USDA Natural Resources Conservation Service

Ecological site R083CY023TX
Sandy Loam

Last updated: 9/19/2023
Accessed: 04/23/2024

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.

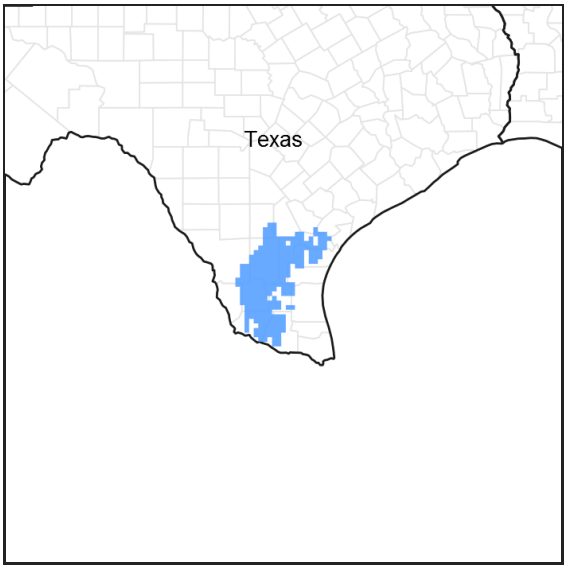


Figure 1. Mapped extent

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): 083C–Central Rio Grande Plain

Major Land Resource Area (MLRA) 83C makes up about 4,275 square miles (11,075 square kilometers). The towns of Freer, George West, and Hebbronville are in this area. The town of Alice is on the east edge of the area. U.S. Highways 59 and 281 cross the area. This area is comprised of inland, dissected coastal plains.

Classification relationships

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

Ecological site concept

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

Associated sites

R083CY002TX	**Shallow Ridge**
R083CY003TX	**Gravelly Ridge**
R083CY004TX	**Shallow Sandy Loam**
R083CY007TX	**Lakebed**
R083CY013TX	**Loamy Bottomland**
R083CY017TX	**Blackland**
R083CY019TX	**Gray Sandy Loam**
R083CY022TX	**Loamy Sand**
R083CY024TX	**Tight Sandy Loam**
R083CY025TX	**Clay Loam**

Similar sites

R083AY023TX	**Sandy Loam**
R083BY023TX	**Sandy Loam**
R083DY023TX	**Sandy Loam**
R083EY023TX	**Sandy Loam**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Acacia greggii* (2) *Celtis ehrenbergiana*
Herbaceous	(1) *Heteropogon contortus* (2) *Digitaria californica*

Physiographic features

Sandy Loam sites are found on nearly level to gently sloping paleoterraces, ridges, and broad interfluves on inland, dissected coastal plains. Slopes range from 0 to 8 percent, but are mainly less than 5 percent. Elevation ranges from 20 to 860 feet.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Paleoterrace (2) Coastal plain > Ridge (3) Coastal plain > Interfluve
Runoff class	Negligible to high
Flooding frequency	None to rare
Ponding frequency	None
Elevation	20–860 ft
Slope	0–5%
Aspect	Aspect is not a significant factor

Climatic features

MLRA 83C is subtropical, subhumid on the western boundary and subtropical humid on the eastern boundary. Winters are dry and mild, and the summers are hot and humid. Tropical maritime air masses predominate throughout spring, summer, and fall. Modified polar air masses exert considerable influence during winter, creating

a continental climate characterized by large variations in temperature. Peak rainfall, because of rain showers, occurs late in spring and a secondary peak occurs early in fall. Heavy thunderstorm activities increase in April, May, and June. July is hot and dry with little weather variations. Rainfall increases again in late August and September as tropical disturbances increase and become more frequent. Tropical air masses from the Gulf of Mexico dominate during the spring, summer, and fall. Prevailing winds are southerly to southeasterly throughout the year except in December when winds are predominately northerly.

Table 3. Representative climatic features

Frost-free period (characteristic range)	255-291 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	23-26 in
Frost-free period (actual range)	255-347 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	21-26 in
Frost-free period (average)	283 days
Freeze-free period (average)	365 days
Precipitation total (average)	25 in

Climate stations used

- (1) CALLIHAM [USC00411337], Calliham, TX
- (2) FREER [USC00413341], Freer, TX
- (3) MCCOOK [USC00415721], Edinburg, TX
- (4) CHOKE CANYON DAM [USC00411720], Three Rivers, TX
- (5) HEBBRONVILLE [USC00414058], Hebbronville, TX

Influencing water features

Some sites may flood following intense tropical storms. No other water features affect this site.

Wetland description

N/A

Soil features

Soils are moderately deep to very deep, well drained, formed in loamy materials derived from sandstone. Soil series correlated to this site include: Czar, Delmita, Duval, Hebbronville, Turcotte, Vargas, Weesatche, and Willacy.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone (2) Eolian deposits–sandstone
Surface texture	(1) Fine sandy loam (2) Loamy fine sand (3) Sandy clay loam
Family particle size	(1) Fine-loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	20–80 in
Surface fragment cover <=3"	0–1%

Surface fragment cover >3"	0–2%
Available water capacity (0-40in)	4–6 in
Calcium carbonate equivalent (0-40in)	0–20%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–10
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–4%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

The plant communities are dynamic and vary in relation to grazing and drought. The reference plant community is an open grassland with scattered mottes of woody shrubs. The dominant grasses included false rhodesgrass (*Trichloris crinita*), plains bristlegrass (*Setaria vulpiseta*), Arizona cottontop (*Digitaria californica*), silver bluestem (*Bothriochloa laguroides*), hooded windmillgrass (*Chloris cucullata*), pink pappusgrass (*Pappophorum bicolor*), and lovegrass tridens (*Tridens eragrostoides*). The mixed brush component is diverse and includes species like mesquite (*Prosopis glandulosa*), brasil (*Condalia hookeri*), granjeno (*Celtis ehrenbergiana*), lime pricklyash (*Zanthoxylum fagara*), desert yaupon (*Schaefferia cuneifolia*), and other woody shrubs. Grasses make up about 90 percent of the composition by weight of the reference plant community.

Climatic variation and topoedaphic heterogeneity interact to influence vegetation responses to disturbances such as fire and grazing. Plants of the reference plant community evolved with and are generally well adapted to grazing and fire. Prior to European settlement, fires would likely have been frequent, between 5 and 10 years. These fires would have resulted from lightning during the hot, dry summer months or were set by Native Americans. The occurrence of fire promotes grasses while making it difficult for woody plants to achieve dominance. During the Pleistocene, there were significant populations of large-bodied grazers and browsers. Most of these went extinct, so that by the Holocene (about 10,000 years ago) only bison (Bos bison), white-tailed deer (Odocoileus virginianus), and antelope (Antilocapra americana) remained. Archeological evidence indicates that bison occurred in the region, but there is also evidence of centuries of absence. In addition, their numbers may have varied seasonally as herds migrated. When present, bison may have grazed certain areas heavily, but then moved on. Activities of other native herbivores (termites, cutter ants, soil nematodes, kangaroo rats (Dipodomys spp.)) also influenced vegetation productivity and dynamics.

Accounts of earlier explorers and settlers suggest the Rio Grande Plains was likely a mosaic of grasslands, savannahs, shrublands, and woodlands. Historical photographs suggest the nature of the vegetation structure likely varied from place-to-place depending on topography, soil properties and time since the last major disturbances (such as drought or fire). However, the occurrence of extensive grasslands and grassland fauna (antelope, for example) is mentioned in numerous historical accounts. Grasses dominating Sandy Loam uplands at the time of European settlement likely included little bluestem (*Schizachyrium scoparium*), false Rhodes grass (Chloris crinata), and multiflower false Rhodes grass (Chloris pluriflora), Arizona cottontop (*Digitaria californica*), plains bristlegrass (*Setaria vulpiseta*), and pink pappusgrass (*Pappophorum bicolor*). The composition and productivity of grass communities would have varied with annual rainfall, soil depth and the extent of argillic horizon development. Many Sandy Loam sites are now dominated by mesquite (*Prosopis glandulosa*), various acacias (Acacia spp.), granjeno (Celtis pallida), condalia (Condalia obovata), lime prickly ash, and prickly pear (Opuntia spp.). These woody plants are not new arrivals, but are native to the region and have increased in size and abundance within their historic ranges.

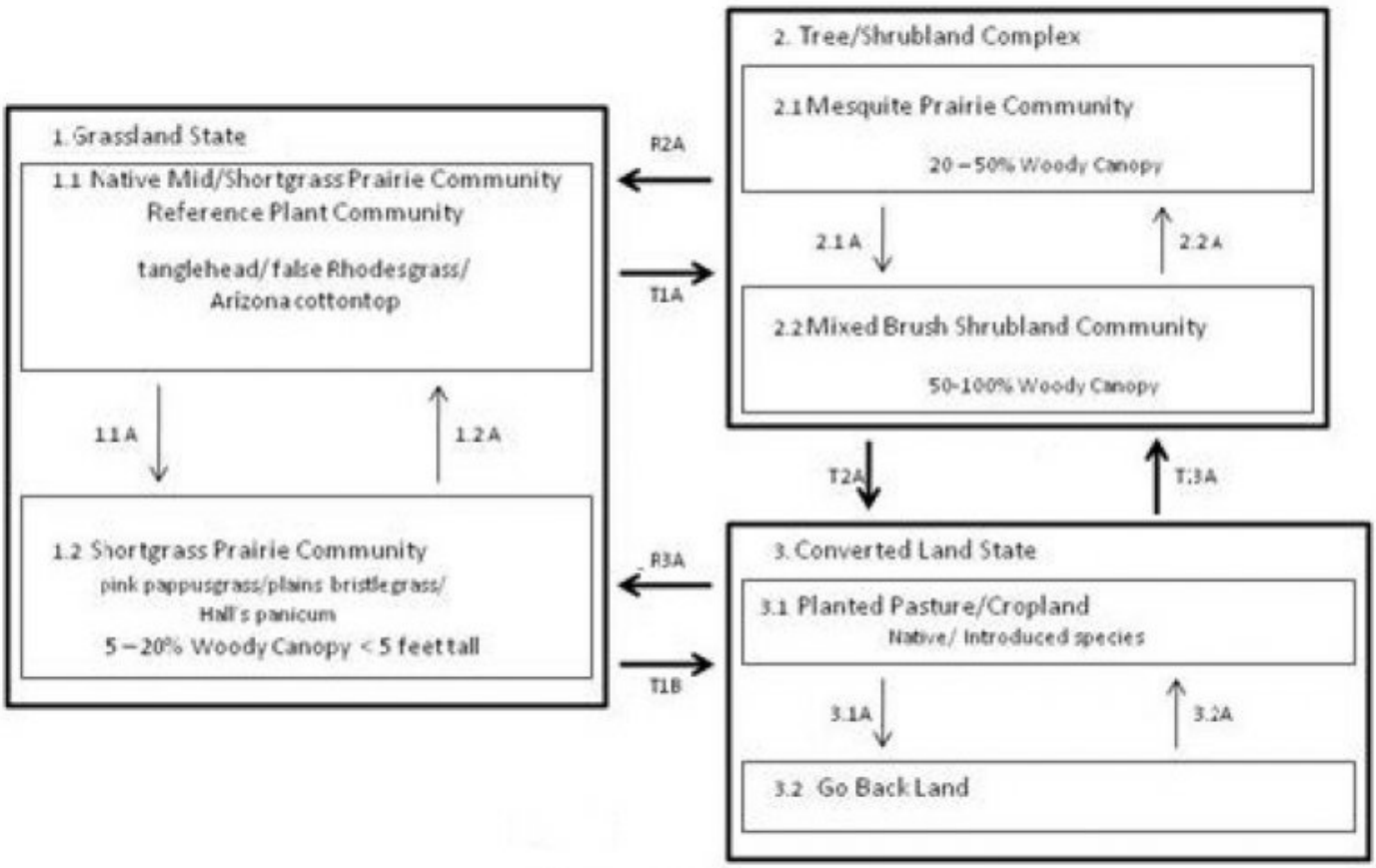
Grazing and fire are two factors that critically influence the relative abundance of grasses and woody plants through time. By the early 1800’s cattle and sheep numbers appear to have been quite high in the Rio Grande Plains,

resulting in heavy, year-round grazing. The resulting reduction in abundance of late seral grasses lead to a decline in soil organic matter, a reduction in fire frequency/intensity (due to lack of fine fuels), and a shift from midgrass domination to shortgrass, like hooded windmill grass (*Chloris cucullata*), three-awns (Aristida spp.) and forbs, like orange zexmenia (Wedelia hispida), and croton (Croton spp.). These changes would have favored woody plants, most of which are unpalatable to livestock, and enabled them to establish and attain dominance. This would be especially true for leguminous shrubs such as mesquite, whose seeds are widely spread by livestock.

The shift from grass to woody plant domination became the impetus for brush management practices. By the 1950's, large-scale mechanized clearing was common and by the 1970's, aerial herbicide applications were widespread. However, by the 1980's it was clear that brush management practices were often treating symptoms rather than underlying problems and having undesirable environmental consequences, including adverse effects on wildlife populations. Sites cleared of brush regenerated rapidly and often formed thickets that were denser and of lower diversity than the original stands. This realization, coupled with the fact that brush management treatments were typically short-lived, lead to the development of Integrated Brush Management Systems (IBMS). The IBMS approach takes a holistic, large-scale, long-term, whole-farm, ecosystem-based approach to brush management and recognizes multiple-use options for rangeland resources. Shrublands developing on former grasslands have other potential socioeconomic values that should be considered when contemplating brush management. These include alternate classes of livestock, lease hunting, deer and exotic game ranching, and ecotourism.

While shrublands on Sandy Loam sites have traditionally been viewed as degraded from a livestock production standpoint, it is important to recognize that they are not necessarily degraded from the ecological perspectives of primary productivity, nutrient cycling and biodiversity. The productivity of shrublands may be comparable to the grassland they replaced. In addition, shrubs modify soils and microclimate to increase levels of organic matter and nutrients in the upper four inches of the soil profile. This nutrient enrichment by shrubs can offset grazing-induced losses of soil nutrients and contribute to enhance grass production when shrub cover is reduced by natural or management-induced means. While the development of shrub communities may have adverse impacts on grasses and grassland fauna, other plants and animals may benefit. Thus, while ecosystem biodiversity certainly changes, it does not necessarily decrease with a shift from grass to woody plant domination on Sandy Loam sites.

State and transition model



Legend

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

State 1
Grassland

Dominant plant species

- false Rhodes grass (*Trichloris crinita*), grass
- plains bristlegrass (*Setaria vulpiseta*), grass

Community 1.1

Native Mid/Shortgrass Prairie

This Native Mid/Shortgrass Prairie Community (1.1) developed under natural disturbance regimes spanning thousands of years. Composition of midgrasses makes up about 60 percent of annual production, shortgrasses approximately 30 percent, and associated forbs and shrubs make up the remainder. Annual forbs occur in varying amounts in response to grazing intensity, fire, drought, or excessive precipitation. The herbaceous plant structure will vary depending mainly on weather conditions and grazing pressure, but a mix of healthy mid and shortgrass species will maintain enough ground cover to facilitate water infiltration into the soil and outcompete shrub species for light and nutrients. The differences in rainfall will cause subtle changes in plant community and overall productivity. Although the values provided in this report are representative, doing an onsite inventory of plant community and production when planning management decisions will help land managers make sound decisions based on actual conditions on the ground.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1800	3000	3600
Forb	100	150	200
Shrub/Vine	100	130	160
Tree	0	20	40
Total	**2000**	**3300**	**4000**

Table 6. Ground cover

Tree foliar cover	0-1%
Shrub/vine/liana foliar cover	0-1%
Grass/grasslike foliar cover	70-90%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-25%
Surface fragments >0.25" and <=3"	0-4%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0-5%

Table 7. Canopy structure (% cover)

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

Figure 9. Plant community growth curve (percent production by month). TX5125, Midgrass Grassland Community. Warm-season production from grass, forbs, and woody species..

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

Community 1.2
Shortgrass Prairie

The Shortgrass Prairie Community (1.2) develops because of continued heavy grazing, an absence of the historic fire regime, and lack of brush management. The grass community in this phase is less productive and has less litter than the Mid/Shortgrass Prairie (1.1). Shortgrasses are very common and bare ground will increase and vary depending on grazing use and rainfall. The ability to support the historic fire regime is diminished and the shrub community will begin to increase over time. This plant community phase can quickly transition from a grass-dominated community to a shrub community if conditions do not favor herbaceous production. When this site occurs on water shedding positions the plant community will look similar to the Tight Sandy Loam ecological site because the soil surface can form a crust and runoff increases. In this phase, reduced rainfall and prolonged droughts will begin to have more of an impact on plant production. As midgrasses decrease, shortgrasses such as red grama, Hall's panicum (*Panicum hallii*), and perennial threeawns increase. Annual and perennial forbs often increase as a result of decreased competition for sunlight and moisture. This phase will quickly transition to the Tree/Shrubland Complex (2) if herbaceous plant production does not increase and shrub density grows.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1350	2025	2700
Shrub/Vine	450	700	950
Forb	150	200	250
Tree	50	75	100
Total	**2000**	**3000**	**4000**

Figure 11. Plant community growth curve (percent production by month). TX5128, Shortgrass Dominant Community. Shortgrass dominates the site with decreasing midgrasses and increasing shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	5	15	20	21	5	5	10	10	5	2

Pathway 1.1A
Community 1.1 to 1.2

The midgrasses that dominate the landscape are highly preferred by livestock and are easily eliminated from the plant community with heavy continuous grazing. Once shortgrass species begin to dominate the herbaceous community, environmental factors like an increase in bare ground and water runoff will begin to favor the invasion of woody species. The historic fire regime has also been changed so that intermittent fires every three to eight years, which would decrease woody plant encroachment and encourage midgrass dominance, have been prevented to protect livestock and societal interests. These factors cause a shift from a Native Mid/Shortgrass Prairie Community (1.1) to a Shortgrass Prairie Community (1.2).

Pathway 1.2A
Community 1.2 to 1.1

The restoration to the Reference Plant Community (1.1) can be accomplished by prescribed grazing with appropriate stocking rates. If the herbaceous component of this community remains healthy and maintains at least 85 to 90 percent ground cover, including live plants and litter, the woody component of this site will remain stable

and new seedling growth will be inhibited. Individual Plant Treatment (IPT) and prescribed burning will be the most efficient and economical ways to manage brush species encroachment. The use of prescribed fire in conjunction with prescribed grazing enhances the recovery process. Mechanical or chemical brush management is also feasible and relatively economical because this community has less than a 20 percent shrub canopy. Once initial woody plant management has been achieved, periodic burning, reduced stocking, and prescribed grazing will cause a transition towards the reference plant community over time. If the landowner wants to speed this transition, some range planting can be done to increase the number of desired species.

State 2
Tree/Shrubland

Dominant plant species

- honey mesquite (*Prosopis glandulosa*), shrub

Community 2.1
Mesquite Prairie

Figure 12. 2.1 Mesquite Prairie Community

A threshold has been crossed between the Grassland State (1) and the Tree/Shrubland Complex (2). This Mesquite Prairie Community (2.1) has developed because of continuous heavy grazing, loss of fire as a management tool, greatly altered water and energy cycles, and invasion of woody plants. Episodic droughts will also hasten this process. The shift from the Grassland Community (1) to the Mesquite Prairie Community (2.1) can happen within a period of 5 to 10 years under certain conditions. Mesquite will be the first woody species to invade this site, but other woody species, such as granjeno and lime pricklyash, will occur as part of the plant community. The woody species will begin to form mottes which will grow in size and density. In this state the herbaceous plant community is quickly becoming less productive and as a result bare ground increases. This can become a problem the soil surface begins to crust and creates conditions that are not conducive to grass or forb germination. Unpalatable perennial forbs like dogweed (Thymophylla penchaeta) and false broomweed will invade. During rainfall events, more water will runoff of the site depending on its landscape position and slope, instead of entering the soil and becoming available to the plants. This will favor the shrubby species and break the water and nutrient cycles that promote herbaceous production.

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1000	1500	2000
Shrub/Vine	800	1200	1600
Tree	100	150	200
Forb	100	150	200
Total	**2000**	**3000**	**4000**

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
Mixed Brush Shrubland

Figure 15. 2.2 Mixed Brush Shrubland

Figure 16. 2.2 Mixed Brush Shrubland

Over time, with continued heavy grazing, no fire, and no brush management the Sandy Loam ecological site will be transformed into a Mixed Brush Shrubland Complex (2.2) with canopies from 50 to 100 percent. Average canopy height in this state ranges from 10 to 20 feet with motte size and spacing varying from less than 2 feet to more than 30 feet depending on the age of the shrub community and the strength of the herbaceous plants. Shrub species like lotebush (*Ziziphus obtusifolia*), desert yaupon, agarito (*Mahonia trifoliolata*), and armagosa (*Castela erecta*) will increase and can create dense shrub mottes with very little understory herbaceous production. Extended droughts will hasten this process. In this state, grass production is severely limited, and no amount of deferred grazing will restore the plant community to the Grassland state. The herbaceous production is dominated by threeawn species, Hall's panicum, red grama (*Bouteloua trifida*), and annual forbs and grasses. The same grass species present in the Grassland state (1) can be found in this community phase, but they will be much less productive and more infrequent. Livestock management also becomes problematic in this plant community because of drastically reduced grass production.

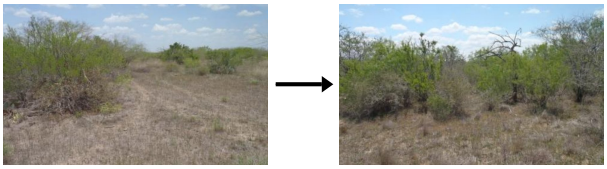
Table 10. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	1050	1700	2350
Tree	400	600	800
Grass/Grasslike	500	625	750
Forb	50	75	100
Total	**2000**	**3000**	**4000**

Figure 18. Plant community growth curve (percent production by month). TX5131, Shrubland Complex Community, >50% woody canopy. Woodland Community with 50-80% woody canopy cover..

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

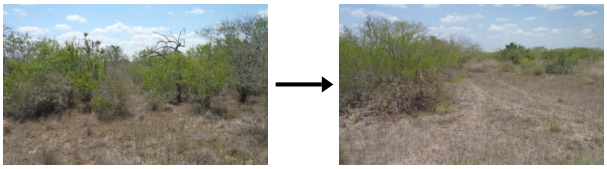
Pathway 2.1A
Community 2.1 to 2.2



Mesquite Prairie **Mixed Brush Shrubland**

Without diligent brush management along with prescribed grazing and other conservation practices this phase will inevitably transition from a Mesquite Prairie Community (2.1) to a Mixed Brush Shrubland Complex (2.2). This transition can happen within a 10-year period and is based on an increase of woody canopy cover to more than 50 percent and a severe decrease in herbaceous plant production. An increase in shrub diversity will also occur. Shortgrasses and forbs will dominate the herbaceous vegetation and while this transition may be desirable for some wildlife, it will be detrimental for a cattle or livestock operation.

Pathway 2.2A
Community 2.2 to 2.1



Mixed Brush Shrubland **Mesquite Prairie**

Major inputs, both chemical and mechanical, are often required to restore this community to the Mesquite Prairie Community (2.1). Often with this community, mechanical means such as root plowing and raking are utilized along with dozing and grubbing to create a mosaic of brush mottes that allow herbaceous plants to thrive. Species like mesquite and huisache will re-sprout if not removed completely from the ground. Chaining and roller chopping are mechanical practices which will be short-lived and will typically result in thicker, harder to manage brush stands and will encourage brush seedlings. Follow-up conservation practices such as Individual Plant Treatment (IPT) for woody re-growth and new seedlings and prescribed grazing will be necessary for several years after the initial brush management to maintain an improved plant community. Depending on local conditions it may also be necessary to re-introduce a seed source for desired native plant species through range planting.

State 3
Converted Land

Dominant plant species

- buffelgrass (*Pennisetum ciliare*), grass

Community 3.1
Planted Pasture/Cropland

Figure 19. 3.1 Planted Pasture/Cropland

Figure 20. 3.1 Planted Pasture/Cropland

To go from the Mixed Brush Shrubland Complex (2.2) to the Converted Land State, (3) mechanical brush management must be applied. Typically, rootplowing and raking are utilized to remove the woody vegetation. A seedbed is then prepared, and the area is planted into grass or crops. Typical crops planted on this site include small grains, oats, or feed grains like sorghum and hay grazer. If introduced species are planted with the addition of moderate to high rates of commercial fertilizer this site can be productive. Because these soils are productive, this site has historically been planted to buffelgrass or introduced bluestems. Inputs such as fertilizer, herbicide, and adequate precipitation or irrigation may be necessary to maintain high productivity. Now, because of the availability of seed, landowners can also replant with native species. To maintain this seeded state, herbicides must be used to control woody seedlings that invade as soon as the pasture is established. Not only is there a long-lived seed source of mesquite, huisache, and other woody species, additional seed are brought in by grazing animals and domestic livestock.

Table 11. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2000	3000	4000
Total	**2000**	**3000**	**4000**

Figure 22. Plant community growth curve (percent production by month). TX5132, Converted Land Community - Pastureland. Converting into pastureland by planting native and 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

Community 3.2
Go Back Land

Figure 23. 3.2 Go Back Land

This community develops after land has been cropped and left to fallow without management inputs. It can also develop after a mechanical brush management practice has been applied during poor weather conditions or not followed up with appropriate management practices. It is typified by the dominance of woody species, very little herbaceous grass production, high amounts of annual forbs and grasses, and large areas covered by tree-leaf litter, bare ground, and low plant diversity. Because of the seed bank present in the soil and the constant addition of new seed from grazing/browsing animals and seed eating birds, re-infestation of woody seedlings happens in a relatively short time period of two to five years. Typically, pastureland will transition to the Mesquite Prairie Community (2.1) and not to Go Back Land (3.2).

Figure 24. Plant community growth curve (percent production by month). TX5136, Converted Land Community - Woody Seedling Encroachment. Converted Land Community that has been encroached by woody seedlings due to abandonment of crop and pastureland..

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

Pathway 3.1A
Community 3.1 to 3.2

Planted Pasture/Cropland **Go Back Land**

The transition from Planted Pasture/Cropland (3.1) to Go Back Land (3.2) can occur when crop fields are left to fallow without management. Generally, pasture will transition to the Tree/Shrubland Complex (2) and not to the Go Back Land plant community.

Pathway 3.2A
Community 3.2 to 3.1

Go Back Land Planted Pasture/Cropland

Many land managers may want to utilize this site as cropland or pastureland. To achieve this transition land clearing practices such as dozing and raking will be necessary. After the land has been cleared and an appropriate seedbed prepared, the crop or pasture can be planted.

Transition T1A
State 1 to 2

The transition from the Grassland State (1) to the Tree/Shrubland Complex (2) can happen within 5 to 10 years. This transition can be driven by persistently dry weather conditions, grazing management, and the lack of fire and brush management practices. Overstocking the site with grazing animals will put pressure on the herbaceous plant component of the community. This will create a more favorable environment with bare ground and open spaces for woody plants to germinate and grow. If the woody component is not managed it will begin to dominate the landscape and out-compete grasses and forbs for water, sunlight, and other resources.

Transition T1B
State 1 to 3

Land managers may want to utilize this site as cropland or pastureland. To achieve this transition from the Grassland State (1), brush management and heavy disking with a Rhome disk, or other heavy implement, will be necessary to incorporate the vegetation into the soil. Prescribed burning can also be used prior to the disking operation to eliminate excessive vegetation. After the land has been cleared and an appropriate seedbed prepared, the crop or pasture can be planted.

Restoration pathway R2A
State 2 to 1

Major inputs, both chemical and mechanical, are often required to restore the Tree/Shrubland Complex State (2) to the Grassland State (1). The same techniques used to transition to the Mesquite Prairie Community (2.1) are used, but much more brush is typically cleared, allowing the majority of the site to revert to a Mid/Shortgrass Prairie Community (1.1). Depending on local conditions, it may also be necessary to prepare an appropriate seedbed and re-introduce a seed source for desired native plant species through range planting.

Transition T2A
State 2 to 3

Land managers may want to utilize this site as cropland or pastureland. To achieve this transition, practices such as dozing and raking will be necessary. After the land has been cleared and an appropriate seedbed prepared, the crop or pasture can be planted.

Transition T3A
State 3 to 2

If the Go Back Land Community (3.2) is left alone, eventually the woody plants will create a moderate to heavy canopy. At this point, the desired understory grasses, forbs, and/or crops will be shaded out and the site will transition into a Tree/Shrubland Complex (2).

Additional community tables

Table 12. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)

Grass/Grasslike					
1	**Tall/Midgrasses**			600–1200	
	tanglehead	HECO10	*Heteropogon contortus*	200–450	–
	false Rhodes grass	TRCR9	*Trichloris crinita*	200–450	–
	multiflower false Rhodes grass	TRPL3	*Trichloris pluriflora*	200–450	–
2	**Midgrasses**			1000–2000	
	silver beardgrass	BOLA2	*Bothriochloa laguroides*	150–400	–
	hooded windmill grass	CHCU2	*Chloris cucullata*	150–400	–
	Arizona cottontop	DICA8	*Digitaria californica*	150–400	–
	pink pappusgrass	PABI2	*Pappophorum bicolor*	150–400	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	150–400	–
3	**Shortgrasses**			200–400	
	threeawn	ARIST	*Aristida*	30–75	–
	Texas grama	BORI	*Bouteloua rigidiseta*	30–75	–
	fall witchgrass	DICO6	*Digitaria cognata*	30–75	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	30–75	–
	curly-mesquite	HIBE	*Hilaria belangeri*	30–75	–
	Hall's panicgrass	PAHA	*Panicum hallii*	30–75	–
	lovegrass tridens	TRER	*Tridens eragrostoides*	30–75	–
	slim tridens	TRMU	*Tridens muticus*	30–75	–
Forb					
4	**Forbs**			100–200	
	Forb, annual	2FA	*Forb, annual*	20–50	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	20–50	–
	Arkansas dozedaisy	APSK	*Aphanostephus skirrhobasis*	20–50	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	20–50	–
	bushsunflower	SIMSI	*Simsia*	20–50	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	20–50	–
Shrub/Vine					
5	**Shrubs**			100–160	
	catclaw acacia	ACGR	*Acacia greggii*	20–50	–
	spiny hackberry	CEEH	*Celtis ehrenbergiana*	20–50	–
	Brazilian bluewood	COHO	*Condalia hookeri*	20–50	–
	Texan hogplum	COTET	*Colubrina texensis var. texensis*	20–50	–
	Texas lignum-vitae	GUAN	*Guaiacum angustifolium*	20–50	–
	desert yaupon	SCCU4	*Schaefferia cuneifolia*	20–50	–
	lime pricklyash	ZAFA	*Zanthoxylum fagara*	20–50	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	20–50	–
Tree					
6	**Trees**			0–40	
	honey mesquite	PRGLG	*Prosopis glandulosa var. glandulosa*	0–40	–

Animal community

As a historic tall/midgrass prairie, this site was occupied by bison, antelope, deer, quail, turkey, and dove. This site was also used by many species of grassland songbirds, migratory waterfowl, and coyotes. This site now provides forage for livestock and is still used by quail, dove, migratory waterfowl, grassland birds, coyotes, and deer.

Feral hogs (Sus scrofa) can be found on most ecological sites in Texas. Damage caused by feral hogs each year includes, crop damage by rutting up crops, destroyed fences, livestock watering areas, and predation on native wildlife. Feral hogs have few natural predators, thus allowing their population to grow to high numbers.

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

Grassland State (1): This state provides the maximum amount of forage for livestock such as cattle. It is also utilized by deer, quail and other birds as a source of food. When a site is in the reference plant community phase (1.1) it will also be used by some birds for nesting, if other habitat requirements like thermal and escape cover are near.

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

Converted Land State (3): The quality of wildlife habitat this site will produce is extremely variable and is influenced greatly by the timing of rain events. This state is often manipulated to meet landowner goals. If livestock production is the main goal, it can be converted to pastureland. It can also be planted to a mix of grasses and forbs that will benefit both livestock and wildlife. A mix of forbs in the pasture could attract pollinators, birds and other types of wildlife. Food plots can also be planted to provide extra nutrition for deer.

This rating system provides general guidance as to animal preference for plant species. It also indicates possible competition between kinds of herbivores for various plants. Grazing preference changes from time to time, especially between seasons, and between animal kinds and classes. Grazing preference does not necessarily reflect the ecological status of the plant within the plant community. For wildlife, plant preferences for food and plant suitability for cover are rated. Refer to habitat guides for a more complete description of a species habitat needs.

Hydrological functions

Peak rainfall periods occur in May and June from thunderstorms and in September and October from tropical systems. Rainfall events may be high (3 to 5 inches per event) and intense. Extended periods (45 to 60 days) of little to no rainfall during the growing season are common. Because of the flat topography of this site erosion is minimal. On more sloping aspects (greater than three percent), erosion may be very significant. This site provides little water for aquifer recharge because when wet, infiltration is very slow.

Recreational uses

Hunting and photography are common activities.

Wood products

In the Grassland State, no wood products are available. In a Shrubland State, the site may produce many large mesquite trees and these are often cut for firewood and barbecue.

Inventory data references

The data contained in this document is derived from analysis of inventories, clipping studies, and ecological

interpretation from field evaluations.

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Rangeland health reference sheet

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

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Date	09/17/2012
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. **Presence of water flow patterns:** Few water flow pattens are normal for this site following intense rainfall events.

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

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

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** Small-to-medium sized litter may move short distances during intense storms.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil surface is resistant to erosion. Soil stability class range is expected to be 4 to 6.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface struture is 5 to 14 inches thick with colors ranging from very dark grayish brown to brown with subangular blocky structure. Soil organic matter is less than three percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** A high canopy cover of bunch, rhizomatous, and stoloniferous grasses will help minimize runoff and maximize infiltration. Grasses should comprise approximately 90 percent of total annual production by weight. Shrubs will comprise about 5% by weight.

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

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

    Dominant: Perennial Midgrasses > Perennial Tall/Midgrasses >>

    Sub-dominant: Perennial Shortgrasses > Forbs > Shrubs > Trees

    Other:

    Additional:

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

14. **Average percent litter cover (%) and depth (in):** 5 to 20 percent litter cover.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 2,000 to 5,500 pounds per acre.

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if**

their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: Mesquite, Old World bluestems, and buffelgrass.

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17. **Perennial plant reproductive capability:** All species should be capable of reproducing.
