USDA Natural Resources Conservation Service

Ecological site R083EY024TX
Tight Sandy Loam

Last updated: 9/21/2023
Accessed: 11/13/2024

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.

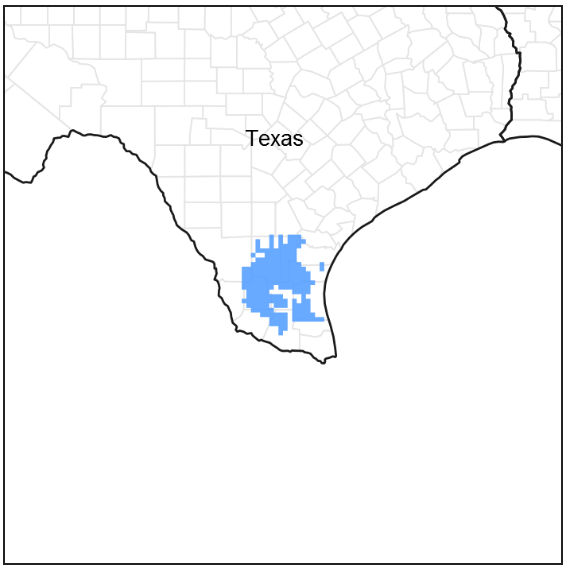

Figure 1. Mapped extent

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): 083E–Sandsheet Prairie

Major Land Resource Area (MLRA) 83E makes up about 4,300 square miles (11,150 square kilometers). The towns of Falfurrias, Premont, and Sarita are in this area. U.S. Highways 77 and 281 run through the area in a north-south direction.

Classification relationships

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

Ecological site concept

The Tight Sandy Loam ecological site has fine sandy loam and loamy fine sand surface textures are underlain by a dense argillic horizon at 9 to 14 inches. These contrasting soil textures perch water during rainfall events but become droughty during times of dry weather.

Associated sites

R083EY014TX	**Sandy Flat**
R083EY021TX	**Sandy**
R083EY023TX	**Sandy Loam**
R083EY007TX	**Lakebed**
R083EY022TX	**Loamy Sand**

Similar sites

R083AY024TX	**Tight Sandy Loam**
R083DY024TX	**Tight Sandy Loam**
R083CY024TX	**Tight Sandy Loam**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Celtis ehrenbergiana* (2) *Zanthoxylum fagara*
Herbaceous	(1) *Schizachyrium scoparium* (2) *Bouteloua curtipendula*

Physiographic features

The sites are found on nearly level to gently sloping soils on the Sandsheet Prairie of the South Texas Sand Plain. Slopes range from 0 to 5 percent but mainly 0 to 3 percent slopes. Elevation ranges from 10 to 920 feet.

Table 2. Representative physiographic features

Landforms	(1) Sand plain > Sand sheet
Runoff class	Low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	3–280 m
Slope	0–3%
Water table depth	114–203 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 83 has a subtropical subhumid climate. Winters are dry and fairly 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)	235-365 days
Freeze-free period (characteristic range)	365 days

Precipitation total (characteristic range)	610-737 mm
Frost-free period (actual range)	222-365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	559-762 mm
Frost-free period (average)	288 days
Freeze-free period (average)	365 days
Precipitation total (average)	660 mm

Climate stations used

- (1) FALFURRIAS [USC00413063], Encino, TX
- (2) MCCOOK [USC00415721], Edinburg, TX
- (3) RAYMONDVILLE [USC00417458], Raymondville, TX
- (4) SARITA 7 E [USC00418081], Sarita, TX
- (5) HEBBRONVILLE [USC00414058], Hebbronville, TX
- (6) KINGSVILLE NAAS [USW00012928], Kingsville, TX

Influencing water features

During normal years of precipitation, a seasonal water table perches on top of the natric horizon for brief periods of less than one to two weeks, most likely in the months of May to October. In some years tropical storms or prolonged periods of above-normal precipitation result in a seasonal water table perched on top of the natric horizon for two to four weeks most likely in the months of June to October. This site does not contain wetlands.

Wetland description

N/A.

Soil features

The soils are very deep, moderately well drained, slow to very slow permeable that formed in sandy eolian deposits over loamy sediments of Pleistocene age. Most soils will have an abrupt texture change from the A and B horizons between 9 to 13 inches of the surface and these soils will also have a natric horizon within 40 inches. Soils correlated to this site include: Delfina, Palobia, and Papalote.

Table 4. Representative soil features

Parent material	(1) Eolian sands–sedimentary rock (2) Alluvium–sedimentary rock
Surface texture	(1) Loamy fine sand (2) Fine sandy loam
Family particle size	(1) Fine-loamy (2) Fine
Drainage class	Moderately well drained
Permeability class	Moderately slow to slow
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–12.7 cm

Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–16 mmhos/cm
Sodium adsorption ratio (25.4-101.6cm)	5–30
Soil reaction (1:1 water) (0-101.6cm)	5.6–9
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Climate is an important, sometimes downplayed, force that affects the plant communities by impacting general plant composition and diversity at a regional scale. Over the past 130 years three climatic regimes have exhibited distinct weather patterns over the American South West that can be related to the establishment of different kinds of plants (e.g. C4 grasses versus C3 shrubs). Perennial warm season grasses and plants (usually C4) benefit most when spring and summer rainfall is consistent. On the opposite spectrum, mesquite, shrubs, and cool season annuals (usually C3) can take advantage of winter rains and can also conserve energy during hot dry summers.

Droughts are a common occurrence in South Texas and were often documented in letters and historical text. For example, Captain John S. "Rip" Ford mentioned the 1864 drought in his memoirs. He reported thousands of domestic animals dead around South Texas water holes and that the Nueces River was dry for miles. Maria Von Blucher commented in 1872 that, "as a result of the tremendous drought…half of all the cattle in Texas died…at every prominence where one can overlook the Nueces River, one might count more than 3,000 dead cattle."

Despite the dry climate, this area of Texas was a mid/shortgrass prairie, which was attractive to ranchers and early settlers. In the mid-1800's the number of grazing animals affecting the ecosystem began to rise dramatically. In general, numbers of wild horses and cattle increased from the 1840's through the end of the Civil War. Sheep numbers expanded to outnumber both cattle and horses between 1867 and 1900, and peaked at numbers exceeding 2 million. Since that time sheep numbers have fallen dramatically, and cattle have become the principal commercial livestock. The January 2013 Texas Livestock Inventory provided by the National Agricultural Statistics Service shows that less than 500,000 head of livestock including cattle, sheep, and goats are currently being raised south of the Nueces River.

Starting in the mid-1800's the region saw wide anthropogenic changes in several environmental disturbance regimes. Research done to investigate the transition from grassland plant communities to shrubland communities in South Texas indicates that a significant successional change across the region began 100 to 200 years ago, and that stable carbon isotope ratios indicate C3 woody plants currently occupy sites once dominated by C4 grasses. When climate and/or other disturbance regimes change to favor the establishment and spread of woody plants a transition from grassland to shrubland will occur. As grazing use increases past sustainable levels mulch, litter, and other types of ground cover start to decrease, including standing herbaceous material. The plant community structure would also change slowly from a mid/shortgrass prairie to a short grass prairie with an increase in bare ground, annual forbs, and perennial woody species. This would have had a significant impact on water runoff and infiltration rates as well as soil temperatures and historic fire regimes.

Climate and unsustainable grazing pressure have played large roles in the conversion of South Texas grasslands to what is now called "brush country", but another important factor is a change in the historic fire regime. The range of woody species has not significantly changed in the past 300 to 500 years, but the stature and density of shrub species has greatly increased. The historic fire regime of South Texas was highly variable with fires every five to thirty years. The variability of fires across the region would have been driven by several factors including fine fuel load but, at a local level, fires would have been frequent enough to prevent woody plant seedlings from maturing and dominating a particular area. Grasses are much better adapted to survive periodic fires and have faster regrowth rates than most shrub species but, once established; brush species in South Texas have shown the tendency to survive fires because of their re-sprouting characteristics.

On the Sandsheet Prairie, the surface texture of most of the soils allows water to infiltrate the soil easily. Because water can infiltrate into the soil quickly water runoff and erosion are not typical resource concerns. This allows plants to take advantage of rainfall events and increase production and growth. This favors quick response of herbaceous plants, but shrubs will have a long-term benefit. Another factor which plays an important role in plant community development is the sandy clay or clay loam argillic horizon which is usually 9 to 14 inches below the soil surface. This soil horizon is slowly permeable and can create a temporary water table after rainfall events. On the other hand, during times of dry weather or drought the consistency of the argillic horizon will become very hard, reducing plant available water and restricting root growth. This causes the site to become droughty and will severely impact plant production.

The reference plant community is a grassland with scattered live oak mottes and occasional mesquite trees. Little bluestem is the prevailing dominant. False rhodesgrass and multi-flowerd false Rhode’s grass (*Trichloris pluriflora*) are the co-dominants on this site. Other important associated grasses included pink pappusgrass (*Pappophorum bicolor*), brownseed paspalum, silver bluestem (*Bothriochloa laguroides*), and thin paspalum. The reference plant community supports a diverse understory of perennial legumes and other forbs.

On severely grazed rangeland, little bluestem is virtually absent. Sandbur, fringed signalgrass, red lovegrass, rose palafoxia (*Palafoxia rosea*), and other forbs dominate. Severe overuse results in a large amount of bare ground, causing blowing sand. Blowing sand further accelerates community degradation. Mesquite increases with continued overuse. Once the mesquites reach sufficient size, understory shrubs including granjeno (Celtis pallida), brasil (*Condalia hookeri*), and lime prickly-ash (*Zanthoxylum fagara*) establish beneath them forming brush mottes.

State and transition model

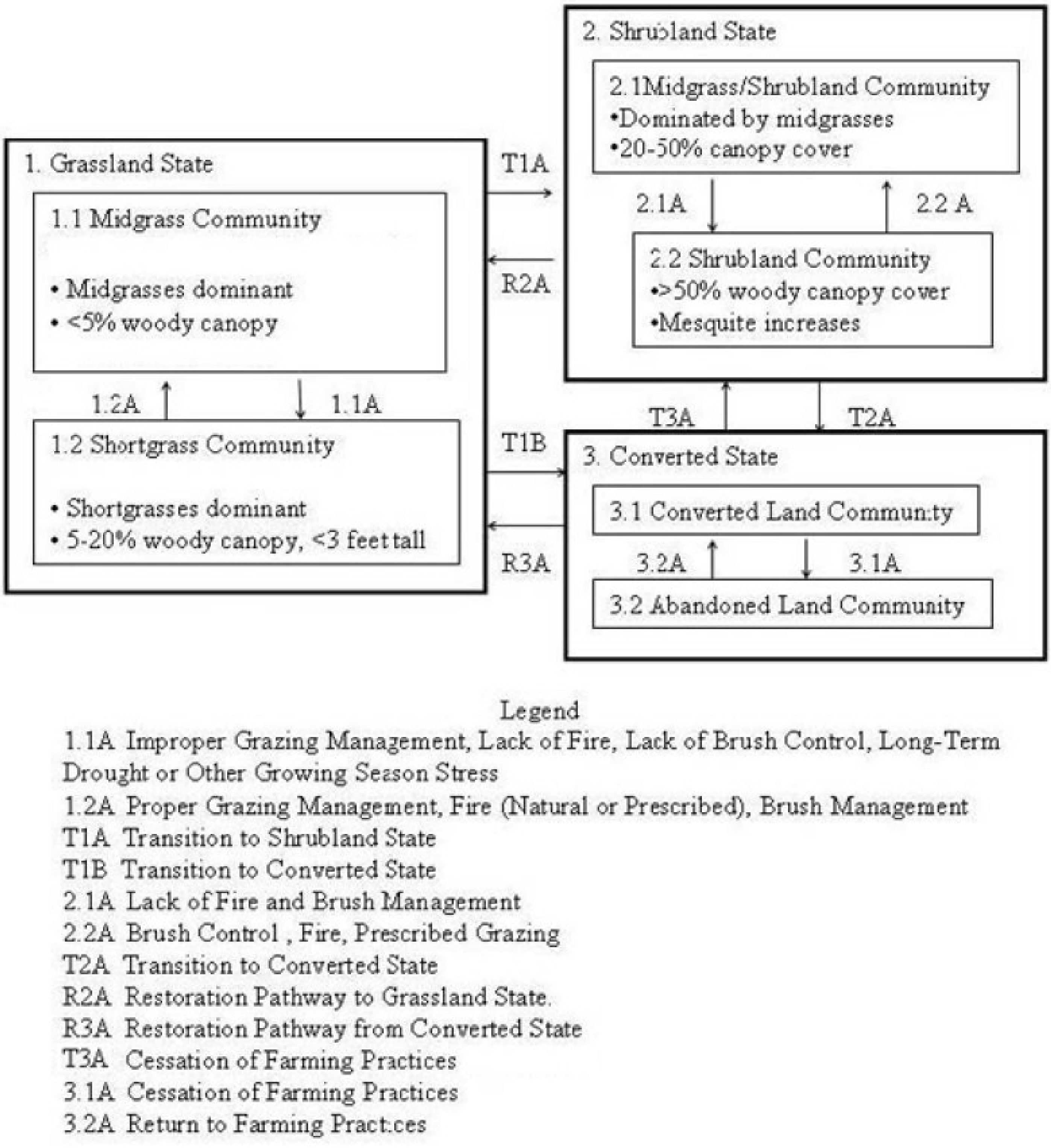

Figure 8. STM

State 1
Grassland

Community 1.1
Midgrass

The Midgrass Community (1.1) developed under natural disturbance regimes spanning thousands of years. Composition of grasses makes up over 90 percent by weight of annual production while forbs, shrubs, and woody species make up the remainder. Shrubs and trees may be found scattered throughout, and without disturbance will grow very large, but will not create a significant canopy cover. Annual forbs occur in varying amounts in response to grazing intensity, fire, drought, or excessive precipitation. This community is greatly affected by variations in plant available water in the soil. This sometimes extreme fluctuation is reflected in the herbaceous plant community and along with grazing may be the most important factor driving species composition within the Grassland State (1). Tall and midgrasses dominate this site under favorable growing conditions and bare ground is limited due to the multi-layered structure of the grass and forb community. The herbaceous cover produces a thermal insulation which reduces evaporation of soil water and greatly reduces ground temperatures. These factors promote the midgrass and forb community. During drought conditions shortgrasses will increase and become larger components of the herbaceous community and bare ground will slightly increase. Differences in rainfall across the region 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 (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1569	2802	4035
Shrub/Vine	84	157	224
Forb	84	157	224
Tree	–	28	56
Total	**1737**	**3144**	**4539**

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%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0-5%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	0-1%	0-1%	10-40%	5-10%
>0.15 <= 0.3	0-1%	0-1%	20-40%	5-10%
>0.3 <= 0.6	0-1%	0-1%	40-100%	5-10%
>0.6 <= 1.4	0-1%	–	30-70%	–
>1.4 <= 4	0-1%	–	–	–
>4 <= 12	0-1%	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 10. Plant community growth curve (percent production by month). TX8513, Mid/Tallgrass Community. Mid and tallgrasses dominate the site with few forbs and shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	20	15	5	10	15	10	5	5

Community 1.2
Shortgrass

Figure 11. 1.2 Shortgrass Community

The Shortgrass Community (1.2) develops because of continued heavy grazing, an absence of the historic fire regime, and lack of brush management. This community could also be driven by precipitation and may have been more common than the reference plant community (1.1) in drier parts of the region. The Shortgrass Prairie Community (1.2) has reduced biomass production and litter accumulation which causes subtle impacts to the water, mineral, and energy cycles. 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, brownseed paspalum, plains bristlegrass, and perennial three awns increase. Reduced fuel loads result in reduced fire frequency and intensity. Annual and perennial forbs often increase as a result of decreased competition for sunlight and moisture. Introduced grass species such as Kleberg bluestem (Dicanthium annulatum) and other introduced bluestems may start to invade. For the first time on this site, woody invader seedlings, such as mesquite and huisache, gain considerable height and density. This phase will quickly transition to the Shrubland State (2) if herbaceous plant production does not increase and shrub density grows. While the appearance of introduced plants may prevent a full restoration to the reference community, some of these plants do perform the same functions as native species. Management activities can slow down the increase of introduced plants if this is the management goal.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1093	1933	2802
Shrub/Vine	336	560	785
Forb	252	460	673
Tree	56	140	224
Total	**1737**	**3093**	**4484**

Figure 13. Plant community growth curve (percent production by month). TX8514, Mid/Shortgrass Parkland Community. Mid and shortgrasses dominate while oak mottes and density of mesquite are expanded..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	20	15	5	10	15	10	5	5

Pathway 1.1A
Community 1.1 to 1.2

The midgrasses are highly preferred by livestock and are easily eliminated from the plant community with heavy continuous grazing. This is because less palatable plants are left ungrazed and will eventually be able to out-compete the dominant grasses for resources and space. Rainfall patterns and subsoil moisture variations drive the diversity of the herbaceous component on this site, but prolonged drought and continuous grazing will create conditions that increase bare ground and shortgrass dominance. Invasive shrub species, like mesquite, will begin to encroach. 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 Midgrass Community (1.1) to a Shortgrass 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. 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 rates, 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
Shrubland

Community 2.1
Midgrass/Shrubland

Figure 14. 2.1 Midgrass/Shrubland Community

A threshold has been crossed between the Grassland State (1) and the Shrubland State (2). This Midgrass/Shrubland 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 can happen within a period of 5 to 10 years under certain conditions. Mesquite will be the dominate woody species on this site, but other woody species such as lime pricklyash, granjeno, desert yaupon (Schaefferia cuneifloia), prickly pear (*Opuntia engelmannii*), and algerita (*Mahonia trifoliolata*) will begin to increase as part of the plant community. Herbaceous production in this state is lower than in the Grassland State (1) and because of an increase in bare ground and shrub canopy cover, the resilience of the grass community is negatively affected. The more productive midgrasses will begin to fade from the plant community while less palatable shortgrasses increase. Plants that will increase in this state include red grama (*Bouteloua trifida*), three awn species (Aristida spp.), brownseed paspalum, and forbs like false broomweed (*Haploesthes greggii*) and dogweed. Grazing management on this site plays an important role in maintaining healthy grass communities that can take advantage of rainfall events and are more capable of withstanding drought conditions. In this state, forbs will respond quickly to rainfall events and can also out-compete grasses for resources, causing an overall decrease in grass production.

Table 9. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	729	1289	1849
Shrub/Vine	448	981	1513
Tree	224	392	560
Forb	336	448	560
Total	**1737**	**3110**	**4482**

Figure 16. Plant community growth curve (percent production by month). TX8507, Woodland Community, 30+% canopy. Woody canopy is greater than 30%..

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

Community 2.2 Shrubland

Figure 17. 2.2 Shrubland Community

Over time, with continued heavy grazing, no fire, and no brush management the Tight Sandy Loam ecological site will be transformed into a Shrubland Community (2.2) with canopies from 50 to 100 percent. Average shrub canopy heights can vary from 10 to 20 feet depending on the age of the plants and local rainfall history. Extended droughts will hasten this transition process. Once the mesquite community begins to mature, mixed shrubs will begin to increase underneath the canopy creating mottes that will increase in size and density. Shrub species like desert yaupon (Schaefferia cuneifloia), catclaw acacia (Acacia gregii), elbowbush (*Forestiera pubescens*), and the other species already mentioned, will increase in density. At this point, no amount of deferred grazing will restore the plant community to the Grassland State (1). The herbaceous production is dominated by threeawn species, red grama, annual grasses, and annual forbs. 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. Because of the higher amounts of bare ground, opportunistic forbs like western ragweed (*Ambrosia psilostachya*), annual broomweed (*Amphiachyris amoena*), and dogweed will be able to quickly take advantage of timely rain events. Livestock management becomes problematic in this plant community because of drastically reduced grass production. The community may be much better wildlife habitat than the previous state because of the increased amount of woody cover and the increased production of both perennial and annual forbs. With increased emphasis on white-tailed deer and bobwhite quail, many landowners choose to manage their land in this condition to enhance wildlife populations.

Table 10. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	785	1373	1961
Grass/Grasslike	504	925	1345
Tree	336	588	841
Forb	56	196	336
Total	**1681**	**3082**	**4483**

Figure 19. Plant community growth curve (percent production by month). TX8507, Woodland Community, 30+% canopy. Woody canopy is greater than 30%..

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

Pathway 2.1A
Community 2.1 to 2.2

Midgrass/Shrubland

Shrubland

Without diligent brush management, prescribed grazing, and other conservation practices, this phase will inevitably transition to a Shrubland Community (2.2). This transition is relatively long-term, but can begin within 5 to 10 years. This transition is based on an increase of woody canopy cover and a severe decrease in herbaceous plant production. Shortgrasses and forbs will dominate the herbaceous vegetation. This transition may be desirable for some wildlife, but it will be detrimental for a cattle operation.

Pathway 2.2A
Community 2.2 to 2.1

Shrubland

Midgrass/Shrubland

Major inputs, both chemical and mechanical, are often required to restore this community to the Mesquite Prairie Community (2.1). Prescribed burning is an effective tool to control the mixed brush community if weather conditions are good and the plant community can produce enough fine fuel to carry a burn. Often with this community, mechanical means such as root plowing and raking are utilized along with dozing and grubbing. Species like mesquite will re-sprout if not removed completely from the ground. Chaining and roller chopping are short-lived mechanical practices typically resulting in thicker, harder to manage brush stands that encourage brush seedlings. Follow-up conservation practices such as Individual Plant Treatment (IPT) for woody re-growth 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 replant seeds for desired native plants.

State 3
Converted Land

Community 3.1
Converted Land

Figure 20. 3.1 Converted Land Community

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. Crops planted on this site include small grains like oats or feed grains. Inputs such as fertilizer, herbicide, and adequate 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. Not only is there a long-lived seed source of mesquite and other woody species, additional seeds are brought in by grazing animals and domestic livestock.

Table 11. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1681	3082	4483
Total	**1681**	**3082**	**4483**

Figure 22. Plant community growth curve (percent production by month). TX8513, Mid/Tallgrass Community. Mid and tallgrasses dominate the site with few forbs and shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	20	15	5	10	15	10	5	5

Community 3.2
Abandoned Land

Figure 23. 3.2 Abandoned Land Community

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 but not followed up with appropriate management practices. It is typified by the dominance of mesquite, very little herbaceous grass production, high amounts of annual forbs and grasses, large areas covered by tree leaf litter, and/or bare ground. This phase does not have a diverse plant community and the shrub canopy cover can be up to 100 percent mesquite. 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, planted pasture will transition directly to the Shrubland State (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

Converted Land

Abandoned Land

The transition from the Converted Land Community (3.1) to the Abandoned Land Community (3.2) can occur when crop fields are left to fallow without management. Shrub species, like mesquite, will begin to grow and dominate the plant community. Generally, planted pasture will transition to the Shrubland State (2).

Pathway 3.2A
Community 3.2 to 3.1

Abandoned Land

Converted Land

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 Shrubland State (2) can happen within 5 to 10 years. This transition is driven by persistently dry weather conditions, grazing management, and the lack of fire and brush management practices. Overstocking 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

Brush management, either mechanical or chemical, is necessary to restore the site to the Grassland State. Removal of woody species to reduce canopy cover will allow light to the herbaceous species. Prescribed grazing and fire will also help.

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.

Restoration pathway R3A
State 3 to 1

The transition from the Converted Land State (3) to the Grassland State (1) will take time and patience. If practices such as fertilizer application and weed control are stopped, prescribed grazing is applied, woody seedlings are managed, and prescribed burning is applied, this state will begin the reversion back to the Grassland State (1). Introduced grass species are very resilient and competitive. They can maintain dominance in a pasture for a very long time after they are planted even without careful management. In these cases, management practices such as disking or applying herbicide to kill or suppress introduced species will be necessary to achieve the transition from an introduced pasture to a native pasture. This transition may occur very slowly because introduced grasses will remain competitive and will probably always be present. This transition may also require brush management practices and the re-introduction of desirable native species through range planting.

Transition T3A
State 3 to 2

In time, this site will revert to the Shrubland State (2) on its own. If no brush management occurs, woody species will occupy the overstory canopy and shad out herbaceous species.

Additional community tables

Table 12. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall/Midgrasses**			897–2242	
	little bluestem	SCSC	*Schizachyrium scoparium*	616–1681	–
	false Rhodes grass	TRCR9	*Trichloris crinita*	616–1681	–
	multiflower false Rhodes grass	TRPL3	*Trichloris pluriflora*	616–1681	–
2	**Midgrasses**			448–1345	
	sideoats grama	BOCU	*Bouteloua curtipendula*	280–897	–
	silver beardgrass	BOLA2	*Bothriochloa laguroides*	280–897	–
	Arizona cottontop	DICA8	*Digitaria californica*	280–897	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	280–897	–

	tanglehead	HECO10	*Heteropogon contortus*	280–897	–
	pink pappusgrass	PABI2	*Pappophorum bicolor*	336–897	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	336–897	–
3	**Shortgrasses**			224–448	
	threeawn	ARIST	*Aristida*	84–280	–
	buffalograss	BODA2	*Bouteloua dactyloides*	84–280	–
	slender grama	BORE2	*Bouteloua repens*	84–280	–
	red grama	BOTR2	*Bouteloua trifida*	84–280	–
	coastal sandbur	CESP4	*Cenchrus spinifex*	84–280	–
	hooded windmill grass	CHCU2	*Chloris cucullata*	84–280	–
	fall witchgrass	DICO6	*Digitaria cognata*	84–280	–
	curly-mesquite	HIBE	*Hilaria belangeri*	84–280	–
	brownseed paspalum	PAPL3	*Paspalum plicatulum*	84–280	–
Forb					
4	**Forbs**			84–224	
	Forb, annual	2FA	*Forb, annual*	67–179	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	67–179	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	67–179	–
	Engelmann's daisy	ENPE4	*Engelmannia peristenia*	67–179	–
	coastal indigo	INMI	*Indigofera miniata*	67–179	–
	yellow puff	NELU2	*Neptunia lutea*	67–179	–
	rosy palafox	PARO	*Palafoxia rosea*	67–179	–
	Virginia plantain	PLVI	*Plantago virginica*	67–179	–
	American snoutbean	RHAM	*Rhynchosia americana*	67–179	–
	awnless bushsunflower	SICA7	*Simsia calva*	67–179	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	67–179	–
	fiveneedle pricklyleaf	THPEP	*Thymophylla pentachaeta var. pentachaeta*	67–179	–
Shrub/Vine					
5	**Shrubs**			84–224	
	spiny hackberry	CEEH	*Celtis ehrenbergiana*	28–112	–
	Brazilian bluewood	COHO	*Condalia hookeri*	28–112	–
	lime pricklyash	ZAFA	*Zanthoxylum fagara*	28–112	–
Tree					
6	**Tree**			0–56	
	honey mesquite	PRGLG	*Prosopis glandulosa var. glandulosa*	0–56	–

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.

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

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

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

Hydrological functions

Peak rainfall periods occur in May and June from thunderstorms and in September and October from tropical systems. Rainfall events may be high (three to five 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, water erosion is minimal.

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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Acknowledgments

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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)	David Hinojosa, RMS, NRCS, Robstown, Texas Jason Hohlt, RMS, NRCS, Kingsville, Texas
Contact for lead author	361-241-0609
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:** Water flow pattens are rare for this site due to landscape position and slopes.

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Less than 10 percent bare ground.

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 9 to 14 inches thick with brown colors and 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:** Herbaceous production of bunch, rhizomatous, and stoliniferous grasses will help minimize runoff and maximize infiltration. Grasses should comprise approximately 90 percent of total annual production by weight. Shrubs will comprise about five percent by weight.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** A strong, naturally occuring argillic horizon is commonly found within 9 to 14 inches of the soil surface.

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 Shortgrasses > Perennial Tall/Midgrasses >

    Sub-dominant: 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 to 15 percent plant mortality of perennial bunchgrasses during extreme drought.

14. **Average percent litter cover (%) and depth (in):** 5 to 15 percent litter cover.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1,500 to 4,050 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, buffelgrass, guineagrass, false broomweed, goldenweed, and tanglehead.

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