Ecological site R083BY018TX
Clay Flat

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.

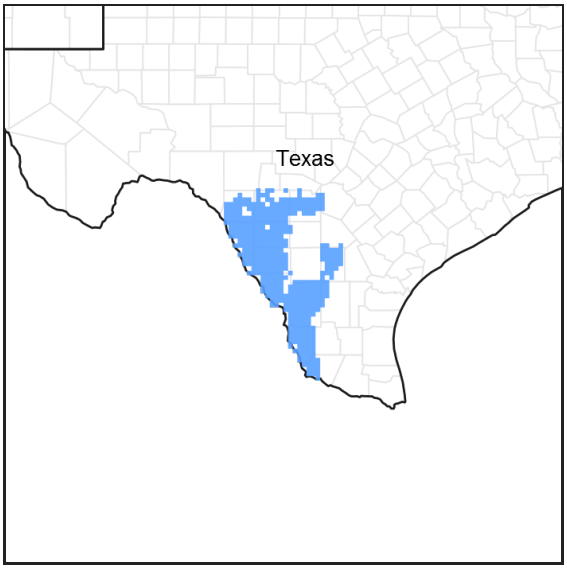

Figure 1. Mapped extent

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): 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 Clay Flat is characterized by heavy clay soils on nearly level slopes. Sites are productive, but can be droughty due to their high clay content and available moisture to plants.

Associated sites

R083BY003TX	**Gravelly Ridge**
R083BY015TX	**Saline Clay**
R083BY016TX	**Saline Clay Loam**
R083BY010TX	**Vega**
R083BY019TX	**Gray Sandy Loam**

Table 1. Dominant plant species

Tree	(1) *Prosopis glandulosa*
Shrub	(1) *Celtis ehrenbergiana* (2) *Ziziphus obtusifolia*
Herbaceous	(1) *Sporobolus airoides* (2) *Tridens albescens*

Physiographic features

These nearly level soils are on smooth uplands and occasionally flooded drainageways on the inland, dissected Coastal Plains. Slopes range from 0 to about 1. Elevation is 200 to 600 feet.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Drainageway (2) Coastal plain > Flat
Runoff class	High
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	200–600 ft
Slope	0–1%
Aspect	Aspect is not a significant factor

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

Influencing water features

Water enters the soil rapidly when it is cracked, but very slow when the soil is moist and cracks are closed. Some map units are occasionally flooded for brief durations.

Wetland description

N/A

Soil features

The soils are very deep, moderately well drained with very slow permeability. They were formed in alkaline clayey alluvium. Surface color is dark gray or gray. The profile is effervescent throughout. Gilgai relief, in undisturbed areas, has microhighs 5 to 12 feet in diameter and 3 to 12 inches higher than the microlows. The soil series correlated to this site is the Monwebb series.

Table 4. Representative soil features

Parent material	(1) Alluvium–sedimentary rock
Surface texture	(1) Clay
Family particle size	(1) Fine
Drainage class	Moderately well drained
Permeability class	Very 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)	2–40%
Electrical conductivity (0-40in)	0–20 mmhos/cm
Sodium adsorption ratio (0-40in)	0–40

Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–3%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The Clay Flats are a productive plant community, but this is a droughty site due to heavy clay soils with high shrink/swell properties. If this site is denuded by excessive grazing, extended long-term drought, or some other catastrophic event and perennial grasses are lost, the site will be slow to recover. The plant communities found on this site are dominated by midgrasses with occasional shrubs throughout. The dominant midgrasses include alkali sacaton (*Sporobolus airoides*), vine mesquite (*Panicum obtusum*), false Rhodesgrass (*Trichloris crinita*), white tridens (*Tridens albescens*), silver bluestem (*Bothriochloa laguroides*), Arizona cottontop (Digitara californica), and plains bristlegrass (*Setaria vulpiseta*). Shortgrasses such as curly-mesquite (*Hilaria belangeri*), Hall's panicum (Panicum halli), and buffalograss (*Bouteloua dactyloides*) were common to the site but made up a small percentage of the total herbaceous production. The woody plant community on this site is sparse and scattered and contain honey mesquite (*Prosopis glandulosa*), lotebush (*Ziziphus obtusifolia*), wolfberry (*Lycium berlandieri*), whitebrush (*Aloysia gratissima*) and prickly pear (Opuntia spp.). Forbs common to the site include jicamilla (*Jatropha cathartica*), low wild mercury (*Argythamnia humilis*), Texas varilla (*Varilla texana*), hairy tubetongue (*Justicia pilosella*), and prostrate bundleflower (*Desmanthus glandulosus*).

Historically, the plant community was maintained by periodic grazing of roaming herds of wildlife, such as bison (Bos bison), and numerous fires that were set by lightning and Native Americans. Likely, this was a shifting mosaic over time over the landscape consisting of burned/grazed and unburn/ungrazed portions. The site was very productive and maintained a high percentage of ground cover with forage production. Runoff of rainfall was slow allowing the soil profile to fill to capacity. The fertility of the site was high.

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.

State and transition model

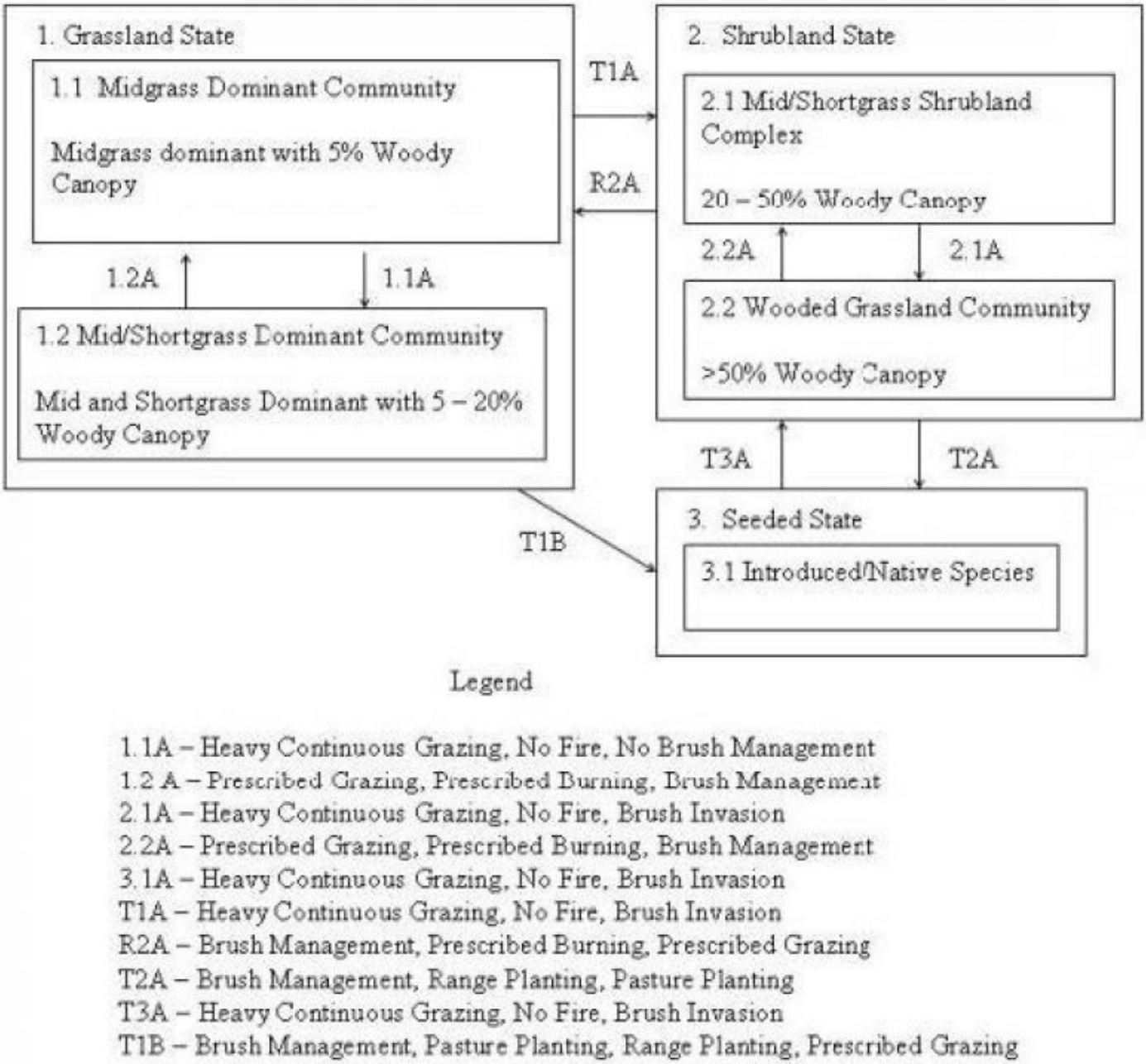

Figure 8. STM

State 1
Grassland

Dominant plant species

- alkali sacaton (*Sporobolus airoides*), grass
- vine mesquite (*Panicum obtusum*), grass

Community 1.1
Midgrass Dominant

The reference community for the site was a midgrass dominated plant community. Trees and shrubs on this site were widely scattered and made up an insignificant portion of total production. Bison grazing was intermittent, and fires were both frequent (5 to 10 years) and intense. This site was extensively grazed by wild ungulates and domestic livestock by the mid-1700's and even more heavily grazed by livestock by the mid-1800's. Abusive grazing with no rest was exacerbated by the introduction of barbed wire and water development. Continued overuse will result in a reduced production of biomass, reduced litter accumulation, loss or reduction of some midgrass species, and reduction of fire frequency and intensity. Common midgrasses include alkali sacaton, false Rhodesgrass, white tridens, Arizona cottontop, plains bristlegrass, and Texas bristlegrass. Shortgrass species

include curly-mesquite, buffalograss, and Hall's panicum. Woody plants included honey mesquite, lotebush, guayacan, wolfberry, whitebrush, and prickly pear.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1000	2500	3700
Tree	150	200	225
Shrub/Vine	100	150	175
Forb	25	50	100
Total	**1275**	**2900**	**4200**

Figure 10. Plant community growth curve (percent production by month). TX4800, Midgrass Dominant Community. Warm-season midgrasses with forbs and shrubs..

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

Community 1.2
Mid/Shortgrass Dominant

Figure 11. 1.2 Mid/Shortgrass Dominant Community

This plant community develops as abusive grazing continues. Midgrasses such as alkali sacaton, false Rhodesgrass, vine mesquite, and plains bristlegrass decrease in the plant community. Less palatable midgrasses such as white tridens and pappusgrass increase along with increased amounts of curly-mesquite and other shortgrasses. Fire frequency and intensity will decrease allowing woody plants and prickly pear to begin encroaching on the landscape. Woody canopy includes mesquite, lotebush, and guayacan.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	800	2200	3200
Tree	200	250	275
Shrub/Vine	150	200	225
Forb	25	50	100
Total	**1175**	**2700**	**3800**

Figure 13. Plant community growth curve (percent production by month). TX4805, Mid/Shortgrass Dominant Community. Mid and shortgrasses with increasing trees and shrubs..

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

Pathway 1.1A
Community 1.1 to 1.2

The reference community (1.1) will transition to the Mid/Shortgrass Dominant Community (1.2) with lack of fire, continued overgrazing, insufficient rest cycles, and/or natural disturbances, like prolonged drought.

Pathway 1.2A
Community 1.2 to 1.1

This phase can be managed back to the Midgrass Dominant Community (1.1) but will take the reintroduction of fire to the ecosystem or some method of brush management that allows selective removal of the plants. A prescribed grazing plan will be essential to reverse the trend and return the midgrasses back to the plant community over an extended period time.

State 2
Shrubland

Dominant plant species

- honey mesquite (*Prosopis glandulosa*), shrub
- lotebush (*Ziziphus obtusifolia*), shrub

Community 2.1
Mid/Shortgrass Shrubland Complex

This community develops because of continued heavy grazing which reduces biomass production and litter accumulation thus reducing fire frequency and intensity. Other subtle impacts occur on the site as water, mineral, and energy cycles are altered. Midgrasses are significantly reduced and alkali sacaton, false Rhodesgrass, vine mesquite, Arizona cottontop and other more palatable mid grasses may be absent. Other midgrasses such as pappusgrass, white tridens, hooded windmillgrass, and purple three-awn are the most common midgrasses. Shortgrasses such as curly-mesquite, whorled dropseed, and Hall's panicum are much more common than in the reference community and account for a higher percentage of herbaceous production. Due to reduced grass canopy, decreased fire frequency, and more exposed soil surface, woody species have increased significantly on the site. The woody plant community will be dominated by honey mesquite and prickly pear, but other woody species such as lotebush, guayacan, whitebrush will be present.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	600	1800	2600
Tree	400	450	500
Shrub/Vine	200	250	300
Forb	50	75	100
Total	**1250**	**2575**	**3500**

Figure 15. Plant community growth curve (percent production by month). TX4801, Mid/Shortgrasses Shrubland Community. Mid and shortgrasses with forbs and 20-50% woody canopy..

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

Community 2.2
Wooded Grassland

Figure 16. 2.2 Wooded Grassland Community

In community 2.1, midgrasses are limited in volume and may be relegated to growing within thorny shrubs and/or prickly pear. Interspaces between woody plants are dominated by shortgrasses such as curly-mesquite, whorled dropseed, Hall's panicum, and purple three-awn. Fire is a rare occurrence and most likely occurs only following years of abundant rainfall. Honey mesquite and prickly pear are greatly increased along with woody shrubs such as whitebrush, lotebush and guayacan. This state may also be heavily invaded by goldenweed and perennial broomweed, which greatly reduces grass production. These weedy species along with mesquite can be managed with appropriate herbicides allowing grasses to increase and flourish. Herbicidal uses should be followed by prescribed grazing and prescribed burning as needed.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	350	1000	1500
Tree	600	650	700
Shrub/Vine	225	275	300
Forb	50	100	150
Total	**1225**	**2025**	**2650**

Figure 18. Plant community growth curve (percent production by month). TX4802, Wooded Grassland Community. Wooded Grassland Community with 50 to 80% woody canopy cover..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	5	14	16	16	10	13	15	6	2	1

Pathway 2.1A
Community 2.1 to 2.2

Continued heavy grazing coupled with lack of fire will cause this community to transition to the Woodland Community (2.2). Brush density and height will continue to increase and shade the ground.

Pathway 2.2A
Community 2.2 to 2.1

To transition Community 2.2 back to 2.1, the land manager will need to apply prescribed grazing, prescribed burning (if enough fuel loads still exist), and brush management. The key is lessening the canopy cover by woody species.

State 3
Seeded

Dominant plant species

- Kleberg's bluestem (*Dichanthium annulatum*), grass

Community 3.1
Introduced/Native Species

The Seeded State is a result of two pathways. One pathway is the result of rootplowing followed by seeding. In the past, seeds adapted to this site included Kleberg bluestem, King Ranch bluestem or Rhodesgrass. The other pathway is a result of abusive grazing followed by invasion of the site by the above-mentioned species. Seeds of the introduced bluestems are wind borne and when these species are present or carried in on vehicles or equipment, invasion is both rapid and complete. Once this site is established to these species, especially the introduced bluestems, reclamation back to a native state is nearly impossible due to the aggressive nature of these plants.

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	600	1600	2400
Tree	40	50	70
Shrub/Vine	20	30	40
Forb	10	20	30
Total	**670**	**1700**	**2540**

Figure 20. Plant community growth curve (percent production by month). TX4806, Converted Land Community - Introduced Seeding. Seeded into introduced grass species..

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

Transition T1A
State 1 to 2

Once the woody canopy exceeds approximately 20 percent and is taller than three feet, a threshold will have been crossed to the Shrubland State (2). In this case energy in the form of heavy equipment and/or herbicides will be required along with prescribed grazing to shift the plant community back to the Grassland State (1).

Transition T1B
State 1 to 3

The Grassland Savannah State (1) can be converted to the Seeded State (3) by controlling the brush and seeding to native or introduced grasses. It may also be plowed and converted to cropland.

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 Shrubland State (2) can be converted to the Seeded State (3) by controlling the brush and seeding to native or introduced grasses. It may also be plowed and converted to cropland.

Transition T3A
State 3 to 2

If the Seeded State (3) is left alone, eventually the woody plants will create a moderate to heavy canopy. At this point, the desired understory grasses, forbs, and/or crops will be shaded out and the site will transition into a Shrubland State (2).

Additional community tables

Table 10. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Midgrasses**			500–1850	
	alkali sacaton	SPAI	*Sporobolus airoides*	400–1000	–
	large-spike bristlegrass	SEMA5	*Setaria macrostachya*	300–800	–
	vine mesquite	PAOB	*Panicum obtusum*	200–400	–
	false Rhodes grass	TRCR9	*Trichloris crinita*	100–400	–
2	**Midgrasses**			250–925	
	Texas bristlegrass	SETE6	*Setaria texana*	150–400	–
	white tridens	TRAL2	*Tridens albescens*	200–400	–
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	75–150	–
	Arizona cottontop	DICA8	*Digitaria californica*	50–150	–
3	**Short/Midgrasses**			150–555	
	hooded windmill grass	CHCU2	*Chloris cucullata*	75–150	–
	tobosagrass	PLMU3	*Pleuraphis mutica*	0–125	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	0–100	–
	whiplash pappusgrass	PAVA2	*Pappophorum vaginatum*	20–100	–
	purple threeawn	ARPU9	*Aristida purpurea*	10–75	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	10–50	–
4	**Shortgrasses**			100–370	
	curly-mesquite	HIBE	*Hilaria belangeri*	100–200	–
	Hall's panicgrass	PAHAH	*Panicum hallii var. hallii*	50–150	–
	Madagascar dropseed	SPPY2	*Sporobolus pyramidatus*	5–100	–
	buffalograss	BODA2	*Bouteloua dactyloides*	0–100	–
	Texas grama	BORI	*Bouteloua rigidiseta*	0–30	–
	red grama	BOTR2	*Bouteloua trifida*	0–20	–
	fall witchgrass	DICO6	*Digitaria cognata*	0–20	–
Forb					
5	**Forbs**			25–100	
	Drummond's goldenbush	ISDR	*Isocoma drummondii*	5–100	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–50	–

	Texas varilla	VATE2	*Varilla texana*	0–50	–
	Berlandier's nettlespurge	JACA3	*Jatropha cathartica*	5–20	–
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	5–20	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	5–20	–
	low silverbush	ARHU5	*Argythamnia humilis*	1–10	–
	prairie broomweed	AMDR	*Amphiachyris dracunculoides*	0–10	–
	Gregg's tube tongue	JUPI5	*Justicia pilosella*	5–10	–
	sensitive plant	MIMOS	*Mimosa*	2–10	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	0–10	–
	globemallow	SPHAE	*Sphaeralcea*	2–10	–
	haplopappus	HAPLO11	*Haplopappus*	2–5	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	0–5	–
	fanpetals	SIDA	*Sida*	2–5	–
	Forb, annual	2FA	*Forb, annual*	1–5	–
	Forb, perennial	2FP	*Forb, perennial*	1–5	–
	Rio Grande stickpea	CACO	*Calliandra conferta*	1–5	–
	glandular bundleflower	DEGL8	*Desmanthus glandulosus*	2–5	–
Shrub/Vine					
6	**Shrubs/Vines**			100–175	
	pricklypear	OPUNT	*Opuntia*	10–50	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	15–50	–
	spiny hackberry	CEEH	*Celtis ehrenbergiana*	10–40	–
	Texas lignum-vitae	GUAN	*Guaiacum angustifolium*	20–40	–
	crown of thorns	KOSP	*Koeberlinia spinosa*	5–20	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	10–20	–
	catclaw acacia	ACGRG3	*Acacia greggii var. greggii*	5–20	–
	catclaw acacia	ACGRW	*Acacia greggii var. wrightii*	5–20	–
	Schaffner's wattle	ACSCB	*Acacia schaffneri var. bravoensis*	5–20	–
	whitebrush	ALGR2	*Aloysia gratissima*	5–20	–
	Texan goatbush	CAERT	*Castela erecta ssp. texana*	5–20	–
	jointfir	EPHED	*Ephedra*	5–15	–
	leatherstem	JADI	*Jatropha dioica*	5–10	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	5–10	–
Tree					
7	**Trees**			150–225	
	honey mesquite	PRGL2	*Prosopis glandulosa*	150–225	–

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 (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.

Seeded 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 grassland and the grassland/shrubland communities on this site use all the water from rainfall events that occur. Research has shown that the evapotranspiration rate on the grassland and the grassland/shrubland is nearly the same. Very little water could be harvested from this site if the woody plant community is replaced by a grass-dominated community.

Recreational uses

White-tailed deer, quail, javelina, and feral hogs are hunted on the site. Bird watching is also common.

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

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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, Zone RMS, NRCS, Corpus Christi, Texas
Contact for lead author	361-241-0609
Date	04/25/2008
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None.

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2. **Presence of water flow patterns:** None except following extremely high intensity storms when short flow patterns may appear.

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

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

bare ground): 0 to 3 percent bare ground with small and non-connected areas.

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5. **Number of gullies and erosion associated with gullies:** None.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.

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

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

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon is 0 to 7 inches of gray clay with medium subangular blocky to moderate very fine granular structure. Surface horizons are hard, firm, very sticky, very plastic with common medium tubular pores. Some surfaces have few fine krotovinas with snail shell fragments. They have violent effervescence and are moderately alkaline.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** High canopy, basal cover, and density with small interspaces should make rainfall impact negligible. This site has very deep, well drained soils with nearly level slopes but have high runoff due to the high clay content.

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

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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 midgrasses >>

    Sub-dominant:

    Other: Warm-season shortgrasses > Cool-season midgrasses > Perennial forbs > Trees > Shrubs/Vines

    Additional: Forbs make up 5% species composition while trees and shrubs/vines compose trace percent species composition.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Grasses will exhibit some mortality and decadence, though very slight.

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1,275 to 4,000 pounds per acre.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Mesquite, prickly pear, golden weed, and white brush are primary invaders.

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17. **Perennial plant reproductive capability:** All species should be capable of plant reproduction, except during periods of prolonged drought conditions, heavy natural herbivory, or wildfires.
