USDA Natural Resources Conservation Service

Ecological site R078AY117TX
Clayey Upland 25-28" PZ

Last updated: 9/12/2023
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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

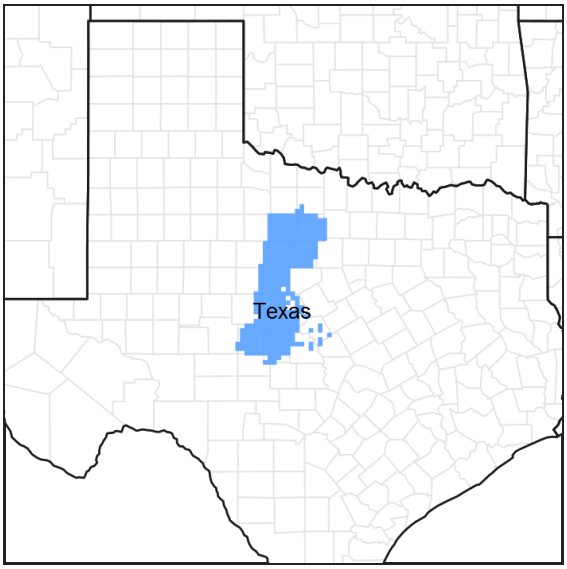


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 078A–Rolling Limestone Prairie

MLRA 78A is characterized by erosional plains with terraces adjacent to perennial and intermittent streams. Loamy and clayey soils range from shallow to deep over limestones and shales of Permian and Pennsylvanian age. Loamy soils are also associated with stream terraces.

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

This site occurs on moderately deep heavy clay soils on uplands. The reference vegetation consists of midgrasses and shortgrasses with forbs and few woody plants. In the absence of fire or other brush management, woody

species may increase in abundance. Abusive grazing practices may lead to a shift in the plant community. The soils associated with this site have high shrink-swell potential.

Associated sites

R078AY119TX	**Clay Loam 25-28" PZ** Clayey Upland sites are most frequently found adjacent to Clay Loam sites.
R078AY120TX	**Clay Slopes 25-28" PZ** Clayey Upland sites are frequently found adjacent to Clay Slopes sites.
R078AY121TX	**Loamy Bottomland 25-28" PZ** Clayey Upland sites are frequently found adjacent to Loamy Bottomland sites.

Similar sites

R078AY119TX	**Clay Loam 25-28" PZ** Clay Loam site has similar herbaceous plant species composition, but has a greater shrub component. The soils of the Clay Loam site have a more favorable soil-water-air-plant relationship. Annual production is significantly higher on the Clay Loam site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Bouteloua curtipendula* (2) *Bouteloua dactyloides*

Physiographic features

These nearly level to gently sloping soils in the Clayey Upland ecological site occur on terraces on plains in filled valleys located in the Rolling Limestone Prairie. These soils were formed in alkaline clayey alluvium having thick beds of unconsolidated calcareous, clayey sediments from shaly clay of Pennsylvanian or Permian age. Slopes range from 0 to 5 percent. Elevation ranges from 950 to 2250 feet.

Table 2. Representative physiographic features

Landforms	(1) Plains > Terrace
Runoff class	High to very high
Elevation	290–686 m
Slope	0–5%
Aspect	Aspect is not a significant factor

Climatic features

The climate of MLRA 78A is subtropical subhumid, with hot, dry summers and mild, dry winters. The Precipitation is similar north to south throughout the area, but decreases slightly from east to west. Temperature is similar east to west, but warmer from north to south. The area is clear to partly cloudy 80 percent of the time during the summer and 60 percent during the winter. Prevailing winds usually occur from a southerly direction and from north to northwest during passage of fall and winter cool fronts. March and April are the windiest months of the year.

Most precipitation occurs during the warmer months from April to October, in the form of rainfall during thunderstorms, often of short duration and high intensity, with considerable variation in amounts of rain and the area covered. Lightening, strong winds and hail frequently accompany the thunderstorms. Occasional tornadoes are not uncommon. Precipitation distribution is bimodal, with peaks occurring in May-June and September-October. The annual precipitation is about 25 to 28 inches. Timeliness and amount of rainfall are critical to plant growth. Rainfall events of one-fourth inch or less have limited effectiveness. High temperatures and dry winds reduce precipitation

effectiveness. Snowfall represents only a small part of the annual precipitation. Snowfall of one inch or more occurs about one in five years, while snowfall of greater than five inches occurs only about one in ten years. Snow cover generally is of short duration (i.e. one to three days). Probability of snowfall is greater in the northern part of MLRA 78A.

Rainfall in the region is highly erratic, usually with more years below than above average. Periodic droughts of both temporary and prolonged duration are common to the area, although not predictable. Some of the more severe droughts of the past century in this region occurred during 1918-1919, early 1930's, early to mid 1950's, and mid to late 1990's. High temperatures and dry winds accentuate the effects of drought. The extremes in climate have greater influence on plant communities than averages. Historic wet and dry cycles of extended duration likely influenced the evolution of drought hardiness and other survival traits in the endemic flora and fauna of the area.

Temperatures range from 31 degrees F in January to 96 degrees F in July, based on the 30-year average from 1971-2000, although considerably lower and higher temperatures for these months, respectively, have been recorded for some years. Periods of excessive heat, exceeding 100 degrees F, are not uncommon during July and August. Temperatures in the winter are generally mild, but abrupt and large drops in temperature can occur when polar air masses plunge southward across the area. The duration of freezing temperatures usually does not last more than three to five days. Temperatures in the spring are mild, both daytime and nighttime. Summer temperatures are hot, with highs generally in the 80's to mid 90's during the daytime, cooling down to the upper 70's during the night. Fall is usually pleasant with mild, sunny days and crisp, cool nights, as cool northers periodically begin moving south this time of year. The area has a frost-free period of approximately 225 to 233 days and a freeze-free period of about 248 to 259 days. The primary growing season for warm-season plants is approximately 233 to 246 days, increasing from north to south. The first frost generally occurs around November 15 and the last frost occurs around March 15. These dates will vary from north to south and from year to year.

The average relative humidity ranges from 35 to 50 percent in mid-afternoon as diurnal air temperature nears maximum. As nighttime air temperature drops, relative humidity rises, averaging 70 to 80 percent by dawn.

Table 3. Representative climatic features

Frost-free period (characteristic range)	196-207 days
Freeze-free period (characteristic range)	219-237 days
Precipitation total (characteristic range)	686-711 mm
Frost-free period (actual range)	195-215 days
Freeze-free period (actual range)	213-258 days
Precipitation total (actual range)	686-737 mm
Frost-free period (average)	202 days
Freeze-free period (average)	230 days
Precipitation total (average)	711 mm

Climate stations used

- (1) CONCHO PK/IVIE RSVR [USC00411934], Millersview, TX
- (2) COLEMAN [USC00411875], Coleman, TX
- (3) PUTNAM [USC00417327], Baird, TX
- (4) ALBANY [USC00410120], Albany, TX
- (5) THROCKMORTON [USC00419014], Throckmorton, TX

Influencing water features

N/A.

Wetland description

NA

Soil features

The soil series in the Clayey Upland ecological site consist of deep to very deep, well drained, very slowly to slowly permeable soils over shaly clay.

Major Soil Taxonomic Units correlated to this site include: Leeray.

Table 4. Representative soil features

Parent material	(1) Alluvium–claystone
Surface texture	(1) Clay (2) Silty clay
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow
Soil depth	457–516 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	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 reference plant community for the Clayey Upland ecological site is a midgrass/shortgrass prairie. Evidence of the historic vegetation can be found in the journals and records of explorers, military expeditions, boundary survey teams, and early scientists who studied the vegetation.

Gilgai micro-relief is a characteristic feature of this site. Shallow depressions and low surface mounds are the result of the high shrink-swell potential of the heavy clay soil. Vine mesquite, white tridens, and other similar grasses are found in the scattered shallow depressions. Midgrasses and shortgrasses such as sideoats grama, Texas wintergrass, dropseeds, silver bluestem, buffalograss, and curlymesquite are dominant in the interspaces as well as on the sides and tops of small mounds.

Climate is a major factor influencing vegetation on the site. The soils are deep, but rooting depth of herbaceous vegetation can be restricted because of the density of the heavy clay soil. As a result, plants on this site may show signs of distress in the early stages of drought. Even short-term dry periods have a negative impact on this site compared to associated sites. The Clayey Upland ecological site can be useful as an indicator to begin preparations for implementation of the first stage of drought plans. Livestock grazing and vehicle traffic often have to be restricted during extended rainy weather because of the boggy nature of the heavy clay soils when wet.

Numerous deep and wide cracks occur on the soil surface and throughout the upper soil profile during extremely dry periods.

Long-term droughts lasting multiple years or growing seasons are infrequent, but when they do occur, they can have a negative impact on the vegetation. If abusive grazing occurs during or immediately following the drought period, the results can be devastating. The effects of erratic seasonal moisture and short-term dry spells lasting a few months are not as severe as those caused by long-term droughts. However, the lower the ecological status of the site, the greater the negative impact will be during drought periods regardless of duration.

Fire is also an important part of the ecosystem. Historic fires on this site were probably not as intense as they were on most associated sites because of the structure of the vegetation, and the relatively low amount of fine fuel to sustain the fires. The shorter height of the grasses and the scarcity of forbs and woody plants contributed to these less intense fires. However, fires of moderate to low intensity did play a key role in refreshing and reinvigorating the old growth vegetation and keeping weeds and brush suppressed. Lack of fire allows unwanted woody species and weeds to encroach from adjacent sites and become established.

Prior to settlement, this site was subject to periodic grazing and browsing by vast herds of bison, wild cattle, wild horses, and antelope. It was a preferred site for short periods of time during the early spring when fresh, new growth of annuals and shortgrasses appeared. At times these grazing and browsing episodes were intense and severe, but periods of heavy use were followed by long periods of non-use as the herds migrated to fresh grazing areas before returning to previously grazed areas. The grazed areas had an opportunity to rest, regrow, regain vigor, and reproduce prior to the next grazing event.

As the region was settled, fire was reduced or eliminated and grasslands were fenced off to facilitate grazing and control the movement of domestic livestock. As a result of abusive grazing or lack of grazing and/or the elimination of fire, in association with extreme climatic events, the historic plant community has been altered on most Clayey Upland sites. As late successional midgrasses decrease on the site, they are replaced by early-successional midgrasses, a significant increase in the shortgrasses, as well as annual grasses and forbs. Further deterioration leads to the loss of the perennial midgrass plant community as shortgrasses, annual forbs, and annual grasses, begin to dominate the site. If disturbances are severe enough for an extended period of time, annual species dominate and bare ground is extensive. This provides the opportunity for woody species such as mesquite, lotebush, pricklypear, tasajillo, and juniper to encroach from adjacent sites.

Selective removal of individual undesirable trees and shrubs is relatively easy and more practical when brush plants initially appear on the site. The increase of brush can be fairly rapid and the plants per acre will soon become too numerous for individual control to be feasible. Once woody plants become mature or develop into dense stands, control is expensive, uneconomical, impractical, and difficult to achieve. Brush management is most successful using a systems approach. Initial treatment by mechanical methods can be followed by using approved herbicides, and using prescribed fire as a maintenance technique. Prescribed grazing with a reasonable stocking rate can sustain the grass species composition and production at a near historic climax level.

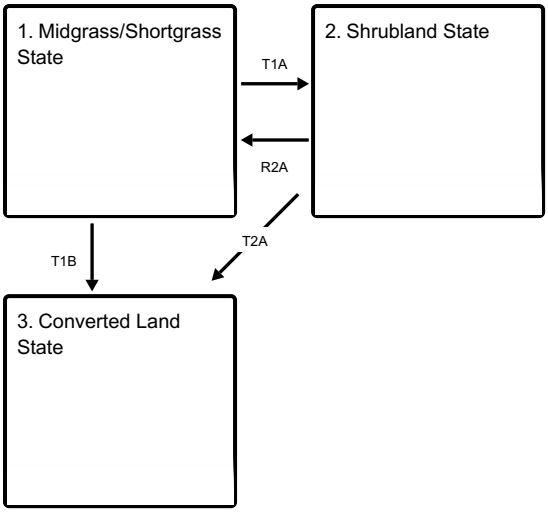
Changes in plant communities and vegetation states on the Clayey Upland site are result of the combined influences of natural events (rainfall, temperature, drought, etc.) and the accompanying management systems implemented on the area (prescribed fire, grazing management, brush management).

Rangeland Health Reference Worksheets have been posted for this site on the Texas NRCS website (www.tx.nrcs.usda.gov) in Section II of the eFOTG under (F) Ecological Site Descriptions.

State and Transition Model:
The State and Transition Diagram which follows provides information on some of the most typical pathways that the vegetation on this site can follow as the result of natural events, management inputs, and application of conservation treatments. There may be other plant communities that can exist on this site under certain conditions. Consultation with local experts and professionals is recommended prior to application of practices or management strategies in order to ensure that specific objectives will be met.

State and transition model

Ecosystem states



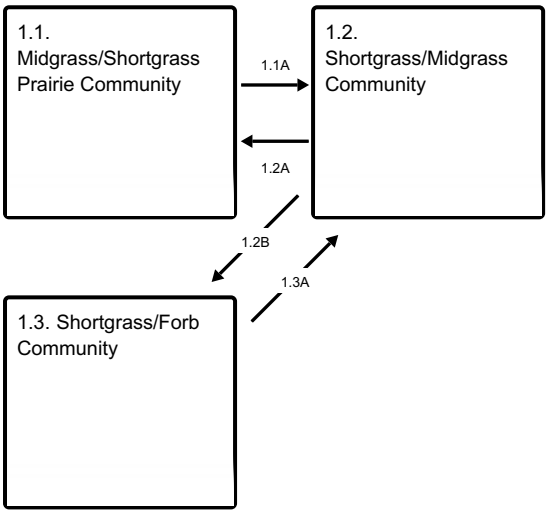
T1A - Absence of disturbance and natural regeneration over time, may be coupled with excessive grazing pressure

T1B - extensive soil disturbance followed by seeding

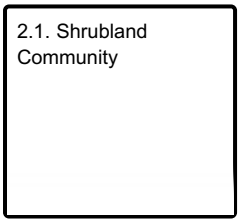
R2A - Adequate rest from defoliation and removal of woody canopy, followed by reintroduction of historic disturbance regimes

T2A - extensive soil disturbance followed by seeding

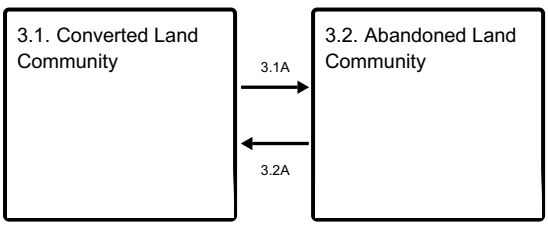
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1
Midgrass/Shortgrass State

The reference plant community for the Clayey Upland ecological site is an open grassland composed of midgrass/shortgrass prairie. In pristine conditions, the site is dominated by midgrasses such as sideoats grama, vine-mesquite, and Texas wintergrass. Shortgrasses such as buffalograss and curlymesquite are a significant part of the plant community as well. This site has relatively few perennial forbs. Shrubs and trees make up less than 2% woody canopy. The Shortgrass/Midgrass Community is composed of sideoats grama and vine mesquite which begin to decline because of disturbance or neglect as a result of short-term or sporadic heavy grazing, lack of fire, climatic factors, or other factors. Shortgrasses such as buffalograss, curlymesquite, and Texas grama begin to dominate the site. More annual grasses and forbs begin to appear on the site. Mesquite, lotebush, pricklypear, and tasajillo begin to invade from adjacent sites and the shrub canopy begins to gradually increase. The Shortgrass/Forb Community is the result of prolonged periods of damaging disturbances and neglect which may include continuous abusive grazing and total lack of prescribed fire or brush management. Shortgrasses continue to dominate the site, and annual forbs and grasses increase dramatically. A few individual plants of sideoats grama and vine mesquite remain in isolated areas. Mesquite, lotebush, pricklypear, and tasajillo become well established.

Dominant plant species

- sideoats grama (*Bouteloua curtipendula*), grass
- buffalograss (*Bouteloua dactyloides*), grass

Community 1.1
Midgrass/Shortgrass Prairie Community

Figure 8. 1.1 Midgrass/Shortgrass Prairie Community

Figure 9. 1.1 Midgrass/Shortgrass Prairie Community (2)

The reference plant community for the Clayey Upland ecological site is an open grassland. The Reference Plant Community is a midgrass/shortgrass prairie. In pristine conditions, the site is dominated by midgrasses such as sideoats grama, vine-mesquite, and Texas wintergrass. Other midgrasses include white tridens, meadow dropseed, and silver bluestem. Shortgrasses such as buffalograss and curlymesquite are a significant part of the plant community as well. This site has relatively few perennial forbs. The most common forbs are heath aster, gayfeather, western ragweed, eryngo, filaree, greenthread, Engelmann daisy, and trailing ratany. Shrubs and trees make up an

insignificant part of the historic plant community. Scattered hackberry trees, bumelia, lotebush, pricklyash, and ephedra may occur. There is less than 2% woody canopy.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1681	2690	3643
Forb	280	224	168
Shrub/Vine	168	112	112
Total	**2129**	**3026**	**3923**

Figure 11. Plant community growth curve (percent production by month). TX2529, Midgrass/Shortgrass - No Shrubs/Trees. Midgrass/Shortgrass-sideoats grama, vine mesquite, Texas wintergrass, buffalograss, curlymesquite/no shrubs or trees. .

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	4	10	25	25	4	3	10	10	3	2

Community 1.2
Shortgrass/Midgrass Community

Figure 12. 1.2 Shortgrass/Midgrass Community

Sideoats grama and vine mesquite begin to decline because of disturbance or neglect as a result of short-term or sporadic heavy grazing, lack of fire, climatic factors, or other factors. Obvious shifts in plant species and structure of the plant community begin to occur. Shortgrasses such as buffalograss, curlymesquite, and Texas grama begin to dominate the site. Other midgrasses including silver bluestem, white tridens, tumble windmillgrass, and hairy grama begin to increase on the site. More annual grasses and forbs begin to appear on the site. Mesquite, lotebush, pricklypear, and tasajillo begin to invade from adjacent sites and the shrub canopy begins to gradually increase.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1681	2466	3250
Forb	224	308	392
Shrub/Vine	112	140	168
Total	**2017**	**2914**	**3810**

Figure 14. Plant community growth curve (percent production by month). TX2530, Shortgrass/Midgrass - No Shrubs/Trees. Shortgrass/Midgrass - buffalograss, curlymesquite, Texas wintergrass, sideoats grama, vine mesquite/no shrubs or trees..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3	4	7	15	18	15	5	5	10	10	5	3

Community 1.3
Shortgrass/Forb Community

Figure 15. 1.3 Shortgrass/Forbs Community

Figure 16. 1.3 Shortgrass/Forb Community (2)

This plant community is the result of prolonged periods of damaging disturbances and neglect which may include continuous abusive grazing and total lack of prescribed fire or brush management. Shortgrasses continue to dominate the site, and annual forbs and grasses increase dramatically. A few individual plants of sideoats grama and vine mesquite remain in isolated areas, but Texas wintergrass, silver bluestem, and white tridens, and meadow dropseed are the most common midgrasses. Mesquite, lotebush, pricklypear, and tasajillo become well established.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1009	1457	1905
Forb	224	336	448
Shrub/Vine	112	224	336
Total	**1345**	**2017**	**2689**

Figure 18. Plant community growth curve (percent production by month). TX2531, Shortgrass/Annuals/Mesquite and Shrubs . Shortgrass/Annuals/Mesquite and Shrubs – buffalograss, curlymesquite, broomweed, annual forbs and grasses, mesquite, lotebush..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3	4	8	16	18	12	4	4	10	12	6	3

Pathway 1.1A
Community 1.1 to 1.2

Midgrass/Shortgrass Prairie Community

Shortgrass/Midgrass Community

Uncontrolled grazing and the elimination of fire from the ecosystem are the two primary factors that cause the reference midgrass plant community dominated by sideoats grama, vine mesquite and Texas wintergrass to shift toward a midgrass/shortgrass plant community. Sideoats grama and vine mesquite are the preferred forage species on this site. As these plants are repeatedly selectively grazed by livestock, they are replaced by silver bluestem, dropseeds, buffalograss, curlymesquite, Texas grama, and threeawns. Forbs begin to increase noticeably. Shrubs begin to gradually increase in density and canopy. Elimination or interruption of the natural fire cycle also contributes to an imbalance in the original plant community and tends to favor the more aggressive and competitive species.

Pathway 1.2A
Community 1.2 to 1.1

Shortgrass/Midgrass Community

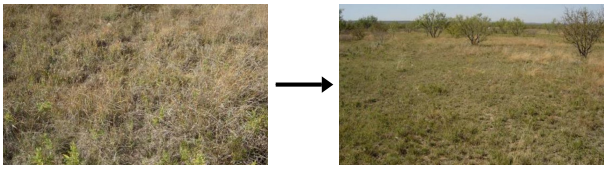
Midgrass/Shortgrass Prairie Community

Sideoats grama and vine mesquite still comprise a significant part of the overall plant community in this phase, and a viable seed source still exists to enable the original midgrass plant community to recover if sound management practices are followed. Implementation of a prescribed grazing management strategy and re-introduction of fire into the ecosystem will reverse the shift away from the original plant community. A reasonable and sustainable stocking rate, as well as implementation of a grazing system to control timing, frequency, and duration of livestock grazing can result in the re-establishment of the balanced and more diverse original midgrass plant community. A strategically planned and implemented prescribed burning program will assist with the turnaround, and is essential in maintaining a healthy plant community.

Conservation practices

Prescribed Burning
Prescribed Grazing

Pathway 1.2B
Community 1.2 to 1.3



Shortgrass/Midgrass Community

Shortgrass/Forb Community

Continued uncontrolled grazing and lack of fire will eventually result in the midgrass/shortgrass plant community

shifting to a plant community dominated by shortgrasses and forbs. Buffalograss, curlymesquite, threeawns and Texas grama become the most prominent grasses. As the amount of bare ground increases, forbs such as western ragweed, thistles, nightshade, gumweed, greenthread, and broomweed increase and invade the site. If stocking rates are not monitored and adjusted as needed, selective grazing and overgrazing will lead to increased competition from more aggressive grasses and forbs and cause this vegetation change. This change will be accelerated if drought conditions occur.

Pathway 1.3A
Community 1.3 to 1.2

Shortgrass/Forb Community

Shortgrass/Midgrass Community

Implementation of a grazing management plan to insure proper stocking rates and to control the timing, frequency, and duration of livestock grazing will enable the shortgrass/forb community to revert back to a midgrass/Shortgrass plant community as long as there is a viable population of midgrasses remaining to produce a seed crop. Prescribed burning will assist with the recovery and maintenance of the desired plant community. As non-native or undesired shrubs begin to encroach or increase on the site, individual plant treatment can be an effective and economical method of maintaining this plant community and preventing the transition to another vegetation state

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

State 2
Shrubland State

The Shrubland Community is dominated by shrubs. Mesquite canopy may exceed 20%. Texas wintergrass increased concurrently with increasing canopy as it is a shade tolerant cool-season grass. Lotebush is found throughout the site and pricklypear and tasajillo populations increase significantly. Annual forbs such as broomweed are abundant.

Dominant plant species

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

Community 2.1
Shrubland Community

Figure 19. 2.1 Shrubland Community

Continued lack of fire and brush management along with abusive grazing results in a plant community dominated by shrubs. Mesquite canopy may exceed 20%. Texas wintergrass increased concurrently with increasing canopy as it is a shade tolerant cool-season grass. Lotebush is found throughout the site and pricklypear and tasajillo populations increase significantly. Annual forbs such as broomweed are abundant. Areas of bare ground occur frequently.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	560	841	1233
Forb	280	448	560
Shrub/Vine	112	168	224
Total	**952**	**1457**	**2017**

Figure 21. Plant community growth curve (percent production by month). TX2516, Mesquite/Pricklypear/Shortgrass. Mesquite/Pricklypear/Shortgrass community..

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

State 3
Converted Land State

A large percentage of this site has been plowed up and converted to cropland or planted to monocultures of introduced grasses. Cropland is mostly small grains or cotton. Introduced grasses used on this site are primarily bermudagrass, Kleingrass, and K.R. bluestem. Areas converted to cropland, pastureland, or hayland are intensively managed with annual cultivation and/or frequent use of herbicides, pesticides, and commercial fertilizers to increase production. Refer to Forage Suitability Group Descriptions to learn more about adapted species, management, and production potentials on pasturelands and haylands.

Dominant plant species

- Bermudagrass (*Cynodon dactylon*), other herbaceous
- kleingrass (*Panicum coloratum*), other herbaceous

Community 3.1
Converted Land Community

Figure 22. 3.1 Converted Land Community

Because of the deep soil, level terrain, and the relative lack of trees and shrubs, a large percentage of this site has been plowed up and converted to cropland or planted to monocultures of introduced grasses. Cropland is mostly small grains or cotton. Introduced grasses used on this site are primarily bermudagrass, Kleingrass, and K.R. bluestem. Areas converted to cropland, pastureland, or hayland are intensively managed with annual cultivation and/or frequent use of herbicides, pesticides, and commercial fertilizers to increase production. Refer to Forage Suitability Group Descriptions to learn more about adapted species, management, and production potentials on pasturelands and haylands.

Table 9. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1905	4147	6389
Forb	224	224	224
Shrub/Vine	112	112	112
Total	**2241**	**4483**	**6725**

Figure 24. Plant community growth curve (percent production by month). TX2527, Converted Land Community. Planted into monocultures of introduced grasses and cropland species..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	3	5	14	23	20	5	4	12	8	3	2

Community 3.2
Abandoned Land Community

Figure 25. 3.2 Abandoned Land Community

Abandoned croplands and reseeded areas tend to revert back to a more natural state through the process of secondary succession. This is a very slow process that takes decades or centuries, dependent on the status of the area at the time it is abandoned. The first plants to establish are annual forbs and grasses followed by early successional shortgrasses and midgrasses. If managed properly, some of these abandoned areas may eventually begin to approximate the diversity and complexity of the native Clayey Upland ecosystem. Midgrasses and perennial forbs may begin to establish if the area is carefully managed. However, it is highly unlikely that abandoned lands can ever return to climax vegetation within a reasonable period of time.

Table 10. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Forb	448	560	673
Grass/Grasslike	336	448	560
Shrub/Vine	112	224	336
Total	**896**	**1232**	**1569**

Figure 27. Plant community growth curve (percent production by month). TX2528, Abandoned Land Community. Abandoned croplands, pasturelands, and seeded areas. .

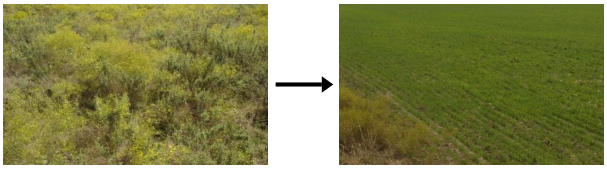
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3	4	8	16	18	12	4	4	10	12	6	3

Pathway 3.1A
Community 3.1 to 3.2

Converted Land Community **Abandoned Land Community**

If lands that were previously cultivated as cropland or managed intensively as pastureland are not managed properly or abandoned, the land will attempt to revert to its natural state. After being abandoned, the vegetation goes through various phases during the process of secondary succession. The early “pioneer” plants are primarily shallow-rooted annual forbs and grasses and seedlings of non-native shrubs such as mesquite.

Pathway 3.2A
Community 3.2 to 3.1



Abandoned Land Community **Converted Land Community**

Because of the radical disturbance of the soil and the complete destruction or alteration of the native plant community, these abandoned lands will never be able to return to their original plant community in a reasonable time frame. They can be converted back to cropland, pastureland, or seeded rangeland by cultivation to control weeds, and prepare a seedbed, and planting of the desired crop or grasses.

Conservation practices

Brush Management
Conservation Crop Rotation
Forage and Biomass Planting

Prescribed Grazing
Range Planting
Nutrient Management
Integrated Pest Management (IPM)

Transition T1A
State 1 to 2

Abusive grazing, resulting from overstocking and continuous grazing, leads to a drastic change in the herbaceous plant community. Lower successional grasses including threeawns, Texas grama, red lovegrass, broomweed, and annual grasses become the dominant herbaceous species. Increased bare ground enables opportunistic forbs such as broomweed and annual forbs to invade the site. Elimination of fire from the ecosystem is a major cause of the significant increase in the frequency, density, and canopy of invasive shrubs such as mesquite, lotebush, pricklyash, catclaw acacia, pricklypear, and tasajillo.

Transition T1B
State 1 to 3

The site can be converted to other land uses including cropland, orchard land, introduced pasture, etc. At this stage, the land conversion would require the following steps: 1) Brush management if the tree and shrub density and canopy exceed 15 to 20%, 2) followed by seedbed preparation, 3) seeding or planting of the desired crop, grasses, or trees.

Restoration pathway R2A
State 2 to 1

Once the site has deteriorated to this state, it is no longer capable of recovering to the reference plant community through the implementation of management practices alone. Brush Management practices are needed to eliminate non-native species, control undesired native species, and reduce overhead canopy to allow understory species to establish and produce. At this stage, there is not a viable population or seed source of the original plant community, so Range Planting is needed to re-establish native grasses and forbs that were components of the original plant community. However, mechanical Brush Management and Range Planting are very expensive. If the original plant community can be restored, Prescribed Grazing and Prescribed Burning are essential to the recovery and maintenance of the desired plant community.

Conservation practices

Brush Management
Prescribed Burning
Range Planting
Prescribed Grazing

Transition T2A
State 2 to 3

The site can be converted to other land uses including cropland, orchard land, introduced pasture, etc. At this stage, the land conversion would require the following steps: 1) Brush management and/or land clearing to remove shrubs and trees, 2) seedbed preparation, 3) seeding or planting of the desired crop, grasses, or trees.

Additional community tables

Table 11. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)

Grass/Grasslike					
1	**Midgrasses**			1233–2242	
	sideoats grama	BOCU	*Bouteloua curtipendula*	448–1569	–
	vine mesquite	PAOB	*Panicum obtusum*	336–1569	–
	Texas wintergrass	NALE3	*Nassella leucotricha*	448–785	–
2	**Midgrasses**			224–785	
	Texas cupgrass	ERSE5	*Eriochloa sericea*	0–392	–
	white tridens	TRAL2	*Tridens albescens*	56–392	–
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	56–224	–
	Arizona cottontop	DICA8	*Digitaria californica*	0–168	–
	Rio Grande bristlegrass	SERER	*Setaria reverchonii ssp. ramiseta*	0–168	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	0–168	–
	Drummond's dropseed	SPCOD3	*Sporobolus compositus var. drummondii*	56–168	–
3	**Shortgrasses**			112–224	
	hairy grama	BOHI2	*Bouteloua hirsuta*	56–112	–
	sedge	CAREX	*Carex*	0–56	–
	hooded windmill grass	CHCU2	*Chloris cucullata*	0–56	–
	tumble windmill grass	CHVE2	*Chloris verticillata*	0–56	–
	tumblegrass	SCPA	*Schedonnardus paniculatus*	0–56	–
	slim tridens	TRMUM	*Tridens muticus var. muticus*	0–56	–
	purple threeawn	ARPU9	*Aristida purpurea*	0–56	–
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	0–56	–
4	**Shortgrasses**			224–392	
	curly-mesquite	HIBE	*Hilaria belangeri*	56–392	–
	buffalograss	BODA2	*Bouteloua dactyloides*	112–392	–
	Texas grama	BORI	*Bouteloua rigidiseta*	0–56	–
Forb					
5	**Forbs**			56–168	
	white heath aster	SYERE	*Symphyotrichum ericoides var. ericoides*	0–56	–
	Engelmann's daisy	ENPE4	*Engelmannia peristenia*	0–56	–
	onion	ALLIU	*Allium*	0–28	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–28	–
	Texas thistle	CITE2	*Cirsium texanum*	0–28	–
	Queen Anne's lace	DACA6	*Daucus carota*	0–28	–
	prairie clover	DALEA	*Dalea*	0–28	–
	slender greenthread	THSI	*Thelesperma simplicifolium*	0–28	–
	Texas vervain	VEHA	*Verbena halei*	0–28	–
	spiny cocklebur	XASP2	*Xanthium spinosum*	0–28	–
	Leavenworth's eryngo	ERLE11	*Eryngium leavenworthii*	0–28	–
	Texas stork's bill	ERTE13	*Erodium texanum*	0–28	–
	beeblossom	GAURA	*Gaura*	0–28	–

	curlycup gumweed	GRSQ	*Grindelia squarrosa*	0–28	–
	Indian rushpea	HOGL2	*Hoffmannseggia glauca*	0–28	–
	trailing krameria	KRLA	*Krameria lanceolata*	0–28	–
	littleleaf sensitive-briar	MIMI22	*Mimosa microphylla*	0–28	–
	pony beebalm	MOPE	*Monarda pectinata*	0–28	–
	woodsorrel	OXALI	*Oxalis*	0–28	–
	smartweed leaf-flower	PHPO3	*Phyllanthus polygonoides*	0–28	–
	redseed plantain	PLRH	*Plantago rhodosperma*	0–28	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	0–28	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	0–28	–
Shrub/Vine					
6	**Shrubs/Vines**			0–56	
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	0–28	–
	clapweed	EPAN	*Ephedra antisyphilitica*	0–28	–
	pricklypear	OPUNT	*Opuntia*	0–28	–
	bully	SIDER2	*Sideroxylon*	0–28	–
	pricklyash	ZANTH	*Zanthoxylum*	0–28	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–28	–
Tree					
7	**Trees**			0–56	
	hackberry	CELTI	*Celtis*	0–56	–
	honey mesquite	PRGL2	*Prosopis glandulosa*	0–28	–

Animal community

Historically, the Clayey Upland site was occasionally utilized by a variety mammals, reptiles, and birds. Several historical references and journals written in the 18th and 19th century by explorers, survey parties, and military expeditions refer to herds of bison, wild cattle, wild horses, and antelope roaming freely across the North Central Prairie and adjacent regions.

Currently, the site is utilized intermittently by deer, quail, dove, species of grassland birds, and small fur-bearing mammals such as rabbits and prairie dogs. Feral hogs are also frequent visitors to the site in some areas. This is not a preferred site for most wildlife species because of the relatively low and uniform structure of the vegetation, as well as the lack of trees, shrubs, and forbs. Wildlife tends to use this site incidentally in association with the use of more suitable adjacent sites. Animal species and populations fluctuate as the vegetation cycles through temporary phases and different ecological stages. Large animals may have difficulty traversing the site when the soil is wet.

Livestock grazing should be controlled by implementing grazing management systems that incorporate frequent and timely deferment periods to prevent abusive grazing.

Hydrological functions

When the soil is cracked and dry, infiltration is rapid and runoff is limited on this site. When the soil is wet, it seals over and runoff is accelerated. A thick, healthy grass cover reduces runoff velocity and results in improved water quality because it serves as a filter or trap to reduce sediments and pollutants before the water flows offsite.

Recreational uses

Because of the scarcity of trees and shrubs, the level terrain, characteristics of the soil, and the uniformity of the

plant community, recreational use of this site is incidental and is generally associated with recreational use of adjacent sites.

Wood products

Insignificant.

Other products

Insignificant.

Other information

None.

Inventory data references

Vegetation data for this site was obtained from existing Range Site Descriptions, SCS-RANGE -417 Production and Composition Records for Native Grazing Lands, and on-site inventories by the author and local experts including ranchers, natural resource specialists from federal and state agencies, and personnel from cooperating agencies and organizations. A total of 7 SCS-RANGE-417's containing data collected from 4 counties (Stephens, Shackelford, Throckmorton and Coleman Counties) during the period 12/30/1981 to 12/12/1986 were reviewed for this site.

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Reviewers:
Lem Creswell, RMS, NRCS, Weatherford, Texas
Nathan Haile, RSS, NRCS, Weatherford, Texas
Mark Moseley, RMS, NRCS, Boerne, Texas
Justin Clary, RMS, NRCS, Temple, Texas

Contributors

Dan Caudle, RMS, NRCS, Abilene, Texas
PES Edits by Tyson Morley, MLRA Soil Scientist, Altus, Oklahoma

Approval

Bryan Christensen, 9/12/2023

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)	Lem Creswell, Zone RMS, NRCS, Weatherford, Texas
Contact for lead author	817-596-2865
Date	11/19/2008
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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2. **Presence of water flow patterns:** Deposition or erosion is uncommon during normal rainfall events, but may occur in limited areas during intense rainfall events.

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

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Expect no more than 10% bare ground scattered randomly throughout the site.

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

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Little or no litter movement or deposition during normal rainfall events; however, litter of all sizes may move long distances depending on obstructions under intense storm events.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil surface in HCPC is resistant to erosion. Stability range is expected to be 5-6.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Up to 48" thick with dark grayish brown clay with generally moderate fine granular and subangular blocky structure. SOM approximately 1-6%. See Soil Survey for specific soil.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Areas of dense, low growing, sod forming grasses may contribute to moderately high runoff rate and reduced infiltration rates.

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

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

    Dominant: Warm-season midgrasses >>

    Sub-dominant: Warm-season shortgrasses >

    Other: Cool-season grasses > Forbs > Shrubs/Vines > Trees

    Additional:

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

decadence): Perennial grasses will naturally exhibit a minor amount (less than 5%) of senescence and some mortality every year.

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

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1800-3400 pounds per acre.

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

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17. **Perennial plant reproductive capability:** All perennial species should be capable of reproducing every year unless disrupted by extended drought, overgrazing, wildfire, insect damage, or other events occuring immediately prior to, or during the reproductive phase.
