Ecological site R083EY023TX
Sandy Loam

Last updated: 9/21/2023
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General information

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

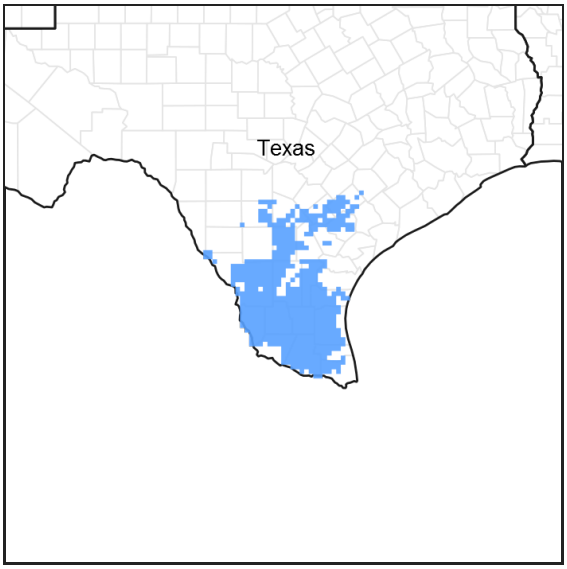


Figure 1. Mapped extent

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

MLRA notes

Major Land Resource Area (MLRA): 083E–Sandsheet Prairie

Major Land Resource Area (MLRA) 83E makes up about 4,300 square miles (11,150 square kilometers). The towns of Falfurrias, Premont, and Sarita are in this area. U.S. Highways 77 and 281 run through the area in a north-south direction.

Classification relationships

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

Ecological site concept

The Sandy Loam ecological site typically has a fine sandy loam or very fine sandy loam surface. Sandy clay loam subsoil horizons are generally present 12 inches below the surface. The reference plant community was a grassland with some woody species.

Associated sites

R083EY008TX	**Salty Prairie**
R083EY020TX	**Sand Hills**
R083EY021TX	**Sandy**
R083EY024TX	**Tight Sandy Loam**

Similar sites

R083AY023TX	**Sandy Loam**
R083BY023TX	**Sandy Loam**
R083CY023TX	**Sandy Loam**
R083DY023TX	**Sandy Loam**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Colubrina texensis* (2) *Acacia rigidula*
Herbaceous	(1) *Trichloris pluriflora* (2) *Digitaria californica*

Physiographic features

The Sandy Loam is found on nearly level to gently sloping soils on the western periphery of the Sandsheet Prairie. Slope ranges from 0 to 5 percent, but are mostly less than 3 percent. Elevation ranges from 10 to 600 feet.

Table 2. Representative physiographic features

Landforms	(1) Sand plain > Sand sheet (2) Sand plain > Dune
Runoff class	Negligible to low
Flooding frequency	None
Ponding frequency	None
Elevation	10–600 ft
Slope	0–5%
Aspect	Aspect is not a significant factor

Climatic features

MLRA 83 has a subtropical subhumid climate. Winters are dry and fairly warm, 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 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)	235-365 days
Freeze-free period (characteristic range)	365 days

Precipitation total (characteristic range)	24-29 in
Frost-free period (actual range)	222-365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	22-30 in
Frost-free period (average)	288 days
Freeze-free period (average)	365 days
Precipitation total (average)	26 in

Climate stations used

- (1) FALFURRIAS [USC00413063], Encino, TX
- (2) MCCOOK [USC00415721], Edinburg, TX
- (3) SARITA 7 E [USC00418081], Sarita, TX
- (4) RAYMONDVILLE [USC00417458], Raymondville, TX
- (5) KINGSVILLE NAAS [USW00012928], Kingsville, TX
- (6) HEBBRONVILLE [USC00414058], Hebbronville, TX

Influencing water features

This ecological site is not influenced by water from a wetland or stream. No ponding or flooding is expected for this ecological site during normal years.

Wetland description

N/A

Soil features

The soils are very deep, moderately well to well drained with moderate to moderately rapid permeability. They have a fine sandy loam or loamy fine sand surface textures and brown to yellowish brown colors. These soils formed over calcareous alluvium, so they are effervescence within the top 40 inches. Soils correlated to this site include: Brennan, Cayo, Colmena, Ebanito, Escobas, Hebbronville, Suerte, and Yturria.

Table 4. Representative soil features

Parent material	(1) Eolian sands–sedimentary rock (2) Alluvium–sedimentary rock
Surface texture	(1) Fine sandy loam (2) Loamy fine sand (3) Loam
Family particle size	(1) Fine-loamy (2) Coarse-loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4–6 in
Calcium carbonate equivalent (0-40in)	0–20%

Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–4
Soil reaction (1:1 water) (0-40in)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–3%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The first crude maps labeled this area of South Texas as Nuevo Santader (1746) and later as the Wild Horse Desert (1850). Now ecologists more commonly refer to it as the Tamaulipan Biotic Province or the Mesquite Acacia Woodland. The Sandy Loam ecological site can be found on soils with a fine sandy loam surface or a loamy fine sand surface texture. This does not cause a large difference in plant communities during normal years partly due because of the mean annual precipitation deficiency experienced by this part of the region. That is the difference between the mean annual rainfall and the potential evapotranspiration.

Climate is an important, sometimes downplayed, force that affects the plant communities by impacting general plant composition and diversity at a regional scale. Over the past 130 years three climatic regimes have exhibited distinct weather patterns over the American South West that can be related to the establishment of different kinds of plants (e.g. C4 grasses versus C3 shrubs). Perennial warm season grasses and plants (usually C4) benefit most when spring and summer rainfall is consistent. On the opposite spectrum, mesquite, shrubs, and cool season annuals (usually C3) can take advantage of winter rains and can also conserve energy during hot dry summers.

Droughts are a common occurrence in South Texas and were often documented in letters and historical text. For example, Captain John S. “Rip” Ford mentioned the 1864 drought in his memoirs. He reported thousands of domestic animals dead around South Texas water holes and that the Nueces River was dry for miles. Maria Von Blucher commented in 1872 that, “as a result of the tremendous drought…half of all the cattle in Texas died…at every prominence where one can overlook the Nueces River, one might count more than 3,000 dead cattle.”

Despite the dry climate, this area of Texas was a mid/shortgrass prairie, which was attractive to ranchers and early settlers. In the mid-1800’s the number of grazing animals affecting the ecosystem began to rise dramatically. In general, numbers of wild horses and cattle increased from the 1840’s through the end of the Civil War. Sheep numbers expanded to outnumber both cattle and horses between 1867 and 1900, and peaked at numbers exceeding 2 million. Since that time sheep numbers have fallen dramatically and cattle have become the principal commercial livestock. The January 2013 Texas Livestock Inventory provided by the National Agricultural Statistics Service shows that less than 500,000 head of livestock including cattle, sheep, and goats are currently being raised south of the Nueces River.

Starting in the mid-1800’s the region saw wide anthropogenic changes in several environmental disturbance regimes. Research done to investigate the transition from grassland plant communities to shrubland communities in South Texas indicates that a significant successional change across the region began 100 to 200 years ago, and that stable carbon isotope ratios indicate C3 woody plants currently occupy sites once dominated by C4 grasses. When climate and/or other disturbance regimes change to favor the establishment and spread of woody plants a transition from grassland to shrubland will occur. As grazing use increases past sustainable levels mulch, litter, and other types of ground cover start to decrease, including standing herbaceous material. The plant community structure would also change slowly from a mid/shortgrass prairie to a short grass prairie with an increase in bare ground, annual forbs, and perennial woody species. This would have had a significant impact on water runoff and infiltration rates as well as soil temperatures and historic fire regimes.

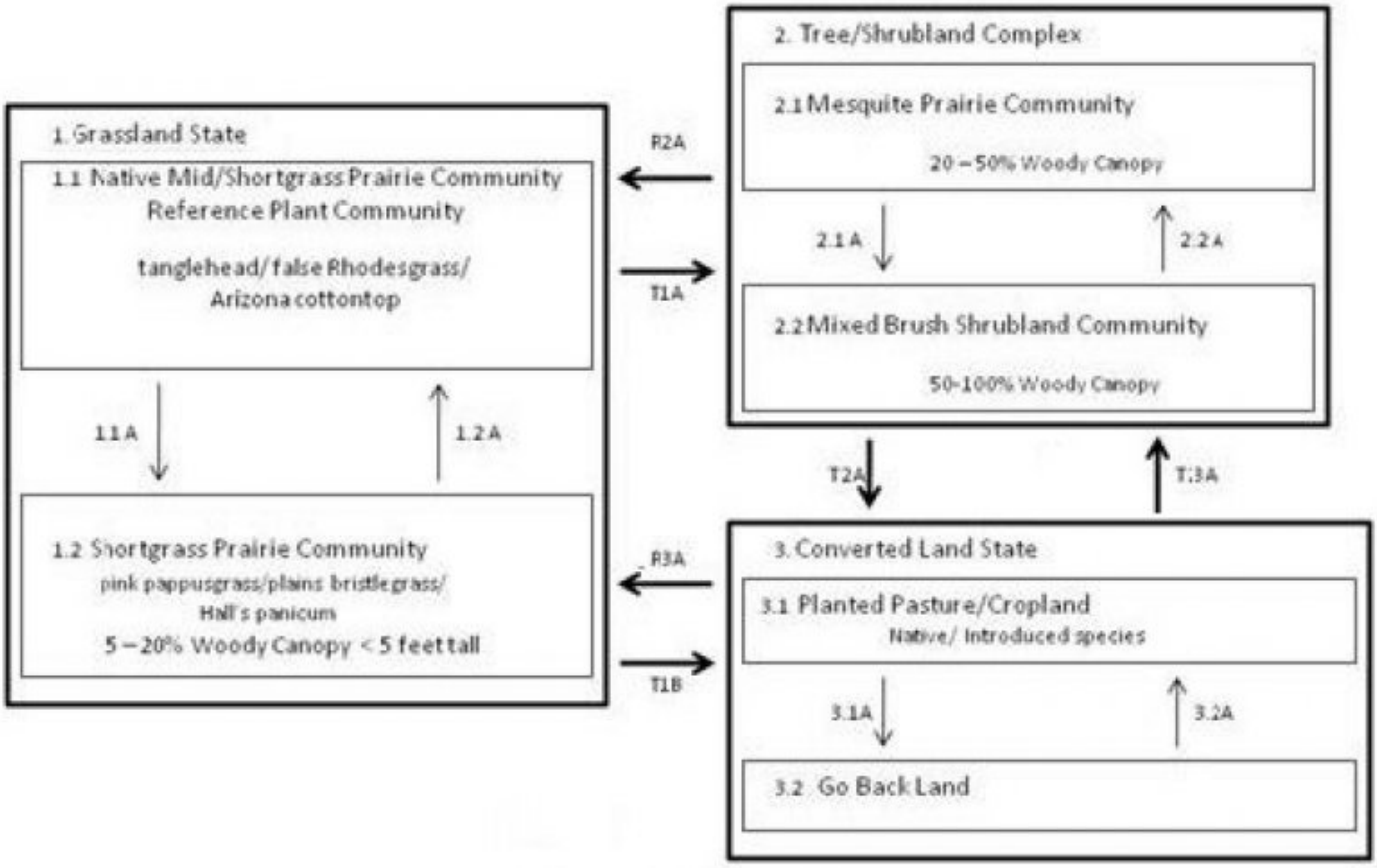
A grassland community has the intrinsic ability to compete with woody species for available water and nutrients in the soil when they are growing in the same space at the same time. Their fibrous and expansive root systems are better adapted to use the top 12 to 16 inches of the soil and there appears to be a critical one to two year period

during which mesquite seedlings might be in acute competition with grasses for soil resources. As herbaceous cover decreases bare ground increases, providing more opportunity for woody species to germinate and establish. The amount of herbaceous ground cover can also have a large impact on soil surface temperatures. The higher temperature extremes of bare soil may prevent seed germination of both grasses and shrubs creating a negative feedback loop which is only broken when some type of ground cover is established.

Climate and unsustainable grazing pressure have played large roles in the conversion of South Texas grasslands to what is now called “brush country”, but another important factor is a change in the historic fire regime. The range of woody species has not significantly changed in the past 300 to 500 years, but the stature and density of shrub species has greatly increased. The historic fire regime of South Texas was highly variable with fires every five to thirty years. The variability of fires across the region would have been driven by several factors including fine fuel load but, at a local level, fires would have been frequent enough to prevent woody plant seedlings from maturing and dominating a particular area. Grasses are much better adapted to survive periodic fires and have faster regrowth rates than most shrub species but, once established; brush species in South Texas have shown the tendency to survive fires because of their re-sprouting characteristics.

Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and aspect. The reference plant community is not necessarily the management goal; other vegetative states may be desired plant communities if the Range Health assessments are in the moderate and above category. The biological processes on this ecological site are complex. Therefore, representative values are presented in a land management context. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this ecological site. They are not intended to cover every situation or the full range of conditions, species, and responses for the ecological site.

State and transition model



Legend

1.1A – Heavy Continuous Grazing, No Fire, No Brush Management
1.2 A – Prescribed Grazing, Prescribed Burning, Brush Management
2.1A – Heavy Continuous Grazing, No Fire, Brush Invasion
2.2A – Prescribed Grazing, Prescribed Burning, Brush Management
3.1A – Heavy Continuous Grazing, No Fire, Brush Invasion
3.2A – Brush Management, Prescribed Burning, Prescribed Grazing, Seeding
T1A – Heavy Continuous Grazing, No Fire, Brush Invasion
R2A – Brush Management, Prescribed Burning, Prescribed Grazing
T2A – Brush Management, Range Planting, Pasture Planting
T3A – Heavy Continuous Grazing, No Fire, Brush Invasion
T1B – Brush Management, Pasture Planting, Range Planting, Prescribed Grazing
R3A – Brush Management, Prescribed Burning, Prescribed Grazing, Seeding

State 1
Grassland

Community 1.1
Native Mid/Shortgrass Prairie

Because of a lack of reference communities, the interpretive information for this plant community is derived from previously developed range site descriptions and professional consensus of range-trained staff. This plant community is a productive mid/short grass prairie with a mix of occasional woody plants. This plant structure is

maintained by infrequent grazing and fire regime which recycled organic matter and nutrients from standing herbaceous material and prevented woody species from establishing dominance on the ecological site. This plant community is resistant to change and can persist through periodic droughts and other types of disturbance. On the other hand, it is not very resilient if herbaceous production and ground cover are dramatically reduced on a regular basis.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1025	2215	3400
Forb	100	160	225
Shrub/Vine	75	100	125
Tree	0	25	50
Total	**1200**	**2500**	**3800**

Table 6. Ground cover

Tree foliar cover	0-10%
Shrub/vine/liana foliar cover	5-10%
Grass/grasslike foliar cover	85-95%
Forb foliar cover	10-20%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-10%
Surface fragments >0.25" and <=3"	0-1%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0-5%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	1-5%	1-5%	85-95%	10-20%
>0.5 <= 1	1-5%	1-5%	85-95%	10-20%
>1 <= 2	1-10%	5-10%	75-85%	10-20%
>2 <= 4.5	1-10%	5-10%	75-85%	5-10%
>4.5 <= 13	–	–	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Figure 9. Plant community growth curve (percent production by month). TX4800, Midgrass Dominant Community. Warm-season midgrasses with forbs and shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	2	10	20	20	5	8	15	10	6	2

Community 1.2
Shortgrass Prairie

Figure 10. 1.2 Shortgrass Prairie Community

This community phase occurs as the taller, more productive grasses are slowly replaced by shortgrasses and forbs. Threeawn species (Aristida spp.), hooded windmill grass (*Chloris cucullata*), tumble lovegrass (*Eragrostis sessilispica*), fall witchgrass (Digitaria cognate), grass bur (*Cenchrus spinifex*), thin paspalum (*Paspalum setaceum*), hairy grama (Bouteloua hirsute), and knotgrass (*Setaria reverchonii* subsp firmula) increase in abundance. The annual forb and grass community is highly variable but responds quickly to rainfall events. Some common forbs include annual and perennial crotons (Croton spp.), slender evolvulus (*Evolvulus alsinoides*), and Indian mallow (*Abutilon fruticosum*). Mesquite (*Prosopis glandulosa*), whitebrush (*Aloysia gratissima*), and hogplum (*Colubrina texensis*) are commonly the first woody species that begin to establish. These soils will form a crust as bare ground increases causing less water infiltration after rainfall events and a decrease in herbaceous productivity and seedling germination.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	800	1750	2700
Shrub/Vine	200	350	500
Forb	200	350	500
Tree	0	50	100
Total	**1200**	**2500**	**3800**

Figure 12. Plant community growth curve (percent production by month). TX4805, Mid/Shortgrass Dominant Community. Mid and shortgrasses with increasing trees and shrubs..

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

Pathway 1.1A
Community 1.1 to 1.2

This pathway represents a slow but continuous reduction in herbaceous plant production which affects many different ecological processes. Drought and grazing pressure are the main drivers for this transition, which affects the fire regime. The larger bunchgrass species lose dominance and are gradually replaced with shortgrasses and forbs as litter cover is reduced and bare ground increases.

Pathway 1.2A

Community 1.2 to 1.1

Grazing management is key to restoring the Mid/Shortgrass Prairie Community (1.1). Sustainable grazing keeps pressure off target grass species and allows enough fine fuel to build up and support prescribed burns. In this phase, fire is an effective tool that can be used to suppress woody plants and promote the grass and forb community. A prescribed burn plan with the goal of suppressing brush in the Grassland State should initially be designed to have burns every three to five years. In some cases, burning may not be feasible because of weather conditions or ranch management issues. Currently, prescribed burns may also have unintended results such as the increase of species like buffelgrass (*Pennisetum ciliare*) and Kleberg bluestem (*Dichanthium annulatum*). In these cases, mechanical brush control practices that remove the rootcrown of re-sprouting species or herbicide that can kill target species without ground disturbance are effective. An integrated brush management plan which utilizes fire in combination with mechanical and chemical treatments can suppress brush encroachment.

State 2
Mixed Brush Complex

Community 2.1
Savannah

Figure 13. 2.1 Savannah Community

Figure 14. 2.1 Savannah Community

This community phase is a complex of grasses, forbs, and shrubs. The woody component has established and grown tall enough to survive periodic fire. Research in areas of South Texas have shown that different plant species are recruited into the plant community at different stages of succession. Mesquite, whitebrush, and hogplum are commonly the first to appear. Blackbrush acacia (*Acacia rigidula*), catclaw acacia (*Acacia greggii*) ,and rarely wherry mimosa (*Mimosa texana*) can also be the primary brush species. Other species that will fill in the brush canopy include lime pricklyash (*Zanthoxylum fagara*), granjeno (*Celtis ehrenbergiana*), brasil (*Condalia hookeri*), Texas persimmon (*Diospyros texana*), lantana (*Lantana urticoides*), leather stem (*Jatropha dioica*), and prickly pear (*Opuntia engelmannii*). As brush mottes develop, desert yaupon (Schaefferia cuneifloia), elbowbush (*Forestiera pubescens*), wolf berry (*Lycium berlandieri*), coma (*Sideroxylon celastrinum*), and lotebush (*Ziziphus obtusifolia*) will begin to appear. The brush component will eventually form continuous mottes that will cover large areas. The herbaceous component can be similar to the grassland state, but grass production will continue to decrease while bare ground will increase. In this phase, introduced grasses like buffelgrass and Kleberg bluestem can increase and invade the native plant community. Bare ground in this phase will typically range from 1 to 30 percent, with total litter cover ranging up to 65 percent. Gaps in the brush canopy can range from 5 to 90 feet with an average brush canopy gap of about 32 feet.

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	650	1325	2000
Shrub/Vine	300	550	800
Tree	50	275	500
Forb	200	350	500
Total	**1200**	**2500**	**3800**

Figure 16. Plant community growth curve (percent production by month). TX4808, Short/Midgrass Shrubland Complex. Shortgrasses with declining midgrasses with 20-50% shrub canopy..

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 2.2
Shrubland

Figure 17. 2.2 Shrubland Community

Figure 18. 2.2 Shrubland Community

Figure 19. 2.2 Shrubland Community

The Shrubland Community develops as brush species coalesce into large mottes and severely limit herbaceous production. These mottes form a continuous brush canopy that can expand to cover vast areas and are exclusively composed of woody species. Herbaceous production is very low and will include plants like threeawn species, hooded windmillgrass and Rio Grande bristlegrass. Although mesquite is very common on this ecological site, other co-dominant species include hog plum, catclaw acacia, blackbrush acacia, and rarely wherry mimosa. The sub-

canopy is very diverse but the most common brush species are granjeno, brasil, lime pricklyash, prickly pear, whitebrush, lotebush, guayacan, and armagosa. Bare ground in this phase will typically range from 1 to 15 percent with total litter cover ranging from 30 to 97 percent. Gaps in the brush canopy can range from 5 to 50 feet with an average brush canopy gap of about 15 feet.

Table 10. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	500	900	1300
Tree	400	775	1150
Grass/Grasslike	200	600	1000
Forb	100	225	350
Total	**1200**	**2500**	**3800**

Figure 21. Plant community growth curve (percent production by month). TX4809, Shrubland Complex, >50% woody canopy. Woody shrubs dominate with lesser amounts of shortgrasses and forbs..

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

Pathway 2.1A
Community 2.1 to 2.2

Savannah

Shrubland

The transition from Savannah to Shrubland can occur quickly depending on seed dispersal and the timing of rain, but is also highly dependent on ground cover and competition from grasses. Because there are so many factors, it is difficult to determine which areas are most susceptible to woody plant encroachment. This plant community can have a large amount of bare ground and relatively low amounts of herbaceous production, putting it constantly at risk of brush encroachment.

Pathway 2.2A
Community 2.2 to 2.1

Shrubland

Savannah

The Shrubland Community (2.2) is distinguished from the Savannah community (2.1) by the increase in woody plant canopy cover which negatively affects herbaceous production. Extreme dry weather can cause plant mortality and a decrease in woody cover, but this is a cyclic process and woody cover density will recover. Mechanical brush control will be necessary to restore the Savannah Community (2.1) because grazing and fire will not have large impacts on mature brush mottes.

State 3
Converted Land

Community 3.1

Planted Pasture

Figure 22. 3.1 Planted Pasture Community

Buffelgrass is the main species that is used by land managers to develop grass pastures. Herbicide and adequate precipitation are necessary to maintain high productivity. Now, because of the availability of seed, landowners can also replant with native species. To maintain this pasture, 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 of mesquite and other woody species, additional seed are brought in by grazing animals and domestic livestock.

Table 11. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1000	2500	4000
Total	**1000**	**2500**	**4000**

Figure 24. Plant community growth curve (percent production by month). TX4762, Introduced Grass Community. Planted into introduced grasses for pasture planting..

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

Community 3.2
Go Back Land

Figure 25. 3.2 Go Back Land Community

This community develops after land has been planted to pasture and left to fallow without management. It can also develop after a mechanical brush management practice has been applied during poor weather conditions. It is typified by low plant diversity, with mesquite and prickly pear dominating the woody species, very little herbaceous

grass production, and high amounts of bare ground. 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 can happen in a relatively short time period of less than five years. The production and plant community structure are highly variable in the Go Back Land (3.2).

Figure 26. Plant community growth curve (percent production by month). TX4812, Converted Land Community - Woody Seedling Encroachment. Converted Land Community that has been encroached by woody seedlings due to abandonment of crop and pastureland..

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

Planted Pasture

Go Back Land

The transition from Planted Pasture (3.1) to Go Back Land (3.2) occurs when pastures are left to fallow without brush management. Woody species gain a competitive advantage and a low diversity plant community typically develops.

Pathway 3.2A
Community 3.2 to 3.1

Go Back Land

Planted Pasture

After an area has reverted to the Go Back Land phase (3.2), land managers may want to utilize the ecological site as pasture again. From a species diversity and wildlife habitat perspective it is usually a good idea to reclaim an area that has already been manipulated in the past instead of clearing another species rich part of the management area. Once in this phase, mechanical brush control will be necessary, and a seed bed will need to be prepared to replant grasses for pasture.

Transition T1A
State 1 to 2

The transition from the Grassland State (1) to the Mixed Brush Complex (2) is relatively slow, in part because of low rainfall received in this area. This phase can be stable for more than 15 years before brush species are able to establish. As bare ground increases and competition from grasses decrease, woody plants have a chance to germinate.

Transition T1B
State 1 to 3

Land managers may want to utilize this ecological site as pastureland. After the land has been cleared and an appropriate seedbed prepared, the land can be planted to introduced grasses for pasture.

Restoration pathway R2A
State 2 to 1

Land managers may want to restore back to the Grassland State. Once in the Mixed Brush Complex (2), mechanical or chemical brush control will be necessary to make the transition. The restoration process is heavily dependent on favorable weather and patience. Land managers can plant native seed to speed up restoration efforts, or can rely on native seed that is already in the soil. Grazing pressure on restoration sites should be deferred for a minimum of one growing season, but it is often necessary to defer livestock grazing completely or carefully graze for years before the desired plant community can develop.

Transition T2A
State 2 to 3

Land managers may want to utilize this ecological site as pastureland. Once in the Mixed Brush Complex (2), mechanical brush control will be necessary. Many species of brush on this ecological site are capable of re-sprouting after top removal; which is an important factor to consider when deciding how to clear the land to plant pasture. After the land has been cleared and an appropriate seedbed prepared, the land can be planted to grasses for pasture.

Restoration pathway R3A
State 3 to 1

The transition from the Converted Land State (3) to the Grassland State (1) will take time and patience. In the Planted Pasture (3.1), if practices such as fertilizer application and weed control are stopped, prescribed grazing is applied, woody seedlings are managed, and prescribed burning is applied, this ecological site will begin the restoration back to the Grassland State (1. Introduced grass species are very resilient and competitive. They can maintain dominance in a pasture for a very long time after they are planted even without careful management. In these cases, management practices such as disking or applying herbicide to kill or suppress introduced species will be necessary. This transition may occur very slowly because introduced grasses will remain competitive and will probably always be present. This transition may also require brush management practices and the re-introduction of desirable native species through range planting.

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 Mixed Brush Complex (2).

Additional community tables

Table 12. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Mid/Tallgrasses**			350–1600	
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	75–400	–
	Arizona cottontop	DICA8	*Digitaria californica*	75–400	–
	tanglehead	HECO10	*Heteropogon contortus*	25–400	–
	multiflower false Rhodes grass	TRPL3	*Trichloris pluriflora*	75–400	–
2	**Midgrasses**			550–1800	
	hooded windmill grass	CHCU2	*Chloris cucullata*	35–300	–
	pink pappusgrass	PABI2	*Pappophorum bicolor*	35–300	–
	whiplash pappusgrass	PAVA2	*Pappophorum vaginatum*	35–300	–
	knot grass	SEREF	*Setaria reverchonii ssp. firmula*	35–300	–

	Rio Grande bristlegrass	SERER	*Setaria reverchonii ssp. ramiseta*	35–300	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	35–300	–
	lovegrass tridens	TRER	*Tridens eragrostoides*	35–300	–
3	**Shortgrasses**			125–400	
	threeawn	ARIST	*Aristida*	15–100	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	15–100	–
	coastal sandbur	CESP4	*Cenchrus spinifex*	15–100	–
	fall witchgrass	DICO6	*Digitaria cognata*	15–100	–
	slim tridens	TRMU	*Tridens muticus*	15–100	–
Forb					
4	**Forbs**			100–225	
	Forb, annual	2FA	*Forb, annual*	10–20	–
	common goldenbush	ISCO	*Isocoma coronopifolia*	10–20	–
	leatherstem	JADI	*Jatropha dioica*	5–15	–
	manystem ratany	KRRA	*Krameria ramosissima*	5–15	–
	littleleaf sensitive-briar	MIMI22	*Mimosa microphylla*	5–15	–
	Texas palafox	PATEA	*Palafoxia texana var. ambigua*	5–15	–
	woody crinklemat	TICAC	*Tiquilia canescens var. canescens*	5–15	–
	Texas Indian mallow	ABFR3	*Abutilon fruticosum*	5–15	–
	tailed nicker	CACA26	*Caesalpinia caudata*	5–15	–
	lambsquarters	CHAL7	*Chenopodium album*	5–15	–
	Torrey's croton	CRIN13	*Croton incanus*	5–15	–
Shrub/Vine					
5	**Shrubs/Vines**			75–125	
	whitebrush	ALGR2	*Aloysia gratissima*	5–25	–
	blackbrush acacia	ACRI	*Acacia rigidula*	5–20	–
	Schaffner's wattle	ACSC2	*Acacia schaffneri*	5–20	–
	spiny hackberry	CEEH	*Celtis ehrenbergiana*	5–20	–
	Brazilian bluewood	COHO	*Condalia hookeri*	5–20	–
	lime pricklyash	ZAFA	*Zanthoxylum fagara*	5–20	–
	Texan hogplum	COTET	*Colubrina texensis var. texensis*	5–20	–
	catclaw acacia	ACGR	*Acacia greggii*	5–20	–
	Texas persimmon	DITE3	*Diospyros texana*	5–15	–
	Texas ebony	EBEB	*Ebenopsis ebano*	5–15	–
	stretchberry	FOPU2	*Forestiera pubescens*	5–15	–
	Texas lignum-vitae	GUAN	*Guaiacum angustifolium*	5–15	–
	coyotillo	KAHU	*Karwinskia humboldtiana*	5–15	–
	crown of thorns	KOSP	*Koeberlinia spinosa*	5–15	–
	Texas barometer bush	LEFR3	*Leucophyllum frutescens*	5–15	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	5–15	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	5–15	–
	saffron plum	SICE2	*Sideroxylon celastrinum*	5–15	–
	Texas mimosa	MITE6	*Mimosa texana*	0–15	–
	Texas pricklypear	OPENI	*Opuntia engelmannii var.*	5–15	–

	Texas pricklypear	OPENE	*Opuntia engelmannii var. lindheimeri*	5–15	–
	desert yaupon	SCCU4	*Schaefferia cuneifolia*	5–15	–
	knifeleaf condalia	COSP3	*Condalia spathulata*	5–15	–
	anacahuita	COBO2	*Cordia boissieri*	5–15	–
	Rio Grande beebrush	ALMA9	*Aloysia macrostachya*	5–15	–
	Texan goatbush	CAERT	*Castela erecta ssp. texana*	5–15	–
	Don Quixote's lace	YUTR	*Yucca treculeana*	0–10	–
	pitaya	ECEN2	*Echinocereus enneacanthus*	0–5	–
	dahlia hedgehog cactus	ECPO4	*Echinocereus poselgeri*	0–5	–
	horse crippler	ECTE	*Echinocactus texensis*	0–5	–
Tree					
6	**Trees**			0–50	
	honey mesquite	PRGLG	*Prosopis glandulosa var. glandulosa*	0–50	–

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. Because of the flat topography of this ecological site, erosion is minimal, however on more sloping aspects (greater than three percent), erosion may be very significant.

Recreational uses

The area is often used for hunting and photography.

Wood products

In the Grassland State, no wood products are available. In a Mixed Brush Complex, the ecological site may grow large numbers of mesquite trees and these can be 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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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
Contact for lead author	361-241-0609, Zone 3 Rangeland Management Specialist
Date	09/23/2013
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 following intense rainfall events.

3. **Number and height of erosional pedestals or terracettes:** Pedestals would have been uncommon for this site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Less than five 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 horizons are 8 to 15 inches thick; brown (10YR 4/3) fine sandy loam or loamy fine sand; weak, fine subangular blocky structure; gradual smooth boundary; 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:** A high canopy cover of bunch, rhizomatous, and stoliniferous grasses will help minimize runoff and maximize infiltration. Grasses should comprise approximately 90 percent of total annual production by weight. Shrubs will comprise about five 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: Midgrasses >

    Sub-dominant: Mid/Tallgrasses >> Shortgrasses > Forbs > Shrubs/Vines > Trees

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Potential for 5 to 15 percent plant mortality of perrenial bunchgrasses during extreme drought.

14. **Average percent litter cover (%) and depth (in):** Litter is primarily herbaceous.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1,200 to 3,800 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:** Mesquite, buffelgrass, and Old World bluestems are common invaders.

17. **Perennial plant reproductive capability:** All species should be capable of reproducing, except during periods of prolonged drought conditions.