

Ecological site R078BY082TX Loamy Sand 19-26" PZ

Last updated: 9/15/2023

Accessed: 05/21/2025

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.

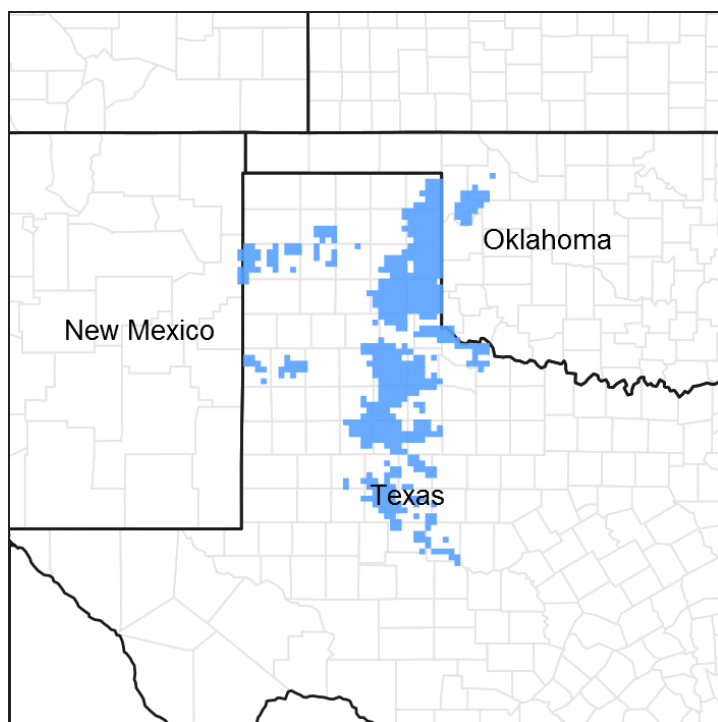


Figure 1. Mapped extent

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): 078B—Central Rolling Red Plains, Western Part

MLRA 78B is characterized by strongly dissected, rolling plains with prominent ridges and valleys and rolling to steep irregular topography. Loamy soils are generally well drained,

range from shallow to deep, and developed in sediments of Triassic and Permian age.

LRU notes

NA

Classification relationships

This ecological site is correlated to soil components at the Major Land Resource Area (MLRA) level which is further described in USDA Ag Handbook 296.

Ecological site concept

These sites occur on rolling to hummocky sandy soils on uplands. The soils are more developed and produce more vegetation than the Sand Hill ecosites. Reference vegetation consists of tall and midgrasses with forbs and scattered shrubs. Abusive grazing practices can lead to a shift in the plant community. Without fire or alternative brush management, woody species canopy may increase.

Associated sites

R078BY081TX	Loamy Upland 19-26" PZ Loamy soils on uplands
R078BY086TX	Sandy 19-26" PZ Sandy soils under shinnery oak
R078BY087TX	Sandy Bottomland 19-26" PZ Sandy soils on floodplains
R078BY088TX	Sandy Loam 19-26" PZ Sandy loam soils on uplands

Similar sites

R078BY086TX	Sandy 19-26" PZ The Sandy site has a course textured surface, and will have more shinoak and less sand sagebrush and mesquite present. The sandy site will have many of the same grass species but will tend to have more sand bluestem, little bluestem and other tall grasses present.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia filifolia</i>
Herbaceous	(1) <i>Schizachyrium scoparium</i>

Physiographic features

This site is classified as an upland. The site occurs on upland rolling plains or on ancient alluvial terraces. These loamy sand soils formed in sandy alluvial sediment of the Quaternary age. The site may be small to relatively large, varying from 50 to over 1000 acres in size. Terrain is nearly level to gently rolling, undulating or hummocky. Slopes range from 0 to 8 %. Small areas of fine sand and fine sandy loam are included in this mapping, along with small areas along drainage ways that are similar soils with fine sandy loam surfaces. Small gravel outcrops and soils that have gravel strata at a depth of 2 to 4 feet are also included. Elevations range from 1000 to 3100 feet.

Table 2. Representative physiographic features

Landforms	(1) Plains > Plain (2) Plains > Terrace (3) Plains > Ridge
Runoff class	Very low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	305–945 m
Slope	0–8%
Water table depth	191–203 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate of the western rolling plains is dry, sub-humid with hot summers and mild winters. Temperatures often reach 100 degrees F for several consecutive days during summer. Cold spells with temperatures less than 20 degrees F only last short periods of time. The soil is not frozen below the 3-inch depth for more than 2 to 3 days. Humidity is low during the winter and early spring months. Sometimes relative humidity is high enough to make summer days seem uncomfortable. Most of the precipitation comes in the form of rain and that in the spring and early summer principally. May is the wettest month followed by June. July and August are dryer and much hotter. Rainfall often comes as intense showers of relatively short duration. Rainfall rate per hour is often high and runoff is significant. Infiltration is diminished due to lack of opportunity time. The growing season begins in April and ends with the first killing frost in November. There is little snowfall with the average being about 10 inches. Rainfall averages about 22 inches.

There is a 70% chance that yearly precipitation will fall between 16 and 24 inches. About 55% of the time, the yearly rainfall is below the mean. Dry spells during the growing season are common and long-term droughts occur in cycles of about 20 years. Native vegetation is principally warm season.

Table 3. Representative climatic features

Frost-free period (characteristic range)	189-194 days
Freeze-free period (characteristic range)	204-222 days
Precipitation total (characteristic range)	584-610 mm
Frost-free period (actual range)	184-201 days
Freeze-free period (actual range)	202-223 days
Precipitation total (actual range)	559-635 mm
Frost-free period (average)	192 days
Freeze-free period (average)	213 days
Precipitation total (average)	584 mm

Climate stations used

- (1) WELLINGTON [USC00419565], Wellington, TX
- (2) PADUCAH [USC00416740], Paducah, TX
- (3) JAYTON [USC00414570], Jayton, TX
- (4) SNYDER [USC00418433], Snyder, TX
- (5) ROBERT LEE [USC00417669], Robert Lee, TX

Influencing water features

This site has low to moderate runoff due to loamy sand surfaces and sandy loam to sandy clay loam subsurface layers.

Wetland description

NA

Soil features

Soils are deep, well drained, moderately rapidly permeable, sandy soils on uplands. They are slightly acidic to slightly alkaline. These soils formed in alluvial sediment. The typical surface layer is loamy fine sand 16 to 18 inches thick. This is underlain by fine sandy loam to sandy clay loam. Available water holding capacity is moderate, with low runoff.

Susceptibility to water erosion is slight, but the potential for wind erosion is severe without good protective plant cover. These soils have a moderately low water and fertility holding capacity but release maximum amounts of water to plants. There is a good plant, soil, water, air relationship.

The associated soils for this Loamy Sand Prairie Ecological Site include: Springer loamy fine sand, Delwin fine sand, Miles loamy fine sand, Likes loamy fine sand and Devol loamy fine sand.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Well drained
Permeability class	Moderately slow to rapid
Soil depth	152–203 cm
Surface fragment cover ≤3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.11–16 cm
Calcium carbonate equivalent (0-101.6cm)	0–3%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0–3%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The Loamy Sand ecological site occurs on uplands in the Rolling Red Plains. The parent material is sandy outwash or old alluvial deposits. Slopes vary, but typically fall in the 1-5% slope range. Infiltration is moderate to rapid with low runoff. Water erosion susceptibility is slight, but wind erosion potential is severe without good plant cover. The loamy sand soils have a moderately low water holding capacity, and are low in fertility but have a good plant, soil moisture, and air relationship. Plant basal cover is moderate, and can vary depending on moisture conditions.

The climate varies in temperature and rainfall from hot, dry summers to cool moist

conditions, depending on seasonal weather patterns. In general, more rain falls in May and June, followed by hot, dry, and often windy July and August. Moisture in the fall varies greatly depending on storm systems that develop during the season. Drought conditions occur and some are severe, lasting several years, as in the “Dust Bowl” of the 1930’s and the 1950 – 1957 drought. Naturally occurring fires shaped the ecology of this site. Dry lightning storms move across the plains, generally from west to east in the early spring and in mid-to-late fall. Random lightning strikes may cause fires that travel for miles. These fires are thought to have occurred on average once every 7-12 years.

Large herbivores such as bison, elk, pronghorn and deer existed on the Rolling Plains, with large migrations of bison herds grazing in high densities for short periods of time, then moving on to fresh, green vegetation. It is anticipated that these grazing events were closely tied to fire frequency. Minor herbivores such as jackrabbits, cottontail rabbit, ground squirrels, prairie dogs as well as various species of rats, mice and voles benefited from the vegetation of this site. Native American cultures depended on the bison for the majority of their sustenance. The bison provided meat, hides for shelter and clothing, and bone for tools and weapons. The hunter – gatherer culture is evident from the stone tools, grinding and pounding artifacts found among ancient campsites throughout the region. The Native Americans are thought to have used fire to influence the movement of bison, enticing them onto fresh, tender regrowth of herbaceous vegetation. This facilitated harvesting bison by nomadic tribes of Native Americans whose whole culture and customs relied on the ebb and flow of the migrating herds of bison.

This reference plant community is dominated by tall and midgrasses with a good perennial forb population. This community can be described as a Tall/Midgrass Dominant Community (1.). There is a moderate amount of sand sagebrush (*Artemisia filifolia*), skunkbush sumac (*Rhus aromatica*), yucca (*Yucca glauca*) and catclaw mimosa (*Mimosa aculeaticarpa* var. *biuncifera*). Scattered trees are present, mainly hackberry (*Celtis* spp.), Western soapberry (*Sapindus saponaria*) and Havard or sand shinnery oak (*Quercus havardii*). Woody plants make up approximately 10 – 15% of the total vegetative production for the reference plant community of this site. The principal grass species are little bluestem (*Schizachyrium scoparium*) and sideoats grama (*Bouteloua curtipendula*), with lesser amounts of sand bluestem (*Andropogon hallii*), Indiangrass (*Sorghastrum nutans*), sand lovegrass (*Eragrostis trichodes*), switchgrass (*Panicum virgatum*), dropseeds (*Sporobolus* spp.), silver bluestem (*Bothriochloa laguroides*) and Arizona cottontop (*Digitaria californica*). Cool-season grasses such as Texas bluegrass (*Poa arachnifera*), Canada wildrye (*Elymus canadensis*) and Needle-and-Thread (*Hesperostipa comata*) may be present. A diverse population of forbs such as Illinois bundleflower (*Desmanthus illinoensis*), dotted gayfeather (*Liatris punctata*), wild buckwheat (*Eriogonum* spp.), Western ragweed (*Ambrosia psilostachya*), spectaclepod (*Dimorphocarpa wislizeni*), sandlily (*Mentzelia stricta*), catclaw sensitivebriar (*Mimosa nuttallii*), prairie clover (*Dalea* spp.), erect dayflower (*Commelina erecta*), prairie sagewort (*Artemisia caudata*) and Queens delight (*Stillingia sylvatica*) compose 5 to 10% of the total vegetative production. In years of greater rainfall, cryptogammic crust may be found. In advanced ecological states, this site is diverse and productive. Native trees such as

western soapberry and hackberry may be present on areas with more favorable plant/soil moisture conditions. The community can be maintained by management practices such as prescribed grazing and prescribed burning.

It is thought that fire has historically played a role in sustaining the balance of the woody plants and tallgrasses. Tallgrasses such as sand and little bluestem and midgrasses such as sideoats grama are stimulated by fire and vegetatively respond well to periodic burns, especially if the burns are in spring or early summer. Woody shrubs are suppressed allowing grasses to become more dominant, allowing a grassland aspect to exist. Fire promoted diversity in the community allowing forbs to express themselves more in seasons following burning. An ecological balance between the woody plants, grasses, forbs and herbivores existed prior to the advent of European exploitation and settlement in the latter part of the 19th century. Its culture of fire suppression and abusive grazing began to alter the community allowing woody species to increase along with invading grasses and forbs. The reference community is dynamic, fluctuating between plant communities comprising 70 to 75 % grasses and shrubs like sand sagebrush and sand shinnery oak at 10 to 15% to a 60 to 70% grass and forb composition due to the normal cycle of climate extremes and presence of fire.

The observer needs to be cognizant of the weather patterns and fire frequency when observing this community and state. Many species have either increased or decreased, depending on herbivory and grazing management. There is general agreement that overuse, either by grazing or browsing is a major factor in retrogression and species shift resulting in the decline of palatable plants. With heavy continuous grazing by domestic livestock, the taller grasses are pressured and begin to decline in composition and production. When this grazing regime occurs, the Mid/Tallgrass Dominant Community (1.2) develops and midgrasses such as sideoats grama, sand lovegrass, silver bluestem, Arizona cottontop and perennial three-awns (*Aristida* spp.) increase along with annual forbs. Sand sagebrush, Havard oak, yucca, prickly pear (*Opuntia* spp.), and annual forbs, although present in reference condition, can increase and dominate with continuous heavy grazing, the absence of fire and brush management.

With heavy continuous grazing and fire suppression, the tallgrasses decline in response and the Midgrass/Shrub Community (2.1) exists. Midgrasses such as sideoats grama and sand dropseed (*Sporobolus cryptandrus*) increase along with forbs such as western ragweed. Woody shrubs such as sand sagebrush and Havard or sand shinnery oak increase to more than 25% of the annual forage production. Annual wild buckwheat, for example, and weak perennial grasses such as red lovegrass (*Eragrostis secundiflora*) and gummy lovegrass (*Eragrostis curtipedicellata*) can increase with heavy continuous grazing. In addition, there is a decrease of ground cover, decreased annual herbaceous production, and decreased vigor of tallgrasses such as little bluestem with heavy continuous grazing and fire suppression. Prescribed burning along with brush management may be necessary to restore and maintain the balanced plant community. The Loamy Sand ecological site responds well to brush management and individual plant treatment (IPT) using herbicides. Oaks and sagebrush can be successfully managed and

the tallgrasses such as the bluestems and desirable midgrasses respond quickly to the reduction in competition for water and nutrients. Grazing deferment after brush treatment is essential to allow desirable vegetation to recover.

The Loamy Sand site retrogresses further with continued heavy grazing. If abusive grazing takes place after the woody plants have been suppressed, then the community can retrogress to the Midgrass/Shortgrass/Forb (3.1) community. This community is dominated by forbs, mainly western ragweed, camphorweed (*Heterotheca subaxillaris*) and annuals such as wild buckwheat. Scattered perennial grasses exist, mostly perennial threeawn, some dropseeds, fringed signalgrass (*Urochloa ciliatissima*), blue grama (*Bouteloua gracilis*), hairy grama (*Bouteloua hirsuta*), buffalograss (*Bouteloua dactyloides*) and weak perennials such as red lovegrass, gummy lovegrass and sandbur (*Cenchrus incertus*). Woody shrubs compose approximately 25%. Some scattered honey mesquite (*Prosopis glandulosa*) and prickly pear may increase in the less sandy portions of this site with sand sagebrush and Havard oak comprising most of the shrub population. Bare ground can increase soil movement that occurs when winds deposit sandy topsoil on any herbaceous or structural barrier. Sandy knolls and subsequent blowouts occur in advanced retrogressive states. Prescribed grazing, brush management, and management of weedy competition are essential in achieving any level of restoration.

A stable state of shrub domination can occur with sand sagebrush being the dominant species. If brush management is not initiated and heavy continuous grazing continues when community 2.1 is in retrogression, this site becomes a Shrub/Shortgrass Community (4.1). Decreased plant diversity is evident and is dominated by sand sagebrush mixed with Havard oak that may exceed 45% canopy. In this state, few perennial grasses such as fringed signalgrass, hairy grama exists and annual forbs, such as annual wild buckwheat, are very prevalent. Some pedestalling is apparent, water flow patterns are mostly absent, and wind transports and deposits soil on sand shinnery oak motts prone to blowout and the development of a hummocky landscape.

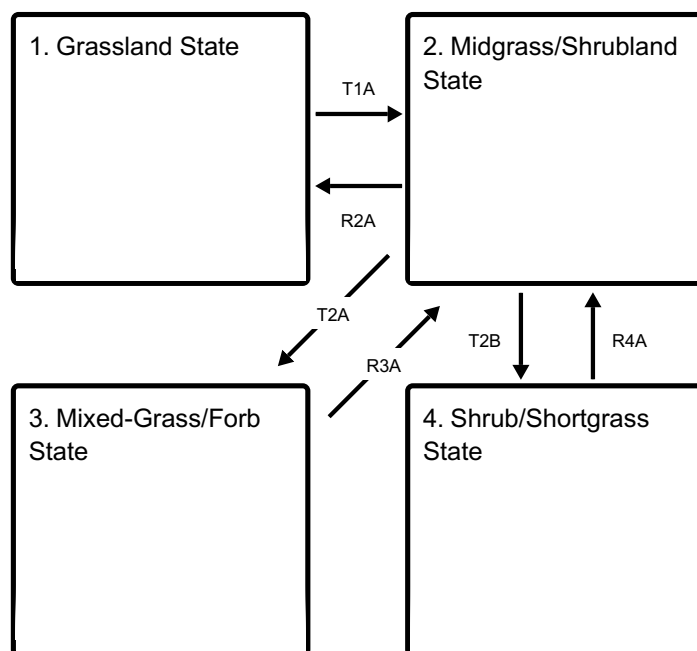
Communities 3.1 and 4.1 shows markedly decreased annual production with less biomass and organic matter forming. These communities respond well when prescribed grazing, brush management and deferment from grazing are implemented. Generally, range planting is not necessary to restore this site from regression. Usually there is enough tallgrass and midgrass seed sources and basal crowns present for a progressive response if competition from brush encroachment and grazing pressure is managed. To maintain a balanced plant community, occasional brush suppression may be necessary.

Plant Communities and Transitional Pathways (diagram):

The following diagram shows plant communities and transitional pathways that the vegetation on this site might follow. There may be other states not shown on the diagram. This information is intended to show what might happen with a given set of natural or man induced circumstances and it does not mean that this would happen the same way in every instance. Local professional guidance should always be sought before pursuing a treatment scenario.

State and transition model

Ecosystem states



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

R2A - Adequate rest from defoliation, followed by reintroduction of historic disturbance regimes

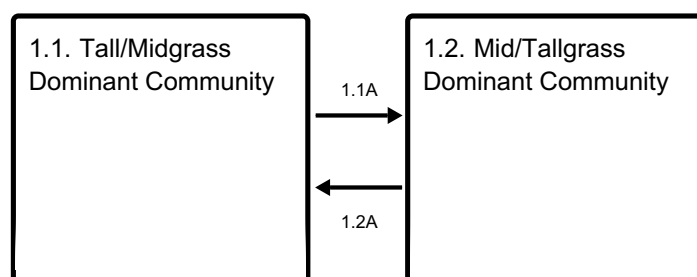
T2A - Absence of disturbance and natural regeneration over time, may be coupled with excessive grazing pressure

T2B - Absence of disturbance and natural regeneration over time, may be coupled with excessive grazing pressure

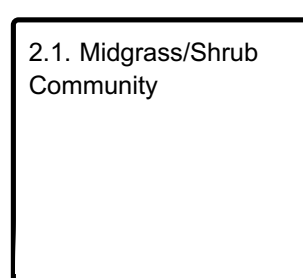
R3A - Adequate rest from defoliation and removal of woody canopy

R4A - Adequate rest from defoliation and removal of woody canopy

State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities

3.1.
Midgrass/Shortgrass/S
hrubs/Forb Community

State 4 submodel, plant communities

4.1. Shortgrass/Shrub
Community

State 1 Grassland State

The Tallgrass/Midgrass Dominant Community is a balanced mixture of tallgrasses such as little bluestem and sand bluestem and occasionally switchgrass and sand lovegrass; midgrasses such as sideoats grama, dropseeds, and silver bluestem; a good diversity of forbs such as Illinois bundleflower, dotted gayfeather, catclaw sensitivebriar (*Mimosa microphylla*), prairie clover, and bushsunflower; scattered woody shrubs such as sand sagebrush, skunkbush sumac, yucca, catclaw mimosa and sand shinnery or Havard oak. Scattered hardwood trees are present, mainly hackberry and western soapberry. The Mid/Tallgrass Dominant Community (1.2) has a mixture of mid and tallgrasses such as sideoats grama, little bluestem, and lovegrass species. This site also has a good diversity of forbs and shrubs/vines such as bundleflower, ragweed, prairie clover, sand sagebrush, skunkbush, yucca, and sand shinnery oak. Scattered trees such as hackberry and western soapberry are also present in this community.

Dominant plant species

- sand sagebrush (*Artemisia filifolia*), shrub
- little bluestem (*Schizachyrium scoparium*), grass

Community 1.1 Tall/Midgrass Dominant Community



Figure 8. 1.1 Tall/Midgrass Dominant Community

The interpretive or "reference" plant community for this site is a balanced mixture of tallgrasses such as little bluestem (*Schizachyrium scoparium*) and sand bluestem (*Andropogon hallii*) and occasionally switchgrass (*Panicum virgatum*) and sand lovegrass (*Eragrostis trichodes*); midgrasses such as sideoats grama (*Bouteloua curtipendula*), dropseeds (*Sporobolus* spp.), and silver bluestem (*Bothriochloa laguroides*); a good diversity of forbs such as Illinois bundleflower (*Desmanthus illinoensis*), dotted gayfeather (*Liatris punctata*), wild buckwheat (*Eriogonum* spp.), Western ragweed (*Ambrosia psilostachya*), spectaclepod (*Dimorphocarpa wislizeni*), sandlily (*Mentzelia stricta*), catclaw sensitivebriar (*Mimosa microphylla*), prairie clover (*Dalea purpurea*), and bushsunflower (*Simsia* spp.); scattered woody shrubs such as sand sagebrush (*Artemisia filifolia*), skunkbush sumac (*Rhus aromatica*), yucca (*Yucca glauca*), catclaw mimosa (*Mimosa aculeaticarpa* var. *biuncifera*) and sand shinnery or Havard oak (*Quercus havardii*). Scattered hardwood trees are present, mainly hackberry (*Celtis* spp.) and western soapberry (*Sapindus saponaria*).

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1233	1681	2466
Shrub/Vine	336	560	897
Forb	90	168	224
Tree	56	78	78
Microbiotic Crusts	11	17	28
Total	1726	2504	3693

Figure 10. Plant community growth curve (percent production by month). TX2019, Tall/Midgrass prairie with trees, shrubs and forbs. Tall and midgrasses with trees, small shrubs and forbs in near historic climax..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	3	5	10	25	25	10	5	8	5	2	1

Community 1.2

Mid/Tallgrass Dominant Community

The interpretive plant community for this site is the Mid/Tallgrass Dominant Community (1.2). This community has a mixture of mid and tallgrasses such as sideoats grama, little bluestem, and lovegrass species. This site also has a good diversity of forbs and shrubs/vines such as bundleflower, ragweed, prairie clover, sand sagebrush, skunkbush, yucca, and sand shinnery oak. Scattered trees such as hackberry and western soapberry are also present in this community.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1233	1681	2466
Shrub/Vine	336	560	897
Forb	90	168	224
Tree	56	78	78
Microbiotic Crusts	11	17	28
Total	1726	2504	3693

Figure 12. Plant community growth curve (percent production by month). TX2021, Midgrass/Shrubs. Midgrasses and some remnants of tall grasses with shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	5	8	24	25	12	7	10	5	2	0

Pathway 1.1A

Community 1.1 to 1.2

With heavy continuous grazing, no fires and no brush management, the Tallgrass/Midgrass Dominant Community will shift to the Mid/Tallgrass Dominant Community.

Pathway 1.2A

Community 1.2 to 1.1

With the implementation of various conservation practices such as Prescribed Grazing, Brush Management, and Prescribed Burning, the Mid/Tallgrass Dominant Community can

revert back to the Tall/Midgrass Dominant Community.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

State 2
Midgrass/Shrubland State

The Midgrass/Shrub Community is dominated by midgrasses such as sideoats grama and sand dropseed along with forbs such as western ragweed. Woody shrubs such as sand sagebrush and Havard or sand shinnery oak increase to more than 25% of the annual forage production. Annual forbs such as wild buckwheat and weak perennial grasses such as red and gummy lovegrass can increase. There is a decrease of ground cover, decreased annual herbaceous production, and decreased vigor of tallgrasses such as little bluestem.

Dominant plant species

- sand sagebrush (*Artemisia filifolia*), shrub
- sideoats grama (*Bouteloua curtipendula*), grass
- sand dropseed (*Sporobolus cryptandrus*), grass

Community 2.1
Midgrass/Shrub Community



Figure 13. 2.1 Midgrass/Shrub Community

This community represents the first phase in the transition of the Tallgrass/Midgrass and

Mid/Tallgrass Communities (1.1 and 1.2) toward the Midgrass/Shrub community (2.1). Midgrasses such as sideoats grama and sand dropseed (*Sporobolus cryptandrus*) increase along with forbs such as western ragweed. Woody shrubs such as sand sagebrush and Havard or sand shinnery oak increase to more than 25% of the annual forage production. Annual forbs such as wild buckwheat and weak perennial grasses such as red and gummy lovegrass can increase. There is a decrease of ground cover, decreased annual herbaceous production, and decreased vigor of tallgrasses such as little bluestem. Prescribed burning along with brush management may be necessary to restore and maintain the balanced plant community. Proper grazing and brush management such as herbicides can easily maintain this phase and prevent the transition toward the Midgrass/Shortgrass/Shrubs/Forb community (3.1). Oaks and sagebrush can be successfully managed and the tallgrasses such as the bluestems and midgrasses respond quickly to the reduction in competition for water and nutrients. Great care must be taken to properly graze this site following brush management.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	560	785	1065
Shrub/Vine	336	560	785
Forb	112	168	280
Tree	56	90	90
Microbiotic Crusts	6	11	22
Total	1070	1614	2242

Figure 15. Plant community growth curve (percent production by month). TX2021, Midgrass/Shrubs. Midgrasses and some remnants of tall grasses with shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	5	8	24	25	12	7	10	5	2	0

State 3 Mixed-Grass/Forb State

The Midgrass/Shortgrass/Shrubs/Forb Community (3.1) is dominated by weedy forbs, mainly western ragweed, camphorweed and annuals such as wild buckwheat. Scattered perennial grasses found in this community consisted of mostly perennial threeawn, dropseeds, fringed signalgrass, blue grama, hairy grama, buffalograss and annuals such as red lovegrass, gummy lovegrass, and sandbur. Woody shrubs compose approximately 25% of the composition. Some scattered honey mesquite and pricklypear may increase in the less sandy portions of this site with sand sagebrush and Havard oak comprising most of the shrub population.

Dominant plant species

- threeawn (*Aristida*), grass
- Cuman ragweed (*Ambrosia psilostachya*), other herbaceous
- camphorweed (*Heterotheca subaxillaris*), other herbaceous

Community 3.1

Midgrass/Shortgrass/Shrubs/Forb Community



Figure 16. 3.1 Midgrass/Shortgrass/Shrubs/Forb Community

The Midgrass/Shortgrass/Shrub –Forb Community (3.1) is dominated by weedy forbs, mainly western ragweed, camphorweed (*Heterotheca canescens*) and annuals such as wild buckwheat. Scattered perennial grasses found in this community consisted of mostly perennial threeawn, dropseeds, fringed signalgrass (*Urochloa ciliatissima*), blue grama (*Bouteloua gracilis*), hairy grama (*Bouteloua hirsuta*), buffalograss (*Bouteloua dactyloides*) and annuals such as red lovegrass, gummy lovegrass, and sandbur (*Cenchrus incertus*). Woody shrubs compose approximately 25% of the composition. Some scattered honey mesquite (*Prosopis glandulosa*) and pricklypear may increase in the less sandy portions of this site with sand sagebrush and Havard oak comprising most of the shrub population. Bare ground can increase where soil movement may occur, with wind depositing the sandy topsoil at the base of any herbaceous barrier. Hummocks and soil blowouts characterize this site in advanced retrogression states. Prescribed grazing, brush management, and pest management of weedy forbs and deferment from grazing will be necessary to achieve any level of restoration.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	448	673	897
Grass/Grasslike	336	560	785
Forb	56	202	336
Tree	90	101	101
Microbiotic Crusts	–	6	11
Total	930	1542	2130

Figure 18. Plant community growth curve (percent production by month). TX2040, Midgrass/Shortgrass Community with Forbs and Shrubs. Warm season mid and shortgrasses along with traces of tallgrasses, forbs, and shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	4	8	25	25	14	6	8	5	2	1

State 4

Shrub/Shortgrass State

The Shrub/Shortgrass State consists of forbs and woody shrub dominating the site, which occurs with sand sagebrush being the dominant species. There are some shortgrasses present as well. In time, tallgrasses will all but disappear allowing lower successional grasses such as fringed signalgrass and forbs like western ragweed and annual forbs to become more numerous. In some cases, mesquite and pricklypear cactus will occupy portions of the site where soil texture is slightly less in sand content.

Dominant plant species

- oak (*Quercus*), shrub
- hairy grama (*Bouteloua hirsuta*), grass

Community 4.1

Shortgrass/Shrub Community



Figure 19. 4.1 Shrubs/Shortgrass Community

The Shrubs/Shortgrass Community (4.1) consists of forbs and woody shrub dominating the site, which occurs with sand sagebrush being the dominant plant. There are some shortgrasses present as well. In time with abusive grazing, no fire and no pest management of invasive species, tallgrasses will all but disappear allowing lower successional grasses such as fringed signalgrass and forbs like western ragweed and annual forbs to become more numerous. In some cases, mesquite and pricklypear cactus will occupy portions of the site where soil texture is slightly less in sand content.

Table 9. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	560	785	1009
Grass/Grasslike	224	448	560
Forb	45	90	224
Tree	101	112	112
Microbiotic Crusts	–	6	11
Total	930	1441	1916

Figure 21. Plant community growth curve (percent production by month). TX2050, Shrubs and Shortgrass community. shortgrasses, warm- and cool-season forbs, and short shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	8	16	25	5	5	10	16	8	3

Transition T1A
State 1 to 2

With heavy continuous grazing, no fires, and no brush management implemented, the Grassland State will transition into the Midgrass/Shrubland State.

Restoration pathway R2A

State 2 to 1

With the implementation of Prescribed Grazing, Brush Management, and Prescribed Burning conservation practices, the Midgrass/Shrubland State can be restored back to the Grassland State.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

Transition T2A

State 2 to 3

With heavy continuous grazing, no brush management, brush invasion, and no fires, the Midgrass/Shrubland State will transition into the Mixed-grass/Forb State.

Transition T2B

State 2 to 4

With heavy continuous grazing, no brush management, brush invasion and no fires, the Midgrass/Shrubland State will transition into the Shrub/Shortgrass State.

Restoration pathway R3A

State 3 to 2

The Mixed-grass/Forb State can be restored back to the Midgrass/Shrubland State with the application of conservation practices such as Prescribed Grazing, Brush Management, Pest Management, and Prescribed Burning.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing
Integrated Pest Management (IPM)

Restoration pathway R4A

State 4 to 2

With the implementation of various conservation practices such as Prescribed Grazing, Brush Management and Prescribed Burning, the Shrub/Shortgrass State can be restored back to the Midgrass/Shrubland State.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing
Integrated Pest Management (IPM)

Additional community tables

Table 10. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
0	Midgrass			168–308	
1	Tallgrasses			897–1121	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	499–622	–
	sand bluestem	ANHA	<i>Andropogon hallii</i>	398–499	–
2	Midgrasses			336–644	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–644	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–644	–
	silver beardgrass	BOLAT	<i>Bothriochloa laguroides</i> ssp. <i>torreyana</i>	0–644	–
	hooded windmill grass	CHCU2	<i>Chloris cucullata</i>	0–644	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	0–644	–
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	0–644	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	0–644	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–644	–
	giant dropseed	SPGI	<i>Sporobolus giganteus</i>	0–644	–
3	Tallgrasses			84–168	
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	0–168	–

	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	0–168	–
4	Shortgrasses			56–112	
	threeawn	ARIST	<i>Aristida</i>	0–112	–
	signalgrass	BRACH	<i>Brachiaria</i>	0–112	–
	fall witchgrass	DICO6	<i>Digitaria cognata</i>	0–112	–
	red lovegrass	ERSEO	<i>Eragrostis secundiflora</i> <i>ssp. oxylepis</i>	0–112	–
5	Cool-season Grasses			45–112	
	grassleaf sedge	CAAG	<i>Carex agrostoides</i>	0–112	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–112	–
	intermediate needle and thread	HECOI	<i>Hesperostipa comata</i> <i>ssp. intermedia</i>	0–112	–
	Texas bluegrass	POAR	<i>Poa arachnifera</i>	0–112	–
Forb					
6	Forbs			90–224	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–224	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	0–224	–
	whitemouth dayflower	COER	<i>Commelina erecta</i>	0–224	–
	Texas croton	CRTET	<i>Croton texensis</i> var. <i>texensis</i>	0–224	–
	prairie clover	DALEA	<i>Dalea</i>	0–224	–
	bundleflower	DESMA	<i>Desmanthus</i>	0–224	–
	touristplant	DIWI2	<i>Dimorphocarpa wislizeni</i>	0–224	–
	jointfir	EPHED	<i>Ephedra</i>	0–224	–
	annual buckwheat	ERAN4	<i>Eriogonum annuum</i>	0–224	–
	kisses	GASU2	<i>Gaura suffulta</i>	0–224	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	0–224	–
	blazingstar	MENTZ	<i>Mentzelia</i>	0–224	–
	Nuttall's sensitive- briar	MINU6	<i>Mimosa nuttallii</i>	0–224	–
	spotted evening primrose	OECA3	<i>Oenothera canescens</i>	0–224	–
	narrowleaf Indian breadroot	PELI10	<i>Pediomelum</i> <i>linearifolium</i>	0–224	–
	white milkwort	POAL4	<i>Polygala alba</i>	0–224	–
	Riddell's ragwort	SEPI2	<i>Senecio riddellii</i>	0–224	–

	Rudbeck's ragwort	SENZ	<i>Senecio rudbeckii</i>	0-224	—
	bushsunflower	SIMSI	<i>Simsia</i>	0-224	—
	queen's-delight	STSY	<i>Stillingia sylvatica</i>	0-224	—
	Virginia tephrosia	TEVI	<i>Tephrosia virginiana</i>	0-224	—
Shrub/Vine					
7	Shrubs			560-897	
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	0-897	—
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa</i> <i>var. biuncifera</i>	0-897	—
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0-897	—
	Havard oak	QUHA3	<i>Quercus havardii</i>	0-897	—
	fragrant sumac	RHAR4	<i>Rhus aromatica</i>	0-897	—
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0-897	—
Tree					
8	Trees			56-78	
	netleaf hackberry	CELAR	<i>Celtis laevigata</i> <i>var. reticulata</i>	0-78	—
	western soapberry	SASAD	<i>Sapindus saponaria</i> <i>var. drummondii</i>	0-78	—

Animal community

A variety of grassland wildlife species have and continue to use the Loamy Sand ecological site for a part of their habitat needs. Many types of insect, reptiles, birds, and mammals frequent the site. The Texas horned lizard is often present along with several species of lizards and snakes. Small mammals include the jackrabbit, cottontail rabbit, raccoon, skunk, ringtail cat, armadillo and a variety of small rodents. Predators include coyote, red fox, gray fox, bobcat, badger, and in the presence of sufficient populations of deer, an occasional cougar. Many types of songbirds, game birds, and birds of prey are indigenous. Texas mockingbird, meadowlark, bobwhite and blue quail, mourning dove, Rio Grande turkey, hawks, harriers, owls and roadrunner are among the bird population. White-tailed deer, mule deer and pronghorn antelope utilize the site for browsing and cover. Occasional feral hogs or wild boar may travel through the site to reach adjacent associated sites or water. Deer, pronghorn, quail, turkey, dove, and hog hunting provide important sport and potential income to land users. Ecotourism in the form of wildlife watching and photography can be significant.

Hydrological functions

With good vegetative cover, runoff is reduced and water erosion is minimized. The Loamy Sand site with good vegetative cover, runoff is reduced and water erosion is minimized.

The Loamy Sand ecological site is a well-drained deep to very deep upland site that contributes runoff to small and medium sized drainages. Slopes vary from nearly level to moderately sloping but usually fall within the 1 - 5 % slope range. The parent material is eolian sediments and alluvium and infiltration can be rapid and runoff minimal with good herbaceous cover. A change from a grassland community to a shrub community can increase runoff due to the decreased amount of fibrous roots and fine vegetation to slow water movement.

Recreational uses

The Loamy Sand ecological site is well suited for many outdoor recreational uses such as hunting, hiking, camping, horseback riding, and bird watching. Along with adjacent sites, this site provides diverse and dramatic scenic beauty for recreational and photography use along with many recreational opportunities.

Wood products

None.

Other products

None.

Other information

None.

Inventory data references

NRCS FOTG – Section II of the FOTG Range Site Descriptions and numerous historical accounts of vegetative conditions at the time of early settlement in the area were used in the development of this site description. Vegetative inventories were made at several site locations for support documentation.

NRCS FOTG – Section II - Range Site Descriptions
NRCS Clipping Data summaries over a 20 year period

Other references

J.R. Bell, USDA-NRCS Rangeland Management Specialist (retired)
Natural Resources Conservation Service - Range Site Descriptions
USDA-Natural Resources Conservation Service - Soil Surveys & Website soil database
Rathjen, Frederick W., The Texas Panhandle Frontier, Rev. 1998, Univ. of Texas Press
Hatch, Brown and Ghandi, Vascular Plants of Texas (An Ecological Checklist)
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Acknowledgments

Site Development and Testing Plan:

Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.

Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team.

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)	Stan Bradbury, Zone RMS, NRCS, Lubbock, Texas
Contact for lead author	806-791-0581
Date	09/04/2007
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. **Presence of water flow patterns:** None to slight.

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 25 to 30% bare ground.

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** None to slight.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** These soils, if left unprotected by vegetation, are highly susceptible to wind erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Fine sand single grained surface; very low SOM.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Basal cover and density with small interspaces should make rainfall impact minimal. This site has rapid permeability, runoff is slow and available water holding capacity is low.

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

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

Dominant: Warm-season tallgrasses >>

Sub-dominant: Shrubs/Vines > Warm-season midgrasses >

Other: Forbs > Cool-season grasses

Additional:

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

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

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1,500 to 3,500 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: Sand sagebrush, sand shinoak and yucca can be invasive.
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17. **Perennial plant reproductive capability:** All plant species should be capable of reproduction except during periods of prolonged drought conditions, heavy natural herbivory or intense wildfires.
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