Ecological site R078AY605TX
Sandy Loam 25-28" PZ

Last updated: 9/15/2023
Accessed: 04/20/2024

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.

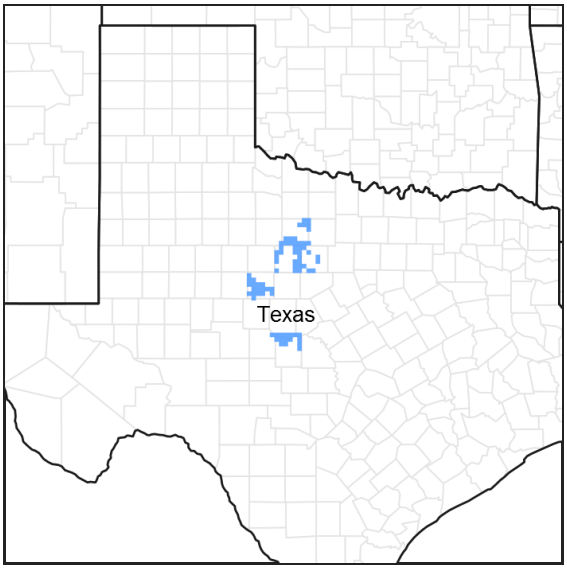


Figure 1. Mapped extent

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): 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 deep rolling sandy loam soils. The reference vegetation consists of tall and midgrasses with forbs and scattered trees. In the absence of periodic fire or other brush management, woody species canopy may

increase across the site. Abusive grazing practices can lead to a decline in the more palatable tallgrasses and a shift in the plant community.

Associated sites

R078AY121TX	**Loamy Bottomland 25-28" PZ** Frequently occurs adjacent to Sandy Loam site in a lower position on the landscape.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Schizachyrium scoparium* (2) *Andropogon hallii*

Physiographic features

These nearly level to moderately steep soils in the Sandy Loam ecological site occur on stream terraces on alluvial plains in the Rolling Limestone Prairie. These soils were formed in loamy and sandy alluvium, and eolian sediments of Pleistocene age. Slopes range from 0 to 15 percent. Elevation ranges from 1000 to 3000 feet.

Table 2. Representative physiographic features

Landforms	(1) Plains > Terrace (2) Plains > Ridge
Runoff class	Low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	1,000–3,000 ft
Slope	0–15%
Water table depth	72 in
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)	197-210 days
Freeze-free period (characteristic range)	222-244 days
Precipitation total (characteristic range)	27-29 in
Frost-free period (actual range)	195-216 days
Freeze-free period (actual range)	221-260 days
Precipitation total (actual range)	27-30 in
Frost-free period (average)	204 days
Freeze-free period (average)	235 days
Precipitation total (average)	28 in

Climate stations used

- (1) THROCKMORTON 7NE [USC00419016], Throckmorton, TX
- (2) ALBANY [USC00410120], Albany, TX
- (3) PUTNAM [USC00417327], Baird, TX
- (4) COLEMAN [USC00411875], Coleman, TX
- (5) CONCHO PK/IVIE RSVR [USC00411934], Millersview, TX

Influencing water features

NA

Wetland description

NA

Soil features

The soil series in the Sandy Loam ecological site consist of very deep, moderately well to well drained, very slow to moderately permeable soils.

Major Soil Taxonomic Units correlated to this site include: Grandfield, Chaney, Cisco, Enterprise, Hext, Lusk, and

Rochelle soil series.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone
Surface texture	(1) Silt loam (2) Fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	150–200 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	2–6 in
Calcium carbonate equivalent (0-40in)	0–10%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–6%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

The reference plant community for the Sandy Loam ecological site is a tallgrass/midgrass savanna. Evidence of the historic vegetation can be found in the journals and records of explorers, military expeditions, and boundary survey teams.

Climate is a major factor influencing vegetation on the site. 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. Most ecosystems in the Rolling Limestone Prairie developed in a 4 to 6 year cycle of recurring fires. Many of these fires resulted from lightning strikes during thunderstorms. Native Americans frequently set fires to manipulate the movement of bison and other animals as well as a defensive or offensive technique when dealing with their enemies. These historic fires were usually severe because of the amount of grass fuel available to carry the fire. The intensity of fires kept shrubs and sapling trees suppressed and allowed grasses and forbs to flourish. Tallgrass species are fire tolerant and are enhanced by periodic burning. Forbs usually increase for a year or two following these fires before the grasses become dominant again.

Lack of fire allows herbaceous vegetation to become senescent and may eventually lead to the loss of the most desirable species. Seedlings of non-native brush species and invasive weeds may encroach on the site from adjacent sites.

Prior to settlement, this site was subject to periodic grazing and browsing by vast herds of bison, wild cattle, wild horses, and deer. 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. Intervals between grazing periods were frequently influenced by the amount of time that had elapsed since the last fire on the area.

As the region was settled, fire was reduced or eliminated and grasslands were fenced off to control movement and facilitate grazing by 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 tallgrass plant community has been eliminated or severely reduced on most Sandy Loam sites.

Further deterioration leads to the loss of the perennial warm-season midgrass and forb plant community and an increase in short grasses, annuals, and bare ground. This provides the opportunity for less desirable woody species such as mesquite and pricklypear to encroach from adjacent sites. As the amount of bare ground increases, so does the potential for wind erosion.

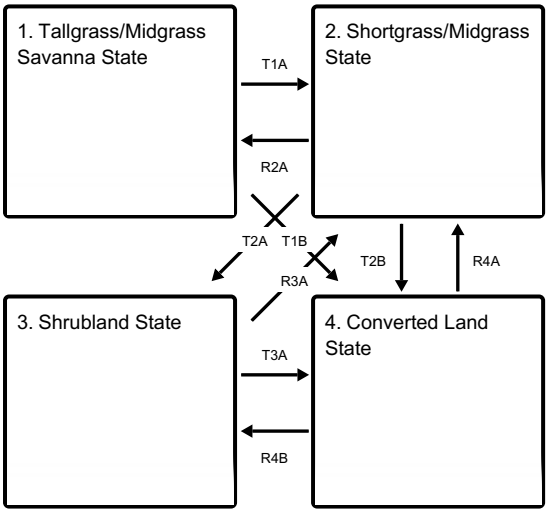
Selective individual removal of undesirable trees and shrubs is relatively easy and more practical when brush plants initially appear on the site. The increase of brush can be fairly rapid and the plants per acre will soon become too numerous for individual control to be feasible. Once woody plants become 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 Sandy Loam ecological site are result of the combined influences of natural events (rainfall, temperature, droughts, etc.) and the accompanying management systems implemented on the area (prescribed fire, grazing management, and brush management).

The following diagram suggests some pathways that the vegetation on this site might take. There may be other states not shown on the diagram. This information is intended to show what might happen in a given set of circumstances; 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

T1B - Extensive soil disturbance followed by seeding

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 - Extensive soil disturbance followed by seeding

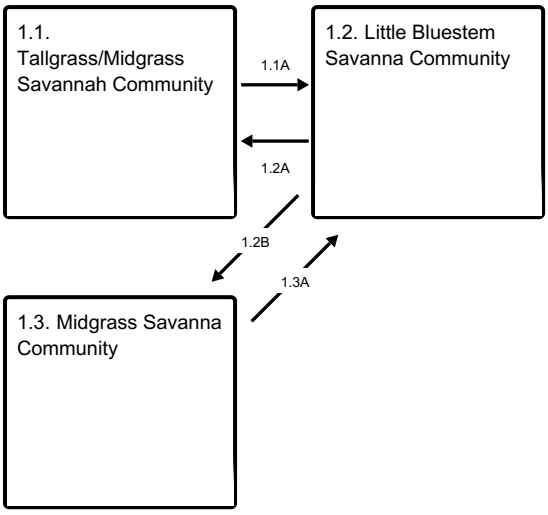
R3A - Adequate rest from defoliation and removal of woody canopy

T3A - Extensive soil disturbance followed by seeding

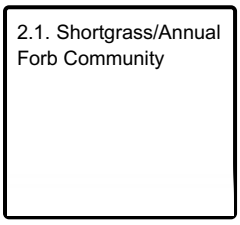
R4A - Absence of disturbance and natural regeneration over time, may be coupled with drought

R4B - Absence of disturbance and natural regeneration over time, may be coupled with drought

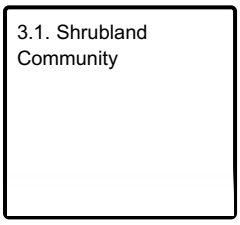
State 1 submodel, plant communities



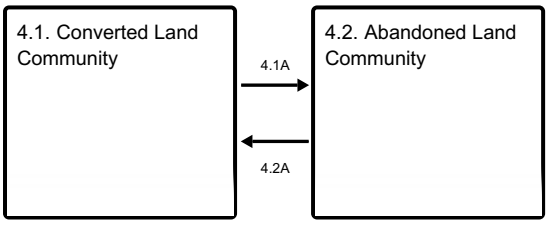
State 2 submodel, plant communities



State 3 submodel, plant communities



State 4 submodel, plant communities



State 1
Tallgrass/Midgrass Savanna State

Historically, the Tallgrass/Midgrass Savanna Community consisted of a diverse mixture of tallgrasses and midgrasses, a minor but significant shortgrass component, an abundance of forbs, with trees and shrubs distributed throughout the landscape. In pristine conditions, little bluestem is the dominant grass with a significant amount of other tallgrasses. Midgrasses such as sideoats grama, Arizona cottontop, silver bluestem, and Texas wintergrass are also a significant component. A wide variety of forbs such as Engelmann daisy, gayfeather, prairie clover, bundleflower, and daleas occurs. Mottes of liveoak and individual trees of post oak, hackberry, and elm are distributed throughout the site. Shrubs such as flameleaf sumac, skunkbush sumac, and bumelia are also scattered across the landscape. In the Little Bluestem Savanna Community, Indiangrass, big or sand bluestem, switchgrass, and sand lovegrass begin to decline and their presence is significantly reduced. Little bluestem becomes very

dominant and may comprise as much as 60% of the total plant community in this phase. Sideoats grama also tends to increase somewhat in this initial stage of retrogression. Species composition of forbs, shrubs, and trees generally remains static in this phase. Tallgrasses such as Indiangrass, big bluestem, and switchgrass are drastically reduced in the Midgrass Community. Remnant populations and widely scattered individual tallgrass species remain in protected areas. They are often unnoticed because they are grazed very short, are in low vigor, and are not prominent on the site. Midgrasses such as sideoats grama, Arizona cottontop, silver bluestem, and Texas wintergrass become dominant. Perennial forbs increase. Mesquite, pricklypear, and other woody species gradually begin to increase in density and canopy as they encroach from adjacent sites.

Dominant plant species

- little bluestem (*Schizachyrium scoparium*), grass
- sand bluestem (*Andropogon hallii*), grass

Community 1.1
Tallgrass/Midgrass Savannah Community

Figure 8. 1.1 Tallgrass/Midgrass Savanna Community

Figure 9. 1.1 Tallgrass/Midgrass Savanna Community (2)

The reference plant community for the Sandy Loam ecological site is a tallgrass/midgrass savanna. The Sandy Loam site in this MLRA is a transitional site between the Sandy Loam sites that occur in the midgrass prairies of the Rolling Plains to the west and sites that are found in the tallgrass/oak savannas of the North Central Prairie to the east. Historically, the plant community consisted of a diverse mixture of tallgrasses and midgrasses, a minor but significant shortgrass component, an abundance of forbs, with trees and shrubs distributed throughout the landscape. In reference conditions little bluestem is the dominant grass with a significant amount of other tallgrasses including Indiangrass and big or sand bluestem, and lesser amounts of switchgrass. Midgrasses such as sideoats grama, Arizona cottontop, silver bluestem, Texas wintergrass, sand lovegrass, blue grama, vine mesquite and dropseeds are also a significant component of the this plant community. A wide variety of forbs occupy the historic climax plant community. The most common forbs are heath aster, Engelmann daisy, gayfeather, prairie clover, bundleflower, daleas, evening primrose, sagewort, and American basketflower. Mottes of liveoak and

individual trees of post oak, hackberry, and elm are distributed throughout the site. Shrubs such as flameleaf sumac, skunkbush sumac, plum, bumelia, pricklyash, and catclaw acacia are also scattered across the landscape.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1900	2900	4000
Forb	250	350	500
Tree	100	200	250
Shrub/Vine	150	200	250
Total	**2400**	**3650**	**5000**

Figure 11. Plant community growth curve (percent production by month). TX2534, Tallgrass/Midgrass Savanna, 10% Canopy . Little bluestem dominant. Other tallgrasses and midgrasses sub-dominant. Abundance of forbs. Significant amount of post oak, hackberry, elm, and shrubs. .

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	2	10	20	24	10	5	10	10	3	2

Community 1.2
Little Bluestem Savanna Community

Figure 12. 1.2 Little Bluestem Savanna Community

This community shift occurs as a result of disturbances such as extended drought, frequent short-term heavy grazing, etc. Indiangrass, big or sand bluestem, switchgrass, and sand lovegrass begin to decline and their presence is significantly reduced. Little bluestem becomes very dominant and may comprise as much as 60% of the total plant community in this phase. Sideoats grama also tends to increase somewhat in this initial stage of retrogression. Species composition of forbs, shrubs, and trees generally remains static in this phase.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1700	2500	3500
Forb	250	400	500
Tree	100	200	250
Shrub/Vine	150	200	250
Total	**2200**	**3300**	**4500**

Figure 14. Plant community growth curve (percent production by month). TX2534, Tallgrass/Midgrass Savanna, 10% Canopy . Little bluestem

dominant. Other tallgrasses and midgrasses sub-dominant. Abundance of forbs. Significant amount of post oak, hackberry, elm, and shrubs. .

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	2	10	20	24	10	5	10	10	3	2

Community 1.3
Midgrass Savanna Community

Figure 15. 1.3 Midgrass Savanna Community

Severe disturbances such as heavy continuous grazing, persistent drought conditions, or combinations of heavy continuous grazing, extreme climatic conditions, and other factors, cause the plant community to change dramatically. Tallgrasses such as Indiangrass, big bluestem, and switchgrass are drastically reduced on the site, but remnant populations and widely scattered individual plants remain in protected areas. They are often unnoticed because they are grazed very short, are in low vigor, and are not prominent on the site. Midgrasses such as sideoats grama, blue grama, Arizona cottontop, silver bluestem, Texas wintergrass, and dropseeds become dominant. Western ragweed and other perennial forbs increase. Mesquite, pricklypear, catclaw acacia, tasajillo, and greenbriar gradually begin to increase in density and canopy as they encroach from adjacent sites.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1100	1500	2000
Forb	300	600	900
Tree	200	250	300
Shrub/Vine	200	250	300
Total	**1800**	**2600**	**3500**

Figure 17. Plant community growth curve (percent production by month). TX2521, Midgrass - Oak Savanna <10% woody Canopy. Abundant warm-season midgrasses, with scattered warm-season tallgrasses, scattered trees and shrubs, and a diverse forb community..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	5	13	21	21	7	5	10	8	4	2

Pathway 1.1A
Community 1.1 to 1.2

Tallgrass/Midgrass Savannah Community

Little Bluestem Savanna Community

Abusive grazing and the elimination of fire from the ecosystem are the two primary factors that cause the reference plant community to change from tallgrass/midgrass savanna to a savanna with an herbaceous plant community that is totally dominated by little bluestem. As Indiangrass, big bluestem, and switchgrass decline, they are replaced by little bluestem, and midgrasses such as sideoats grama, Texas wintergrass, silver bluestem, dropseeds, and bristlegrass. Blue grama and hairy grama also increase. Elimination or interruption of the natural fire cycle also contributes to an imbalance in the original plant community, and tends to favor the more competitive and aggressive midgrasses and perennial forbs.

Pathway 1.2A
Community 1.2 to 1.1

Little Bluestem Savanna Community

Tallgrass/Midgrass Savannah Community

A viable population and/or seed source of Indiangrass, big bluestem, and switchgrass still exists to enable the original plant community to recover if sound management practices are followed. Implementation of a prescribed grazing management strategy and re-introduction of periodic fire into the ecosystem will reverse the shift away from the original plant community and allow other tallgrasses to compete with little bluestem. A reasonable and sustainable stocking rate in combination with a grazing system to control the timing, frequency, duration, and degree of grazing can result in the re-establishment of the balanced and diverse tallgrass/midgrass prairie. A strategically planned and implemented prescribed burning program will accelerate the recovery process. Tree and shrub canopy remains relatively stable in this phase.

Conservation practices

Prescribed Burning
Prescribed Grazing

Pathway 1.2B
Community 1.2 to 1.3

Little Bluestem Savanna Community

Midgrass Savanna Community

Abusive grazing and a lack of fire in the ecosystem are the primary factors that trigger the shift away from a little bluestem dominated plant community to a midgrass community dominated by sideoats grama, Arizona cottontop, vine mesquite, and blue grama. Silver bluestem, dropseeds, threeawns, and forbs such as western ragweed and gayfeather increase significantly. The canopy and density of trees and shrubs increases slightly.

Pathway 1.3A
Community 1.3 to 1.2

Midgrass Savanna Community

Little Bluestem Savanna Community

This is still a productive and resilient plant community with a sufficient number of individual tallgrass plants to enable recovery to a tallgrass/midgrass prairie. Carefully planned and skillfully implemented grazing management and prescribed burning programs are essential to the re-establishment of the diverse historic plant community.

Conservation practices

Prescribed Burning
Prescribed Grazing

State 2
Shortgrass/Midgrass State

The Shortgrass/Annual Forb Community is marked by continued deterioration of the plant community due to abusive grazing and/or other destructive disturbances eventually results in a plant community dominated by shortgrasses and midgrasses. Bare ground can become significant in the most deteriorated state. Tallgrass species and many of the midgrass species no longer exist in sufficient amounts to allow the site to recover through management alone.

Dominant plant species

- buffalograss (*Bouteloua dactyloides*), grass
- dropseed (*Sporobolus*), grass

Community 2.1
Shortgrass/Annual Forb Community

Figure 18. 2.1 Shortgrass/Annual Forb Community

Continued deterioration of the plant community due to abusive grazing and/or other destructive disturbances eventually results in a plant community dominated by shortgrasses and midgrasses. Shortgrasses such as buffalograss, Texas grama, threeawns, silver bluestem, dropseeds, and tumble windmillgrass and opportunistic annual forbs and grasses become established on the exposed soil surface and dominate the plant community. Western ragweed and broomweed are the dominant forbs. Bare ground is evident in many areas and can become significant in the most deteriorated state. Tallgrass species and many of the more desirable midgrass species no longer exist in sufficient amounts to allow the site to recover through management alone. Mesquite, lotebush, pricklyash, catclaw acacia, pricklypear, and other brush species increase significantly as they invade from adjacent sites.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Forb	300	400	550
Shrub/Vine	200	300	450
Grass/Grasslike	300	400	450
Tree	200	300	350
Total	**1000**	**1400**	**1800**

Figure 20. Plant community growth curve (percent production by month). TX2515, Shortgrass/Shrub Dominant Community. Shortgrasses and Shrubs dominate this plant community..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3	4	10	10	20	20	5	5	10	8	2	3

State 3
Shrubland State

The Shrubland State has seen an increase in annual forbs and grasses. There is also an increase of brush species such as mesquite, lotebush, catclaw acacia, greenbriar, pricklypear, and tasajillo become well established eventually developing a canopy of more than 20% on the site.

Dominant plant species

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

Community 3.1
Shrubland Community

Figure 21. 3.1 Shrubland Community

Figure 22. 3.1 Shrubland Community (2)

Annual forbs, annual grasses, and scattered midgrasses dominate the understory, while brush species such as mesquite, lotebush, catclaw acacia, greenbriar, pricklypear, and tasajillo become well established eventually developing a canopy of more than 20% on the site.

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Forb	300	450	600
Shrub/Vine	300	400	500
Grass/Grasslike	200	300	400
Tree	200	250	300
Total	**1000**	**1400**	**1800**

Figure 24. Plant community growth curve (percent production by month). TX2515, Shortgrass/Shrub Dominant Community. Shortgrasses and Shrubs dominate this plant community..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3	4	10	10	20	20	5	5	10	8	2	3

State 4
Converted Land State

Hundreds of thousands of acres have been plowed up and converted to cropland, pastureland, or hayland or also known as the Converted Land Community. Bermudagrass is the primary introduced species used in this area. The Sandy Loam site can be an extremely productive forage producing site with the application of optimum amounts of fertilizer. Refer to Forage Suitability Group Descriptions for specific recommendations, production potentials, species adaptation, etc. In some localized areas, several hundred acres of pecan and peach orchards have been established on the sandy loam soils related to this site. Abandoned croplands and reseeded areas tend to revert back to a more natural state through the process of secondary succession. This plant community is also known as Abandoned Land CommunityThe 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 Sandy Loam ecosystem.

Community 4.1
Converted Land Community

Figure 25. 4.1 Converted Land Community

The Sandy Loam site is one of the most frequently converted sites because of its deep soils, favorable soil/water/plant relationship, and relatively level terrain. Hundreds of thousands of acres have been plowed up and converted to cropland, pastureland, or hayland. Bermudagrass is the primary introduced species used in this area. The Sandy Loam site can be an extremely productive forage producing site with the application of optimum amounts of fertilizer. Refer to Forage Suitability Group Descriptions for specific recommendations, production potentials, species adaptation, etc. In some localized areas, several hundred acres of pecan and peach orchards have been established on the sandy loam soils related to this site. In the highest state of production following conversion, the trees, shrubs and forbs have been severely reduced or eliminated from the site. The more woodies and forbs that occur on a converted site, the lower the overall production would be. The annual production figures below reflect this change.

Table 10. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2200	3700	5400
Forb	250	200	100
Tree	0	0	0
Shrub/Vine	150	100	0
Total	**2600**	**4000**	**5500**

Figure 27. 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 4.2
Abandoned Land Community

Figure 28. 4.2 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 Sandy Loam ecosystem. Midgrasses, perennial forbs, and tallgrasses may begin to establish if the area is carefully managed. However, it is highly unlikely that abandoned lands can ever return to reference vegetation within a reasonable period of time because of soil degradation and lack of natural seed source.

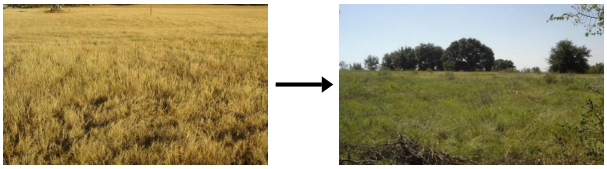
Table 11. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Forb	350	400	500
Grass/Grasslike	250	300	400
Shrub/Vine	100	200	300
Tree	0	0	0
Total	**700**	**900**	**1200**

Figure 30. 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 4.1A
Community 4.1 to 4.2



Converted Land Community **Abandoned Land Community**

After conversion to other land uses, these areas must be intensively managed in order to maintain production and quality. Economics, drought, and other outside factors may result in these areas being abandoned or neglected. If fertility is not maintained, and weed control is not routinely carried out, the land will tend to revert to “pioneer” plants such as annual forbs and grasses.

Pathway 4.2A

Community 4.2 to 4.1

Abandoned Land Community **Converted Land Community**

Abandoned lands can be re-established to cropland, introduced pasture, or seeded monocultures by cultivation to control unwanted vegetation, seedbed preparation, and seeding or planting desired vegetation with normal with seedbed preparation. Implementation of a grazing management plan is necessary to allow establishment of seeded vegetation and control the timing, frequency, duration, and degree of grazing following establishment. Prescribed burning will assist with the recovery and maintenance of the desired plant community.

Conservation practices

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

Transition T1A
State 1 to 2

Long-term abusive grazing and a lack of fire will eventually result in the transition from a midgrass plant community to a plant community dominated by shortgrasses and annuals. Sideoats grama, Arizona cottontop, and vine mesquite decline drastically. Shortgrasses, such as buffalograss, hairy grama, Texas grama, and threeawns become the dominant grasses. Silver bluestem and dropseeds become the primary midgrasses in this phase. Opportunistic species such as broomweed, other annual forbs, and annual grasses invade the site as bare ground increases. Non-native and invasive shrubs begin to increase on the site and invade from adjacent sites. The increase in density and woody canopy of shrubs begins to have an adverse effect on the understory herbaceous vegetation because of increased shading and competition for space and soil moisture.

Transition T1B
State 1 to 4

Thousands of acres of the native vegetation on this site have been “broken out” and converted to other land uses such as cropland, introduced pasture, seeded monocultures of native grasses, or orchard land. This is a favored site for conversion due to the relatively deep and fertile soils as well as the flat to gently rolling topography. Seedbed preparation can be accomplished with normal cultivation equipment and desired vegetation can be seeded or planted.

Restoration pathway R2A
State 2 to 1

At this stage, there is no longer a viable population of the original tallgrasses and primary midgrasses to reproduce sufficient seed to enable the plant community to recover through management practices alone. Brush management is needed when the density and canopy of shrubs and trees begins to have an adverse effect on the desired grasses and forbs. Brush management treatment methods become more complicated, more expensive, and less effective. At this stage, Range Planting will be required to re-introduce the original midgrasses and tallgrasses. Implementation of a grazing management plan is necessary to allow establishment of seeded vegetation and control the timing, frequency, duration, and degree of grazing following establishment. Prescribed burning will assist with the recovery and maintenance of the desired plant community.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing
Range Planting

Transition T2A
State 2 to 3

Continued abusive grazing, lack of fire, extended drought, and lack of brush management will result in a plant community which is dominated by shrubs including mesquite, lotebush, catclaw acacia, pricklypear, yucca, and tasajillo. The woody canopy has a detrimental effect on the understory vegetation. Extensive areas of bare ground may occur. Shortgrasses as well as annual grasses and forbs increase dramatically and invade from adjacent sites. Texas wintergrass and other shade tolerant species increase. Once the site has declined to this stage, it will not return to a higher state of vegetation through management practices alone.

Transition T2B
State 2 to 4

This plant community can be converted to cropland, introduced pasture, or orchard land, but it may require mechanical brush management to remove unwanted shrubs and trees if they are dense enough to interfere with seedbed preparation, seeding or planting operations, or management following establishment. Seedbed preparation methods may require heavier equipment, and seeding or planting methods may have to be modified to overcome more intensive land preparation treatments.

Restoration pathway R3A
State 3 to 2

It is probably not practical or economically feasible to attempt to restore the original plant community through brush management and revegetation. However, brush management can be carried out in selected areas to open up the canopy and reduce tree density to improve wildlife habitat, improve growing conditions for herbaceous vegetation, and provide access. Brush management followed by seeding or planting native vegetation can be expected to establish a healthy plant community that contains many of the original native grasses, but lacks the diversity of forbs and minor grasses found in the reference plant community. Implementation of a grazing management plan is necessary to allow establishment of seeded vegetation and control the timing, frequency, duration, and degree of grazing following establishment. Prescribed burning will assist with the recovery and maintenance of the desired plant community.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing
Range Planting

Transition T3A
State 3 to 4

Extensive brush management and seedbed preparation techniques with heavy equipment are required to clear the land in order to convert it to cropland, introduced pasture, or seeded monocultures at this point. These treatments are radical, expensive, and generally not recommended.

Restoration pathway R4A

State 4 to 2

After conversion to other land uses, these areas must be intensively managed in order to maintain production and quality. Economics, drought, and other outside factors may result in these areas being abandoned or neglected. If fertility is not maintained, and weed control is not routinely carried out, the land may revert to shortgrasses and early successional forbs and grasses.

Restoration pathway R4B
State 4 to 3

After conversion to other land uses, these areas must be intensively managed in order to maintain production and quality. Economics, drought, and other outside factors may result in these areas being abandoned or neglected. If fertility is not maintained, weed control is not routinely carried out, and invasive shrubs and trees are not controlled, the land may revert to a shrubland state with a canopy cover of more than 20% and an understory of early successional shortgrasses and forbs.

Additional community tables

Table 12. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Warm-season tallgrass**			500–2500	
	little bluestem	SCSC	*Schizachyrium scoparium*	500–2500	–
2	**Warm-season tallgrasses**			500–2500	
	Indiangrass	SONU2	*Sorghastrum nutans*	250–1250	–
	big bluestem	ANGE	*Andropogon gerardii*	0–750	–
	sand bluestem	ANHA	*Andropogon hallii*	0–750	–
	switchgrass	PAVI2	*Panicum virgatum*	0–500	–
	purpletop tridens	TRFL2	*Tridens flavus*	0–100	–
3	**Warm-season midgrasses**			500–1250	
	sideoats grama	BOCU	*Bouteloua curtipendula*	250–750	–
	sand lovegrass	ERTR3	*Eragrostis trichodes*	250–500	–
	vine mesquite	PAOB	*Panicum obtusum*	0–200	–
	streambed bristlegrass	SELE6	*Setaria leucopila*	0–200	–
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	0–200	–
	Arizona cottontop	DICA8	*Digitaria californica*	0–200	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	0–200	–
	Drummond's dropseed	SPCOD3	*Sporobolus compositus var. drummondii*	0–200	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–200	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	0–100	–
4	**Cool-season grasses**			250–750	
	Texas wintergrass	NALE3	*Nassella leucotricha*	250–750	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–250	–
5	**Warm-season short/midgrasses**			500–1000	
	buffalograss	BODA2	*Bouteloua dactyloides*	200–500	–
	blue grama	BOGR2	*Bouteloua gracilis*	200–500	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	50–250	–

	hooded windmill grass	CHCU2	*Chloris cucullata*	50–250	–
	tumble windmill grass	CHVE2	*Chloris verticillata*	0–100	–
	fall witchgrass	DICO6	*Digitaria cognata*	0–50	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0–50	–
	purple threeawn	ARPUP6	*Aristida purpurea var. purpurea*	0–50	–
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	0–50	–
Forb					
6	**Forbs**			250–600	
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	0–100	–
	Engelmann's daisy	ENPE4	*Engelmannia peristenia*	0–100	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–100	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	0–100	–
	Texas skeletonplant	LYTE	*Lygodesmia texana*	0–50	–
	Nuttall's sensitive-briar	MINU6	*Mimosa nuttallii*	0–50	–
	pony beebalm	MOPE	*Monarda pectinata*	0–50	–
	yellow puff	NELU2	*Neptunia lutea*	0–50	–
	evening primrose	OENOT	*Oenothera*	0–50	–
	groundcherry	PHYSA	*Physalis*	0–50	–
	white milkwort	POAL4	*Polygala alba*	0–50	–
	white heath aster	SYERE	*Symphyotrichum ericoides var. ericoides*	0–50	–
	prairie spiderwort	TROC	*Tradescantia occidentalis*	0–50	–
	Texas vervain	VEHA	*Verbena halei*	0–50	–
	white sagebrush	ARLUM2	*Artemisia ludoviciana ssp. mexicana*	0–50	–
	yellow sundrops	CASE12	*Calylophus serrulatus*	0–50	–
	American star-thistle	CEAM2	*Centaurea americana*	0–50	–
	partridge pea	CHFA2	*Chamaecrista fasciculata*	0–50	–
	whitemouth dayflower	COER	*Commelina erecta*	0–50	–
	prairie clover	DALEA	*Dalea*	0–50	–
	purple prairie clover	DAPU5	*Dalea purpurea*	0–50	–
	longleaf buckwheat	ERLO5	*Eriogonum longifolium*	0–50	–
	beeblossom	GAURA	*Gaura*	0–50	–
	Dakota mock vervain	GLBIB	*Glandularia bipinnatifida var. bipinnatifida*	0–50	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	0–50	–
Shrub/Vine					
7	**Shrubs/Vines**			100–400	
	Chickasaw plum	PRAN3	*Prunus angustifolia*	0–200	–
	winged sumac	RHCO	*Rhus copallinum*	0–200	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–200	–
	bully	SIDER2	*Sideroxylon*	0–200	–
	pricklyash	ZANTH	*Zanthoxylum*	0–100	–

	smooth sumac	RHGL	*Rhus glabra*	0–100	–
	fragrant sumac	RHAR4	*Rhus aromatica*	0–100	–
	catclaw acacia	ACGRG3	*Acacia greggii var. greggii*	0–100	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	0–50	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	0–50	–
	pricklypear	OPUNT	*Opuntia*	0–50	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–50	–
	greenbrier	SMILA2	*Smilax*	0–50	–
	yucca	YUCCA	*Yucca*	0–50	–
Tree					
8	**Trees**			250–750	
	post oak	QUST	*Quercus stellata*	0–750	–
	live oak	QUVI	*Quercus virginiana*	0–500	–
	cedar elm	ULCR	*Ulmus crassifolia*	0–500	–
	netleaf hackberry	CELAR	*Celtis laevigata var. reticulata*	0–500	–
	green ash	FRPE	*Fraxinus pennsylvanica*	0–150	–
	honey mesquite	PRGL2	*Prosopis glandulosa*	0–100	–

Animal community

Historically, the Sandy Loam site was inhabited permanently and intermittently by a wide variety of 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, deer, and antelope roaming freely across the North Central Prairie and adjacent regions.

The Sandy Loam ecological site has a complex and diverse plant community. It is a preferred habitat for many species of wildlife because of the composition, structure, and distribution of vegetation. Currently, the site is utilized by deer, wild turkey, quail, dove, numerous species of birds, and a variety of small fur-bearing mammals. Animal species and populations fluctuate as the vegetation cycles through temporary phases and different ecological stages.

The Sandy Loam ecological site is a preferred grazing site for livestock. Livestock grazing should be controlled by implementing grazing management systems that incorporate sustainable stocking rates as well as frequent and timely deferment periods to prevent abusive grazing.

Hydrological functions

When herbaceous vegetation and ground cover are maintained in a healthy and vigorous status, water infiltration into the soil profile and deep percolation into groundwater is increased significantly, resulting in very little runoff. A thick, healthy grass cover also 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

These scenic areas offer outdoor activities including photography, bird watching, hiking, camping, horseback riding, and off-road vehicle use. Hunting quail, dove, deer, and turkey can be a lucrative enterprise on properly managed areas because the Sandy Loam site and adjacent sites provide good habitat for a variety of wildlife species.

Wood products

Post oak and other hardwood trees that occur on this site can be used for firewood, fence posts, and crafts.

Other products

None.

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 5 NRCS-RANGE-417's containing data collected from 4 counties during the period 12/30/1981 to 12/12/1986 were reviewed for this site.

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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)	Lem Creswell, Zone RMS, NRCS, Weatherford, Texas
Contact for lead author	817-596-2865
Date	11/26/2008
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:** Water flow patterns are observed only in areas close to creeks, streams or drainageways. 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 would have been 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 15% bare ground scattered randomly throughout the site.

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5. **Number of gullies and erosion associated with gullies:** Some gullies may be present on side drains into perennial and intermitttent streams. Gullies should be vegetated and stable.

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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):** Under normal rainfall, little litter movement should be expected; however, litter of all sizes may move long distances depending on obstructions.

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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.

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** 0-10 inches thick that has reddish brown fine sandy loam texture with weak to moderate fine granular structure. SOM approximately 1-6%. See soil survey for specific soils.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Under HCPC, the savanna of warm season tall and midgrasses with oak and elm trees, shrubs, and forbs has adequate litter and little bare ground. This provides for maximum infiltration and little runoff under normal rainfall events.

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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 tallgrasses >

    Sub-dominant: Warm-season midgrasses >

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

    Additional:

---

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.

---

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):** 2400 to 5000 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.

---

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.
