

Ecological site R084BY175TX Tight Sandy Loam 29-33" PZ

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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.

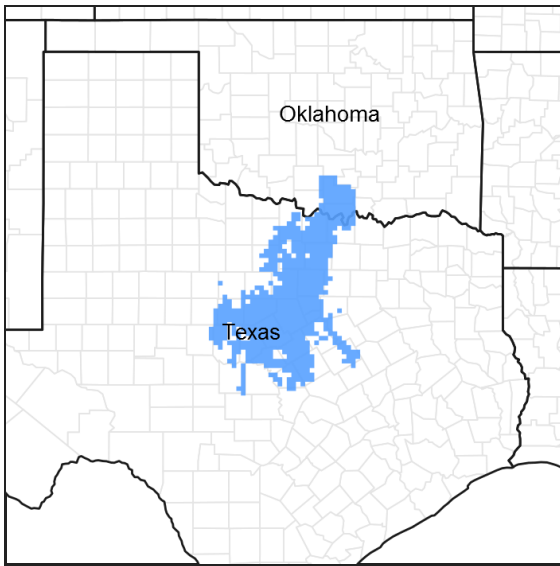


Figure 1. Mapped extent

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): 084B–West Cross Timbers

MLRA 84B is characterized by nearly level to strongly sloping, dissected plains with narrow valleys that deepen eastward. Soils are generally deep and formed in sediments of Cretaceous age. Average annual precipitation is 25 to 35 inches, and elevation ranges from 1000 to 1300 feet.

Classification relationships

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

Ecological site concept

These sites occur on soils with a sandy loam surface and a clay loam subsoil. The reference vegetation is a post/blackjack oak savannah with native tallgrasses dominating the plant community. Forbs and shrubs also occur scattered across the site. In the absence of fire or other brush management, woody species may dominate the site. This site is especially susceptible to mesquite invasion.

Associated sites

| | |
|-------------|---|
| R084BY174TX | Sandy Loam 29-33" PZ Sandy loam soils on uplands. |
|-------------|---|

Similar sites

| | |
|-------------|---|
| R084BY174TX | Sandy Loam 29-33" PZ Sandy loam savannah site. Lacks clay/clayloam subsoil. |
| R084BY168TX | Claypan 29-33" PZ Dense clay subsoils over shale. |

Table 1. Dominant plant species

| | |
|------------|---|
| Tree | (1) <i>Quercus stellata</i> (2) <i>Quercus marilandica</i> |
| Shrub | Not specified |
| Herbaceous | (1) <i>Schizachyrium scoparium</i> (2) <i>Sorghastrum nutans</i> |

Physiographic features

This site occurs on interfluves, crests and side slopes of hillslopes in the West Cross Timbers. This site is characteristically a water shedding site. Slopes are typically less than 8 percent.

Table 2. Representative physiographic features

| | |
|--------------|--|
| Landforms | (1) Hills > Ridge (2) Hills > Hillslope |
| Runoff class | Medium to high |
| Elevation | 198–640 m |
| Slope | 1–8% |
| Aspect | Aspect is not a significant factor |

Table 3. Representative physiographic features (actual ranges)

| | |
|--------------|---------------|
| Runoff class | Low to high |
| Elevation | Not specified |
| Slope | Not specified |

Climatic features

Precipitation varies from an average of 33 inches in the eastern part of the Cross Timbers to 29 inches in the western part. The climate is subtropical. Large variations in temperature sometime accompany polar air masses in the winter. Tropical maritime air masses control the weather during the spring, summer, and fall. The prevailing winds are southerly throughout the year, even in the winter months.

Table 4. Representative climatic features

| | |
|--|--------------|
| Frost-free period (characteristic range) | 193-200 days |
| Freeze-free period (characteristic range) | 220-225 days |
| Precipitation total (characteristic range) | 787-838 mm |
| Frost-free period (actual range) | 192-204 days |

| | |
|------------------------------------|--------------|
| Freeze-free period (actual range) | 216-226 days |
| Precipitation total (actual range) | 711-864 mm |
| Frost-free period (average) | 197 days |
| Freeze-free period (average) | 222 days |
| Precipitation total (average) | 813 mm |

Climate stations used

- (1) PUTNAM [USC00417327], Baird, TX
- (2) RISING STAR 1S [USC00417633], Rising Star, TX
- (3) PROCTOR RSVR [USC00417300], Comanche, TX
- (4) MINERAL WELLS AP [USW00093985], Millsap, TX
- (5) BRIDGEPORT [USC00411063], Bridgeport, TX

Influencing water features

A stream or wetland does not influence the plant communities of this site.

The site may receive run off water from adjacent sites as well as shed some water to sites lower on the landscape. The presence of a good cover of tallgrasses helps to facilitate infiltration into the soil.

Wetland description

NA

Figure 7-1 The hydrologic cycle with factors that affect hydrologic processes

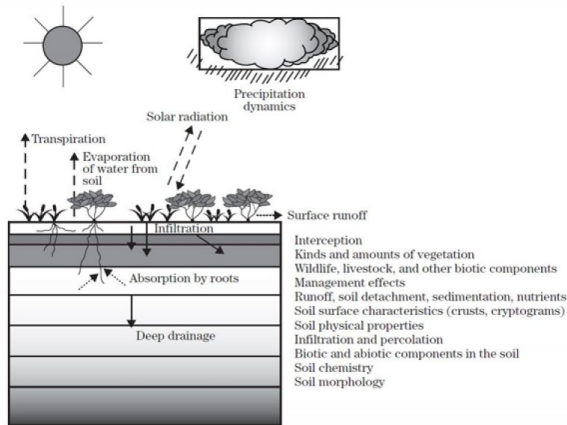


Figure 8.

Soil features

Representative soil components for this ecological site include: Keeter, Pedernales, and Windthorst

The site is characterized by soils with an abrupt textural change from the loamy surface horizon to a clayey subsoil in the upper part of the argillic horizon. Water has difficulty permeating the subsoil when the soil is dry or when deep rooted plants are absent.

Table 5. Representative soil features

| | |
|-----------------|--|
| Parent material | (1) Residuum–sandstone and siltstone |
| Surface texture | (1) Stony fine sandy loam (2) Very fine sandy loam (3) Sandy clay loam |

| | |
|--|---|
| Drainage class | Moderately well drained to well drained |
| Permeability class | Moderately slow |
| Soil depth | 51–152 cm |
| Surface fragment cover <=3" | 0–10% |
| Surface fragment cover >3" | 0–10% |
| Available water capacity (0-101.6cm) | 22.86–27.94 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0–10% |
| 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) | 5.1–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–5% |
| Subsurface fragment volume >3" (Depth not specified) | 0–5% |

Ecological dynamics

The Tight Sandy Loam ecological site evolved and was maintained by the grazing and herding effects of native wild large and small ungulates, extreme climatic fluctuations, and periodic fires. The reference plant community for this site is a post oak savannah with a tallgrass understory. If oaks are removed, open areas are often invaded by mesquite (*Prosopis glandulosa*). The herbaceous understory is dominated by tallgrasses such as little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*) and small amounts midgrasses such as sideoats grama (*Bouteloua curtipendula*). With continuous heavy grazing on perennial grasses (decreasers) such as Indiangrass and little bluestem, tallgrasses will decrease and be replaced by increasers such as silver bluestem, sideoats grama, Texas wintergrass (*Nassella leucotricha*) and sand dropseed (*Sporobolus cryptandrus*). Further regression will cause undesirable grasses, or invaders, such as three-awns (*Aristida* spp.) and annual grasses to increase. Forbs will make up a larger percentage of the plant composition and grasses would make up a smaller percentage.

Fire played a role in the ecology of the site as is true for most of the grasslands. The main effect of fire on this site was to hold woody shrubs and cactus in check. The grass species such as little bluestem and Indiangrass are considered fire neutral as far as their response to fire. Climate and soils are the most important and limiting factors affecting grass vegetation on the site. Fire stimulated forbs growth if the timing was right and the fires of pre-settlement days were probably more severe due to more fuel being available which could have been more damaging to woody plants. Fire usually creates more diversity in this site for a year or two post-burn. Fire will usually not produce much mortality in older woody plants. After brush has been controlled with herbicides or mechanically, fire can sometimes be used effectively to suppress regrowth. Small juniper (*Juniperus* spp.) can be killed by fire. Fuel loads are often the most limiting factor for the effective use of prescribed fire on this site.

Since this site is much preferred as a grazing resource, it has a tendency to be abused perhaps more than some other associated sites. With abusive grazing practices, the vigorous Indiangrass and big bluestem (*Andropogon gerardii*) will become lower in vigor while little bluestem will increase then secondary successional species such as sand dropseed and silver bluestem (*Bothriochloa laguroides*) will begin to increase along with an increase of woody plants. The little bluestem is a tough, resistant grass species tolerant of some fairly heavy grazing for long periods, but at some point, a threshold is crossed and the ground cover is opened up resulting in bare places where weedy

species can establish. Western ragweed (*Ambrosia psilostachya*), crotons (*Croton* spp.), and cool-season annuals will quickly invade if the principal species are in a weakened condition. Mesquite when present will usually increase on this site but it is slowed by good management.

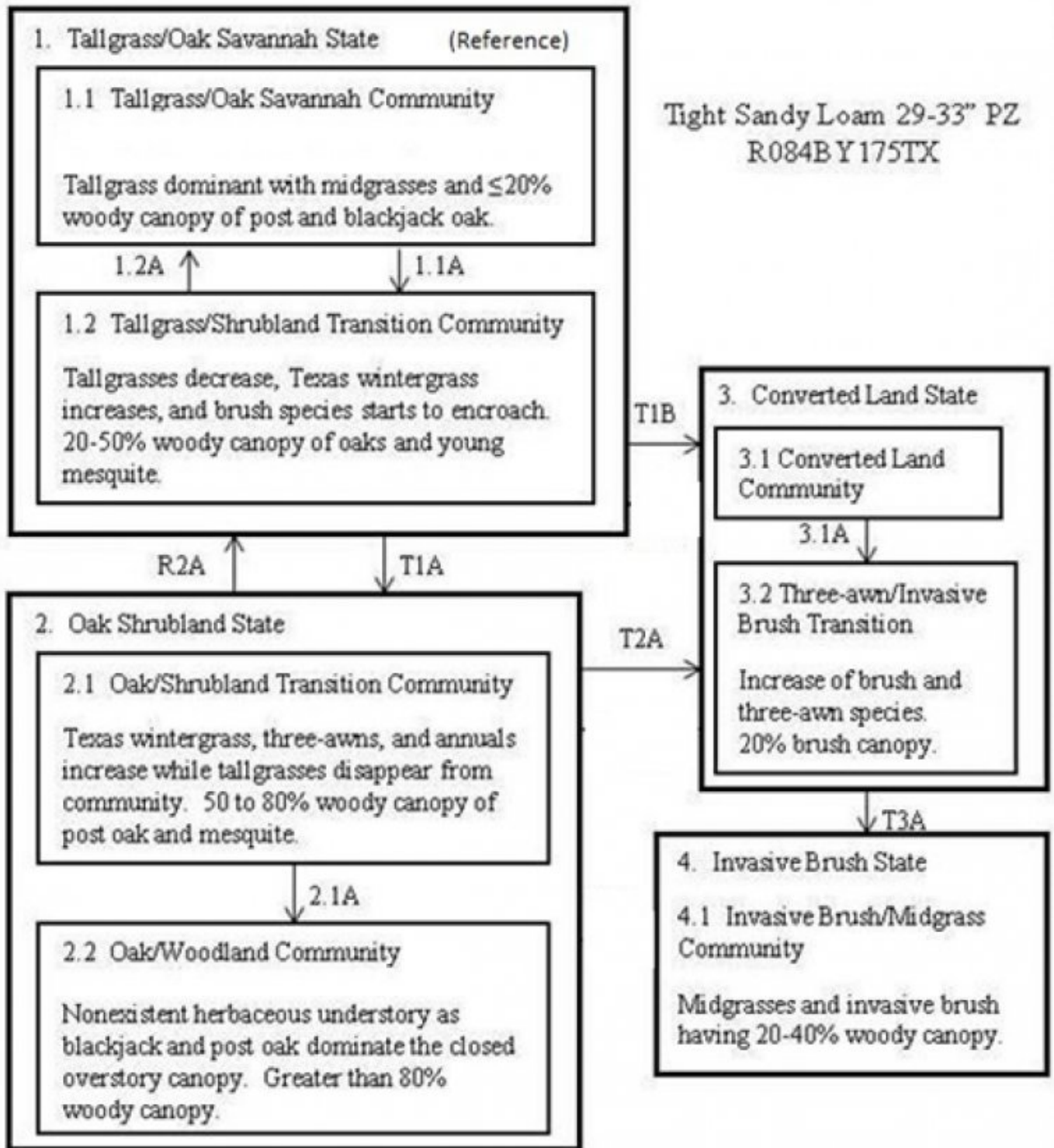
The greatest contributor to the increase of mesquite is the domestic cow. The seed is consumed by animals after the seed pods ripen in late summer and when passed through the digestive system and excreted in the manure, the seed finds an excellent seedbed complete with moisture and nutrients. Some wildlife species rely heavily on mesquite beans and juniper berries for food and contribute to the spread of these species. It is possible for mesquite beans to lay dormant in the soil for many years and then germinate when ideal conditions occur. Grazing management probably has minimal effect on the proliferation of mesquite and other woody plants, but a good cover of perennial grasses likely minimizes the seed to soil contact the mesquite needs to establish. Prescribed fire where it can be safely carried out provides a much better method to control the spread of woody plants. Selective individual removal of mesquite and/or juniper is easy and economical when a few plants begin to show up on the site, but the increase of number of plants can be fairly rapid and the number of woody plants per acre will soon become too numerous for individual control to be feasible. Prescribed grazing with a reasonable stocking rate can sustain the grass species composition and production at a near historic climax level until the brush canopy is so dense that the shade starts to interfere with photosynthesis. The Sandy Loam site can be abused to the point that the perennial warm-season grasses thin out and lower successional grasses along with annual forbs begin to dominate. This process of degradation usually takes many years and is further exacerbated by summer drought and above average winter moisture.

Long-term droughts that occur only three to four times in a century can effect some change in plant communities. Short-term droughts are common and usually do not have a lasting effect in changing stable plant communities, although production will be affected. When a brush canopy becomes established which shades the ground sufficiently it tends to favor cool-season annual species. Once a plant community consisting of brush and cool-season annuals is reached, recovery to a good perennial grass cover is unlikely without major input with brush management and reseeding. In summary, the change in various plant communities of vegetation depend on the type of grazing management applied over many years and the rate of invasion and establishment of woody species. The effects of seasonal moisture and short-term dry spells become more pronounced after the site crosses thresholds to a lower ecological condition. Plant communities that consist of warm-season perennial grasses such as little bluestem and the associated species of the reference community are able to persist and withstand climatic extremes with only minor shifts in the overall plant community.

This site was inhabited by grassland wildlife species such as bison, grassland birds and small mammals. Over the years, as the site has changed to a more mixed grass and shrub community, more wildlife species have come to utilize it for habitat. Woody plants provide cover for white tailed deer and bob white quail. These wildlife species have both increased along with the brushy plants due to the cover that these plants provide. More forbs are needed to meet these species food requirements and woody plants for browse are important for deer. It is often the objective of many land owners to strike a balance in plant community so that these wildlife species can exist along with domestic livestock. This can be accomplished by a carefully thought out grazing and brush management program. It must be realized that managing at a lower successional level may meet some wildlife species requirements very well, but may not be nearly as productive for grazing purposes, and may not be as capable of satisfying functions such as nutrient cycling, hydrologic protection, plant community stability or soil protection. A proper balance can be achieved with careful planning that considers all resources.

Hydrologically, the site contributes runoff to the various draws, creeks, and streams that are common in the MLRA. If the perennial grass cover is maintained in good vigor, then maximum infiltration occurs and runoff is reduced. More water getting into the ground means a healthier, more productive plant community. If infiltration is minimal, then the effect is an artificially shallow soil with plant roots retreating to near the soil surface. More perennial grass cover means less runoff may result; but the runoff that does occur is less laden with sediment. Overall watershed protection is enhanced by a healthy grassland community, as is nutrient cycling.

State and transition model



Legend

- 1.1A Heavy Continuous Grazing, No Fire, Idle
- 1.2A Prescribed Grazing, Brush Management, Prescribed Burning
- T1A Heavy Continuous Grazing, No Fire, Idle
- R2A Prescribed Grazing, Brush Management, Range Planting, Prescribed Burning
- T1B Pasture Planting, Crop Cultivation, Pest Mgmt, Nutrient Mgmt, Prescribed Grazing

- 2.1A Heavy Continuous Grazing, No Fire, Idle
- T2A Pasture Planting, Crop Cultivation, Pest Management, Nutrient Management

- 3.1A Heavy Continuous Grazing, No Brush Management, Idle
- T3A Idle, No Fire

State 1

Tallgrass/Oak Savannah State - Reference

The interpretive plant community for this site is the reference plant community. This site is a Tallgrass/Oak Savannah. The community is dominated by warm-season perennial tallgrasses with post oak. The major perennial grass species are well dispersed through the community. Perennial forbs and shrubs are well represented throughout the community. Annual production ranges from 2090 to 4240 pounds per acre. The Tallgrass/Shrubland Transition Community occurs when post oak starts regeneration and the tallgrasses will start to disappear from the plant community. Invader brush (mesquite, juniper, yaupon, etc) appears and becomes established. Cedar elm, bumelia, and hackberry also start to increase. Texas wintergrass increases as brush canopy increases. The plant community consists of about a 20 percent canopy of mature post oak with an understory canopy of shrubs and young post oak. Annual production ranges from 2010 to 4230 pounds per acre.

Dominant plant species

- post oak (*Quercus stellata*), tree
- little bluestem (*Schizachyrium scoparium*), grass

Community 1.1

Tallgrass/Oak Savannah Community



Figure 9. 1.1 Tallgrass/Midgrass/Oak Savannah Community

The interpretive plant community for this site is the reference plant community. This site is a Tall/Oak Savannah Community (1.1). The community is dominated by warm-season perennial tall and midgrasses with post oak and blackjack oak. The major perennial grass species are well dispersed through the plant community. Perennial forbs and shrubs are well represented throughout the community. This plant community evolved with a short duration of heavy use by large herbivores followed by long rest periods due to herd migration along with occasional fire. Annual production ranges from 2090 to 4240 pounds per acre.

Table 6. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 1704 | 2634 | 3587 |
| Forb | 392 | 448 | 616 |
| Tree | 202 | 336 | 448 |
| Shrub/Vine | 45 | 67 | 101 |
| Total | 2343 | 3485 | 4752 |

Figure 11. Plant community growth curve (percent production by month). TX5514, Post oak/Blackjack Oak Savannah. Post oak and blackjack oak savannah with tall grasses..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2 | 2 | 8 | 10 | 20 | 23 | 5 | 3 | 10 | 10 | 5 | 2 |

Community 1.2 Tallgrass/Shrubland Transition Community



Figure 12. 1.2 Tallgrass/Shrubland Transition Community

This transition state occurs with yearlong grazing or no grazing without fire or brush management. Post oak starts regeneration and the tallgrasses will start to disappear from the plant community. Invader brush (mesquite, juniper, etc.) appears and becomes established. Cedar elm, bumelia, and hackberry also start to increase. Texas wintergrass increases as brush canopy increases. The plant community consists of about a 20 to 50 percent canopy of mature post oak and mesquite with a understory of shrubs and young mesquite. Where severe erosion has occurred or cropland has been abandoned mesquite and/or juniper may be the dominate brush species. This transition community (1.2) can revert back to the tall/midgrass/oak savannah community (1.1) with prescribed burning and prescribed grazing. Annual production ranges from 2010 to 4230 pounds per acre.

Table 7. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 1569 | 2466 | 3307 |
| Forb | 336 | 532 | 706 |
| Tree | 280 | 448 | 560 |
| Shrub/Vine | 67 | 90 | 168 |
| Total | 2252 | 3536 | 4741 |

Figure 14. Plant community growth curve (percent production by month). TX5511, Shrubland Transition. Increasing percentage of shrubs invading site (20-50 % canopy).

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 3 | 10 | 30 | 25 | 8 | 5 | 10 | 5 | 2 | 1 |

Pathway 1.1A Community 1.1 to 1.2



Tallgrass/Oak Savannah Community



Tallgrass/Shrubland Transition Community

Heavy Continuous Grazing, no fires, and land being idled are various ways that the Tallgrass/Oak Savannah Community can shift to the Tallgrass/Shrubland Transition Community.

Pathway 1.2A Community 1.2 to 1.1



Tallgrass/Shrubland Transition Community



Tallgrass/Oak Savannah Community

The Tallgrass/Shrubland Transition Community can revert back to the Tallgrass/Oak Savannah Community through the use of Prescribed Grazing, Brush Management, and Prescribed Burning conservation practices.

Conservation practices

| |
|--------------------|
| Brush Management |
| Prescribed Burning |
| Prescribed Grazing |

State 2 Oak Shrubland State

The Oak/Shrubland Transition Community (2.1) consists of 50 to 80% canopy of woody plants. As the Shrubland Community ages post oak matures and the invader species increase. As the Oak/Shrubland Community (2.1) ages, post oak matures and the invader species increase. Warm-season grasses such as little bluestem and Indiangrass have all but disappeared. In this stage of transition some little bluestem may be present; however, as brush canopy increases, Texas wintergrass, three-awns, and annuals continue to increase. Where erosion has occurred or cropland (3.1) has been abandoned mesquite may dominate the site. Annual production ranges from 1425 to 4900 pounds per acre. Oak/Woodland Community is a closed overstory (greater than 80% canopy) woodland dominated by post oak. There are woody vines and understory shrub species present. Annual production ranges from 2025 to 4175 pounds per acre.

Dominant plant species

- post oak (*Quercus stellata*), tree
- Ashe's juniper (*Juniperus ashei*), tree
- elm (*Ulmus*), tree
- honey mesquite (*Prosopis glandulosa*), shrub
- Texas wintergrass (*Nassella leucotricha*), grass

Community 2.1 Oak/Shrubland Transition Community



Figure 15. 2.1 Oak/Shrubland Transition Community

As the Oak/Shrubland Community (2.1) ages, post oak matures and the invader species increase. Warm-season grasses such as little bluestem and Indiangrass have all but disappeared. In this stage of transition some little bluestem may be present; however, as brush canopy increases, Texas wintergrass, three-awns, and annuals continue to increase. Where erosion has occurred or cropland (3.1) has been abandoned mesquite may dominate the site. Annual production ranges from 1425 to 4900 pounds per acre. The Tallgrass/Midgrass/Oak Savannah Community (1.1) can be restored by prescribed grazing and prescribed burning, but will require many years of burning due to lighter fuel loads and a seed source will be present to increase the fuel load to aid in burning in the follow up years.

Table 8. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Shrub/Vine | 560 | 1233 | 2550 |
| Forb | 252 | 504 | 1037 |
| Grass/Grasslike | 392 | 785 | 1009 |
| Tree | 392 | 841 | 897 |
| Total | 1596 | 3363 | 5493 |

Figure 17. Plant community growth curve (percent production by month). TX5512, Oak Shrubland Transition. Continued increase of invader species and post oaks maturity. Approximately 50-80 percent canopy cover..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | 1 | 3 | 10 | 30 | 30 | 5 | 5 | 8 | 5 | 1 | 1 |

Community 2.2 Oak/Woodland Community



Figure 18. 2.2 Oak/Woodland Community

This plant community is a closed overstory (greater than 80% canopy) woodland dominated by post oak. Other species present in small amounts are blackjack (*Quercus marilandica*), cedar elm (*Ulmus crassifolia*), and hackberry (*Celtis* spp.). Understory shrub species present are Mexican plum (*Prunus mexicana*), yaupon (*Ilex* spp.), hawthorns (*Crataegus* spp.) and American beautyberry (*Callicarpa americana*). There are also woody vines such as poison-oak (*Toxicodendron radicans*), greenbriars (*Smilax* spp.), Virginia creeper (*Parthenocissus* spp.), and grapes (*Vitis* spp.). Annual production ranges from 2025 to 4175 pounds per acre. The Tallgrass/ Oak Savannah Community (1.1) can be restored by prescribed grazing and prescribed burning, but will require many years of burning due to light fuel loads of fine fuels and the absence of a seed source for tallgrasses. Chemical treatment alone is usually not a good option due to resistance of some of the plant species to herbicides. Mechanical treatment of this site along with seeding is generally the best method for conversion back to a Tallgrass/Oak Savannah Community. The cost of treatment is usually so expensive as to be not economically feasible so in most instances it is planted to introduced grass species and converted to pastureland (3.2).

Table 9. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|------------------|-----------------------------------|-------------------|
| Tree | 701 | 897 | 1457 |
| Grass/Grasslike | 673 | 1009 | 1345 |
| Shrub/Vine | 504 | 560 | 1037 |
| Forb | 392 | 1037 | 841 |
| Total | 2270 | 3503 | 4680 |

Figure 20. Plant community growth curve (percent production by month). TX5524, Post Oak/Mesquite Woodland (50-80% Canopy). Post Oak Woodland with mesquite. 50-80% Canopy..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | 1 | 3 | 10 | 30 | 30 | 5 | 5 | 8 | 5 | 1 | 1 |

Pathway 2.1A Community 2.1 to 2.2



Oak/Shrubland Transition Community



Oak/Woodland Community

With heavy continuous grazing, no brush management, and idled land, the Oak/Shrubland Transition Community will shift to the Oak/Woodland Community.

State 3

Converted Land State

Conversion of the Tallgrass/Oak Savannah (1.1) to Converted Land (3.1) (mainly for cotton production) occurred from first settlement by European settlers during the middle 1800's and continued until early 1900's. Some acres remain in cropland today. The early cropping with little regard for erosion control leads to severe erosion. Erosion changes fertility, soil structure and moisture holding capacity of the soil. In recent years if cropping is abandoned the land is usually planted to introduced grass and managed as pastureland. Refer to cropland capability classes for production potentials and limitations. This site is often planted to introduced grasses following crop production or brush control. These grasses are planted mostly for livestock grazing and some hay production. Typical species planted include bermudagrass varieties and yellow bluestems. These species may become invasive and once established they are difficult to remove and hinders the establishment of native species. Refer to pastureland suitability groups for species suitability, production potentials and limitations.

Dominant plant species

- Bermudagrass (*Cynodon dactylon*), grass

Community 3.1

Converted Land Community

Conversion of the tallgrass-midgrass-oak savannah (1.1) to cropland (3.1) (mainly for cotton production) occurred from first settlement by European settlers during the middle 1800's and continued until early 1900's. Some remains in cropland today. The early cropping with little regard for erosion control leads to severe erosion. Erosion changes fertility, soil structure and moisture holding capacity of the soil. While restoration of this site to some semblance of the tallgrass-midgrass-oak savannah (1.1) is possible with range planting, prescribed grazing and prescribed burning; a complete restoration of the historic plant community in a reasonable time is very unlikely. If cropland fields are abandoned, the land usually grows up in mesquites and be classified as Threeawn/Invasive Brush Community. This community is usually mechanically treated and planted to introduced grass and managed as pastureland found in the Converted Land state. Refer to cropland capability classes for production potentials and limitations. This site is often planted to introduced grasses following crop production or brush control. These grasses are planted mostly for livestock grazing and some hay production. Typical introduced species planted include bermudagrass (*Cynodon* spp.) varieties, kleingrass (*Panicum coloratum*) and introduced bluestems (*Bothriochloa* spp.). Some of these introduced species may become invasive and once established they are difficult to remove and hinders the establishment of native species. The establishment and maintenance of these species requires fertilization, weed control and prescribed grazing management. Without the annual application of these cultural practices the plant community will move toward a transition of invasive brush such as mesquite and herbaceous plants such as three-awns, triden (*Tridens* spp.) species, western ragweed and various other native species.

Figure 21. Plant community growth curve (percent production by month). TX5520, Pastureland. Coastal Bermudagrass or Introduced Species..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 0 | 10 | 21 | 22 | 10 | 5 | 14 | 10 | 8 | 0 |

Community 3.2

Three-awn/Invasive Brush Community



Figure 22. 3.2 Three-awn/Invasive Brush Transition Community

Without the annual application of the cultural practices, especially fertilization, the plant community will move toward a transition of invasive brush species such as mesquite and/or cactus. The introduced grass species will start to disappear and be replaced by threeawns and annuals. Annual production ranges from 2910 to 5570 pounds per acre.

Table 10. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 1345 | 1973 | 2376 |
| Forb | 1132 | 1849 | 2264 |
| Tree | 448 | 717 | 930 |
| Shrub/Vine | 336 | 504 | 673 |
| Total | 3261 | 5043 | 6243 |

Figure 24. Plant community growth curve (percent production by month). TX5517, Threeawn/Invasive Shrubs Community. Threeawns and Invasive Shrub dominant community. Converted from old cropland into threeawn shrub community..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2 | 2 | 8 | 10 | 20 | 23 | 5 | 3 | 10 | 10 | 5 | 2 |

Pathway 3.1A Community 3.1 to 3.2

With heavy continuous grazing, no fire, no nutrient management, no pest management, and idled land, the Converted Land Community will shift to the Three-awn/Invasive Brush Transition Community.

State 4 Invasive Brush State

With continued absence of added fertility the plant community will continue change toward a brushy condition. The shrubs will continue to thicken to 20-40% woody canopy especially mesquite and as the brush ages the historic hardwoods start to appear. The grass changes toward more perennials, where the fertility is especially low quality splitbeard bluestem (*Andropogon ternarius*) appears and may dominate the grasses.

Dominant plant species

- honey mesquite (*Prosopis glandulosa*), shrub
- Bermudagrass (*Cynodon dactylon*), grass

Community 4.1 Invasive Brush/Midgrass Community



Figure 25. 4.1 Invasive Brush/Midgrass Community

With continued absence of added fertility the plant community will continue change toward a brushy condition. The shrubs will continue to thicken to 20-40% woody canopy especially mesquite and as the brush ages the historic hardwoods start to appear. The grass changes toward more perennials, where the fertility is especially low splitbeard bluestem (*Andropogon ternarius*) appears and may dominate the grasses. At this state the introduced grasses have almost disappeared. Annual production ranges from 3000 to 5570 pounds per acre.

Table 11. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 1401 | 2018 | 2438 |
| Forb | 1132 | 1732 | 2079 |
| Tree | 460 | 757 | 998 |
| Shrub/Vine | 370 | 538 | 729 |
| Total | 3363 | 5045 | 6244 |

Figure 27. Plant community growth curve (percent production by month). TX5523, Midgrass & Invasive Brush Community. old cropland field dominated by plant community consisting of midgrasses and invasive brush..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2 | 2 | 8 | 10 | 20 | 23 | 5 | 3 | 10 | 10 | 5 | 2 |

Transition T1A State 1 to 2

The Tallgrass/Oak Savannah State will transition into the Oak Shrubland State through the use of heavy continuous grazing, no fires, and idled land condition.

Restoration pathway R2A State 2 to 1

Prescribed Grazing, Brush Management, Range Planting, and Prescribed Burning are various conservation practices used in order to restore from an Oak/Shrubland State to the Tallgrass/Oak Savannah State.

Conservation practices

| |
|------------------|
| Brush Management |
|------------------|

| |
|--------------------|
| Prescribed Burning |
| Prescribed Grazing |
| Range Planting |

Transition T2A State 2 to 3

With the implementation of various conservation practices such as Pasture Planting, Crop Cultivation, Pest Management, and Nutrient Management, the Oak/Shrubland State will transition into the Converted Land State.

Transition T3A State 3 to 4

With land idling and no fires, the Converted Land State will transition into the Invasive Brush State.

Additional community tables

Table 12. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|------------------------|----------------------------|--------|--|--------------------------------|------------------|
| Grass/Grasslike | | | | | |
| 1 | Tallgrass | | | 785–1121 | |
| | little bluestem | SCSC | <i>Schizachyrium scoparium</i> | 785–1121 | – |
| 2 | Tallgrass | | | 196–364 | |
| | Indiangrass | SONU2 | <i>Sorghastrum nutans</i> | 196–364 | – |
| 3 | Midgrass | | | 420–476 | |
| | sideoats grama | BOCU | <i>Bouteloua curtipendula</i> | 420–476 | – |
| 4 | Midgrass | | | 196–336 | |
| | silver beardgrass | BOLAT | <i>Bothriochloa laguroides ssp. torreyana</i> | 196–336 | – |
| 5 | Cool Season Grass | | | 84–224 | |
| | Scribner's rosette grass | DIOLS | <i>Dichanthelium oligosanthes var. scribnerianum</i> | 84–224 | – |
| 6 | Cool Season Grasses | | | 112–280 | |
| | Canada wildrye | ELCA4 | <i>Elymus canadensis</i> | 28–140 | – |
| | Texas wintergrass | NALE3 | <i>Nassella leucotricha</i> | 28–140 | – |
| | Texas bluegrass | POAR | <i>Poa arachnifera</i> | 28–140 | – |
| 7 | Mid/Shortgrasses | | | 112–280 | |
| | threeawn | ARIST | <i>Aristida</i> | 0–50 | – |
| | buffalograss | BODA2 | <i>Bouteloua dactyloides</i> | 0–50 | – |
| | hairy grama | BOHI2 | <i>Bouteloua hirsuta</i> | 0–50 | – |
| | fall witchgrass | DICO6 | <i>Digitaria cognata</i> | 0–50 | – |
| | sand lovegrass | ERTR3 | <i>Eragrostis trichodes</i> | 0–50 | – |
| | crowngrass | PASPA2 | <i>Paspalum</i> | 0–50 | – |
| | composite dropseed | SPCOC2 | <i>Sporobolus compositus var. compositus</i> | 0–50 | – |
| | sand dropseed | SPCR | <i>Sporobolus cryptandrus</i> | 0–50 | – |
| | white tridens | TRAL2 | <i>Tridens albescens</i> | 0–50 | – |
| | purpletop tridens | TRFL2 | <i>Tridens flavus</i> | 0–50 | – |
| 8 | Midgrasses | | | 112–280 | |

| | | | | | |
|--|--------------------------|--------|--|------|---|
| | hooded windmill grass | CHCU2 | <i>Chloris cucullata</i> | 0-50 | - |
| | cylinder jointtail grass | COCY | <i>Coelorachis cylindrica</i> | 0-50 | - |
| | Arizona cottontop | DICA8 | <i>Digitaria californica</i> | 0-50 | - |
| | vine mesquite | PAOB | <i>Panicum obtusum</i> | 0-50 | - |
| | coral bristlegrass | SEMA4 | <i>Setaria macrosperma</i> | 0-50 | - |
| | Drummond's dropseed | SPCOD3 | <i>Sporobolus compositus var. drummondii</i> | 0-50 | - |

Forb

| | | | | | |
|---|-----------------------|-------|-------------------------------|---------|---|
| 9 | Forbs | | | 336-504 | |
| | Cuman ragweed | AMPS | <i>Ambrosia psilostachya</i> | 0-50 | - |
| | sagebrush | ARTEM | <i>Artemisia</i> | 0-50 | - |
| | aster | ASTER | <i>Aster</i> | 0-50 | - |
| | Berlandier's sundrops | CABE6 | <i>Calylophus berlandieri</i> | 0-50 | - |
| | whitemouth dayflower | COER | <i>Commelina erecta</i> | 0-50 | - |
| | prairie clover | DALEA | <i>Dalea</i> | 0-50 | - |
| | purple prairie clover | DAPU5 | <i>Dalea purpurea</i> | 0-50 | - |
| | Illinois ticktrefoil | DEIL2 | <i>Desmodium illinoense</i> | 0-50 | - |
| | ticktrefoil | DESMO | <i>Desmodium</i> | 0-50 | - |
| | purple coneflower | ECHIN | <i>Echinacea</i> | 0-50 | - |
| | Engelmann's daisy | ENGEL | <i>Engelmannia</i> | 0-50 | - |
| | beeblossom | GAURA | <i>Gaura</i> | 0-50 | - |
| | Maximilian sunflower | HEMA2 | <i>Helianthus maximiliani</i> | 0-50 | - |
| | trailing krameria | KRLA | <i>Krameria lanceolata</i> | 0-50 | - |
| | lespedeza | LESPE | <i>Lespedeza</i> | 0-50 | - |
| | dotted blazing star | LIPU | <i>Liatris punctata</i> | 0-50 | - |
| | sensitive plant | MIMOS | <i>Mimosa</i> | 0-50 | - |
| | yellow puff | NELU2 | <i>Neptunia lutea</i> | 0-50 | - |
| | amberique-bean | STHE9 | <i>Strophostyles helvola</i> | 0-50 | - |

Shrub/Vine

| | | | | | |
|----|----------------------|-------|--|--------|---|
| 10 | Shrubs/Vines | | | 34-101 | |
| | acacia | ACACI | <i>Acacia</i> | 0-22 | - |
| | stretchberry | FOPU2 | <i>Forestiera pubescens</i> | 0-22 | - |
| | algerita | MATR3 | <i>Mahonia trifoliolata</i> | 0-22 | - |
| | fragrant sumac | RHAR4 | <i>Rhus aromatica</i> | 0-22 | - |
| | roundleaf greenbrier | SMRO | <i>Smilax rotundifolia</i> | 0-22 | - |
| | coralberry | SYOR | <i>Symphoricarpos orbiculatus</i> | 0-22 | - |
| | grape | VITIS | <i>Vitis</i> | 0-22 | - |
| | yucca | YUCCA | <i>Yucca</i> | 0-22 | - |
| | Hercules' club | ZACL | <i>Zanthoxylum clava-herculis</i> | 0-22 | - |
| | lotebush | ZIOBO | <i>Ziziphus obtusifolia var. obtusifolia</i> | 0-22 | - |

Tree

| | | | | | |
|----|---------------|--------|----------------------------|---------|---|
| 11 | Trees | | | 392–504 | |
| | blackjack oak | QUMA3 | <i>Quercus marilandica</i> | 56–196 | – |
| | post oak | QUST | <i>Quercus stellata</i> | 56–196 | – |
| | bully | SIDER2 | <i>Sideroxylon</i> | 0–45 | – |
| | cedar elm | ULCR | <i>Ulmus crassifolia</i> | 0–45 | – |
| | hackberry | CELT1 | <i>Celtis</i> | 0–45 | – |
| | plum | PRUNU | <i>Prunus</i> | 0–45 | – |

Animal community

The historic Tallgrass/Midgrass/Oak Savannah community was habitat to migratory bison herds, antelope, deer, turkey, migratory birds and large predators such as wolves, coyotes, mountain lions, and black bear. White-tail deer, turkey, bobcats, and coyotes along with resident and migratory birds and small mammals find suitable habitat today. Domestic livestock and white-tail deer are the dominant grazers and browsers of this site today. As the savannah changes through the various vegetative states towards post oak/mesquite woodland, the quality of the habitat may improve for some species and decline for others. Management must be applied to maintain a vegetative state in optimum habitat quality for the desired animal species.

Hydrological functions

Peak rainfall periods occur in April, May, June, September, and October. Rainfall amounts may be high (3 to 10 inches per event) and events may be intense. The soils of this site are very susceptible to erosion and severe erosion occurs where adequate herbaceous cover is not maintained and on heavy use areas such as roads, and livestock trails. Periods of 60 plus days of little or no rainfall during the growing season are common. The hydrology of this site may be manipulated with management to yield higher runoff volumes or greater infiltration to groundwater. Management for less herbaceous cover will favor higher surface runoff while dense herbaceous cover favors ground water recharge. Potential movement of soil (erosion), pesticides and both organic and inorganic nutrients (fertilizer) should always be considered when managing for higher volumes of surface runoff.

Recreational uses

Hunting, camping, equestrian, bird watching, hiking, and off road vehicle use.

Wood products

Oaks and mesquite are used for firewood. Mesquite is also used for furniture and barbecue wood.

Other products

Mistletoe is harvested from mesquite in the fall for the holiday season. Quality and Quantity of water yield.

Other information

None.

Inventory data references

The only records found for Tight Sandy Loam were recorded by the Eastland County Field Office.

References

. 2021 (Date accessed). USDA PLANTS Database. <http://plants.usda.gov>.

Other references

White-tailed deer, Their foods and management in the Cross Timbers by Kenneth L. Gee, Michael D. Porter, Steve Demarais, Fred C. Bryant, and Gary Van Vreede. A Samuel Roberts Noble Foundation Publication, 1991.

Technical Review:

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Approval

Bryan Christensen, 9/21/2023

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) | Colin Walden, Range Management Specialist, Soil Survey Region 9. |
| Contact for lead author | colin.walden@ok.usda.gov |
| Date | 01/23/2018 |
| Approved by | Bryan Christensen |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

1. **Number and extent of rills:** Minimal evidence of current or past rill formation.

2. **Presence of water flow patterns:** Few water flow patterns on steep areas. Short and stable, not incising.

-
3. **Number and height of erosional pedestals or terracettes:** No pedestals terracettes present.
-
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground less than 10 percent. Bare areas small and not connected.
-
5. **Number of gullies and erosion associated with gullies:** No gullies present.
-
6. **Extent of wind scoured, blowouts and/or depositional areas:** No wind scoured areas.
-
7. **Amount of litter movement (describe size and distance expected to travel):** Litter movement less than 3 feet. Vegetative cover should restrict litter movement over long distances. Only herbaceous litter less than .25 inches expected to move.
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability scores of 5 or greater expected.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A--0 to 4 inches; brown (10YR 5/3) very fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Presence of perennial tall and midgrasses help to facilitate percolation into the soil. Some runoff expected on steeper slopes during moderate precipitation events.
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction under reference conditions. Beware texture change of Bt horizon not product of compaction.
-
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: Tallgrasses (group 1,2)
- Sub-dominant: Midgrasses (3,4)
- Trees (11)
- Forbs (9)
- Other: All other groups
- Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Possible mortality only during prolonged drought. Less than 5%.

14. **Average percent litter cover (%) and depth (in):** Litter expected to be at 75% cover at average .25 inch depth.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production 3110 lb/acre. Ranging from 2090 to 4240 lbs.

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 and Juniper(Ashe juniper/eastern redcedar) most common invaders.

17. **Perennial plant reproductive capability:** Plants should be capable of reproducing every year with exception of prolonged growing season drought.
