Ecological site R085AY185TX
Shallow 30-38" PZ

Last updated: 9/21/2023
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General information

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

Figure 1. Mapped extent

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

MLRA notes

Major Land Resource Area (MLRA): 085A–Grand Prairie

The Grand Prairie MLRA is characterized by predominately loam and clay loam soils underlain by limestone and shale. Topography transitions from steeper ridges and summits of the Lampasas Cut Plain on the southern end to the more rolling hills of the Fort Worth Prairie to the north. The Arbuckle Mountain area in Oklahoma is also within this MLRA.

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 shallow, often gravelly, clay and clay loam soils over limestone and marl. The reference vegetation consists of native tallgrasses and midgrasses with scattered forbs and very few woody species. However, in the absence of fire or other brush management, woody species may increase and dominate the site.

Associated sites

R085AY179TX	**Clayey Slope 30-38** This site has soils having greater depth, usually >40”, than the Shallow site.
R085AY189TX	**Very Shallow 30-38" PZ** This site has soils having less depth, usually <10”, than the Shallow site.
R085AY176TX	**Adobe 30-38" PZ** Deeper calcareous soils
R085AY177TX	**Blackland 30-38" PZ** Deeper clay soils.
R085AY188TX	**Stony Clay Loam 30-38" PZ** Deeper clay loam soils with stony surface
R085AY279TX	**Clayey Swale 30-38** Downslope. This site has soils having greater depth, usually >40”, than the Shallow site.

R085AY379TX	**Loamy Slope 30-38** Downslope. This site has soils having greater depth, usually >40”, than the Shallow site.
R085AY479TX	**Loamy Swale 30-38** Downslope. This site has soils having greater depth, usually >40”, than the Shallow site.

Similar sites

R085AY479TX	**Loamy Swale 30-38** Downslope. This site has soils having greater depth, usually >40”, than the Shallow site.
R084BY175TX	**Tight Sandy Loam 29-33" PZ** This site is similar in composition and transitional pathways to the Shallow site but does not produce as much vegetation.
R085BY083OK	**Shallow Upland 38-42 PZ** Shallow, cobbly soils over conglomerate in the Arbuckle Uplift portion of MLRA85
R085AY176TX	**Adobe 30-38" PZ** More calcareous soils on uplands.
R085AY279TX	**Clayey Swale 30-38** Downslope. This site has soils having greater depth, usually >40”, than the Shallow site.
R085AY379TX	**Loamy Slope 30-38** Downslope. This site has soils having greater depth, usually >40”, than the Shallow site.

Table 1. Dominant plant species

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

Physiographic features

This site occurs on interfluves and crests of hillslopes in the Grand Prairie. This site is characteristically a water shedding site. Slopes are typically less than 12 percent.

Table 2. Representative physiographic features

Landforms	(1) Hills > Hillslope (2) Hills > Ridge
Runoff class	Low to high
Elevation	500–1,900 ft
Slope	1–12%
Aspect	Aspect is not a significant factor

Climatic features

The climate is subhumid subtropical and is characterized by hot summers and relatively mild winters. Tropical maritime air controls the climate during spring, summer and fall. In winter and early spring, frequent surges of Polar Canadian air cause sudden drops in temperatures and add considerable variety to the daily weather. The average first frost should occur around November 5 and the last freeze of the season should occur around March 19.

The average relative humidity in mid-afternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 75 percent of the time possible during the summer and 50 percent in winter. The prevailing wind direction is from the south and highest windspeeds occur during the spring months.

Approximately two-thirds of annual rainfall occurs during the April to September period. Rainfall during this period

generally falls during thunderstorms, and fairly large amounts of rain may fall in a short time. The driest months are usually July and August.

Table 3. Representative climatic features

Frost-free period (characteristic range)	194-208 days
Freeze-free period (characteristic range)	216-243 days
Precipitation total (characteristic range)	32-38 in
Frost-free period (actual range)	190-209 days
Freeze-free period (actual range)	209-245 days
Precipitation total (actual range)	31-39 in
Frost-free period (average)	201 days
Freeze-free period (average)	230 days
Precipitation total (average)	35 in

Climate stations used

- (1) BENBROOK DAM [USC00410691], Fort Worth, TX
- (2) CLEBURNE [USC00411800], Cleburne, TX
- (3) WHITNEY DAM [USC00419715], Clifton, TX
- (4) DENTON MUNI AP [USW00003991], Ponder, TX
- (5) DECATUR [USC00412334], Decatur, TX
- (6) EVANT 1SSW [USC00413005], Evant, TX
- (7) BROWNWOOD 2ENE [USC00411138], Early, TX
- (8) LAMPASAS [USC00415018], Lampasas, TX

Influencing water features

These sites may receive some run off from adjacent areas upslope and shed some water to bottomland sites. The presence of deep rooted tallgrasses helps facilitate infiltration of rainwater into the soil profile. They are not associated with wetlands.

Wetland description

NA

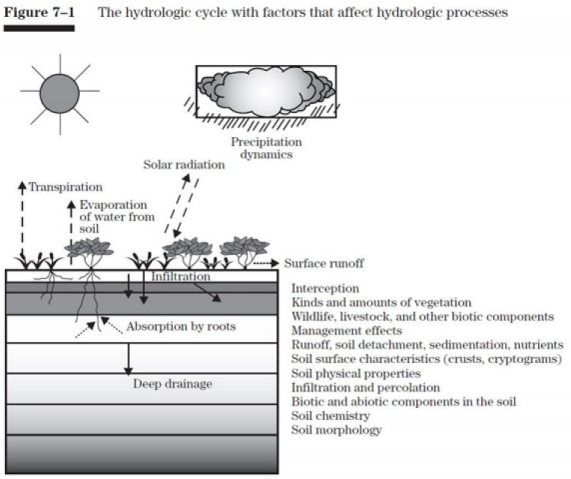


Figure 8.

Soil features

This site includes some soils which were previously included in the Very Shallow site.

Representative soil components for this ecological site include: Aledo, Cho, Doss, Lampasas, Pidcoke, and Purves

The site is characterized by to shallow gravelly, well drained, moderately permeable soils that formed in interbedded limestones and marls.

Subsuface texture ranges from loamy to loamy-skeletal to clayey.

Table 4. Representative soil features

Parent material	(1) Residuum–limestone (2) Residuum–mudstone
Surface texture	(1) Gravelly clay loam (2) Gravelly loam (3) Gravelly clay (4) Gravelly silty clay (5) Very gravelly clay loam (6) Very gravelly loam (7) Stony clay (8) Clay loam (9) Clay (10) Loam (11) Silty clay
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	10–20 in
Surface fragment cover <=3"	5–50%
Surface fragment cover >3"	5–10%
Available water capacity (0-40in)	1–3 in
Calcium carbonate equivalent (0-40in)	5–80%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–1
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	25–60%
Subsurface fragment volume >3" (Depth not specified)	0–20%

Ecological dynamics

The reference plant community for the Shallow site is a Community 1.1. The grasses that are most commonly occurring are little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*) and big bluestem (*Andropogon gerardii*). Smaller amounts of switchgrass (*Panicum virgatum*), and sideoats grama (*Bouteloua curtipendula*) occur as well. Very few shrubs and trees were present on this site, historically. The woody component consists of live oak (*Quercus fusiformis*), Texas red oak (*Quercus buckleyi*), elm species (Ulmus spp.), plum species (Prunus spp.), hackberry (*Celtis occidentalis*) and bumelia (*Sideroxylon lanuginosum*). Most woody plants tend to be more confined to areas along drainages, areas where soil is somewhat deeper, and along the cedar breaks, which are found along the edges of the MLRA 85.

To a large extent the way the site changes and how fast the site evolves depends on the location in relation to the edges of the MLRA and woody vegetation. Sites closely oriented tend to change in the absence of fire toward a juniper/mesquite/brushland community fairly rapidly once change begins while sites located further away would take longer to shift. Woody plants have increased over the past 100 to 150 years on virtually all of the shallow sites located nearest the breaks. Where there is a seed source close by, Ashe juniper (*Juniperus ashei*) and eastern redcedar (*Juniperus virginiana*) will readily invade the site. The juniper first occurs under fences, trees and other places where songbirds tend to rest. In many areas, juniper has become a significant invasive species particularly in the absence of fire. The grasses are palatable and nutritious and the site provides year round grazing. The most limiting soil factor is soil depth. In very dry periods, the soils can appear rather droughty. When good rainfall is received, the site produces well.

Climate and soils are the most important and limiting factors affecting grass vegetation on the site. However, 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 suppress woody shrubs and cacti. The fires of pre-settlement days were probably more severe due to more fuel being available leading to more damage to woody plants. The grass species such as little bluestem, big bluestem and Indiangrass are considered fire neutral as far as their response to fire. Fire stimulated forb growth if the timing was right, and usually creates more plant diversity in this site one or two years post-burn. Then the grasses tend to crowd out the forbs and diversity decreases. Forbs also need spring moisture which is perhaps the major triggering factor. Prescribed fire is sometimes used as a tool to promote diversity for wildlife. Fire will usually not produce much mortality in older, re-sprouting, woody plants. After brush has been chemically or mechanically controlled, fire can be used effectively to suppress regrowth. Small juniper is easily killed by fire. Fuel loads are often the most limiting factor for the effective use of prescribed fire on this site. Once woody plants become mature (larger) or dense stands, the use of fire is limited. Woody plant suppression using safe approved herbicides or mechanical treatment is generally more practical, with fire playing a role as follow-up.

With abusive grazing practices, the vigorous Indiangrass and big bluestem will become lower in vigor while little bluestem will increase. Then secondary successional species such as silver bluestem (*Bothriochloa laguroides*) will begin to increase along with an increase of woody plants. Little bluestem is a tough, resistant species tolerant of some fairly heavy grazing for long periods. At some point, a threshold is crossed and the ground cover is opened up resulting in bare places where weedy species become established. Western ragweed (*Ambrosia psilostachya*), crotons (*Croton setigerus*), and cool-season annuals will quickly increase on the site if the primary species are in a weakened condition. The seeds of many woody species are consumed by birds, passed through the digestive system, and excreted in their droppings. This serves as an excellent seedbed and the seeds readily establish. Grazing management alone probably has minimal effect on the proliferation of woody plants, but a good cover of perennial grasses likely provides shading and minimizes the seed to soil contact the mesquite needs to be allowed to become established. Prescribed fire provides a much better method to control the spread of woody plants. Selective individual plant removal of mesquite and/or juniper is simple and economical when plants are just beginning to show up on the site. When the rapid increase of number of plants occur, the number of woody plants per acre will soon become too numerous for individual plant treatment to be feasible. Prescribed grazing with a moderate stocking rate can sustain the grass species composition and maintain annual production at the near reference community level. The shallow site can be abused to the point that the perennial warm season grasses thin out and the 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 when coupled with abusive grazing. Short-term droughts are common in the area and usually do not have a lasting effect in changing stable plant communities, although annual production can be affected. When a brush canopy becomes established which shades the ground sufficiently, this canopy cover tends to favor cool season annual species. Once a state of brush and cool season annuals is reached, recovery to a good perennial warm season grass cover is unlikely without major input with brush management and range planting.

In summary, the change in states 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 historically inhabited by grassland wildlife species such as bison, deer, grassland birds and small mammals for a part of their habitat needs. Over the years, as the site has changed to a more mixed grass and shrub community, different wildlife species utilize the site for habitat purposes. Woody plants provide cover for white tailed deer and bobwhite quail. Both of these wildlife species have increased along with the brushy plants due to the cover that these plants provide. More forbs and woody plants are needed to meet their requirements. It is often the objective of many land owners to provide a plant community so that wildlife species can exist along with domestic livestock. This can be accomplished by a carefully planned grazing and brush management program. Managing at a lower successional level may meet some wildlife species requirements, but not be as productive for grazing purposes. A lower successional level may not satisfy functions such as nutrient cycling, hydrologic protection, plant community stability nor soil protection. A compromise can be achieved with careful conservation planning that considers all resources as well as goals and objectives set by the land owner.

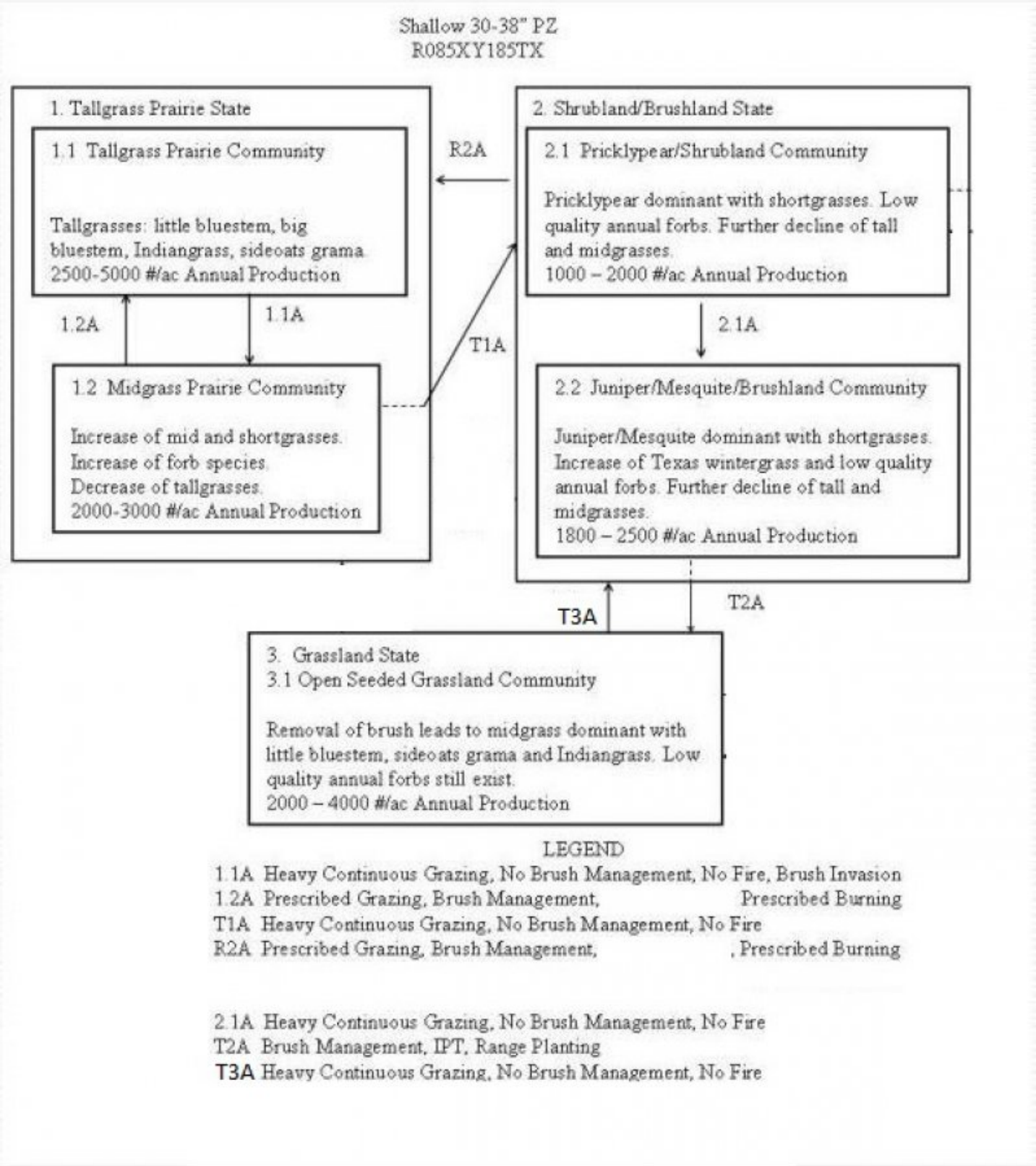
State and Transitional Pathways: Narrative

The following diagram suggests some pathways that the vegetation on this site might take in response to various treatment or natural stimuli over time. There may be other states or plant communities that are not shown on this diagram. This information is to show that changes in plant community can occur due to management and natural factors and can be changed by implementing certain conservation practices. The plant communities described are commonly observed for this site. Before making plans for plant community manipulation for specific purposes, landowners should consult local professionals for assistance.

Plant community changes are due to many factors. Change may occur slowly or in some cases, fairly rapidly. As vegetative changes occur, certain thresholds are crossed. Once a certain point is reached during the transition of one community to another, a return to the first state or previous plant community may not be possible without the input of some form of energy. This often means intervention with practices that are not part of natural processes. An example might be the application of herbicide or mechanical treatment to control some woody species in order to reduce its population and release more grass and forbs growth. Merely adjusting grazing practices would not accomplish any significant change in a plant community once certain thresholds are crossed. The amount of energy required to effect change in community would depend on the present vegetative state and the desired vegetative state.

NOTE: These two arrows from the tallgrass prairie state to the shrubland/brushland state indicate two different pathways. The first is without brush management and without fire while the second is with heavy continuous grazing and brush invader encroachment coupled with no fire or brush management. These two pathways are different in that the first will contain the tallgrasses of the historic conditions until the brush canopy shades out the warm-season grasses.

State and transition model



State 1
Tallgrass Prairie State - Reference

Dominant plant species

- little bluestem (*Schizachyrium scoparium*), grass

Community 1.1
Tallgrass Prairie Community

Figure 9. 1.1 Tallgrass Prairie Community

The interpretive plant community for this site is the tallgrass prairie community (1.1). The community is dominated by warm-season perennial tallgrasses such as little bluestem, big bluestem and Indiangrass. Other major perennial grass species such as switchgrass, sideoats grama and silver bluestem are well dispersed through the site. Perennial forbs such as sunflowers, prairie clovers, bundleflowers, and daleas 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 following occasional fire. With heavy grazing pressure and the removal of fire, the historic community will change into a Midgrass Prairie Community (1.2), a Pricklypear/Shrubland Community (2.1) or Mesquite/Juniper Brushland Community (2.2). This Tallgrass Prairie Community can go directly to the Pricklypear Shrubland Community (2.1) in the absence of fire or some method of suppressing the brush species and still have the tallgrasses present. The changes within the grassland communities can change fairly rapid while the communities having an increase of woody plants are somewhat slower.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2000	3000	4000
Forb	375	528	750
Shrub/Vine	90	120	180
Tree	35	52	70
Total	**2500**	**3700**	**5000**

Figure 11. Plant community growth curve (percent production by month). TX6011, Warm-season perennial tallgrass prairie. The community is dominated by warm-season perennial tallgrasses with few shrubs, trees and forbs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	2	18	23	17	6	4	16	6	3	2

Community 1.2
Midgrass Prairie Community

Figure 12. 1.2 Midgrass Prairie Community

This transition state occurs with yearlong grazing without fire or brush management. The tallgrasses will start to disappear from the plant community. Invader brush species (mesquite, juniper, pricklypear, etc.) become established. Cedar elm (*Ulmus crassifolia*), bumelia (*Sideroxylon lanuginosum*), and hackberry (Celtis spp.) also start to increase. Texas wintergrass (*Nassella leucotricha*) increases as brush canopy increases. The plant community consists of less than 10 percent canopy of woody plants. Continuous grazing by domestic livestock has accelerated the shift towards the Shrubland/Brushland State (2.1 and 2.2). The midgrass prairie community (1.2) can revert back to the tallgrass prairie (1.1) with prescribed burning and/or prescribed grazing. Without prescribed burning and/or prescribed grazing, this plant community would continue to shift toward the Prickly Pear/Shrubland Community (2.1) or Juniper/Mesquite/Brushland Community (2.2).

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1300	1625	1950
Forb	520	650	780
Shrub/Vine	140	175	210
Tree	40	50	60
Total	**2000**	**2500**	**3000**

Figure 14. Plant community growth curve (percent production by month). TX6012, Midgrass Prairie. Midgrass Prairie with increase of forbs, shrubs, and trees (5% canopy)..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	2	18	23	17	6	4	16	6	3	2

Pathway 1.1A
Community 1.1 to 1.2

Tallgrass Prairie Community

Midgrass Prairie Community

Heavy continuous grazing, no brush management, no fires, and invasion of brush species has led to the shift from the Tallgrass Prairie Community to the Midgrass Prairie Community.

Pathway 1.2A
Community 1.2 to 1.1

Midgrass Prairie Community → Tallgrass Prairie Community

With the implementation of conservation practices such as Prescribed Grazing, Brush Management, and Prescribed Burning, the Midgrass Prairie Community can be reverted to the Tallgrass Prairie Community.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

State 2
Shrubland/Brushland State

Dominant plant species

- pricklypear (*Opuntia*), shrub
- Texas wintergrass (*Nassella leucotricha*), grass

Community 2.1
Pricklypear/Shrubland Community

Figure 15. 2.1 Prickly pear/Shrubland Community

The Pricklypear/Shrubland Community (2.1) consists of mid grasses with 10 to 20 percent prickly pear canopy and other woody plants. As this community emerges, pricklypear continues to invade the site along with other woody plants. Warm-season perennial tallgrasses such as Indiangrass and switchgrass have all but disappeared. Brush canopy continues to increase dramatically from the reference plant community. Texas wintergrass, threeawn species (Aristida spp.) and annual grasses continue to increase. Continuous grazing by domestic livestock has accelerated the vegetative shift towards the Juniper/Mesquite/Brushland Community (2.2). The shift to this plant community from the Tallgrass Prairie State has occurred due to the absence of fire or other means of brush suppression coupled with abusive grazing. The grass species that dominate the site are mostly annuals and cool-season species. This Pricklypear/Shrubland community (2.1) can be reverted back to near historic condition by some means of brush suppression and good grazing management. Without this type of treatment on this plant community, the site will continue to shift toward more dense stands of cactus or a Brushland type plant community (2.2).

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	600	800	1000
Forb	200	400	600
Shrub/Vine	120	180	240
Tree	80	120	160
Total	**1000**	**1500**	**2000**

Figure 17. Plant community growth curve (percent production by month). TX6013, Prickly pear/Shrubland Community. Midgrasses with pricklypear canopy that exceeds ten percent..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	8	20	25	20	5	3	10	4	1	1

Community 2.2
Juniper/Mesquite/Brushland Community

Figure 18. 2.2 Juniper/Mesquite/Brushland Community

This plant community is a brushland community (greater than 10% canopy) dominated by mesquite and/or juniper. Other species present in small amounts are cedar elm and hackberry. The herbaceous understory is almost nonexistent with high dense brush canopy. Shade tolerant species such as Texas wintergrass dominate the site where mesquite is the major woody species. When the canopy of juniper increases toward a cedar breaks type (dense stands of juniper) community, most grasses have almost disappeared. Continuous grazing by domestic livestock has continued to accelerate the shift towards the Juniper/Mesquite/Brushland Community (2.2). The tallgrass prairie (1.1) can be restored by prescribed burning but will require many years of burning due to light fuel load of fine fuel and the absence of tallgrass seed sources. Chemical control alone is usually a good option for treatment on a large scale. Mechanical treatment of this site along with range planting is generally not a good option due the nature of the shallow rocky soil. Mechanical brush management followed by range planting in the disturbed area may be used, especially where economics is not a factor. Due to the presence of dense canopy of mesquite and juniper, the amount of grass cover is greatly reduced. This, in turn, reduces forage production.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	810	970	1125
Forb	540	645	750
Tree	270	320	375
Shrub/Vine	180	215	250
Total	**1800**	**2150**	**2500**

Figure 20. Plant community growth curve (percent production by month). TX6014, Mesquite/Juniper/Brushland Community. Consist of mixed grasses with greater than 50 percent canopy of woody plants..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	3	8	20	25	19	5	3	10	4	1	1

Pathway 2.1A
Community 2.1 to 2.2

Pricklypear/Shrubland Community

Juniper/Mesquite/Brushland Community

Heavy continuous grazing, no brush management, and no fires would cause the shift from the Pricklypear/Shrubland Community to the Juniper/Mesquite/Brushland Community.

State 3
Grassland State

Dominant plant species

- Bermudagrass (*Cynodon dactylon*), grass

Community 3.1
Open Seeded Grassland Community

Figure 21. 3.1 Open Seeded Grassland Community

This state is usually the result of applying mechanical brush control and range planting using introduced grass species. These species may include Kleingrass (*Panicum coloratum*), Old World bluestem or yellow bluestem (King Ranch, Spar, WW-B Dahl or Plains) (*Bothriochloa ischaemum*, *Bothriochloa bladhii*, etc.) or one of the hybrid bermudagrass (*Cynodon dactylon*) such as coastal bermudagrass. Coastal bermudagrass is usually not a good choice due to the shallow soil depth for this site. Once the soil is plowed and planted to an introduced species, considerable time and expense will be necessary before the Open Seeded Grassland Community will approach the diversity of Plant Community (1.1).

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1600	2400	3200
Forb	360	540	720
Shrub/Vine	20	30	40
Tree	20	30	40
Total	**2000**	**3000**	**4000**

Figure 23. Plant community growth curve (percent production by month). TX6015, Open Seeded Grassland Community. This state is usually the result of mechanical brush control and reseeding using one or more native grass species..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	2	18	23	17	6	4	16	6	3	2

Transition T1A
State 1 to 2

With heavy continuous grazing, no brush management, and no fires, the Tallgrass Prairie State can shift to the Shrubland State.

Restoration pathway R2A
State 2 to 1

With Prescribed Grazing, Brush Management, and Prescribed Burning conservation practices, the Shrubland/Brushland State can revert back to the Tallgrass Prairie State.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

Transition T2B
State 2 to 3

With Brush Management, Individual Plant Treatments (IPT), and Range Planting, the Pricklypear/Shrubland Community can shift to the Grassland State.

Transition T2A
State 2 to 3

With Brush Management, Individual Plant Treatments (IPT), and Range Planting, the Shrubland/Brushland State can shift to the Grassland State.

Transition T3A
State 3 to 2

With heavy continuous grazing, no brush management, and no fires, the Grassland State can shift to the Shrubland/Brushland State.

Additional community tables

Table 10. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Tallgrass**			1275–2300	
	little bluestem	SCSC	*Schizachyrium scoparium*	1275–2300	–
2	**Tallgrasses**			400–950	
	big bluestem	ANGE	*Andropogon gerardii*	133–950	–
	switchgrass	PAVI2	*Panicum virgatum*	133–950	–
	Indiangrass	SONU2	*Sorghastrum nutans*	133–950	–
3	**Midgrass**			225–500	
	sideoats grama	BOCU	*Bouteloua curtipendula*	225–500	–
4	**Mid/Shortgrasss**			225–425	
	purple threeawn	ARPUP9	*Aristida purpurea var. perplexa*	0–425	–
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	0–425	–
	buffalograss	BODA2	*Bouteloua dactyloides*	0–425	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–425	–
	tall grama	BOHIP	*Bouteloua hirsuta var. pectinata*	0–425	–
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	0–425	–
	fall witchgrass	DICO6	*Digitaria cognata*	0–425	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–425	–
	Virginia wildrye	ELVI3	*Elymus virginicus*	0–425	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	0–425	–
	seep muhly	MURE2	*Muhlenbergia reverchonii*	0–425	–
	Texas wintergrass	NALE3	*Nassella leucotricha*	0–425	–
	vine mesquite	PAOB	*Panicum obtusum*	0–425	–
	Drummond's dropseed	SPCOD3	*Sporobolus compositus var. drummondii*	0–425	–
	slim tridens	TRMU	*Tridens muticus*	0–425	–
Forb					
5	**Forbs**			225–425	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–425	–
	white sagebrush	ARLUM2	*Artemisia ludoviciana ssp. mexicana*	0–425	–
	yellow sundrops	CASE12	*Calylophus serrulatus*	0–425	–
	American star-thistle	CEAM2	*Centaurea americana*	0–425	–
	whitemouth dayflower	COER	*Commelina erecta*	0–425	–
	croton	CROTO	*Croton*	0–425	–
	prairie clover	DALEA	*Dalea*	0–425	–
	purple prairie clover	DAPU5	*Dalea purpurea*	0–425	–
	blacksamson echinacea	ECAN2	*Echinacea angustifolia*	0–425	–
	Engelmann's daisy	ENPE4	*Engelmannia peristenia*	0–425	–
	Leavenworth's eryngo	ERLE11	*Eryngium leavenworthii*	0–425	–
	snow on the mountain	EUMA8	*Euphorbia marginata*	0–425	–
	beeblossom	GAURA	*Gaura*	0–425	–
	hoary false	HECA8	*Heterotheca canescens*	0–425	–

	goldenaster				
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	0–425	–
	bluet	HOUST	*Houstonia*	0–425	–
	coastal indigo	INMI	*Indigofera miniata*	0–425	–
	trailing krameria	KRLA	*Krameria lanceolata*	0–425	–
	dotted blazing star	LIPU	*Liatris punctata*	0–425	–
	Nuttall's sensitive-briar	MINU6	*Mimosa nuttallii*	0–425	–
	yellow puff	NELU2	*Neptunia lutea*	0–425	–
	cobaea beardtongue	PECO4	*Penstemon cobaea*	0–425	–
	groundcherry	PHYSA	*Physalis*	0–425	–
	snoutbean	RHYNC2	*Rhynchosia*	0–425	–
	rhynchosida	RHYNC5	*Rhynchosida*	0–425	–
	blackeyed Susan	RUHI2	*Rudbeckia hirta*	0–425	–
	pitcher sage	SAAZG	*Salvia azurea var. grandiflora*	0–425	–
	Texas star	SACA3	*Sabatia campestris*	0–425	–
	compassplant	SILA3	*Silphium laciniatum*	0–425	–
	false gaura	STLI2	*Stenosiphon linifolius*	0–425	–
	white heath aster	SYERE	*Symphyotrichum ericoides var. ericoides*	0–425	–
Shrub/Vine					
6	**Shrubs/Vines**			75–200	
	catclaw acacia	ACGR	*Acacia greggii*	0–200	–
	stretchberry	FOPU2	*Forestiera pubescens*	0–200	–
	fragrant sumac	RHAR4	*Rhus aromatica*	0–200	–
	winged sumac	RHCO	*Rhus copallinum*	0–200	–
Tree					
7	**Trees**			75–200	
	hackberry	CELTI	*Celtis*	0–200	–
	plum	PRUNU	*Prunus*	0–200	–
	Texas live oak	QUFU	*Quercus fusiformis*	0–200	–
	Lacey oak	QULA	*Quercus laceyi*	0–200	–
	bully	SIDER2	*Sideroxylon*	0–200	–
	Hercules' club	ZACL	*Zanthoxylum clava-herculis*	0–200	–

Animal community

The historic tallgrass prairie was habitat to migratory bison herds. Deer and turkey were mostly found along adjacent wooded streams occasionally feeding on the open prairie. Large predators such as wolves, coyotes, mountain lions and black bear roamed throughout the area. White-tail deer, turkey, bobcats and coyotes along with resident and migratory birds and small mammals use this site for a part of their habitat today. Domestic livestock is the dominant contemporary grazer of the site. As the prairie changes through the various vegetative states towards the brushland state, the quality of the habitat may improve for some species and decline for others. Appropriate management practices must be applied to maintain a vegetative state in optimum habitat quality for the desired animal species.

Hydrological functions

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. Due to the shallow soil underlain with limestone, there is limited deep infiltration and during periods of low water use by plants, there are numerous seeps. 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 carries less sediment. Overall watershed protection is enhanced by a healthy grassland community, as is nutrient cycling.

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 shallow and the water holding ability is limited. 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. Potential movement of soil (erosion), pesticides and both organic and inorganic nutrient applications (fertilizer) should always be considered when managing for higher volumes of surface runoff.

Recreational uses

Hunting, hiking, camping, equestrian, bird watching and off road vehicle use are various recreational uses for the site.

Wood products

None.

Other products

None.

Other information

None.

Inventory data references

Information presented here has been derived from NRCS clipping data and field observations of range trained personnel: James Luton RMS, Montague; William Donham, DC, Weatherford; Kent Ferguson RMS, Weatherford; Dan Caudle

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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	08/25/2005
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None. Current or past formation of rills are not present.

2. **Presence of water flow patterns:** None. This site rarely has flow patterns. Some are to be expected around surface obstacles.

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3. **Number and height of erosional pedestals or terracettes:** None. Some very minor pedestalling may occur in the shallower, lower production portions of the site. Rarely should they be over 1/4 inch height.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 5 to 10 percent bare ground. Small and non-connected areas.

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5. **Number of gullies and erosion associated with gullies:** This site does not develop gullies due to shallow soils.

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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):** Minimal and short. Less than 6 inches. Only associated with water flow patterns following extremely high intensity rainfall.

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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):** Stability class 4-6 for both canopy and interspaces.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Very dark grayish brown clay surface 8 to 20 inches thick with strong very fine subangular blocky and granular structure. Fragments of gravels, cobbles, and stones range from 10 to 80 percent in the soil profile. Soil organic matter is 1 to 4 percent.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** High canopy, basal cover, and density with small interspaces make rainfall impact negligible. The site has well drained soils, slowly permeable with 1 to 16 percent slopes which allows negligible runoff and erosion.

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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 to mimimal. Not restrictive to water movement and root penetration.

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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: forbs = cool-season grasses > shrubs/vines

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Grasses due to their growth habit will exhibit some mortality and decadence though very slight.

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14. **Average percent litter cover (%) and depth (in):** Litter is dominantly herbaceous which covers most all plant and rock interspaces.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 2500 to 5000 pounds per acre. 2500 pounds in below average moisture years, 3700 pounds in "normal" years and 5000 pounds in above average years.

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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:** Ashe juniper, Prickly pear and mesquite are the primary invaders.

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17. **Perennial plant reproductive capability:** Perennial plants are capable of reproducing except during periods of prolonged drought conditions, heavy natural herbivory and intense wildfires.
