USDA Natural Resources Conservation Service

Ecological site R083AY011TX Claypan Prairie

Last updated: 9/19/2023
Accessed: 04/26/2024

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.

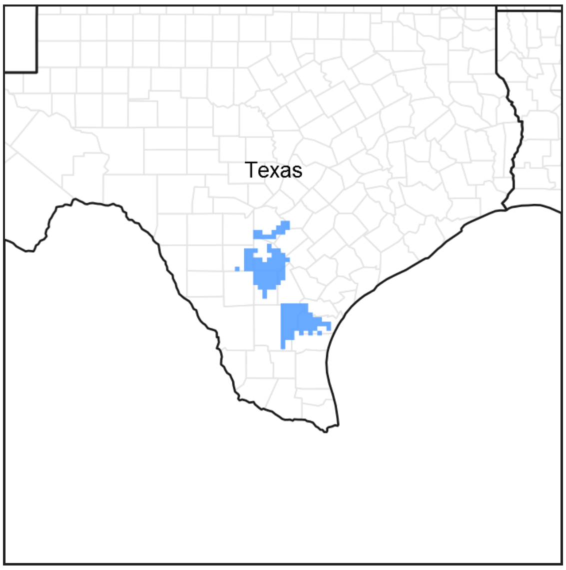


Figure 1. Mapped extent

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): 083A–Northern Rio Grande Plain

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

Classification relationships

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

Ecological site concept

The Claypan Prairie is a grassland site that occurs on nearly level, lower lying areas. Drainage in this site varies. The soils are characterized by a thin layer of fine sandy loam topsoil underlain by deep clay and clay loam subsoils.

Associated sites

R083AY022TX	**Loamy Sand**
R083AY023TX	**Sandy Loam**
R083AY027TX	**Western Clay Loam**

Similar sites

R083BY011TX	**Claypan Prairie**

Table 1. Dominant plant species

Tree	(1) *Prosopis glandulosa*
Shrub	(1) *Opuntia* (2) *Ziziphus obtusifolia*
Herbaceous	(1) *Trichloris pluriflora* (2) *Setaria macrostachya*

Physiographic features

This site occurs in the nearly level to gently sloping floodplains of the Texas Western Rio Grande Plain as stream terraces or steps on drainageways. Drainage in this site varies from well-defined to rather indistinct. Elevation ranges from 200 to 1,000 feet. This area is comprised of inland, dissected coastal plains.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Ridge (2) Coastal plain > Interfluve
Runoff class	Low to medium
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to rare
Ponding frequency	None
Elevation	200–1,000 ft
Slope	0–3%
Aspect	Aspect is not a significant factor

Climatic features

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

Table 3. Representative climatic features

Frost-free period (characteristic range)	223-251 days
Freeze-free period (characteristic range)	263-365 days
Precipitation total (characteristic range)	25-32 in

Frost-free period (actual range)	208-263 days
Freeze-free period (actual range)	254-365 days
Precipitation total (actual range)	24-37 in
Frost-free period (average)	235 days
Freeze-free period (average)	314 days
Precipitation total (average)	29 in

Climate stations used

- (1) FLORESVILLE [USC00413201], Floresville, TX
- (2) LYTLE 3W [USC00415454], Natalia, TX
- (3) PLEASANTON [USC00417111], Pleasanton, TX
- (4) HONDO MUNI AP [USW00012962], Hondo, TX
- (5) BEEVILLE 5 NE [USC00410639], Beeville, TX
- (6) CUERO [USC00412173], Cuero, TX
- (7) GOLIAD [USC00413618], Goliad, TX
- (8) NIXON [USC00416368], Stockdale, TX
- (9) CARRIZO SPRINGS 3W [USC00411486], Carrizo Springs, TX
- (10) FOWLERTON [USC00413299], Fowlerton, TX
- (11) HONDO [USC00414254], Hondo, TX
- (12) KARNES CITY 2N [USC00414696], Karnes City, TX
- (13) MATHIS 4 SSW [USC00415661], Mathis, TX
- (14) POTEET [USC00417215], Poteet, TX
- (15) UVALDE 3 SW [USC00419268], Uvalde, TX
- (16) CHARLOTTE 5 NNW [USC00411663], Charlotte, TX
- (17) PEARSALL [USC00416879], Pearsall, TX
- (18) TILDEN 4 SSE [USC00419031], Tilden, TX
- (19) CHEAPSIDE [USC00411671], Gonzales, TX
- (20) CROSS [USC00412125], Tilden, TX
- (21) DILLEY [USC00412458], Dilley, TX
- (22) CALLIHAM [USC00411337], Calliham, TX

Influencing water features

Flooding varies from none to rarely depending on the site.

Wetland description

N/A

Soil features

The soils are very deep, moderately well drained, very slowly permeable soils that formed in saline loamy alluvium. Soil series correlated are Laparita and Orelia.

Table 4. Representative soil features

Parent material	(1) Residuum–claystone
Surface texture	(1) Clay loam (2) Loam (3) Sandy clay loam
Family particle size	(1) Fine
Drainage class	Well drained

Permeability class	Very slow to slow
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4 in
Calcium carbonate equivalent (0-40in)	0–12%
Electrical conductivity (0-30in)	0–4 mmhos/cm
Sodium adsorption ratio (0-30in)	0–12
Soil reaction (1:1 water) (0-30in)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–2%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

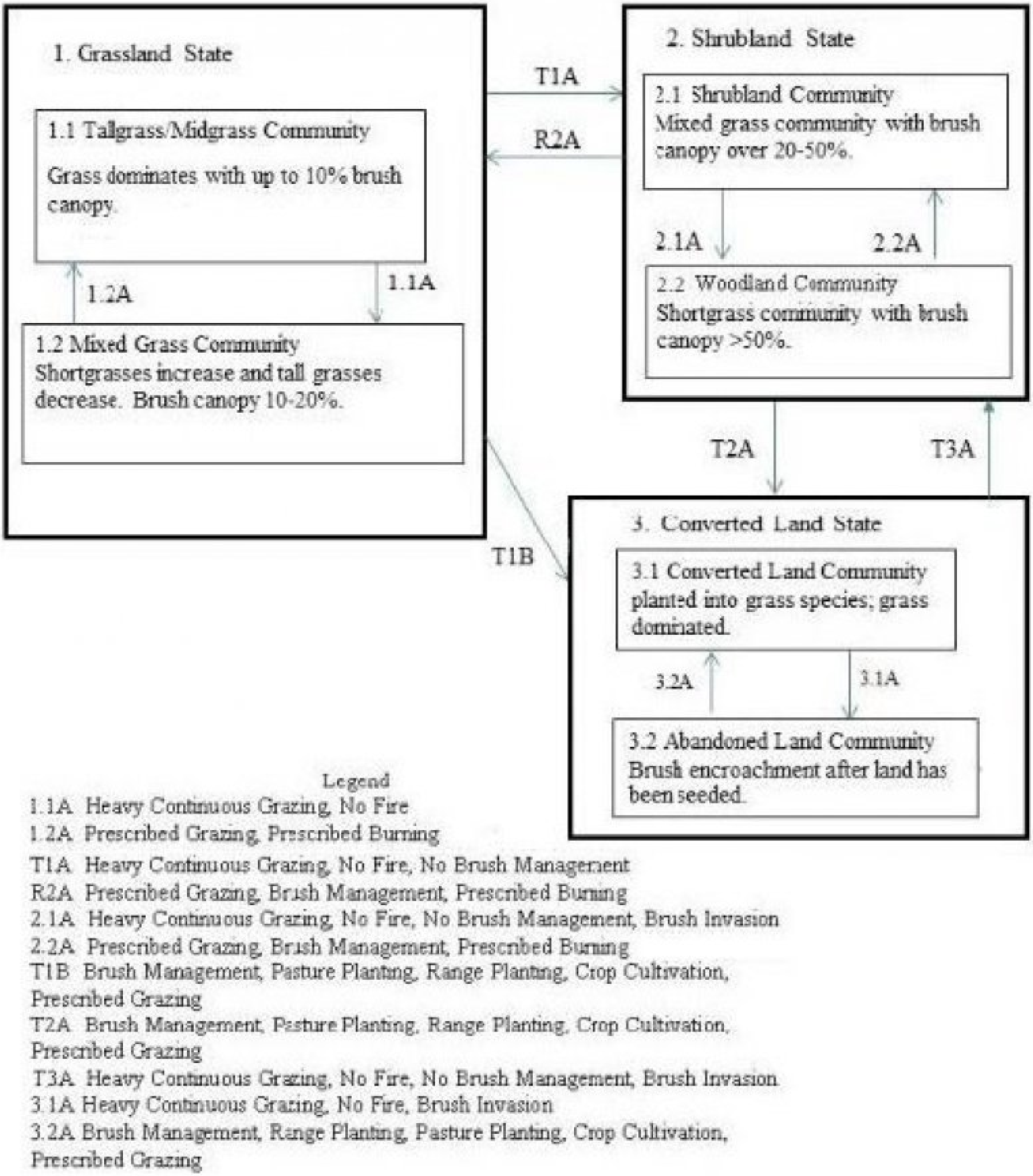
The Northern Rio Grande Plain MLRA was a disturbance-maintained system. Prior to European settlement (pre-1825), fire and grazing were the two primary forms of disturbance. Grazing by large herbivores included antelope, deer, and small herds of bison. The infrequent but intense, short-duration grazing by these species suppressed woody species and invigorated herbaceous species. The herbaceous savannah species adapted to fire and grazing disturbances by maintaining belowground tissues. Wright and Bailey (1982) report that there are no reliable records of fire frequency for the Rio Grande Plains because there are no trees to carry fire scars from which to estimate fire frequency. Because savannah grassland is typically of level or rolling topography, a natural fire frequency of three to seven years seems reasonable for this site.

Precipitation patterns are highly variable. Long-term droughts, occurring three to four times per century, cause shifts in species composition by causing die-off of seedlings, less drought-tolerant species, and some woody species. Droughts also reduce biomass production and create open space, which is colonized by opportunistic species when precipitation increases. Wet periods allow midgrasses to increase in dominance.

Historical accounts prior to 1800 identify grazing by herds of wild horses, followed by heavy grazing by sheep and cattle as settlement progressed. Grazing on early ranches changed natural graze-rest cycles to continuous grazing resulting in stocking rates exceeding the carrying capacity. These shifts in grazing intensity and the removal of rest from the system reduced plant vigor for the most palatable species, which on this site were mid-grasses and palatable forbs. Shortgrasses and less palatable forbs began to dominate the site. This shift resulted in lower fuel loads, which reduced fire frequency and intensity. The reduction in fires resulted in an increase in size and density of woody species.

Today, primarily beef cattle graze rangeland and pastureland. However, horse numbers are increasing rapidly on small acreage properties in the region. There are some areas where dairy cattle, poultry, goats, and sheep are locally important. Whitetail deer, wild turkey, bobwhite quail, and dove are the major wildlife species, and hunting leases are a major source of income for many landowners in this area. Introduced pasture has been established on many acres of old cropland and in areas with deeper soils. Buffelgrass is the most common introduced plant on the site, along with Bermudagrass, guineagrass (*Urochloa maxima*), and kleingrass, which are more commonly used for hay. Cropland is found in the valleys, bottomlands, and deeper upland soils. Wheat (Triticum spp.), oats Avena spp.), forage and grain sorghum (Sorghum spp.), cotton (Gossypium spp.), and corn (*Zea mays*) are major crops in the region.

State and transition model



State 1
Grassland

The grassland state consists of approximately 95 percent grasses, a few of woody plants, and a 5 percent composition of forbs by air-dry weight. For interpretive purposes, the woody crown canopy can be approximately five percent. Two community phases exist: the Midgrass Community and the Midgrass/Shortgrass Community.

Dominant plant species

- Arizona cottontop (*Digitaria californica*), grass
- false Rhodes grass (*Trichloris crinita*), grass

Community 1.1
Midgrass

The reference community is an open grassland dominated by midgrasses such as Arizona cottontop (*Digitaria californica*), false Rhodes grass (*Trichloris crinita*), multi-flowered false Rhodes grass (*Trichloris pluriflora*), longspike beardgrass (*Bothriochloa longipaniculata*), lovegrass tridens, sideoats grama (*Bouteloua curtipendula*), vine-mesquite (*Panicum obtusum*), and cane bluestem (*Bothriochloa barbinodis*). Also occurring, but in lesser amounts, are Texas bristlegrass (*Setaria texana*), buffalograss, plains bristlegrass (*Setaria vulpiseta*), hooded windmillgrass (*Chloris cucullata*), shortspike windmillgrass (Chloris subdolichostachya), and fall witchgrass (*Digitaria cognata*). Historically, this site is perceived to have had regular turnover in the herbaceous plant community between midgrasses, shortgrasses, and forbs because of drought and/or grazing. Individual grass species abundance is expected to fluctuate widely. Fire frequency is perceived to be variable and to occur in above average years followed by drought and/or prolonged dormant periods. The site is productive and maintained a high percentage of ground cover most of the time. During extended droughts, this ground cover of perennial grasses and forbs was often greatly reduced but had the resiliency to recover when favorable climatic conditions returned. A significant role for prescribed grazing is to build and maintain fine fuel amounts for effective prescribed burning. While periodic grazing was a natural component of the ecosystem, continuous abusive grazing has a strong negative impact on this site. Because of abusive grazing, the midgrasses decrease and are replaced by less palatable, short-lived grasses. Droughts hasten the process. Major grass increasers are slim tridens, red grama, buffalograss, curly mesquite, and lovegrass tridens. Mesquite (*Prosopis glandulosa*), twisted acacia (*Acacia schaffneri*), and prickly pear (Opuntia spp.) are the common plants that increase as abusive grazing persists.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1500	2250	3000
Shrub/Vine	75	125	175
Forb	50	100	150
Tree	10	25	40
Total	**1635**	**2500**	**3365**

Table 6. Ground cover

Tree foliar cover	0-1%
Shrub/vine/liana foliar cover	0-5%
Grass/grasslike foliar cover	75-95%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	80-100%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	0-1%	0-2%	70-100%	1-5%
>0.5 <= 1	0-2%	0-2%	70-100%	1-10%
>1 <= 2	1-3%	0-4%	65-75%	5-15%
>2 <= 4.5	0-1%	1-5%	20-45%	5-10%
>4.5 <= 13	0-1%	1-5%	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Figure 9. 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
Mixed Grass

The Mixed Grass Commnity of the Grassland State still exhibits a grassland plant structure with a shift toward weaker, less palatable shortgrasses such as hooded windmill, fall witchgrass, lovegrass tridens, and threeawn. Abusive continuous grazing takes many of the midgrasses out of the site and reduces their vigor. Increaser plants become much more common across the site. Annual and perennial forbs such as leatherstem can be more common in this phase. Woody plants that increase include mesquite, brasil, pear, granjeno, and twisted acacia. There is an increase in bare ground. Plant production becomes more erratic. Drought interacts with grazing to trigger mid to shortgrass transitions. Termite activity often increases during low rainfall periods to further decrease production and ground cover. The shortgrasses and forbs are less productive than the midgrasses they replace. Reductions in aboveground cover and root biomass make this community more prone to runoff, erosion, and prolong the effects of drought. A reduction in ground cover leads to higher soil temperatures that, in conjunction with the reduction of leaf and root biomass inputs, can cause declines in soil organic matter. This reduces soil water holding capacity and fertility that further affects species composition and production. Fire frequency/intensity in this community is reduced because of low fine fuel load and continuity. As a result, woody plants increase unchallenged in size, density, and total cover. With constructive grazing, midgrasses can regain dominance on the site. Undesirable trends in soil organic matter, fertility, temperature, and erosion can be arrested and reversed. However, this process is very difficult to precisely predict. Restoration of fine fuel biomass and continuity enable use of prescribed fire to reduce the stature and cover of established woody plants. The extent to which the original Midgrass Community can be re-established will depend on the extent to which soil physical and chemical properties were altered during retrogression.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1000	1750	2500
Forb	50	150	250
Shrub/Vine	100	150	200
Tree	10	25	40
Total	**1160**	**2075**	**2990**

Figure 11. 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

A shift to the Mixed Grass Community occurs if the Midgrass Community is weakened by excessive leaf removal. Drought hastens the process. A reduction in midgrass also corresponds in a reduction of fuel loading needed for fire to effectively suppress woody species.

Pathway 1.2A
Community 1.2 to 1.1

Managerial activities that restore the hydrologic cycle, the energy capture by midgrasses, and ground cover will move the Mixed Grass Community (1.2) toward the Midgrass Community (1.1). Utilizing historic ecological disturbances such as herbivory and fire in constructive amounts are needed. Selective brush management may also be needed. The time to shift back to the Midgrass Community (1.1) is dependent upon favorable growing conditions and could take 5 to 10 years.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

State 2
Tree Shrubland

The Shrubland State consists of two communities: Shrubland Community (2.1) with a brush canopy of 20 to 50 percent, and the Woodland Community (2.2) with a brush canopy of greater than 50 percent. These communities are mid and shortgrass communities with a shrub canopy of mixed brush and trees.

Dominant plant species

- honey mesquite (*Prosopis glandulosa*), shrub
- Schaffner's wattle (*Acacia schaffneri*), shrub

Community 2.1
Shrubland

Lack of fire and continued abusive grazing causes a shift from grasslands with up to 20 percent shrub cover to shrublands with greater than a 50 percent brush cover. A threshold has been crossed once the site approaches the 20 percent canopy cover. Major shrub species include tasajillo (*Cylindropuntia leptocaulis*), blackbrush, twisted acacia, pricklypear, mesquite, guayacan (*Guaiacum angustifolium*), and a whole suite of others. The herbaceous community is generally composed of slim tridens, red grama, threeawn species, and other short grasses. The forb community is made up of cuman ragweed (*Ambrosia psilostachya*), dogweed (Dyssodia spp.), and many annuals. At this point, prescribed grazing alone will not restore this community back to the Grassland State (1). During the growing season, light showers are captured in the canopy of the shrubs and evaporate before reaching the soil surface. Energy flow is predominately through the shrubs and most nutrients are used by the shrubs. Annual forbs can be produced by rainfall at any time of the year. With these conditions, prescribed fire is a very limited option due to a lack of fine fuel load. With continued abusive grazing and without brush management, woody cover will increase to more than 50 percent canopy.

Community 2.2

Woodland

The community components are very similar to community (2.1), but the stature and density is greater. Major shrub species include tasajillo, blackbrush, twisted acacia, prickly pear, mesquite, guayacan, and a whole suite of others. The herbaceous community is generally composed of slim tridens, red grama, threeawn species, and other short grasses. The forb community is composed of cuman ragweed, dogweed, and many annuals. At this point, prescribed grazing alone will not restore this community back to the Grassland State (1). During the growing season, light showers are captured in the canopy of the shrubs and evaporate before reaching the soil surface. Energy flow and nutrient use is predominately through the shrubs. Annual forbs can be produced by rainfall at any time of the year. With these conditions, prescribed fire is a very limited option due a lack of fine fuel load. Aggressive brush management and constructive grazing management is required to convert the system back to the grassland state or something resembling the grassland state. Re-seeding of perennial warm-season grasses may be necessary and has potential to speed up the restoration process. Reseeding of adapted native plants may also have potential to limit establishment of aggressive, introduced grasses such as Kleberg bluestem.

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	150	325	500
Shrub/Vine	300	400	500
Tree	50	125	200
Forb	25	50	100
Total	**525**	**900**	**1300**

Figure 13. Plant community growth curve (percent production by month). TX5130, Short/Midgrass Shrubland Complex 20-50% woody canopy. Shrubland Community with 20-50% 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

Pathway 2.1A
Community 2.1 to 2.2

A shift to the Tree/Shrubland Community (2.2) occurs if brush management is not accomplished. Drought hastens the process. A lack of brush management allows existing brush to thrive. Seedlings are introduced through droppings from livestock and wildlife. A reduction in midgrass also corresponds in a reduction of fuel loading needed for fire.

Pathway 2.2A
Community 2.2 to 2.1

Managerial activities that restore the hydrologic cycle, such as the energy captured by midgrasses, and restored ground cover will tend to move the Woodland Community (2.2) toward the Shrubland Community (2.1). Selective brush management is needed to accomplish the desired canopy level and spatial arrangement of woody species. Integrated brush management and utilizing historic ecological disturbances such as herbivory and fire in are needed to maintain the desired brush densities. The time to shift back to the Tree/Shrubland Community (2.1) is dependent upon favorable growing conditions and could take three to five years.

Conservation practices

Brush Management

State 3
Converted Land

The Converted Land State is the result of mechanical intervention along with range planting to either native or adapted introduced species.

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 of the previously mentioned communities where brush needs to be reduced and a seed source added to establish a desired plant community. In some instances, an adequate seed source may already exist in the soil. When rootplowing is applied as brush management on this site, long term forb and woody plant diversity will be greatly reduced. Previous attempts at native seeding in this region were met with mixed results because of the seed source not being locally adapted to the region. Many of the grass species listed in the reference plant community are commercially available from collections made in south Texas. The locally adapted species are expected to be more successful in seeding efforts as compared to seed developed several hundred miles outside the region. However, proper seedbed preparation, planting techniques, and timely rainfall are essential for success. The most common introduced grass species seeded is buffelgrass (Cenchrus ciliare). Seeding this species should be cautiously considered due to its aggressive nature to dominate plant communities and reduce herbaceous diversity. Once planted, conversion of buffelgrass dominated areas back to native grass is extremely difficult and rarely successful. The decision of which species to seed is a management decision based on clearly defined goals for livestock and wildlife. Careful consideration should be taken prior to seeding introduced species. Once introduced species are seeded, it is often difficult or impractical to remove them should objectives change. Because of the residual seed source of woody plants, encroachment is inevitable. To help maintain this plant community, prescribed grazing along with fire and some integrated brush management will be needed.

Table 10. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1500	2750	4000
Shrub/Vine	100	200	300
Forb	50	150	250
Total	**1650**	**3100**	**4550**

Figure 15. Plant community growth curve (percent production by month). TX5133, Converted Land Community - Native Grass Seeding. Developed by applying brush management, land clearing and seeding to any of the other plant communities where brush needs to be reduced and a seed source added to establish the desired plant community. .

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 3.2
Abandoned Land

This community develops from the Converted Land Community (3.1) through neglect or abandonment. Without follow-up brush management, seedlings of shrubs establish and spread. Mesquite, twisted acacia, and pricklypear are the most common woody plants or shrubs found on this site following rootplowing. Maintaining healthy grass cover on the site through prescribed grazing might slow brush seedling encroachment however, brush encroachment at some rate is inevitable. If the seedlings are not managed, the plant community will cross a threshold to the Shrubland State (2) which will require application of chemical or mechanical brush management to reduce the canopy. If left untreated too long, reseeding might be needed to restore the grass. As the canopy of the shrubs expands, grass and forb production will be reduced.

Table 11. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	800	1450	2000
Shrub/Vine	200	300	400
Forb	50	150	250
Total	**1050**	**1900**	**2650**

Figure 17. Plant community growth curve (percent production by month). TX5138, Converted Land Community - Woody Seedling Encroachment. Abandoned croplands and land seeded with exotic or native grasses are prone to encroachment by woody plants and with heavy grazing or the absence of fire, can revert to shrublands..

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

A shift to the Abandoned Land Community occurs when management activities such as prescribed grazing, brush management, or fire are not accomplished as brush invades. Drought worsens the process. A reduction in planted grasses also corresponds in a reduction of fuel loading needed for fire to effectively suppress woody species.

Pathway 3.2A
Community 3.2 to 3.1

Brush management along with prescribed grazing can recover the Converted Land Community. Some replanting may be needed and can be done in conjunction with brush management.

Transition T1A
State 1 to 2

The Grassland State will cross a threshold to Shrubland (State 2) with abusive grazing and without brush management or fire. Severe drought is also a significant factor to accelerate this crossing of a threshold. In State 2 more rainfall is being utilized by woody plants than the herbaceous plants. Because of the increased canopy, sunlight is being captured by the woody plants and converted to energy instead of the herbaceous plants.

Transition T1B
State 1 to 3

The transition to the Converted Land State is triggered by major ground disturbing mechanical treatment and planting to native or introduced forages. Planting is usually done following brush management.

Restoration pathway R2A
State 2 to 1

Brush management is the key driver in restoring Shrub/Woodland State (2) back to the Grassland Savannah State (1). Reduction in woody canopy below 20 percent will take large energy inputs depending on the canopy cover. A prescribed grazing plan and prescribed burning plan will keep the state functioning.

Transition T2A
State 2 to 3

The transition to the Converted Land State is triggered by major ground disturbing mechanical treatment and planting to native or introduced forages. Planting is usually done following brush management.

Transition T3A
State 3 to 2

The transition from the Converted Land State to the Shrubland State is triggered by neglect or no management over long periods of time. Shrubs re-establish from the seed bank and introduction from wildlife and livestock. A complete return to a previous state is not possible if adapted non-native plants have been established.

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	**Warm-season midgrasses**			1200–2400	
	multiflower false Rhodes grass	TRPL3	*Trichloris pluriflora*	400–2400	–
	large-spike bristlegrass	SEMA5	*Setaria macrostachya*	400–1500	–
	pink pappusgrass	PABI2	*Pappophorum bicolor*	100–700	–
	hooded windmill grass	CHCU2	*Chloris cucullata*	100–500	–
	Arizona cottontop	DICA8	*Digitaria californica*	0–500	–
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	0–500	–
	longspike beardgrass	BOLO	*Bothriochloa longipaniculata*	0–500	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	50–450	–
	curly-mesquite	HIBE	*Hilaria belangeri*	0–400	–
	Texas bristlegrass	SETE6	*Setaria texana*	50–300	–
	whiplash pappusgrass	PAVA2	*Pappophorum vaginatum*	0–250	–
	buffalograss	BODA2	*Bouteloua dactyloides*	0–250	–
	white tridens	TRAL2	*Tridens albescens*	0–250	–
2	**Warm season shortgrasses**			300–600	
	red grama	BOTR2	*Bouteloua trifida*	0–200	–
	lovegrass tridens	TRER	*Tridens eragrostoides*	0–200	–
	slim tridens	TRMU	*Tridens muticus*	0–200	–
Forb					
3	**Forbs**			50–150	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–50	–
	bundleflower	DESMA	*Desmanthus*	0–40	–
	dogfennel	DYSOD	*Dysodiopsis*	0–30	–
	Lindheimer's bladderpod	LELI2	*Lesquerella lindheimeri*	0–30	–
	plains dozedaisy	APRA	*Aphanostephus ramosissimus*	0–30	–
	vervain	VERBE	*Verbena*	0–30	–
	pepperweed	LEPID	*Lepidium*	0–30	–
	wild petunia	RUELL	*Ruellia*	0–30	–
	awnless bushsunflower	SICA7	*Simsia calva*	0–20	–
	globemallow	SPHAE	*Sphaeralcea*	0–20	–
	fogfruit	PHYLA	*Phyla*	0–20	–
Shrub/Vine					
4	**Shrubs/Vines**			75–175	
	pricklypear	OPUNT	*Opuntia*	10–50	

	pricklypear	OPUNT	*Opuntia*	10–50	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	25–50	–
	desert yaupon	SCCU4	*Schaefferia cuneifolia*	0–30	–
	Texas lignum-vitae	GUAN	*Guaiacum angustifolium*	0–30	–
	leatherstem	JADID	*Jatropha dioica var. dioica*	0–30	–
	Texas persimmon	DITE3	*Diospyros texana*	10–30	–
	blackbrush acacia	ACRI	*Acacia rigidula*	0–30	–
	Schaffner's wattle	ACSC2	*Acacia schaffneri*	10–30	–
	whitebrush	ALGR2	*Aloysia gratissima*	0–30	–
	Texan goatbush	CAERT	*Castela erecta ssp. texana*	0–30	–
	spiny hackberry	CEEH	*Celtis ehrenbergiana*	10–30	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	10–20	–
	pitaya	ECEN2	*Echinocereus enneacanthus*	0–20	–
	stretchberry	FOPU2	*Forestiera pubescens*	0–20	–
Tree					
5	**Trees**			10–40	
	honey mesquite	PRGL2	*Prosopis glandulosa*	10–40	–

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 Complex (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.

Inventory data references

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

Other references

AgriLife. 2009. Managing Feral Hogs Not a One-shot Endeavor. AgNews, April 23, 2009. http://agnews.tamu.edu/showstory.php?id=903.

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. and F. E. Smeins. 1991. Ecosystem-level Processes. In Grazing Management: An Ecological Perspective. Edited by R.K. Heischmidt and J.W. Stuth. Timber Press, Portland, OR.

Baen, J. S. 1997. The growing importance and value implications of recreational hunting leases to agricultural land investors. Journal of Real Estate Research, 14:399-414.

Bailey, V. 1905. North American Fauna No. 25: Biological Survey of Texas. United States Department of Agriculture Biological Survey. Government Printing Office, Washington D. C.

Bestelmeyer, B. T., J.R. Brown, K. M. Havstad, R. Alexander, G. Chavez, and J. E. Herrick. 2003. Development and use of state-and-transition models for rangelands. Journal of Range Management, 56(2):114-126.

Box, T. W. 1960. Herbage production on four range plant communities in South Texas. Journal of Range Management, 13:72-76.

Briske, B B, B. T. Bestelmeyer, T. K. Stringham, and P. L. Shaver. 2008. Recommendations for development of resilience-based State-and-Transition Models. Rangeland Ecology and Management, 61:359-367.

Brown, J. R. and S. Archer. 1999. Shrub invasion of grassland: recruitment is continuous and not regulated by herbaceous biomass or density. Ecology, 80(7):2385-2396.

Diamond, D. D. and T. E. Fulbright. 1990. Contemporary plant communities of upland grasslands of the Coastal Sand Plain, Texas. Southwestern Naturalist, 35:385-392.

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

Edward, D. B. 1836. The history of Texas; or, the immigrants, farmers, and politicians guide to the character, climate, soil and production of that country. Geographically arranged from personal observation and experience. J. A. James and Co., Cincinnati, OH.

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.

Foster, J. H. 1917. Pre-settlement fire frequency regions of the United States: a first approximation. Tall Timbers Fire Ecology Conference Proceedings No. 20.

Foster, W. C., ed. 1998. The La Salle Expedition to Texas: The Journal of Henry Joutel, 1684-1687. Texas State Historical Association, Austin, TX.

Frost, C. C. 1995. Presettlement fire regimes in southeastern marshes, peatlands, and swamps. In: Prodeedings, 19th Tall Timbers fire ecology conference, 39-60. Tall Timbers Research Station, Tallahassee, FL.

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., J. A. Ortega-Santos, A. Lozano-Cavazos, and L. E. Ramirez-Yanez. 2006. Establishing vegetation on migrating inland sand dunes in Texas. Rangeland Ecology and Management, 59:549-556.

Fulbright, T. E., D. D. Diamond, J. Rappole, and J. Norwine. The Coastal Sand Plain of Southern Texas. Rangelands, 12:337-340.

Gould, F. W. 1975. The Grasses of Texas. Texas A&M University Press, College Station, TX.

Grace, J. B., L. K. Allain, H. Q. Baldwin, A. G. Billock, W. R. Eddleman, A. M. Given, C. W. Jeske, and R. Moss. 2005. Effects of prescribed fire in the coastal prairies of Texas. USGS Open File Report 2005-1287.

Hamilton, W. and D. Ueckert. 2005. Rangeland Woody Plant Control: Past, Present, and Future. In: Brush Management: Past, Present, and Future, 3-16. Texas A&M University Press. College Station, TX.

Hansmire, J. A., D. L. Drawe, B. B. Wester and C.M. Britton. 1988. Effect of winter burns on forbs and grasses of the Texas Coastal Prairie. The Southwestern Naturalist, 33(3):333-338.

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.

Kneuper, C. L., C. B. Scott, and W. E. Pinchak. 2003. Consumption and dispersion of mesquite seeds by ruminants. Journal of Range Management, 56:255-259.

Kramp, B., R. Ansley, and D. Jones. 1998. Effect of prescribed fire on mesquite seedlings. Texas Tech University Research Highlights - Range, Wildlife and Fisheries Management, 29:13.

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. 1965. Fire in the range of Attwater's prairie chicken. Tall Timbers Fire Ecology Conference, 4:127-143.

Lehman, V. W. 1969. Forgotten Legions: Sheep in the Rio Grande Plain of Texas. Texas Western Press, El Paso, TX.

Mann, C. 2004. 1491. New Revelations of the Americas before Columbus. Vintage Books, New York City, NY.

Mapston, M. E. 2009. Feral Hogs in Texas. Rep. Texas Cooperative Extension. 23 Apr. 2009 http://icwdm.org/Publications/pdf/Feral%20Pig/Txferalhogs.pdf

McClendon, T. 1991. Preliminary description of the vegetation of South Texas exclusive of the Coastal Saline Zones. Texas Journal of Science, 43:13-32.

McGinty A., D. N. Ueckert. 2001. The Brush Busters success story. Rangelands, 23:3-8.

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

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.

Olmsted, F. L. 1857. A journey through Texas, or a saddle trip on the Southwest frontier: with a statistical appendix. Dix, Edwards, and co., New York, London.

Prichard, D. 1998. A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas. Bureau of Land Management. National Applied Resource Sciences Center, CO.

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

Rhyne, M. Z. 1998. Optimization of wildlife and recreation earnings for private landowners. M. S. Thesis, Texas A&M University-Kingsville, Kingsville, TX.

Schindler, J. R. and T. E. Fulbright. 2003. Roller chopping effects on Tamaulipan scrub community composition. Journal of Range Management, 56:585-590.

Schmidley, D. J. 1983. Texas mammals east of the Balcones Fault zone. Texas A&M University 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. and W. T. Hamilton. 1993. Prescribed burning for brushland management: the South Texas example. Texas A&M Press, College Station, TX.

Scifres, C. J. 1975. Systems for improving McCartney rose infested coastal prairie rangeland. Texas Agricultural Experiment Station Bulletin MP 1225.

Smeins, F. E., S. Fuhlendorf, and C. Taylor, Jr. 1997. Environmental and Land Use Changes: A Long Term Perspective. In Juniper Symposium, 1-21. Texas Agricultural Experiment Station.

Smeins, F. E., D. D. Diamond, and W. Hanselka. 1991. Coastal prairie, 269-290. In Ecosystems of the World: Natural Grasslands. Edited by R. T. Coupland. Elsevier Press, Amsterdam, Netherlands.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database.

Snyder, R. A. and C. L. Boss. 2002. Recovery and stability in barrier island plant communities. Journal of Coastal Research, 18:530-536.

Stiles, H. R., ed. 1906. Joutel's journal of La Salle's last voyage, 1686-1687. Joseph McDonough, Albany, NY.

Stringham, T. K., W. C. Krueger, and P. L. Shaver. 2001. State and transition modeling: and ecological process approach. Journal of Range Management, 56(2):106-113.

Texas A&M Research and Extension Center. 2000. Native Plants of South Texas http://uvalde.tamu.edu/herbarium/index.html.

Texas Agriculture Experiment Station. 2007. Benny Simpson's Texas Native Trees http://aggie-horticulture.tamu.edu/ornamentals/natives/.

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

Tharp, B. C. 1926. Structure of Texas Vegetation east of the 98th meridian. Bulletin 2606. University of Texas, Austin. TX.

Thurow, T. L. 1991. Hydrology and Erosion. In: Grazing Management: An Ecological Perspective. Edited by R.K. Heitschmidt and J.W. Stuth. Timber Press, Portland, OR.

Urbatsch, L. 2000. Chinese tallow tree (Triadica sebifera (L.) Small. USDA-NRCS Plant Guide.

USDA-NRCS Plant Database. 2018. https://plants.usda.gov/.

Van't Hul, J. T., R. S. Lutz and N. E. Mathews. 1997. Impact of prescribed burning on vegetation and bird abundance on Matagorda Island, Texas. Journal of Range Management, 50:346-360.

Vines, R. A. 1984. Trees of Central Texas. University of Texas Press, Austin, TX.

Wade, D. D., B. L. Brock, P. H. Brose, J. B. Grace, G. A. Hoch, and W. A. Patterson III. 2000. Fire in Eastern ecosystems. In Wildland fire in ecosystems: effects of fire on flora. Edited by. J. K. Brown and J. Kaplers. United States Forest Service, Rocky Mountain Research Station, Ogden, UT.

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.

Wright, H.A. and A.W. Bailey. 1982. Fire Ecology: United States and Southern Canada. John Wiley & Sons, Inc., Hoboken, NJ.

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)	Vivian Garcia, RMS, NRCS, Corpus Christi, Texas
Contact for lead author	361-241-0609 Corpus Christi Zone Office
Date	04/02/2015
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:** None.

3. **Number and height of erosional pedestals or terracettes:** None.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** None.

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):** Short, less than one foot except during overflow events.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil Stability Rating 5 to 6.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Subangular blocky, A-horizon 1 to 12 inches and 1 to 1.5 percent SOM.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Tall and midgrasses reduce ronoff to minial amounts except in exceptional rainfall events.

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

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

Dominant: Warm-Season Grasses

Sub-dominant: Forbs

Other: Shrubs

Additional:

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** None

---

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

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1,600 to 3,400 air-dry 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:** Hooded windmill, threeawn, King Ranch bluestem, lovegrass tridens, fall witchgrass, annual forbs, twisted acacia, mesquite, brasil, granjeno, and pear.

---

17. **Perennial plant reproductive capability:** All plants should reproduce each year.
