplished by installation of prescribed grazing with appropriate stocking rates. If the herbaceous component of this community remains healthy and maintains at least 85 to 90 percent ground cover, including live plants and litter, the woody component of this site will remain stable and new seedling growth will be inhibited. Individual Plant Treatment (IPT) and prescribed burning will be the most efficient and economical ways to manage brush species encroachment. The use of prescribed fire will only be possible in good weather years when shortgrasses are able to produce enough fine fuel. Because of the droughty nature of this site, timing and weather conditions are critical to successful restoration efforts. Chemical brush management is also feasible and relatively economical because this community has less than a 30 percent canopy of woody species. Once initial woody plant management has been achieved, reduced stocking and prescribed grazing will cause a transition towards the reference plant community. If the landowner wants to speed this transition, range planting can be done to increase the number of desired species.

State 2
Chaparral Shrubland

Dominant plant species

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

Community 2.1
Shrubland

Figure 14. 2.1 Shrubland Community

Figure 15. 2.1 Shrubland Community

A threshold has been crossed between the Grassland State (1) and the Chaparral Shrubland State (2). This Shrubland Community (2.1) has developed because of continuous heavy grazing, loss of fire as a management tool, greatly altered water and energy cycles, and invasion of woody plants. Episodic droughts will have a big impact on this process. The shift from the Shortgrass Prairie Community (1.2) to the Shrubland Community (2.1) can happen within a period of five years. Guajillo, blackbrush, and cenizo are more adapted to the conditions on this site and together will typically account for over 70 percent of the shrub canopy cover. Woody species such as Texas kidneywood, elbowbush (*Forestiera pubescens*), southwest bernardia, lime pricklyash (*Zanthoxylum fagara*) and others will make up a small component of the shrub community. This state has an average shrub or woody plant canopy cover of 80 percent and 10 percent bare ground, severely reducing the herbaceous production. Shrub density will impact the herbaceous community and spacing between shrub mottes can vary from less than 3 feet to more than 30 feet. The average shrub canopy height is less than eight feet. Shortgrasses such as slim tridens, red grama and threeawn species will make up the herbaceous community. This community is very resilient and relatively unproductive for livestock, but provides many habitat requirements for wildlife management.

Table 9. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	869	1429	1990
Grass/Grasslike	196	432	673
Forb	56	95	140
Total	**1121**	**1956**	**2803**

Figure 17. Plant community growth curve (percent production by month). TX5131, Shrubland Complex Community, >50% woody canopy. Woodland Community with 50-80% woody canopy cover..

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
Planted Pasture

To go from the Chaparral Shrubland State (2) to the Converted Land State (3) mechanical brush management must be applied. Typically, Rhome disking is utilized to remove the woody vegetation. A seedbed is then prepared and the area is planted into grass. This site has typically been planted to buffelgrass (*Pennisetum ciliare*) or an introduced bluestem species. Now, because of the availability of seed, landowners can also replant with native species. To maintain this seeded state, herbicides must be used to control woody seedlings that invade as soon as the pasture is established. Not only is there a long-lived seed source for woody species, additional seeds are brought in by grazing animals and domestic livestock. Because the soils of this site are shallow to a restrictive layer, ground disturbing practices will often break up the petrocalcic parent material and bring it to the soil surface. This results in rocks and gravels making up 10 to 20 percent of the soil surface on manipulated sites. This site is not typically cropped or developed into pasture because the shallow soil is droughty, and the shallow restrictive layer hinders conventional tillage practices.

Table 10. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1121	1961	2802
Total	**1121**	**1961**	**2802**

Figure 19. Plant community growth curve (percent production by month). TX5132, Converted Land Community - Pastureland. Converting into pastureland by planting native and introduced grass species..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	5	15	20	20	5	5	15	8	4	1

Community 3.2
Go Back Land

Figure 20. 3.2 Go Back Land

This community develops after major disturbances to the ground and after a mechanical brush management practice has been applied, but not followed up with appropriate management practices. This plant community phase usually has low plant diversity. It is typified by the dominance of woody species, very little herbaceous grass production, high amounts of annual forbs and grasses, and large areas covered by tree-leaf litter or rocks. Because of the seed bank present in the soil, and the constant addition of new seed from grazing/browsing animals and seed eating birds, re-infestation of woody seedlings happens in a relatively short time period of two to five years.

Figure 21. 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 3.1A
Community 3.1 to 3.2

The transition from Planted Pasture (3.1) to Go Back Land (3.2) can occur when pastures are left without management and woody plants begin to increase.

Pathway 3.2A
Community 3.2 to 3.1

Many land managers may want to utilize this site as pastureland. To achieve this transition land clearing practices such as Rhome disking will be necessary. After the land has been cleared and an appropriate seedbed prepared, the pasture can be planted.

Transition T1A
State 1 to 2

The transition from the Grassland State (1) to the Chaparral Shrubland State (2) can happen within five years. This transition can be driven by persistently dry weather conditions, grazing management, lack of fire, and brush management practices. Overstocking the site with grazing animals will put pressure on the herbaceous plant component of the community. Increased bare ground becomes a large problem affecting the hydrologic cycle. As herbaceous ground cover decreases, runoff and evaporation during rainfall events will increase, causing less water to infiltrate into the soil to become available for plant use. 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.

Transition T1B
State 1 to 3

Land managers may want to utilize this site as pastureland. To achieve this transition from the Grassland State (1), brush management and heavy disking with a Rhome disk, or other heavy implement, will be necessary to incorporate the vegetation into the soil. Prescribed burning can also be used prior to the disking operation to eliminate excessive vegetation. After the land has been cleared and an appropriate seedbed prepared, the pasture can be planted.

Restoration pathway R2A
State 2 to 1

Major inputs, both chemical and mechanical, are often required to restore the Chaparral Shrubland State (2) to the Grassland State (1). Often with this community a mechanical means such as Rhome disking is used. Most of the mixed brush species 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 and will encourage brush seedlings. Follow-up conservation practices such as Individual Plant Treatment for woody re-growth and new seedlings, and prescribed grazing will be necessary for several years after the initial brush management to maintain a stable herbaceous 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.

Transition T2A
State 2 to 3

Land managers may want to utilize this site as pastureland. To achieve this transition, practices such as Rhome disking will be necessary. After the land has been cleared and an appropriate seedbed prepared, the pasture can be planted.

Transition T3A
State 3 to 2

If the Go Back Land Community (3.2) is left alone, eventually the woody plants will create a moderate to heavy canopy. At this point, the desired understory grasses, forbs, and/or crops will be shaded out and the site will transition into a Chaparral Shrubland (2).

Additional community tables

Table 11. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall/Midgrasses**			280–701	
	pink pappusgrass	PABI2	*Pappophorum bicolor*	84–224	–
	false Rhodes grass	TRCR9	*Trichloris crinita*	84–224	–
	multiflower false Rhodes grass	TRPL3	*Trichloris pluriflora*	84–224	–
2	**Mid/Shortgrasses**			504–1121	
	silver beardgrass	BOLA2	*Bothriochloa laguroides*	112–280	–
	Arizona cottontop	DICA8	*Digitaria californica*	112–280	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	56–280	–
	tanglehead	HECO10	*Heteropogon contortus*	112–280	–
	green sprangletop	LEDU	*Leptochloa dubia*	112–280	–
	Texas bristlegrass	SETE6	*Setaria texana*	112–280	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	112–280	–
3	**Shortgrasses**			168–560	
	buffalograss	BODA2	*Bouteloua dactyloides*	39–140	–
	fall witchgrass	DICO6	*Digitaria cognata*	39–140	–
	curly-mesquite	HIBE	*Hilaria belangeri*	39–140	–
	lovegrass tridens	TRER	*Tridens eragrostoides*	39–140	–
	slim tridens	TRMU	*Tridens muticus*	39–140	–
	buffalograss	BODA2	*Bouteloua dactyloides*	39–140	–
	curly-mesquite	HIBE	*Hilaria belangeri*	39–140	–
Forb					
4	**Forbs**			56–140	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	26–59	–
	slim tridens	TRMU	*Tridens muticus*	26–59	–
	Forb, annual	2FA	*Forb, annual*	0–56	–

	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–56	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	0–56	–
	slimleaf heliotrope	HETO	*Heliotropium torreyi*	0–56	–
	Santa Maria feverfew	PAHY	*Parthenium hysterophorus*	0–56	–
	Drummond's skullcap	SCDR2	*Scutellaria drummondii*	0–56	–
	awnless bushsunflower	SICA7	*Simsia calva*	0–56	–
	fiveneedle pricklyleaf	THPEP	*Thymophylla pentachaeta var. pentachaeta*	0–56	–
	woody crinklemat	TICAC	*Tiquilia canescens var. canescens*	0–56	–
Shrub/Vine					
5	**Shrubs**			112–280	
	guajillo	ACBE	*Acacia berlandieri*	56–224	–
	blackbrush acacia	ACRI	*Acacia rigidula*	56–224	–
	Texas barometer bush	LEFR3	*Leucophyllum frutescens*	56–224	–
	desert yaupon	SCCU4	*Schaefferia cuneifolia*	0–112	–
	Rio Grande beebrush	ALMA9	*Aloysia macrostachya*	0–112	–
	Rio Grande stickpea	CACO	*Calliandra conferta*	0–112	–
	Brazilian bluewood	COHO	*Condalia hookeri*	0–112	–
	Texan hogplum	COTET	*Colubrina texensis var. texensis*	0–112	–
	Texas kidneywood	EYTE	*Eysenhardtia texana*	0–112	–
	Texas lignum-vitae	GUAN	*Guaiacum angustifolium*	0–112	–
	catclaw acacia	ACGR	*Acacia greggii*	0–112	–
	bushsunflower	SIMSI	*Simsia*	39–90	–
	leatherstem	JADI	*Jatropha dioica*	0–56	–

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 (three to five inches per event) and intense. Extended periods (45 to 60 days) of little to no rainfall during the growing season are common.

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.

Other references

Archer, S. 1995. Herbivore mediation of grass-woody plant interactions. Tropical Grasslands, 29:218-235.

Archer, S. 1995. Tree-grass dynamics in a Prosopis-thornscrub savanna parkland: reconstructing the past and predicting the future. Ecoscience, 2:83-99.

Archer, S. 1994. Woody plant encroachment into southwestern grasslands and savannas: rates, patterns and proximate causes. Ecological implications of livestock herbivory in the West, 13-68.

Archer, S., C. Scifres, C. R. Bassham, and R. Maggio. 1988. Autogenic succession in a subtropical savanna: conversion of grassland to thorn woodland. Ecological Monographs 58(2):110-127.

Archer, S. 1990. Development and stability of grass/woody mosaics in a subtropical savanna parkland, Texas, USA. Journal of Biogeography 17: 453-462.

Bond, W. J. What Limits Trees in C4 Grasslands and Savannas? Annual Review of Ecology, Evolution, and Systematics. 39:641-659.

De Leon, A. 2003. Itineraries of the De Léon Expeditions of 1689 and 1690. In Spanish Exploration in the Southwest, 1542-1706. Edited by H. E. Bolton. Charles Scribner’s Sons, New York, NY.

Dillehay T. 1974. Late quaternary bison population changes on the Southern Plains. Plains Anthropologist, 19:180-96.

Duaine, C. L. 1971. Caverns of Oblivion. Packrat Press, Oak Harbor, WA.

Everitt, J. H., D. L. Drawe, and R. I. Leonard. 2002. Trees, Shrubs, and Cacti of South Texas. Texas Tech University Press, Lubbock, TX.

Everitt, J. H., D. L. Drawe, and R. I. Lonard. 1999. Field Guide to the Broad-Leaved Herbaceous Plants of South Texas. Texas Tech University Press. Lubbock, TX.
Ford, J. S. 2010. Rip Ford's Texas. University of Texas Press. Austin, TX.

Fulbright, T. E. and S. L. Beasom. 1987. Long-term effects of mechanical treatment on white-tailed deer browse. Wildlife Society Bulletin, 15:560-564.

Fulbright, T. E. and F. C. Bryant. 2003. The Wild Horse Desert: climate and ecology. The Ranch Management, 35-58.

Gilbert, L. E. 1982. An ecosystem perspective on the role of woody vegetation, especially mesquite, in the Tamaulipan biotic region of South Texas. Proceeding Symposium of the Tamaulipan Biotic Province, Corpus Christi, TX.

Hanselka, C. W., D. L. Drawe, and D. C. Ruthven, III. 2004. Management of South Texas Shrublands with prescribed fire. In Proceedings: Shrubland dynamics -- fire and water, 57-61.

Heitschmidt R. K., Stuth J. W., eds. 1991. Grazing management: an ecological perspective. Timberline Press, Portland, OR.

Inglis, J. M. 1964. A history of vegetation of the Rio Grande Plains. Texas Parks and Wildlife Department Bulletin No. 45, Austin, TX.

Jurena, P.N., and S. Archer. 2003. Woody Plant Establishment and Spatial Heterogeneity in Grasslands Ecology, 84(4):907-919.

Le Houerou, H. N. and J. Norwine. 1988. The ecoclimatology of South Texas. In Arid lands: today and tomorrow. Edited by E. E. Whitehead, C. F. Hutchinson, B. N. Timmesman, and R. G. Varady, 417-444. Westview Press, Boulder, CO.

Lehman, V. W. 1969. Forgotten legions: sheep in the Rio Grande Plains of Texas. Texas Western Press, University of Texas at El Paso, El Paso, TX.

McGinty, A. and D. N. Ueckert. 2001. The Brush Busters success story. Rangelands Archives, 23(6):3-8.

McLendon T. 1991. Preliminary description of the vegetation of South Texas exclusive of coastal saline zones. Texas Journal of Science, 43: 13-32

Neilson, R. P. 1987. Biotic regionalization and climatic controls in western North America. Vegetatio, 70(3): 135-147.

Norwine, J. 1978. Twentieth-century semiarid climates and climatic fluctuations in Texas and northeastern Mexico. Journal of Arid Environments, 1:313-325.

Norwine, J. and R. Bingham. 1986. Frequency and severity of droughts in South Texas: 1900-1983, 1-17. In Livestock and wildlife management during drought. Edited by R. D. Brown. Caesar Kleberg Wildlife Research Institute, Kingsville, TX.

Parvin, R. W. 2003. Rio Bravo Resource Conservation and Development. Llanos Mestenos South Texas Heritage Trail. Zapata, TX.

Rappole, J. H. and G. W. Blacklock. 1994. A field guide: Birds of Texas. Texas A&M University Press, College Station, TX.

Schmidley, D. J. 1983. Texas mammals east of the Balcones Fault zone. Texas A&M University Press. College Station, TX.

Scifres, C. J. and W. T. Hamilton. 1993. Prescribed burning for brushland management: the South Texas example. Texas A&M Press, College Station, TX.

Scifres C. J., W. T. Hamilton, J. R. Conner, J. M. Inglis, and G. A. Rasmussen. 1985. Integrated Brush Management Systems for South Texas: Development and Implementation. Texas Agricultural Experiment Station, College Station, TX.

Scifres, C. J., J.W. McAtee, and D. L. Drawe. 1980. Botanical, Edaphic, and Water Relationships of Gulf Cordgrass (Spartina spartinae [Trin.] Hitchc.) and Associated Communities The Southwestern Naturalist 25(3):397-409.

Texas Parks and Wildlife Department. 2007. List of White-tailed Deer Browse and Ratings. District 8.

Vavra, M., W. A. Laycock, R. D. Pieper. 1994. Ecological Implications of livestock herbivory in the West. Society for Range Management. Denver, CO.

Weltz, M. A. and W. H. Blackburn. 1995. Water budget for south Texas rangelands. Journal of Range Management, 48:45-52.

Whittaker, R. H., L. E. Gilbert, and J. H. Connell. 1979. Analysis of a two-phase pattern in a mesquite grassland, Texas. Journal of Ecology, 67:935-52.

Wright, B. D., R. K. Lyons, J. C. Cathey, and S. Cooper. 2002. White-tailed deer browse preferences for South Texas and the Edwards Plateau. Texas Cooperative Extension Bulletin B-6130.

Contributors

Gary Harris, MSSL, NRCS, Robstown, Texas.

Approval

Bryan Christensen, 9/19/2023

Acknowledgments

Technical reviewers and contributors include: Clark Harshbarger, RSS, NRCS, Robstown
Vivian Garcia, RMS, NRCS, Corpus Christi
Shanna Dunn, RSS, NRCS, Corpus Christi
Jason Hohlt, RMS, NRCS, Kingsville
Tyson Hart, RMS, NRCS, Nacogdoches
Michael Margo, RMS, NRCS, Marfa

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)	David Hinojosa, RMS, NRCS, Robstown, TX Jason Hohlt, RMS, NRCS, Kingsville, TX
Contact for lead author	361-241-0609
Date	09/17/2012

Approved by	Bryan Christensen
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:** Few water flow pattens are normal for this site due to landscape position and slopes.

3. **Number and height of erosional pedestals or terracettes:** Pedestals range from being uncommon to common for this site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 5 to 20 percent bare ground.

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 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 4 to 6.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface struture is three to eight inches thick with colors ranging from very dark grayish brown to brown with subangular blocky structure. Soil organic matter is less than three percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Herbaceous production of bunch, rhizomatous, and stoloniferous grasses will help minimize runoff and maximize infiltration. Grasses should comprise approximately 70 percent of total annual production by weight. Shrubs will comprise about 20 percent by weight.

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: Perennial Mid/Shortgrasses > Perennial Tall/Midgrasses = Perennial Shortgrasses >

    Sub-dominant: Shrubs > Forbs

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Potential for 10 to 20 percent plant mortality of perennial bunchgrasses during extreme drought.

14. **Average percent litter cover (%) and depth (in):** 5 to 10 percent litter cover.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1,000 to 2,500 pounds per acre.

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:** Cenizo, blackbrush, and guajillo.

17. **Perennial plant reproductive capability:** All species should be capable of reproducing.