USDA Natural Resources Conservation Service

Ecological site R084BY173TX
Sandy Bottomland 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

This site occurs on sandy alluvial soils on floodplains. The reference vegetation includes native tallgrasses along with a mixture of forbs and some trees along the water courses. Without fire or other means of brush management, woody species may increase across the site.

Associated sites

R084BY172TX	**Sandy 29-33" PZ** Deep sandy soils on uplands.

Similar sites

R084BY170TX	**Loamy Bottomland 29-33" PZ** Loamy alluvial soils

Table 1. Dominant plant species

Tree	(1) *Populus deltoides* (2) *Platanus occidentalis*
Shrub	Not specified
Herbaceous	(1) *Panicum virgatum* (2) *Sorghastrum nutans*

Physiographic features

This site occurs on flood plains and flood-plain steps in the West Cross Timbers. Slopes are typically less than 2 percent.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Flood plain (2) Alluvial plain > Flood-plain step
Runoff class	Negligible to low
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare to frequent
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to occasional
Elevation	600–2,100 ft
Slope	0–1%
Water table depth	0–72 in
Aspect	Aspect is not a significant factor

Climatic features

The climate is subtropical. Precipitation varies from an average of 33 inches in the eastern part of the Cross Timbers to 29 inches in the western part. Winters are dry and summers are hot and humid. Tropical maritime air masses control the weather during the spring, summer and fall. Large variations in temperature sometimes accompany polar air masses in winter.

Table 3. Representative climatic features

Frost-free period (characteristic range)	193-200 days
Freeze-free period (characteristic range)	220-225 days
Precipitation total (characteristic range)	31-33 in
Frost-free period (actual range)	192-204 days
Freeze-free period (actual range)	216-226 days
Precipitation total (actual range)	28-34 in
Frost-free period (average)	197 days

Freeze-free period (average)	222 days
Precipitation total (average)	32 in

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

This site is adjacent to rivers and streams. It receives water from overflow from watercourses and runoff from higher adjacent sites. This site may contain inclusions of hydric soils.

Wetland description

Site specific evaluations are necessary to determine the presence of wetlands.

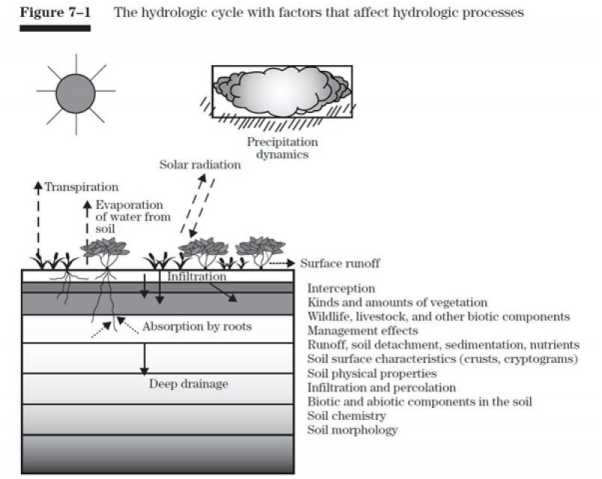


Figure 8.

Soil features

Representative soil components for this ecological site include: Pulexas

The site is characterized by very deep, sandy, alluvial soils on flood plains.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone
Surface texture	(1) Loamy fine sand
Drainage class	Well drained
Permeability class	Moderately rapid to rapid
Soil depth	72 in
Surface fragment cover <=3"	0–1%
Surface fragment cover >3"	0–1%
Available water capacity (0-40in)	6–10 in

Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–1%
Subsurface fragment volume >3" (Depth not specified)	0–1%

Ecological dynamics

The reference plant community for the Sandy Bottomland site is a tallgrass floodplain. The grasses are primarily little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), and switchgrass (*Panicum virgatum*). Smaller amounts of sideoats grama (*Bouteloua curtipendula*), purpletop tridens (*Tridens flavus*) and sand lovegrass (*Eragrostis trichodes*) occur as well. Shrubs and trees consist of cottonwood (*Populus deltoides*), pecan (*Carya illinoinensis*), black willow (*Salix nigra*), plums (Prunus spp), hawthorns (Crataegus spp), greenbriar (Smilax spp), and grapes (Vitis spp), and sycamore (*Platanus occidentalis*). Most woody plants tended to be more confined to areas along drainages and other areas where native wildlife tended to concentrate. Switchgrass and big bluestem tended to occur more in the low drainages. Woody plants have increased on virtually all of the loamy sand sites over the past 100 to 150 years. Where there is a seed source close by, juniper (*Juniperus ashei* and *Juniperus virginiana*) will invade the site. The production potential of the site is moderate; however, the production amount is lower than the Sandy Loam ecological site. Pre-settlement grazers included bison and deer. The grasses are fairly palatable and nutritious and the site provides year round grazing. Generally speaking, the soils on this site are less fertile than the Sandy Loam site but more fertile than the deeper sands of the Loamy Sand and Deep Sand ecological sites. The most limiting soil factor is erodibility followed by fertility. In very dry periods, the soils can appear rather droughty. When good rainfall is received, the site produces well.

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 can be killed by fire. Fuel loads are often the most limiting factor for the effective use of prescribed fire on this site. In general, the uses of fire on mature (larger) or dense stands of woody plants do not result in the same positive effects that burning has in tall/midgrass communities. Woody plant suppression using safe approved herbicides is generally more practical, although prescribed fire may have a place in some circumstances.

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 sand dropseed (*Sporobolus cryptandrus*) and silver bluestem (*Bothriochloa laguroides*) will begin to increase along with an increase of woody plants. The little bluestem is a tough, resistant 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 setigerus*), and cool-season annuals will quickly invade if the principal species are in a weakened condition. Grazing management probably has minimal effect on the proliferation of woody plants, but a good cover of perennial grasses likely minimizes the seed to soil contact the needed 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 woody plants is easy and economical when a few plants begin to show up on the site, but the increase may 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 reference community level until the brush canopy is so dense that the shade starts to interfere with photosynthesis. The Sandy Bottomland ecological site can be abused to the point that the perennial warm-season grasses thin out and lower succession 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 state 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 states of vegetation depend on the type of grazing management applied over many years, and the rate of invasion and establishment of woody species. After the site crosses the threshold to a lower ecological condition, the effects of seasonal moisture and short term dry spells become more pronounced. 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.

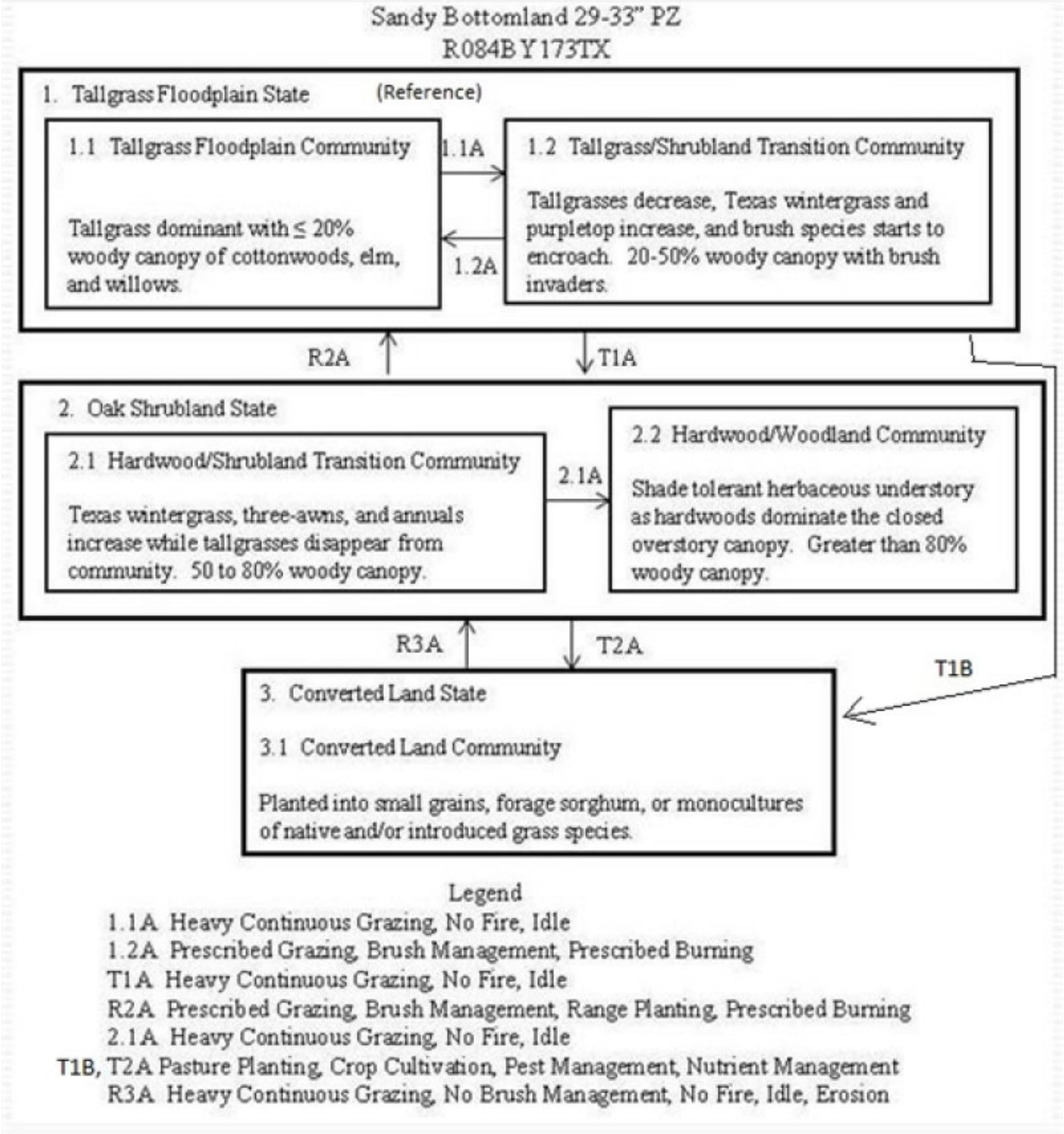
This site was inhabited by grassland wildlife species such as bison, grassland birds and small mammals. Over the years, as the site has changed to a more mixed grass and shrub community, more wildlife species have come to utilize it for habitat. Woody plants provide cover for white-tailed deer and bob-white 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 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 that are not shown on this diagram. This information is to show that changes in plant community do occur as a result of management and natural factors; and can be changed by implementing certain practices. The plant communities described are commonly observed on this site. Before making plans for plant community manipulation for specific purposes, consult local professionals.

As a site changes in plant community makeup, the changes may be due to many factors. Change may occur slowly or in some cases, fairly rapidly. As vegetative changes occur, certain thresholds are crossed. This means that once a certain point is reached during the transition of one community to another, a return to the first state 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 to control some woody species in order to reduce its population and encourage more grass and forbs growth. Merely adjusting grazing practices would probably not accomplish any significant change in 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 change.

State and transition model



State 1
Tallgrass Floodplain State - Reference

The interpretive plant community for this site is plant community 1.1. The community is dominated by warm-season perennial tallgrasses with cottonwood, elm and willow. The major perennial grass species are well dispersed through the 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 4000 to 6000 pounds per acre. Grasses make up 85% of species composition while trees/shrubs make up 10% species composition. The Tallgrass/Shrubland Transition Community occurs when woody species starts regeneration and the tallgrasses will start to disappear from the plant community. Invader brush (juniper, yaupon, etc) appears and becomes established. Texas wintergrass and purpletop tridens increases as brush canopy increases. The plant community consists up to 20 percent canopy of mature trees with an understory canopy of shrubs and young oaks, elm, cottonwood, willow and pecan. Annual production ranges from 4000 to 6000 pounds per acre. Grasses make up 60%, Forbs 10%, and

Trees/Shrubs 30%.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- American sycamore (*Platanus occidentalis*), tree
- switchgrass (*Panicum virgatum*), grass

Community 1.1
Tallgrass Floodplain Community

Figure 9. 1.1 Tallgrass Floodplain Community

This community is dominated by warm-season perennial tallgrasses with cottonwood, elm and willow. The major perennial grass species are well dispersed through the 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 4000 to 6000 pounds per acre. Grasses make up 85% of species composition while trees/shrubs make up 10% species composition.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	3400	4250	5100
Tree	320	400	480
Forb	200	250	300
Shrub/Vine	80	100	120
Total	**4000**	**5000**	**6000**

Figure 11. Plant community growth curve (percent production by month). TX5515, Tallgrass Savannah, <20% Canopy. Tallgrass savannah with less than 20 percent canopy cover of trees and shrubs..

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

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. Woody species starts regeneration and the tallgrasses will start to disappear from the plant community. Invader brush (juniper, yaupon, etc) appears and becomes established. Texas wintergrass and purpletop tridens increases as brush canopy increases. The plant community consists up to 20 percent canopy of mature trees with an understory canopy of shrubs and young oaks, elm, cottonwood, willow and pecan. Annual production ranges from 4000 to 6000 pounds per acre. Grasses make up 60%, Forbs 10%, and Trees/Shrubs 30%. This transition community (1.2) can revert back to the Tallgrass Floodplain Community (1.1) with prescribed burning and/or prescribed grazing. Without prescribed burning and/or prescribed grazing this transition state will continue to shift toward the Hardwood/Shrubland Transition Community (2.1).

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2400	3000	3600
Shrub/Vine	600	750	900
Tree	600	750	900
Forb	400	500	600
Total	**4000**	**5000**	**6000**

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 Floodplain Community

Tallgrass/Shrubland Transition Community

With heavy continuous grazing, no fires, and idled land conditions, the Tallgrass Floodplain Community will shift to the Tallgrass/Shrubland Transition Community.

Pathway 1.2A

Community 1.2 to 1.1

Tallgrass/Shrubland Transition Community

Tallgrass Floodplain Community

With the application of various conservation practices including Prescribed Grazing, Brush Management, and Prescribed Burning, the Tallgrass/Shrubland Transition Community can be shifted back to the Tallgrass Floodplain Community.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

State 2
Oak Shrubland State

The Hardwood/Shrubland Transition Community (2.1) consists of 50 to 80% canopy of woody plants. As the shrubland community ages, oak, elm and cottonwood matures and the invader species increase. Warm-season perennial tallgrasses such as Indiangrass and switchgrass have all but disappeared. In the early stages of this transition stage little bluestem tends to dominate the grasses; however, as brush canopy continues to increase, Texas wintergrass, three-awns (and annuals continue to increase while the little bluestem decreases. Annual production ranges from 4000 to 6000 pounds per acre. Species composition by functional groups include: Grasses 35%, Forbs 20%, and Trees/Shrubs 45%. The Hardwood/Woodland Community community is a closed overstory (greater than 80% canopy) woodland dominated by elms, cottonwood, willow and oaks. Understory shrubs and sub-shrubs include yaupon, hawthorns, and American beautyberry (*Callicarpa americana*). Woody vines are also present and include greenbriars, poisonoak (Toxicodendron spp), Virginia creeper (*Parthenocissus quinquefolia*) and grapes. The herbaceous understory is almost nonexistent. Shade-tolerant species such as purpletop tridens (*Tridens flavus*) and Canada wildrye (*Elymus canadensis*) occur in small amounts. Small isolated clearings will contain little bluestem, perennial three-awns, Texas wintergrass and small amounts of other grasses. Continuous grazing by domestic livestock has accelerated the shift. Annual production ranges from 4000 to 6000 pounds per acre. Function groups are as follows: Grasses 15%, Forbs 20%, and Trees/Shrubs 65%.

Dominant plant species

- elm (*Ulmus*), tree
- hackberry (*Celtis*), tree
- Ashe's juniper (*Juniperus ashei*), tree
- Texas wintergrass (*Nassella leucotricha*), grass

Community 2.1
Hardwood/Shrubland Transition Community

Figure 15. 2.1 Hardwood/Shrubland Transition Community

The Hardwood/Shrubland Transition Community (2.1) consists of 50 to 80% canopy of woody plants. As the shrubland community ages, oak, elm and cottonwood matures and the invader species increase. Warm-season perennial tallgrasses such as Indiangrass and switchgrass have all but disappeared. In the early stages of this transition stage little bluestem tends to dominate the grasses; however, as brush canopy continues to increase, Texas wintergrass, three-awns (and annuals continue to increase while the little bluestem decreases. Continuous grazing by domestic livestock has accelerated the shift. Annual production ranges from 4000 to 6000 pounds per acre. Species composition by functional groups include: Grasses 35%, Forbs 20%, and Trees/Shrubs 45%. The shift to this community has occurred due to the absence of fire or other means of brush suppression. Where this state has been reached from cropland or pasture, mesquite and/or juniper may dominate the woody vegetation, but oaks, elm, cottonwood and pecan are beginning to occur. The grass species that dominate the site are silver bluestem (*Bothriochloa laguroides*), Texas wintergrass and three-awns along with the seeded introduced grass species. This community can be reverted back to near reference condition by some means of brush suppression and good grazing management. Without this treatment the site will continue to shift toward the Hardwood/Woodland Community (2.2).

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1400	1750	2100
Shrub/Vine	1000	1250	1500
Tree	800	1000	1200
Forb	800	1000	1200
Total	**4000**	**5000**	**6000**

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
Hardwood/Woodland Community

Figure 18. 2.2 Hardwood/Woodland Community

This plant community is a closed overstory (greater than 80% canopy) woodland dominated by elms, cottonwood, willow and oaks. Understory shrubs and sub-shrubs include yaupon, hawthorns, and American beautyberry (*Callicarpa americana*). Woody vines are also present and include greenbriars, poisonoak (Toxicodendron spp), Virginia creeper (*Parthenocissus quinquefolia*) and grapes. The herbaceous understory is almost nonexistent. Shade-tolerant species such as purpletop tridens (*Tridens flavus*) and Canada wildrye (*Elymus canadensis*) occur in small amounts. Small isolated clearings will contain little bluestem, perennial three-awns, Texas wintergrass and small amounts of other grasses. Continuous grazing by domestic livestock has accelerated the shift. Annual production ranges from 4000 to 6000 pounds per acre. Function groups are as follows: Grasses 15%, Forbs 20%, and Trees/Shrubs 65%. This Hardwood/Woodland Community (2.2) has developed due to the absence of fire (or some other method of brush suppression). Livestock grazing yearlong accelerates the shift. The tallgrasses can be restored by prescribed burning but will require many years of burning due to a light fuel load of fine fuel and the absence of a seed source for the tall grasses. Chemical control alone is usually not a good option for treatment on a large scale due to the resistance of some of the woody plant species to herbicides. Mechanical treatment of this site along with seeding is generally the best method for conversion back to a tallgrasses. The cost of doing this type 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. The soils of this site are very sensitive to erosion. During the transition states from the Reference State(1) due to the reduction of grass litter, sheet and rill erosion and in some instances wind erosion has accelerated and by the time it has reached the Woodland State the may be bisected by deep gullies. While in the transition stages the organic matter in the soil is also reduced and may never be what was present in the reference condition. At the Hardwood/Woodland Community (2.2), the amount of litter cover is similar to Plant Community (1.1) but this cover is now mostly leaves. The leaves of the trees and underbrush intercept rainfall from lighter intensity rainfall which evaporates before reaching the ground resulting in less water reaching the soil surface. When runoff does occur there are more tendencies for the litter to drift until it catches on the stems of dense underbrush or what little grass is present. When the woodland is grazed the amount of litter decreases along with a decrease of surface vegetation which increases the drifting of the litter with runoff. Due to the presence of shade the amount of grass cover is greatly reduced which in turn reduces forage production from the historic community. When this state is reached following abandonment of converted land communities such as cropland or pastureland of introduced plants quite often severe erosion has occurred.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	1400	1750	2100
Tree	1200	1500	1800
Forb	800	1000	1200
Grass/Grasslike	600	750	900
Total	**4000**	**5000**	**6000**

Figure 20. Plant community growth curve (percent production by month). TX5513, Postoak Woodland. Postoak dominated closed overstory with over 80 percent canopy cover..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	2	10	50	14	5	5	5	5	1	1

Pathway 2.1A
Community 2.1 to 2.2

Hardwood/Shrubland Transition Community

Hardwood/Woodland Community

With heavy continuous grazing, no fire, and idled land conditions, the Hardwood/Shrubland Transition Community will shift to the Hardwood/Woodland Community.

State 3
Converted Land State

Conversion of the tallgrass floodplain community (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 acres remain in cropland today. The early cropping with little reguard 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. Many of 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 floodplain community (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 acres remain in cropland today. The early cropping with little reguard 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 floodplain (1.1) is possible with seeding, prescribed grazing and prescribed burning; a complete restoration of the historic plant community in a reasonable time is very unlikely. 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. Many of these 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 species such as mesquite and/or juniper, silver bluestem, three-awns, tridens species, western ragweed and other various herbaceous plant species. Refer to pastureland suitability groups for species suitability, production potentials and limitations.

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

Transition T1A
State 1 to 2

With heavy continuous grazing, no fire, and idle land conditions, the Tallgrass Floodplain State will transition into the Oak Shrubland State.

Transition T1B
State 1 to 3

Through cultivation and planting of crops and/or introduced species, this Tallgrass Floodplain State can be transitioned to the Converted Land State.

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 Floodplain 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.

Restoration pathway R3A
State 3 to 2

With heavy continuous grazing, no brush management, no fires, idled land conditions, and increase of erosion, the Converted Land State can move to the Oak/Shrubland State.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Tallgrass**			400–600	
	little bluestem	SCSC	*Schizachyrium scoparium*	400–600	–
2	**Tallgrass**			600–900	
	big bluestem	ANGE	*Andropogon gerardii*	250–750	–
	sand bluestem	ANHA	*Andropogon hallii*	250–750	–
3	**Tallgrass**			1000–1500	
	switchgrass	PAVI2	*Panicum virgatum*	1000–1500	

	switchgrass	PAVI2	*Panicum virgatum*	1000–1500	–
4	**Tallgrass**			600–900	
	Indiangrass	SONU2	*Sorghastrum nutans*	600–900	–
5	**Cool Season Grasses**			200–300	
	Texas bluegrass	POAR	*Poa arachnifera*	200–300	–
6	**Midgrass**			200–300	
	beaked panicgrass	PAAN	*Panicum anceps*	200–300	–
7	**Midgrass**			200–300	
	purpletop tridens	TRFL2	*Tridens flavus*	200–300	–
8	**Tall/Mid/Shortgrasses**			200–300	
	threeawn	ARIST	*Aristida*	0–300	–
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	0–300	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–300	–
	sand lovegrass	ERTR3	*Eragrostis trichodes*	0–300	–
	thin paspalum	PASE5	*Paspalum setaceum*	0–300	–
	Drummond's dropseed	SPCOD3	*Sporobolus compositus var. drummondii*	0–300	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–300	–
	eastern gamagrass	TRDA3	*Tripsacum dactyloides*	0–300	–
Forb					
9	**Forbs**			200–300	
	aster	ASTER	*Aster*	0–50	–
	sensitive partridge pea	CHNI2	*Chamaecrista nictitans*	0–50	–
	Texas bullnettle	CNTE	*Cnidoscolus texanus*	0–50	–
	whitemouth dayflower	COER	*Commelina erecta*	0–50	–
	bundleflower	DESMA	*Desmanthus*	0–50	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	0–50	–
	coastal indigo	INMI	*Indigofera miniata*	0–50	–
	lespedeza	LESPE	*Lespedeza*	0–50	–
	redwhisker clammyweed	PODO3	*Polanisia dodecandra*	0–50	–
	pitcher sage	SAAZG	*Salvia azurea var. grandiflora*	0–50	–
	gray goldenrod	SONE	*Solidago nemoralis*	0–50	–
	amberique-bean	STHE9	*Strophostyles helvola*	0–50	–
Shrub/Vine					
10	**Shrubs/Vines**			80–120	
	roundleaf greenbrier	SMRO	*Smilax rotundifolia*	0–100	–
	grape	VITIS	*Vitis*	0–100	–
Tree					
11	**Trees**			320–480	
	baccharis	BACCH	*Baccharis*	0–100	–
	pecan	CAIL2	*Carya illinoinensis*	0–100	–
	American sycamore	PLOC	*Platanus occidentalis*	0–100	–
	eastern cottonwood	PODE3	*Populus deltoides*	0–100	–
	black willow	SANI	*Salix nigra*	0–100	–

	winged elm	ULAL	*Ulmus alata*	0–100	–
	American elm	ULAM	*Ulmus americana*	0–100	–
	cedar elm	ULCR	*Ulmus crassifolia*	0–100	–
	slippery elm	ULRU	*Ulmus rubra*	0–100	–

Animal community

The historic tallgrasses were habitat to migratory bison herds, 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 the site. As the site changes through the various vegetative states towards the 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 soil 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, hiking, camping, equestrian, bird watching and off road vehicle use.

Wood products

Oaks and pecan are used for firewood. Where pecans are mature nuts may be harvested.

Other products

None.

Other information

None.

Inventory data references

Information presented here has been derived from limited NRCS clipping data and field observations of range trained personnel: Lemuel Creswell Range Management Specialist (RMS), Comanche; Earl V. Hogan RMS, James Luton RMS, Montague; William Donham, Agronomist, Granbury; Kent Ferguson RMS, Weatherford.

References

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Other references

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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.

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2. **Presence of water flow patterns:** Minimal evidence of any water flow patterns due to very low slopes.

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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. Note: This does not account for flood events.

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):** Ap--0 to 20 cm (0 to 8 in); brown (7.5YR 5/4) loamy fine sand, brown (7.5YR 4/4) 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. Very litter runoff as slopes are typically 0-1%

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.

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: Native Tallgrasses (Groups 1-4)

    Sub-dominant: Forbs (9)
    Other grasses (5-8)

    Other: Woodies (10-11)

    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 5000 lb/acre. Ranging from 4000 to 6000 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:** Juniper(ashe juniper/eastern redcedar) most common invader. Also greenbriar, poison ivy, and other woodies will increase without fire.

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