

Ecological site R083BY002TX Shallow Ridge

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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.

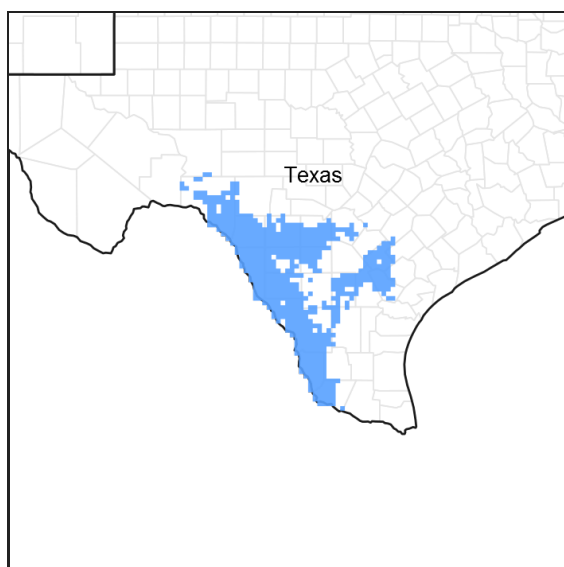


Figure 1. Mapped extent

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): 083B—Western Rio Grande Plain

Major Land Resource Area (MLRA) 83B It makes up about 9,285 square miles (24,060 square kilometers). The border towns of Del Rio, Eagle Pass, Laredo, and Zapata are in this MLRA. Interstate 35 crosses the area just north of Laredo. The Amistad National Recreation Area is just outside this MLRA, northwest of Del Rio, and the Falcon State Recreation Area is southeast of Laredo. Laughlin Air Force Base is just east of Del Rio. This area is comprised of inland, dissected coastal plains.

Classification relationships

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

Ecological site concept

The modal concept of the Shallow Ridge is 3 to 20 inches of loam over bedrock. The site is located on ridges with 1 to 20 percent slopes.

Associated sites

R083BY003TX	Gravelly Ridge
R083BY013TX	Loamy Bottomland
R083BY023TX	Sandy Loam
R083BY001TX	Igneous Hill
R083BY010TX	Vega
R083BY012TX	Ramadero
R083BY017TX	Blackland
R083BY025TX	Clay Loam

Similar sites

R083AY002TX	Shallow Ridge
R083CY002TX	Shallow Ridge

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Acacia berlandieri</i> (2) <i>Acacia rigidula</i>
Herbaceous	(1) <i>Bouteloua curtipendula</i> (2) <i>Pappophorum bicolor</i>

Physiographic features

The sites are found on nearly level to moderately steep linear and convex ridges of the Coastal Plains. Slopes are commonly found from 1 to 8 percent but can range as high as 20 percent. Elevation ranges from 165 to 1,200 feet. This area is comprised of inland, dissected coastal plains.

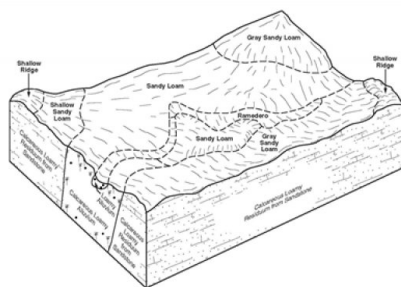


Figure 2.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Ridge
Runoff class	Medium to very high
Elevation	165–1,200 ft
Slope	1–8%

Aspect	Aspect is not a significant factor
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Climatic features

MLRA 83B mainly has a subtropical steppe climate along the Rio Grande River and subtropical subhumid climates in La Salle and McMullen counties. Winters are dry and mild and the summers are hot. 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. Most heavy thunderstorm activities occur during the summer months. 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 as the storms dissipate. 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)	231-321 days
Freeze-free period (characteristic range)	313-365 days
Precipitation total (characteristic range)	20 in
Frost-free period (actual range)	214-365 days
Freeze-free period (actual range)	260-365 days
Precipitation total (actual range)	19-21 in
Frost-free period (average)	270 days
Freeze-free period (average)	340 days
Precipitation total (average)	20 in

Climate stations used

- (1) EAGLE PASS 3N [USC00412679], Eagle Pass, TX
- (2) ZAPATA 1 S [USC00419976], Zapata, TX
- (3) CATARINA [USC00411528], Asherton, TX
- (4) DEL RIO 2 NW [USC00412361], Del Rio, TX
- (5) FALCON DAM [USC00413060], Roma, TX
- (6) CRYSTAL CITY [USC00412160], Crystal City, TX
- (7) LAREDO 2 [USC00415060], Laredo, TX
- (8) DEL RIO INTL AP [USW00022010], Del Rio, TX

Influencing water features

Water features do not influence this site.

Wetland description

N/A

Soil features

The soils are shallow to very shallow, well drained with slow to very slow permeability. They are positioned above the bedrock or petrocalcic horizon and were formed from loamy residuum and calcareous loamy alluvium derived from siltstone, limestone, or sandstone. Surface textures range from sandy loams, loams, and clay loams with gravels. The subsoils are loamy-skeletal, loamy, and clayey. Soil series correlated to this site include: Nido, Olmos, Pavelek, and Zapata.

Table 4. Representative soil features

Parent material	(1) Alluvium–sedimentary rock (2) Residuum–sedimentary rock
Surface texture	(1) Extremely gravelly loam (2) Extremely gravelly sandy loam (3) Very gravelly clay loam
Family particle size	(1) Loamy-skeletal (2) Loamy (3) Clayey
Drainage class	Well drained
Permeability class	Very slow to moderate
Soil depth	5–20 in
Surface fragment cover ≤3"	0–45%
Surface fragment cover >3"	0–15%
Available water capacity (0–20in)	1–3 in
Calcium carbonate equivalent (0–20in)	5–90%
Electrical conductivity (0–20in)	0–4 mmhos/cm
Sodium adsorption ratio (0–20in)	0–15
Soil reaction (1:1 water) (0–20in)	7.4–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0–30%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

The accounts of early explorers and settlers suggest that the Rio Grande Plains was likely a vast mosaic of open grassland, savannah, and shrubland. While moving in 1691 out of Maverick County and into Zavala County, Don Domingo de Teran found after crossing the Nueces River “the country was level and covered with mesquites and cats’ claw.” In 1849, Michler described south Texas as “concerning the land both on the Frio and the Leona, from these rivers back, that it may be divided into four parallel strips—the first, next to the river, consisting of heavy timber, and a heavy black soil, the second, a mesquite flat, of small width, and the soil of a lighter nature, and very fertile; the third, a range of low hills, covered with loose stones, and thick chaparral; the fourth, a wide-open prairie.” Lehman indicates, “thus while it is quite true that the Rio Grande Plains once had fewer woody plants and more grass than now, it is also true that an ample seed stock of shrubs and trees has been widely distributed for as long as man has known.” The vegetation structure likely varied from place-to-place depending on topography, soil properties, and time since the last major disturbance.

Large numbers of domestic livestock grazed South Texas as early as the mid-1700’s. Formal deeds to properties from the Spanish and Mexican governments came in the late 1760’s with much larger blocks granted in the decades to follow. Lehman indicated, “in 1757, the official Spanish census showed residents of Camargo and Reynosa in the lower Rio Grande owning over 90,000 sheep and goats. By way of contrast, combined numbers of cattle, oxen, horses, mules and burros were less than 16,000.” By the mid-1800’s, according to Lehman’s figures from the U. S. Census of 1889, “there were a minimum of 1,644,268 sheep—fully 45 percent of Texas total population, grazing south of the Nueces River.” According to Inglis, “the Rio Grande Plains had the four-leading sheep producing counties in the state and ten of the top fifteen sheep producing counties were in South Texas. The peak decade was 1880 to 1890, at times exceeding two million head.” These domestic animals were in addition to bison, antelope, deer, and large herds of wild horses. It is obvious from early accounts, that much of the Rio Grande Plains was

periodically grazed hard by both domestic animals and wild populations as early as the early to mid-1700's. It may be that overgrazing by sheep and goats could have suppressed the many shrubs, reduced shrub canopy, and arrested shrub seedlings.

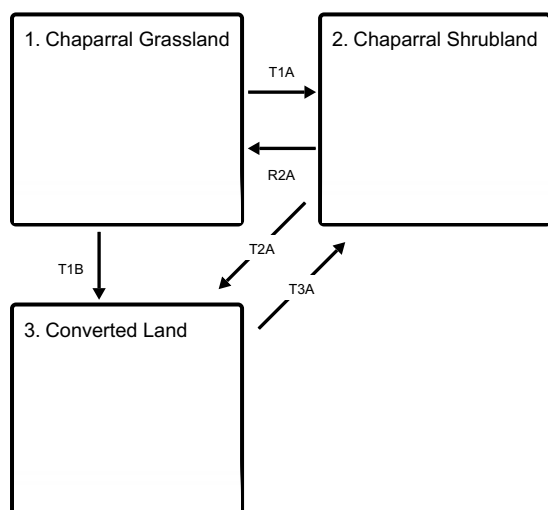
With the arrival of European man, the South Texas area was fenced and, in many instances, stocked beyond its capability to sustain forage. This overstocking led to a reduced fire frequency and intensity, creating an opportunity for woody shrubs to increase across the landscape. As the natural graze-rest cycles were altered and stocking rates continued to exceed the natural carrying capacity of the land, midgrasses were replaced by shortgrasses and the ground cover was opened so additional annual and perennial forbs also increased. Drought certainly enhanced this effect. As prolonged overgrazing continued, shrub cover increased. Shortgrasses became dominant and forage production decreased. This change in plant cover and structure further decreased fire frequency and intensity, favoring shrub establishment and dominance.

The plant communities of this site are dynamic varying in relation to fire, periodic drought, and wet cycles. Periodic fires were set by either Native Americans or started naturally by lightning. Fire did not play as important a role on this site as in deeper more productive sites due to lower production of grasses to burn. Because of large amounts of gravel in the soil, available water holding capacity is greatly reduced. This causes highly variable forage production and minimal grass production during dry years. The historic community of this site was influenced to some extent by periodic grazing by herds of buffalo and wild horses. Herds of buffalo and wild horses would come into an area, graze it down, and then not come back for many months or even years depending upon the availability of water. This long deferment period allowed recovery of the grasses and forbs which served as fuel load. More than likely, fire occurred following years of good rainfall followed by a dry season. The fire frequency for this area is interpreted to be four to six years (Frost, 1998).

While periodic grazing can be a natural component of the ecosystem, overstocking and overgrazing by domestic animals has an impact on the site. With continuous abusive grazing, midgrasses tend to decrease and are replaced by shortgrasses and forbs such as red grama (*Bouteloua trifida*), purple threeawn (*Aristida purpurea*), slim tridens (*Tridens muticus*), curly mesquite (*Hilaria belangeri*), and oreja de perro (*Tiguilia canescens*). Heavy continuous grazing eliminates the possibility of fire. In this condition, a dense cover of brush dominated by blackbrush (*Acacia rigidula*), creosote (*Larrea tridentata*), cenizo (*Leucophyllum frutescens*), and guajillo (*Acacia berlandieri*) will occupy the site. In this condition, very few grasses or forbs will be visible on the site during dry periods. However, during periods of above average rainfall, a flush of annual forbs, annual grasses, and a few opportunistic perennial grasses will coexist with the dense brush. The specific species of plants that dominate this site will vary with the specific soil series present.

State and transition model

Ecosystem states



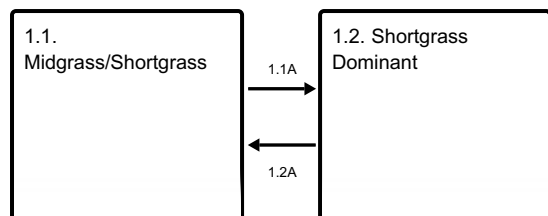
T1A - Absence of disturbance and natural regeneration over time, coupled with excessive grazing pressure

T1B - Extensive soil disturbance followed by seeding improved forage species

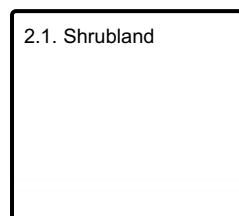
R2A - Reintroduction of historic disturbance return intervals

T2A - Extensive soil disturbance followed by seeding improved forage species

State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1 Chaparral Grassland

The Grassland State consists of approximately 75 percent grasses, 20 percent woody plants, and 5 percent forbs composition by air-dry weight. For interpretive purposes, the woody crown canopy can be up to 30 percent. Two community phases exist, the Midgrass/Shortgrass Community and the Shortgrass Dominant Community.

Dominant plant species

- false Rhodes grass (*Trichloris crinita*), grass
- tanglehead (*Heteropogon contortus*), grass

Community 1.1 Midgrass/Shortgrass

The reference community is a chaparral grassland, consisting of approximately 75 percent grasses, 20 percent woody plants, and 5 percent forbs. Dominant grasses are tall and midgrasses including false rhodesgrass (*Trichloris crinita*), tanglehead (*Heteropogon contortus*), sideoats grama (*Bouteloua curtipendula*), little bluestem (*Schizachyrium scoparium*), bush muhly (*Muhlenbergia porteri*), whiplash pappusgrass (*Pappophorum vaginatum*), pink pappusgrass (*Pappophorum bicolor*), plains bristlegrass (*Setaria leucopila*), and large spike bristlegrass (*Setaria macrostachya*). On the central and western range of the MLRA, sideoats grama may be the more dominant decreaser species. On the more northern and eastern ranges of the MLRA, the same site may be dominated by little bluestem. Green sprangletop (*Leptochloa dubia*), slender grama (*Bouteloua repens*), and cane bluestem (*Bothriochloa barbinodis*) occur regularly on the site. Feather dalea (*Dalea Formosa*), creosote bush, and skeletonleaf golden eye (*Viguiera stenoloba*) are common in the woody plant community as well. Community (1.1) is extremely rare, if not absent, due to thresholds being crossed over the last 200 years into the Chaparral Shrubland Community (2.1). Blackbrush, guajillo, cenizo, creosote can be the dominant woody species on this site depending upon the soil type present. Arizona cottontop (*Digitaria californica*) and plains bristlegrass are the more opportunistic species on this site and respond quickly to timely rainfall. In this plant community, shortgrasses and other midgrasses such as slender grama, rough tridens, Hall's panicum (*Panicum hallii*), slim tridens, threeawn species, and red grama can be expected to be major increasers.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	850	1575	2300
Shrub/Vine	150	325	500
Forb	40	80	120
Tree	0	0	0
Total	1040	1980	2920

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	5-15%
Grass/grasslike foliar cover	70-90%
Forb foliar cover	0-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	15-35%
Surface fragments >0.25" and <=3"	1-5%
Surface fragments >3"	1-5%
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	0%	0-1%	10-20%	5-10%
>0.5 <= 1	—	0-5%	20-25%	5-10%
>1 <= 2	—	5-10%	40-100%	5-10%
>2 <= 4.5	—	10-15%	10-35%	—
>4.5 <= 13	—	—	—	—
>13 <= 40	—	—	—	—
>40 <= 80	—	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

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

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

Community 1.2 Shortgrass Dominant

This phase of the Chaparral Grassland State (1) still exhibits a chaparral plant structure with the woody species canopy as high as 30 percent. Heavy continuous grazing removes many of the midgrasses, which are replaced by

shortgrasses, such as pink pappusgrass, slim tridens, threeawn, and red grama. Prolonged drought can also encourage a shift from midgrasses to shortgrasses. However, a shift due to drought is perceived to be part of a normal cycle back and forth between midgrasses and shortgrasses. The shrub component will be much the same as the reference community. This phase can still be managed back to the Midgrass/Shortgrass Community (1.1) as residual amounts of the original plants are still present, but suppressed. A prescribed grazing plan will be essential to increasing the midgrasses in the plant community. If the midgrasses respond and there are favorable growing conditions, prescribed burning may also be utilized.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	400	800	1200
Shrub/Vine	150	325	500
Forb	40	80	120
Tree	0	0	0
Total	590	1205	1820

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

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

Pathway 1.1A Community 1.1 to 1.2

A shift to the Shortgrass 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 the restoring ground cover will tend to move the Shortgrass Dominant Community (1.2) toward the Midgrass Community (1.1). Utilizing historic ecological disturbances such as herbivory, selective brush management, and fire in constructive amounts can benefit. 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 Chaparral Shrubland

This State has one community, the 2.1 Shrubland Community. Woody cover exceeds 30 percent and is characterized by mid and short grasses.

Dominant plant species

- guajillo (*Acacia berlandieri*), shrub
- blackbrush (*Coleogyne ramosissima*), shrub

Community 2.1
Shrubland



Figure 13. 2.1 Shrubland Community.

This community is a result of an irreversible transition from the Chaparral Grassland State (1) to the Shrubland State (2). Brush canopy levels may vary widely but can easily exceed 50 percent; especially on long-term disturbed sites. The herbaceous understory is very limited in production due to the competition for sunlight, water, and nutrients. Rest from grazing will have limited impact on restoring the grasses with canopy this dense. There is an increase of woody shrubs and the site is generally dominated by guajillo, blackbrush, creosote, and cenizo in varying abundance. Bare ground increases and has crusted to the point that there is little water infiltration and little seedling emergence. Lichen crusts can be common. Water infiltration does occur directly under some of the woody species. Energy flow is predominantly through the shrubs and most nutrients are used by the shrubs. Slim tridens, threeawn, and red grama dominate the site in this condition. This state can be converted to the Converted Land State (3) by controlling the brush and seeding to native or introduced grasses. Due to the shallow soils of this site, care should be taken in the selection of soil disturbance equipment. Root plowing may be impractical on sites with very shallow soils and exposed parent material. Root plowing and heavy disking can have the potential to bring significant amounts of rock to the surface when preformed on this site. Great care should be exercised if these treatments are attempted.

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	50	250	500
Shrub/Vine	250	375	500
Forb	40	60	80
Tree	0	0	0
Total	340	685	1080

Figure 15. Plant community growth curve (percent production by month). TX4544, Shrubland Community, 30+% woody canopy. Shrubs dominate the site with heavy continuous grazing and no brush management. Woody canopy exceeds 30%. Grasses are in further decline..

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

State 3
Converted Land

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 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. Mechanical treatments selected for use on this site should be carefully considered due to the shallow nature of the soils. Previous attempts at native seeding in this region were met with mixed results due to the seed source not being locally adapted to the region. Presently, many of the grass species listed in the reference community are commercially available from collections made in south Texas. The locally adapted species are expected to be more successful in seeding efforts compared to seed developed several hundred miles outside the region. However, proper seedbed preparation, planting techniques, and favorable growing conditions are essential for success. The most common introduced grass species seeded on this site in the western Rio Grande plains is buffelgrass (*Cenchrus ciliaris*). Seeding this species should be cautiously considered due to its aggressive nature to dominate plant communities and reduce herbaceous diversity. Further, conversion of buffelgrass-dominated areas back to native grass is extremely difficult and rarely successful. The decision of species to seed is a management decision based on clearly defined goals for livestock and wildlife. The use of introduced species does provide good forage for cattle and can provide some habitat for wildlife. However, once these species are introduced, it is difficult to remove them should objectives change. 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. The role of prescribed grazing is to keep the grasses healthy to compete against invasion of seedlings and to preserve fuel for maintenance fires.

Table 10. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	700	1250	1800
Shrub/Vine	150	225	300
Forb	50	100	150
Total	900	1575	2250

Figure 17. Plant community growth curve (percent production by month).
TX4530, Converted Land Community. Community converted into warm-season grass seed mixtures..

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 developed from the Converted Land Community (3.1). Brush management efforts on this site include the risk that disking or roller chopping tend to only manipulate the above ground part of brush species. Brush will resprout from the root crown and from the existing seed bank within the soil. If the seedlings are not controlled, the plant community will cross a threshold to the Chaparral Shrubland State (2) which will require application of energy in the form of machinery or herbicides to reduce the canopy. Intervention should be done quickly, or this community will revert back to a Shrubland Community. The role of prescribed grazing is to retain grass vigor to compete against seedling establishment and preserve fuel for maintenance burns.

Table 11. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	300	600	900
Shrub/Vine	200	300	400
Forb	40	80	120
Total	540	980	1420

Figure 19. 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

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.

Conservation practices

Brush Management
Range Planting
Prescribed Grazing

Transition T1A State 1 to 2

The Chaparral Grassland State will cross a threshold to State 2 Chaparral Shrubland State with heavy continuous grazing, no brush management, and subsequently no 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. Because of the increased canopy, sunlight is being captured by the woody plant and converted to energy, limiting the growth 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 (usually following brush management) and planting to native or introduced forages.

Restoration pathway R2A State 2 to 1

If the management goal is to restore to State 1, significant inputs of energy will be needed. An integrated approach to Brush Management (Scifres et.al., 1985) with mechanical treatment, herbicides, and fire will initially reduce the woody species providing opportunity for at least partial recovery of the hydrologic cycle and the energy cycle.

Seeding may be needed and can be done in conjunction with ground disturbance methods of brush management.

Conservation practices

Brush Management
Prescribed Burning
Range Planting
Prescribed Grazing

Transition T2A State 2 to 3

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

Transition T3A State 3 to 2

The transition from the Converted Land State to the Chaparral Shrubland State is triggered by neglect or no management over long periods of time.

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 grasses			500–1250	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	100–1000	–
	tanglehead	HECO10	<i>Heteropogon contortus</i>	100–1000	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	100–600	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	100–600	–
2	Mid-short grasses			300–900	
	pink pappusgrass	PABI2	<i>Pappophorum bicolor</i>	100–500	–
	whiplash pappusgrass	PAVA2	<i>Pappophorum vaginatum</i>	100–500	–
	false Rhodes grass	TRCR9	<i>Trichloris crinita</i>	100–400	–
	green sprangletop	LEDU	<i>Leptochloa dubia</i>	10–400	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	100–300	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	50–250	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	10–150	–
	slender grama	BORE2	<i>Bouteloua repens</i>	10–150	–
3	Short grasses			50–150	
	Hall's panicgrass	PAHA	<i>Panicum hallii</i>	0–100	–
	slim tridens	TRMU	<i>Tridens muticus</i>	10–60	–
	red grama	BOTR2	<i>Bouteloua trifida</i>	0–50	–
Forb					
4	Perennial forbs			30–85	
	awnless bushsunflower	SICA7	<i>Simsia calva</i>	0–40	–
	fleshy honeysweet	TICA2	<i>Tidestromia carnosa</i>	10–20	–
	dogweed	ADENO5	<i>Adenophyllum</i>	0–15	–

	dogwood	ADLE03	<i>Adenophyllum</i>	0–15	–
	Mexican oregano	LIGR6	<i>Lippia graveolens</i>	0–15	–
5	Low/annual forbs			10–35	
	Forb, annual	2FA	<i>Forb, annual</i>	0–35	–
	dutchman's breeches	DICU	<i>Dicentra cucullaria</i>	0–35	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–35	–
	menodora	MENOD	<i>Menodora</i>	0–35	–
	stemless evening primrose	OETR2	<i>Oenothera triloba</i>	0–35	–
	sand phacelia	PHPA4	<i>Phacelia patuliflora</i>	0–35	–
	purple milkwort	POSA3	<i>Polygala sanguinea</i>	0–35	–
	twingleaf senna	SEBA3	<i>Senna bauhinoides</i>	0–35	–
	Gregg's keelpod	SYGR	<i>Synthlipsis greggii</i>	0–35	–
Shrub/Vine					
6	Shrubs			150–500	
	guajillo	ACBE	<i>Acacia berlandieri</i>	25–200	–
	blackbrush acacia	ACRI	<i>Acacia rigidula</i>	25–200	–
	Texas barometer bush	LEFR3	<i>Leucophyllum frutescens</i>	25–200	–
	creosote bush	LATR2	<i>Larrea tridentata</i>	10–100	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–30	–
	desert yaupon	SCCU4	<i>Schaefferia cuneifolia</i>	0–30	–
	resinbush	VIST	<i>Viguiera stenoloba</i>	0–30	–
	prairie clover	DALEA	<i>Dalea</i>	0–30	–
	jointfir	EPHED	<i>Ephedra</i>	0–30	–
	Texas kidneywood	EYTE	<i>Eysenhardtia texana</i>	10–30	–
	stretchberry	FOPU2	<i>Forestiera pubescens</i>	0–30	–
	Texas lignum-vitae	GUAN	<i>Guaiacum angustifolium</i>	0–30	–
	leatherstem	JADI	<i>Jatropha dioica</i>	0–20	–
	coyotillo	KAHU	<i>Karwinskia humboldtiana</i>	0–20	–
	littleleaf ratany	KRER	<i>Krameria erecta</i>	0–20	–
	fairyduster	CAER	<i>Calliandra eriophylla</i>	0–20	–
	Torrey's yucca	YUTO	<i>Yucca torreyi</i>	0–10	–

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. Feral hogs have few natural predators, thus allowing their population to grow to high numbers.

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

Grassland State(1): This state provides the maximum amount of forage for livestock such as cattle. It is also utilized

by deer, quail and other birds as a source of food. When a site is in the reference plant community phase (1.1) it will also be used by some birds for nesting, if other habitat requirements like thermal and escape cover are near.

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

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

In the Shrubland Complex (State 2), annual evapotranspiration from shortgrass/forb herbaceous zones were comparable to those from woody plant patches. Surface runoff and deep drainage were only slightly higher in grass dominated patches (Weltz and Blackburn, 1995). Increasing water yield by converting shrub-dominated areas to grass domination is thus marginal and limited to years when winter and spring rainfall is high. There is little evidence that increases in percolation and surface runoff from converted communities could be reliably captured and dependably made available off-site. The main benefit of brush management is to release moisture in the soil profile to be utilized by herbaceous plants.

Recreational uses

Hunting and bird watching are common activities.

Inventory data references

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

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Approval

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Rangeland health reference sheet

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

Author(s)/participant(s)	Vivian Garcia, RMS, NRCS
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, <1 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 is 4 to 5.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Less than one percent SOM.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Surface runoff moderate and deep drainage higher in grass-dominated patches.
-
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 mid and short grasses>
- Sub-dominant: short grasses>forbs>shrubs
- Other:
- 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):** 1,000 to 2,800 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: Slim tridens, red grama, threeawn, blackbrush acacia, creosote, guajillo, cenizo.

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