Ecological site R083DY009TX
Clayey Bottomland

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.
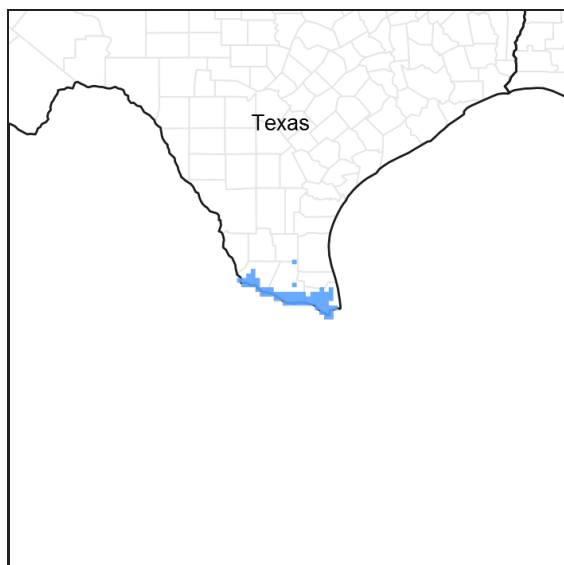

Figure 1. Mapped extent

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): 083D–Lower Rio Grande Plain

Major Land Resource Area (MLRA) 83D makes up about2,500 square miles (6,475 square kilometers). The towns of Brownsville, Edinburg, Harlingen, McAllen, and Raymondville are in this area. U.S. Highways 77 and 281 terminate in Brownsville and McAllen, respectively. The Santa Ana National Wildlife Area is along the Rio Grande in this area.

Classification relationships

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

Ecological site concept

The Clayey Bottomland site is deep to very deep with clay surface textures occurring on flood plains. The soils are slightly alkaline and slightly saline.

Associated sites

R083DY019TX	**Gray Sandy Loam**
R083DY023TX	**Sandy Loam**
R083DY025TX	**Clay Loam**
R083DY003TX	**Gravelly Ridge**
R083DY013TX	**Loamy Bottomland**

Similar sites

R083AY009TX	**Clayey Bottomland**
R083BY009TX	**Clayey Bottomland**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Opuntia*
Herbaceous	(1) *Trichloris pluriflora*

Physiographic features

These soils are nearly level flood plains and drainageways on the Rio Grande delta plain. Slopes range from 0 to 1 percent. Sites can flood and pond for extended durations. A seasonal water table exists when not flooded or ponded.

Table 2. Representative physiographic features

Landforms	(1) Delta plain > Flood plain (2) Delta plain > Terrace
Runoff class	Negligible to high
Flooding duration	Extremely brief (0.1 to 4 hours) to very long (more than 30 days)
Flooding frequency	None to frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	10–550 ft
Slope	0–1%
Ponding depth	0–6 in
Water table depth	0–80 in
Aspect	Aspect is not a significant factor

Climatic features

MLRA 83 has a subtropical, subhumid climate. Winters are dry and 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)	365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	22-26 in
Frost-free period (actual range)	271-365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	21-27 in
Frost-free period (average)	348 days
Freeze-free period (average)	365 days
Precipitation total (average)	24 in

Climate stations used

- (1) RAYMONDVILLE [USC00417458], Raymondville, TX
- (2) SANTA ROSA 3 WNW [USC00418059], Edcouch, TX
- (3) WESLACO [USC00419588], Weslaco, TX
- (4) MCALLEN [USC00415701], McAllen, TX
- (5) MERCEDES 6 SSE [USC00415836], Mercedes, TX
- (6) MCALLEN MILLER INTL AP [USW00012959], McAllen, TX
- (7) HARLINGEN [USC00413943], Harlingen, TX
- (8) MISSION 4 W [USC00415972], Mission, TX
- (9) BROWNSVILLE [USW00012919], Brownsville, TX
- (10) LA JOYA [USC00414911], Mission, TX
- (11) RIO GRANDE CITY [USC00417622], Rio Grande City, TX

Influencing water features

The Clayey Bottomlands occur on flood plains with overflow water. Flooding and ponding can both occur lasting very brief to long durations. Onsite investigation is needed to determine if wetlands exist.

Wetland description

Onsite investigation is needed to determine if wetlands exist.

Soil features

The soils are very deep, moderately well to somewhat poorly drained, and slowly permeable. Soil reaction is slightly alkaline or moderately alkaline. Soil series correlated to this site include: Cameron, Grulla, Harlingen, Matamoros, Olmito, and Runn.

Table 4. Representative soil features

Parent material	(1) Alluvium–sedimentary rock
Surface texture	(1) Clay (2) Silty clay
Family particle size	(1) Fine (2) Very-fine (3) Clayey over loamy
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Slow to moderately slow
Soil depth	80 in
Surface fragment cover <=3"	0%

Surface fragment cover >3"	0%
Available water capacity (0-40in)	2–7 in
Calcium carbonate equivalent (0-40in)	2–30%
Electrical conductivity (0-40in)	0–16 mmhos/cm
Sodium adsorption ratio (0-40in)	0–11
Soil reaction (1:1 water) (0-40in)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–3%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The Lower Rio Grande (MLRA 83D) 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 area.

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 and stocking rates exceeded 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 midgrasses 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.

The open grassland in this area supports mid prairie grasses with scattered woody plants, perennial forbs, and legumes on soils in the uplands. Twoflower and fourflower trichloris, plains bristlegrass, and lovegrass tridens are among the dominant grasses on these soils. Desert yaupon, spiny hackberry, and blackbrush are the major woody plants. In bottomland areas, tallgrasses and midgrasses, such as switchgrass, giant sacaton, fourflower trichloris, big sandbur, little bluestem, and southwestern bristlegrass, are dominant. Hackberry, mesquite, elm, and palm trees are the major woody plants. Forbs are important but minor components of all plant communities.

Most of this area is cropland or improved pasture that is extensively irrigated. Large acreages of rangeland are grazed mainly by beef cattle and wildlife. The major crops are cotton, grain sorghum, citrus, onions, cabbage, and other truck crops. Almost all the crops are grown under irrigation. Hunting leases for white-tailed deer, quail, white-winged dove, and mourning dove are an important source of income in the area. Some of the major wildlife species in this area are white-tailed deer, javelina, coyote, fox, bobcat, raccoon, skunk, opossum, jackrabbit, cottontail, turkey, bobwhite quail, scaled quail, white-winged dove, and mourning dove.
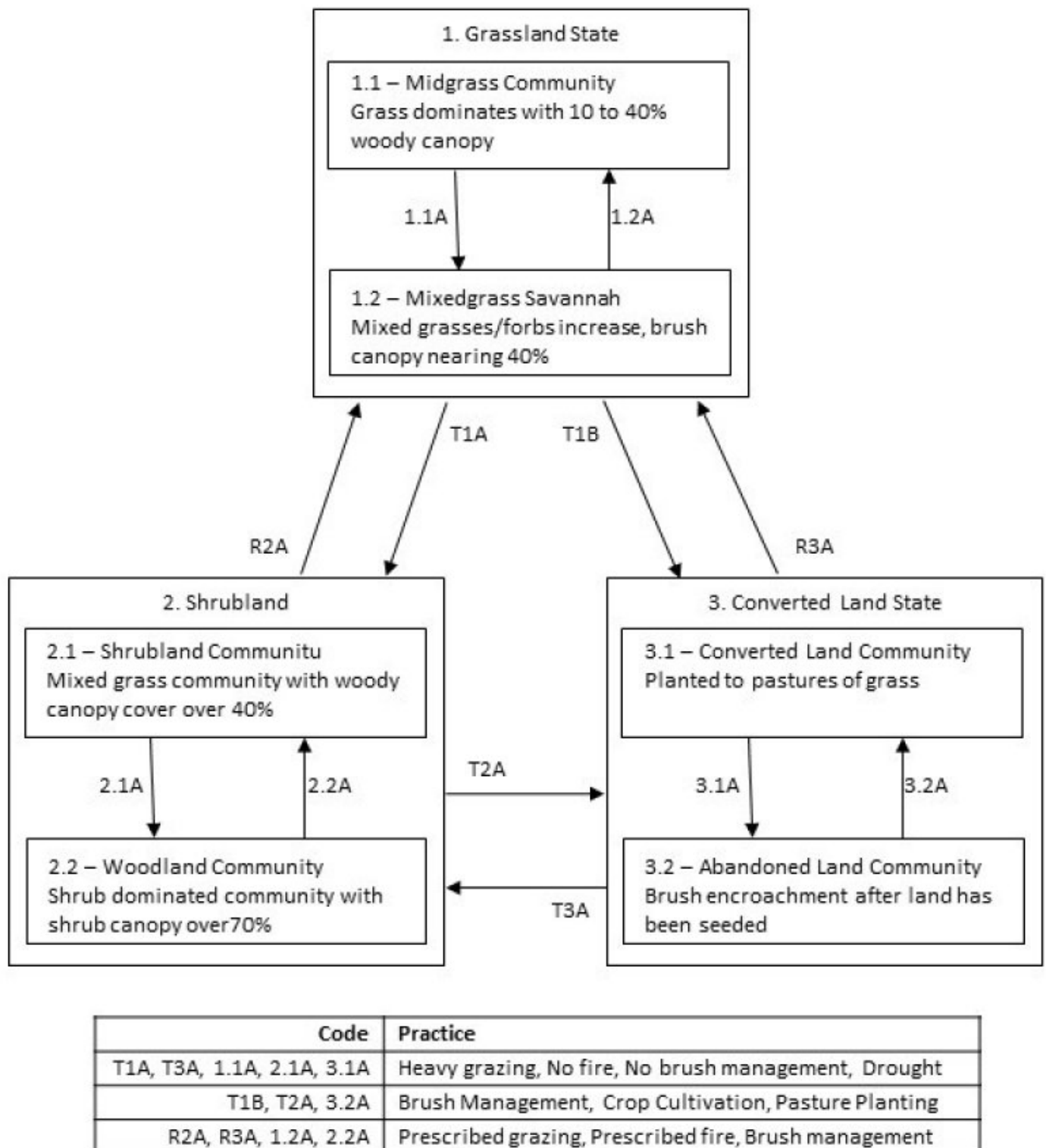
State and transition model

Figure 8. STM

State 1
Savannah

The Savannah State consisted of approximately 70 percent grasses, 20 percent woody plants and a 10 percent composition of forbs by air-dry weight. For interpretive purposes, the woody crown canopy can be approximately 10 to 40 percent. Two community phases exist; the Tallgrass Savannah Community and the Mixedgrass Savannah Community.

Dominant plant species

- multiflower false Rhodes grass (*Trichloris pluriflora*), other herbaceous

Community 1.1
Tallgrass Savannah

The reference community is a tallgrass savannah with some shrub. Bunchgrasses such as multiflowered false Rhodes grass (*Trichloris pluriflora*), southwestern bristlegrass (*Setaria scheelei*), big cenchrus (*Cenchrus myosuroides*), and big sacaton (*Sporobolus wrightii*) are the major species. Immediately adjacent to stream channels, large woody riparian plants are common such as cedar elm (*Ulmus crassifolia*), liveoak (*Quercus virginiana*), bumelia (*Sideroxylon lanuginosum*), anacua (*Ehretia anacua*), and mesquite (*Prosopis glandulosa*). Higher in the flood plain, large mesquites tend to dominate the woody canopy. Underneath heavily shaded areas, cool-season grasses such as Texas wintergrass (Nasella leucotricha) and Virginia wildrye (*Elymus virginicus*) ocuur. Occasional out-of-bank flow provides extra soil moisture and nutrients while also depositing sediments. This community was maintained by periodic grazing by wild populations and numerous fires; both natural and anthropogenic. Fire likely played more of a role on this site as distance from the primary stream channel increased. 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. 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 tallgrasses decrease and are replaced by less palatable, short-lived grasses. Droughts hasten the process. Major grass increasers are white tridens (*Tridens muticus*), vine mesquite (*Panicum obtusum*), buffalograss, curly mesquite (*Hilaria belangeri*) and pink pappusgrass (*Pappophorum bicolor*). Mesquite, twisted acacia (*Acacia schaffneri*), whitebrush (*Aloysia gratissima*), and prickly pear (Opuntia spp.) are the common woody plants that increase as abusive grazing persists. This site, because of the water afforded by landscape position, has the potential to recover much faster than adjacent uplands. However, it will still take several years for a satisfactory recovery. Any efforts to recover this plant community should also consider the proper management of the adjacent upland sites as they are interdependent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	3000	5000	7000
Tree	600	800	1000
Shrub/Vine	100	200	300
Forb	50	150	250
Total	**3750**	**6150**	**8550**

Table 6. Ground cover

Tree foliar cover	0-5%
Shrub/vine/liana foliar cover	5-10%
Grass/grasslike foliar cover	75-95%
Forb foliar cover	5-15%
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	0-10%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/Grasslike	Forb
<0.5	0-2%	1-2%	70-100%	1-10%
>0.5 <= 1	0-2%	1-4%	70-100%	1-15%
>1 <= 2	0-2%	1-4%	60-80%	5-20%
>2 <= 4.5	1-4%	1-5%	30-50%	5-15%
>4.5 <= 13	2-5%	1-5%	–	–
>13 <= 40	5-10%	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

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

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

Community 1.2
Mixedgrass Savannah

This community still exhibits a savannah plant structure dominated by trees, but with a shift to fewer tallgrasses such as multiflowered false Rhodes grass, southwestern bristlegrass, big cenchrus, and big sacaton. Cool-season grasses such as Texas wintergrass and Virginia wildrye increase with the shade from increasing canopy. Large woody plants like cedar elm, liveoak, bumelia, anacua, and mesquite have increased in height and canopy. In the understory, there is an increase of shrubs such as twisted acacia, whitebrush, granjeno and Texas persimmon. 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 tallgrasses decrease and are of reduced vigor. Fire every three to five years will move this community back toward the Tallgrass Savannah Community as there are still enough remnant tallgrasses to respond. A significant role for prescribed grazing is to not only restore vigor to the tallgrasses, but also to build and maintain fine fuel amounts for effective prescribed burning. It will be increasingly difficult to use fire as canopy and cool-season plants increase. Integrated brush management treatment is needed to restore the community.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2000	3500	5000
Tree	600	800	1000
Forb	150	250	350
Shrub/Vine	100	200	300
Total	**2850**	**4750**	**6650**

Figure 12. 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 Mixedgrass Savannah Community occurs if the Tallgrass Savannah Community is weakened by excessive leaf removal. Drought hastens the process. A reduction in tall and midgrasses 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 tall grasses, and ground cover will move the 1.2 Mixedgrass Savannah Community toward the 1.1 Tallgrass Savannah Community. Utilizing historic ecological disturbances such as herbivory and fire in constructive amounts is needed. Selective brush management may also be needed. The time to shift back to the 1.1 Tallgrass Savannah Community certainly is dependent upon favorable growing conditions and could take 5 to 10 years. Landscape position with occasional flooding can increase recovery of this plant community quicker than adjacent upland sites.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

State 2
Shrubland

The Woodland/Shrubland state consists of two communities; Tree/Shrubland Community (2.1) with a brush canopy of 40-70 percent, and the Tree/Shrubland Community (2.2) with a brush canopy of >70 percent. These communities are mixed grass communities with a shrub canopy of mixed brush and trees with some herbaceous plants throughout the interspaces.

Dominant plant species

- whitebrush (*Aloysia gratissima*), shrub

Community 2.1
Shrubland

Shrubs increase significantly as has overstory canopy in the Shrubland Ccommunity. Once woody plants establish and increase on these fertile soils, competition is greatly reduced. At this point, prescribed grazing alone will not restore this community back to the Savanna State (1). Trees and shrubs are very competitive for sunlight, moisture, and nutrients. Flushes of annual forbs can occur throughout the entire year in response to episodic rainfall. Prescribed fire will be a limited option in this community because of a lack of fine fuel load, fuel continuity, and brush cover. Some pockets of the taller grasses such as big sacaton exist, especially where there are saline spots and grazing pressure is light. Unless brush management is done, shrub cover will increase to more than 50 percent canopy. In areas that tend to pond water on this site, spiny aster (*Chloracantha spinosa*) may establish and form dense colonies. Aggressive brush and grazing management is required to restore the system back to the Savannah State. Re-seeding of perennial warm-season grasses may be necessary and has potential to speed up the restoration process. Reseeding may also have potential to limit establishment of aggressive, introduced grasses such as Kleberg bluestem (Dichanthium annualatum).

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	500	1000	1500
Tree	600	800	1000
Forb	200	450	700
Shrub/Vine	200	350	500
Total	**1500**	**2600**	**3700**

Figure 14. 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

Community 2.2
Woodland

A lack of brush management of any kind has allowed this community to develop. At this point, prescribed grazing alone will not restore this community. The understory of shrubs provide a second layer of woody canopy that approaches and exceeds 70 percent. Trees and shrubs now harvest most of the sunlight, moisture, and nutrients. Flushes of annual forbs can occur throughout the entire year in response to episodic rainfall. Prescribed fire is not a viable option in this community because of a lack of fine fuel, fuel continuity, and brush cover. Unless brush management is done, shrub cover will increase to more than 50 percent. Aggressive brush and grazing management is required to restore the system back to the grassland state. Re-seeding of perennial warm-season grasses may be necessary and has potential to speed up the restoration process. Reseeding may also have potential to limit establishment of aggressive, introduced grasses such as Kleberg bluestem.

Table 10. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	200	600	1000
Shrub/Vine	400	700	1000
Tree	600	800	1000
Forb	200	350	500
Total	**1400**	**2450**	**3500**

Figure 16. 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 Woodland Community (2.2) occurs if no brush management is done. Drought hastens the process. A lack of brush management allows existing brush to gain in stature. Seedlings are introduced through droppings of livestock and wildlife. A reduction in tall and midgrasses also corresponds to a reduction of fuel loading needed for fire to effectively suppress woody species. Although the potential of fire is questionable at this point.

Pathway 2.2A
Community 2.2 to 2.1

Managerial activities that restore the hydrologic cycle, the energy capture by grasses, and restoring ground cover will tend to move the 2.2 Woodland Community toward the 2.1 Shrubland Community. 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 constructive amounts is needed to maintain the desired brush densities. The time to shift back to the 2.1 Shrubland Community is dependent upon favorable growing conditions and could take 3 to 5 years.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

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 11. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	3000	4500	6000
Tree	600	800	1000
Forb	100	250	400
Shrub/Vine	100	200	300
Total	**3800**	**5750**	**7700**

Figure 18. 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 12. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	200	1350	2500
Shrub/Vine	400	700	1000
Tree	600	800	1000
Forb	200	350	500
Total	**1400**	**3200**	**5000**

Figure 20. 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

If woody species are not managed by integrated methods such as brush management or fire, the woody species will increase. Once woody species exceed about 10 percent canopy, it will be difficult to manage them at economic levels.

Pathway 3.2A
Community 3.2 to 3.1

An integrated effort with fire and brush management is needed to restore this community to a grassland. Range planting may also be needed. Grazing management is essential to restore the competitiveness of the grasses and to maintain fuel load needed for effective burning.

Conservation practices

Brush Management
Prescribed Burning
Range Planting
Prescribed Grazing

Transition T1A
State 1 to 2

The Savannah State will cross a threshold to Shrubland State with abusive grazing, no brush management, or fire. Severe drought is also a significant factor to accelerate this transition. 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

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. A return to State 1 within a management time frame will be next to impossible when considering returning the trees to their original stature.

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 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 or if the soil health has significantly deteriorated. It will also take 20 to 30 years for the large trees to return.

Additional community tables

Table 13. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Warm season bunchgrasses**			2800–5200	
	big sacaton	SPWR2	*Sporobolus wrightii*	0–5200	–
	switchgrass	PAVI2	*Panicum virgatum*	0–5000	–

	big sandbur	CEMY	*Cenchrus myosuroides*	0–4500	–
	southwestern bristlegrass	SESC2	*Setaria scheelei*	0–4500	–
	multiflower false Rhodes grass	TRPL3	*Trichloris pluriflora*	400–2400	–
	large-spike bristlegrass	SEMA5	*Setaria macrostachya*	0–1000	–
2	**Warm season mid/shortgrasses**			200–1800	
	pink pappusgrass	PABI2	*Pappophorum bicolor*	0–1000	–
	buffalograss	BODA2	*Bouteloua dactyloides*	0–800	–
	curly-mesquite	HIBE	*Hilaria belangeri*	0–800	–
	white tridens	TRAL2	*Tridens albescens*	0–300	–
	Madagascar dropseed	SPPY2	*Sporobolus pyramidatus*	0–200	–
3	**cool season bunch grasses**			200–1800	
	Texas wintergrass	NALE3	*Nassella leucotricha*	0–1000	–
	sedge	CAREX	*Carex*	0–300	–
Forb					
4	**Forbs**			50–250	
	bluestem pricklypoppy	ARAL3	*Argemone albiflora*	0–50	–
	spiny chloracantha	CHSP11	*Chloracantha spinosa*	0–50	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–50	–
	bundleflower	DESMA	*Desmanthus*	0–40	–
	plains dozedaisy	APRA	*Aphanostephus ramosissimus*	0–30	–
	littleleaf sensitive-briar	MIMI22	*Mimosa microphylla*	0–30	–
	vervain	VERBE	*Verbena*	0–30	–
	wild petunia	RUELL	*Ruellia*	0–30	–
	annual bushsunflower	SILA11	*Simsia lagasceiformis*	0–30	–
	globemallow	SPHAE	*Sphaeralcea*	0–20	–
	fanpetals	SIDA	*Sida*	0–20	–
	sand phacelia	PHPA4	*Phacelia patuliflora*	0–20	–
	groundcherry	PHYSA	*Physalis*	0–20	–
	pepperweed	LEAP6	*Lepidium apetalum*	0–20	–
Shrub/Vine					
5	**Shrub/Vines**			100–300	
	whitebrush	ALGR2	*Aloysia gratissima*	0–200	–
	Texas persimmon	DITE3	*Diospyros texana*	0–150	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–100	–
	saltbush	ATRIP	*Atriplex*	0–50	–
	guajillo	ACBE	*Acacia berlandieri*	0–50	–
	blackbrush acacia	ACRI	*Acacia rigidula*	0–50	–
	stretchberry	FOPU2	*Forestiera pubescens*	0–50	–
	Texas lignum-vitae	GUAN	*Guaiacum angustifolium*	0–50	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	0–50	–
	pricklypear	OPUNT	*Opuntia*	10–50	–
	desert yaupon	SCCU4	*Schaefferia cuneifolia*	0–50	–
	lime pricklyash	ZAFA	*Zanthoxylum fagara*	0–50	–

Tree					
6	**Trees**			600–1000	
	live oak	QUVI	*Quercus virginiana*	200–600	–
	cedar elm	ULCR	*Ulmus crassifolia*	150–400	–
	honey mesquite	PRGL2	*Prosopis glandulosa*	150–400	–
	knockaway	EHAN	*Ehretia anacua*	0–300	–
	Mexican ash	FRBE	*Fraxinus berlandieriana*	0–300	–
	common buttonbush	CEOC2	*Cephalanthus occidentalis*	0–200	–
	gum bully	SILA20	*Sideroxylon lanuginosum*	0–200	–

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.

Hydrological functions

The water cycle on this site functions according to the management of not only the existing plant community but also of the surrounding plant communities. The water cycle is most functional when the site is dominated by tall bunchgrass and native trees as the site functions much the same as a sponge. Rapid rainfall infiltration, high soil organic matter, good soil structure, and good porosity are present with a good cover of bunchgrass. Quality of surface runoff will be high, while erosion and sedimentation rates will be low. With high rates of infiltration and

periods of heavy rainfall, some water will move below the root zone of grasses. As this water moves downward it may contribute to the recharge of some aquifers.

When unmanaged grazing causes loss or reduction of bunchgrass and ground cover, the water cycle becomes impaired. Infiltration is decreased and runoff is increased because of poor ground cover, rainfall splash, soil capping, low organic matter, and poor structure. With a combination of a sparse ground cover and intensive rainfall, this site can contribute to an increased frequency and severity of flooding within a watershed. Soil erosion is accelerated, quality of surface runoff is poor, and sedimentation is increased.

As the site becomes dominated by woody species, especially oaks, mesquite, and shrubs, the water cycle is further altered. Interception of rainfall by tree canopies is increased which reduces the amount of rainfall reaching the surface (Thurow and Hester, 1997). Stem flow is increased, however, because of the funneling effect of the canopy by the oaks and mesquite. This increases soil moisture at the base of the tree. Increased transpiration, especially when evergreen species like live oak dominate and provide less chance for deep percolation into aquifers. As woody species increase, grass cover declines, which causes some of the same results as heavy grazing.

Various brush management components can help restore the natural hydrology of the site. Also, critical to the overall health of the Clayey Bottomland is the existence of healthy streamside or riparian vegetation. These small but very important vegetative communities exist in the transition zone between the upland portion of the site and the creeks or streams.

Many important functions come from a healthy riparian plant community. These communities protect the streambanks during flooding much the same as shingles protect a roof. They also trap sediments, deadfall, and nutrients fostering the building of soils and nutrients. Another function is that of a sponge, absorbing water and slowly releasing it over time leading to a more sustained flow. These small areas also provide diverse grazing for livestock.

If a mature woodland canopy develops, a buildup of leaf litter occurs which increases the organic matter of the soil, builds structure, improves infiltration, and retards erosion. Some, but not all values of a properly functioning water cycle are restored on this site when a woodland plant community persists.

Recreational uses

Hunting and bird watching are common activities.

Wood products

Cutting hardwoods for firewood is the main wood product on this site.

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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Rangeland health reference sheet

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

Author(s)/participant(s)	
Contact for lead author	
Date	07/17/2024
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

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

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

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

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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

Dominant:

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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):**

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:**

17. **Perennial plant reproductive capability:**