USDA Natural Resources Conservation Service

Ecological site R084AY018OK
Deep Sand Savannah

Last updated: 9/21/2023
Accessed: 04/26/2024

General information

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

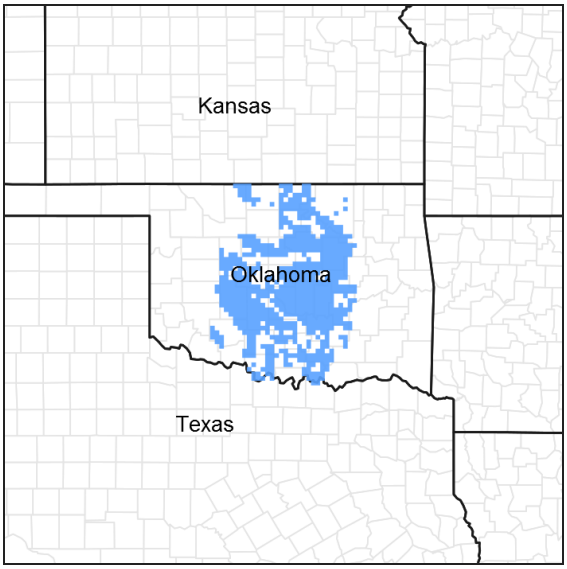


Figure 1. Mapped extent

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

MLRA notes

Major Land Resource Area (MLRA): 084A–North Cross Timbers

MLRA 84A “North Cross Timbers” is characterized by rolling to hilly uplands with oak trees, bedrock outcrops, and narrow stream valleys. It is believed that the Cross Timbers ecosystem is one the least disturbed forest types remaining in the Eastern US. Major rivers in this MLRA include the Verdigris River in Kansas and the Arkansas, Cimarron, and South Canadian Rivers in Oklahoma. The western parts of this MLRA are underlain by sandstone and shale of Permian age, while the eastern parts are underlain by sandstone and shale of Pennsylvanian age. There are also occurrences of Pleistocene age stream terraces along the rivers.

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.

Level IV EPA Ecoregions 27o “Crosstimbers Transition”, 29a “Northern Crosstimbers”, and 29h “Northwestern Crosstimbers”.

Ecological site concept

These sites occur over deep sandy eolian soils on stabilized dunes. The reference vegetation consists of native tallgrass and midgrass species such as sand bluestem and little bluestem. There is also an overstory of Post Oak and Blackjack Oak averaging 30 percent canopy, creating a savannah ecotype. This plant community is disturbance driven and requires periodic fire to maintain the savannah community. When fire is removed from the system, the site is at risk of encroachment of woody species and buildup of leaf litter, altering the plant community and driving it towards a woodland system with little understory production. The deep, coarse textured soils provide good moisture to plants during favorable precipitation. However, they are more susceptible to drought conditions.

Associated sites

R084AY075OK	**Sandy Loam Savannah** Higher landscape positions. Soils are more shallow. Similar vegetation and site characteristics.

Similar sites

R084AY075OK	**Sandy Loam Savannah** Higher landscape positions. Soils are more shallow. Similar vegetation and site characteristics.

Table 1. Dominant plant species

Tree	(1) *Quercus stellata* (2) *Quercus marilandica*
Shrub	(1) *Rhus glabra* (2) *Prunus angustifolia*
Herbaceous	(1) *Andropogon hallii* (2) *Schizachyrium scoparium*

Physiographic features

These sites are on stabilized dunes on reworked stream terraces in the Cross Timbers (MLRA 84A). Slopes are dominantly 0 to 8 percent, but range to 20 percent.

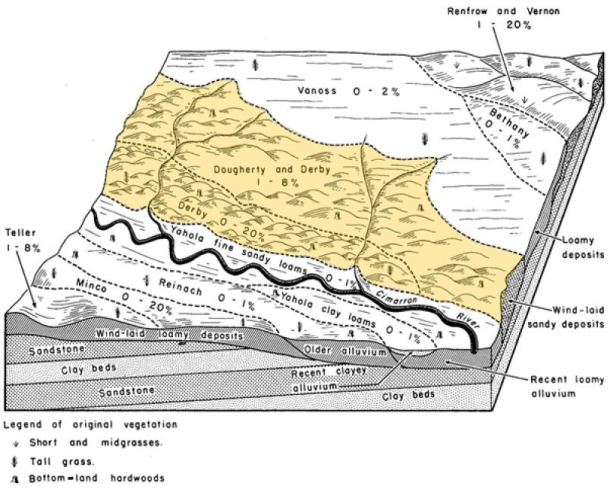


Figure 2. DSS84A

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain remnant > Terrace (2) Alluvial plain remnant > Dune
Runoff class	Negligible to medium
Elevation	700–1,400 ft
Slope	1–20%

Aspect	Aspect is not a significant factor

Climatic features

Climate is moist sub-humid with annual precipitation ranging from 30 to 45 inches. There will be noticeable differences in precipitation and temperatures from north to south and east to west. The most intense rainfall occurs in late spring and early summer while warm season vegetation is growing rapidly. Frost free and freeze free days increase from north to south. Precipitation increases from west to east.

Table 3. Representative climatic features

Frost-free period (characteristic range)	178-189 days
Freeze-free period (characteristic range)	196-208 days
Precipitation total (characteristic range)	33-38 in
Frost-free period (actual range)	169-191 days
Freeze-free period (actual range)	194-208 days
Precipitation total (actual range)	33-41 in
Frost-free period (average)	182 days
Freeze-free period (average)	201 days
Precipitation total (average)	36 in

Climate stations used

- (1) ADA [USC00340017], Ada, OK
- (2) CHICKASHA EXP STATION [USC00341750], Chickasha, OK
- (3) ANADARKO 3 E [USC00340224], Anadarko, OK
- (4) KINGFISHER [USC00344861], Kingfisher, OK
- (5) GREAT SALT PLAINS DAM [USC00343740], Jet, OK

Influencing water features

These upland sites are not associated with any riparian or wetland system.

Wetland description

NA

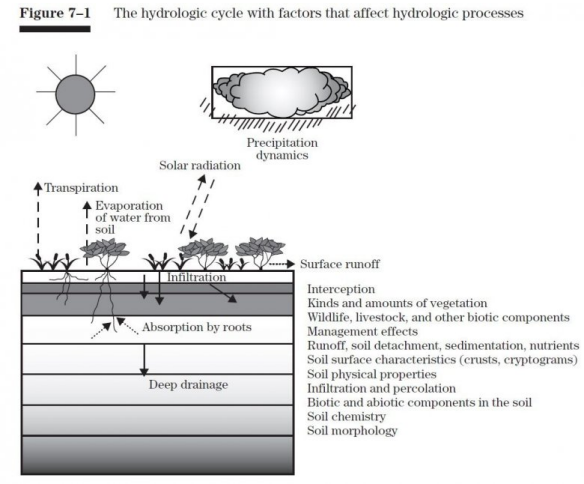


Figure 9.

Soil features

Representative soil components for this site include:
Derby, Dougherty, Eufaula, and Goodnight

These soils consists of very deep, well drained soils that formed in sandy and loamy sediments on terraces of Pleistocene age. They typically have rapid infiltration but can dry out quickly.

Soils are mapped for each county within the MLRA. Mapunits are representations of the major soil series component(s) and named accordingly. Each Mapunit is spatially represented on a digital soils map as polygons of different shapes and sizes. Within these Mapunits, there are often minor soil series components included. These minor components are soils that occur within a Mapunit polygon but are of small extent (15% or less of the Mapunit area). However, it is difficult to separate these minor soils spatially due to the scale of soil mapping.

Ecological sites are correlated at the component level of the soil survey. Therefore, a single Mapunit may contain multiple Ecological Sites just as it may contain multiple soil components. This is important to understand when investigating soils and Ecological Sites. A soil survey Mapunit may be correlated to a single Ecological Site based on the major component; however, there may be inclusional areas of additional Ecological Sites which are correlated to the minor components of that particular soil Mapunit.

Table 4. Representative soil features

Parent material	(1) Eolian sands–sandstone
Surface texture	(1) Fine sand (2) Loamy fine sand (3) Loamy sand
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Soil depth	60 in
Surface fragment cover <=3"	0–1%
Surface fragment cover >3"	0–1%
Available water capacity (0-40in)	3–6 in
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5–7.5
Subsurface fragment volume <=3" (Depth not specified)	0–1%
Subsurface fragment volume >3" (Depth not specified)	0–1%

Table 5. Representative soil features (actual values)

Drainage class	Not specified
Permeability class	Not specified
Soil depth	Not specified
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified

Available water capacity (0-40in)	3–10 in
Electrical conductivity (0-40in)	Not specified
Sodium adsorption ratio (0-40in)	Not specified
Soil reaction (1:1 water) (0-40in)	Not specified
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The reference community of the Deep Sand Savannah ecological site is a tallgrass savannah and with a disturbance driven plant community. Native tallgrasses compose the majority of the herbaceous plant community. Cool season grasses and grass likes are a minor component. Numerous perennial forbs are present.

The average fire return intervals for maintaining the reference state have been estimated between 3 to 5 years(Frost 1998). This fire return keeps the fire-intolerant species restricted to areas protected from fire (i.e. rock outcrops, etc.) allowing the plant community to remain dominated by fire-tolerant species such as Post Oak, Blackjack Oak, and many herbaceous species endemic to the tallgrass prairie ecosystem. This herbaceous community allows for positive infiltration and nutrient cycling.

Long term abusive grazing by domestic animals, primarily cattle or horses, usually results in a decrease of the tallgrasses and more palatable midgrasses, forbs, and legumes. These plants are gradually replaced by less palatable plants for domestic grazing stock, but not necessarily less desirable plants for other management goals. Without periodic burning, woody plants gradually thicken, and leaf litter accumulates, further reducing the amount of herbaceous vegetation in the understory.

The removal of fire will change the ecosystem dynamics. On some savannah locations, tree canopies and creeping vines such as greenbriar have thickened to the point that only sparse amounts of shade tolerant herbaceous plants remain in the understory. In other areas, eastern redcedar has invaded the site. Eastern redcedar can form an understory component of varying heights and density and can easily dominate a site once the overstory canopy is removed. Aside from crowding out herbaceous species, these volatile trees and vines may act as “ladder fuels” because of their growth form. When fire is once again introduced onto the landscape either by wildfire or prescribed fire, these trees can “ladder” the fire from surface level into the tree canopies causing a dangerous crown fire.

The plant species in the reference state allow for good water infiltration into the rapidly permeable soils of the site. As the woody canopy increases and the site transitions to the woody invasion state, the hydrology of the site is altered. The increased canopy intercepts most of the precipitation and leads to evaporative losses. Therefore, the remaining understory species have less available water for growth. However, with increased canopy and shading, understory species may have less evapotranspiration losses due to the altered micro-climate.

State and Transition Diagram:
A State and Transition Diagram for the Deep Sand Savannah (R084AY018OK) is depicted below. Thorough descriptions of each state, transition, and pathway follow the model. Experts base this model on available experimental research, field observations, professional consensus, and interpretations. It is likely to change as knowledge increases.

Plant communities will differ across the MLRA because of the natural variability in weather, soils, and aspect. The Reference Plant Community is not necessarily the management goal; other vegetative states may be desired plant communities as long as the Range Health assessments are in the moderate and above category.

The biological processes on this site are complex. Therefore, representative values are presented in a land

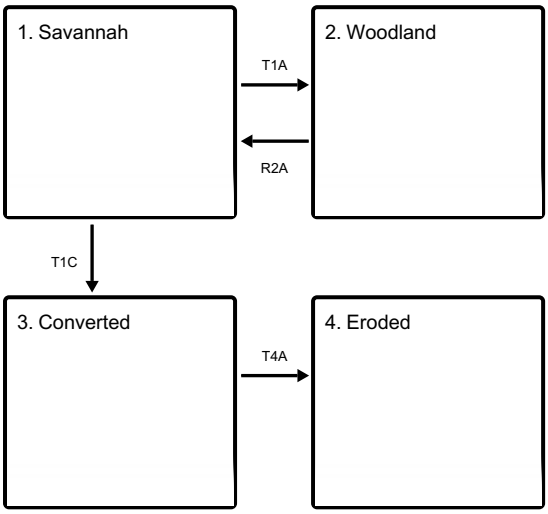
management context. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

Composition by dry weight and percent canopy cover are provided to describe the functional groups. Most observers find it easier to visualize or estimate percent canopy for woody species (trees and shrubs).

The following diagram suggests some pathways that the vegetation on this site might take. There may be other states not shown on the diagram. This information is intended to show what might happen in a given set of circumstances. It does not mean that this would happen the same way in every instance. Local professional guidance should always be sought before pursuing a treatment scenario.

State and transition model

Ecosystem states



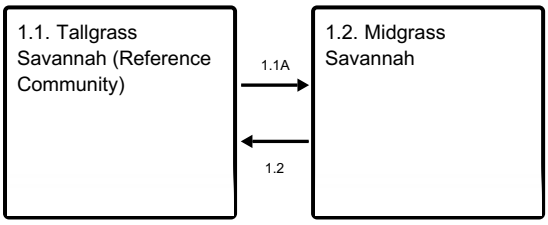
T1A - No fire, No brush management

T1C - Cultivation, Seeding

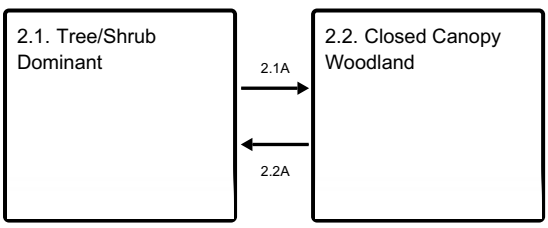
R2A - Selective Thinning, Prescribed Burning

T4A - Soil Erosion

State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities

3.1. Cropland/Tame Pasture

State 1
Savannah

This is the reference or diagnostic community for the site. The description is based on early range site descriptions, clipping data, professional consensus of experienced range specialists, and analysis of field work.

Characteristics and indicators. This ecological state consists of native grasses and forbs with a scattered mosaic overstory of Oak trees. The total canopy coverage of tree species is typically 10-30%. Herbaceous community is dominated by sand bluestem and little bluestem.

Resilience management. This reference ecological state has evolved through periods of drought, fire, and grazing. Changes in the frequency and severity of these disturbances have altered the plant communities on many sites.

Dominant plant species

- post oak (*Quercus stellata*), tree
- blackjack oak (*Quercus marilandica*), tree
- skunkbush sumac (*Rhus trilobata*), shrub
- sand bluestem (*Andropogon hallii*), grass
- little bluestem (*Schizachyrium scoparium*), grass
- annual buckwheat (*Eriogonum annuum*), other herbaceous

Community 1.1
Tallgrass Savannah (Reference Community)

This plant community is the representative plant community for this site. The major plants are tallgrasses with a scattered overstory of trees. Big bluestem, Little bluestem, Indiangrass and switchgrass are the dominant grasses. Secondary grasses include purpletop, sand lovegrass, sand dropseed, and Canada wildrye. Post oak, blackjack oak and various hickory species are the major trees. These trees form an overstory canopy averaging 10 to 30% percent across the landscape. This site supports a large number of forbs and legumes that make up the balance of the plant community in various species amounts. Major legumes include leadplant, Virginia tephrosia, and native lespedezas. More abundant forbs are Maximillian sunflower, hairy sunflower, fringeleaf ruellia, dayflower, and several species of goldenrod. Over the years this plant community was maintained by periodic fires and herbivory. The following plant list and production data will be reviewed and amended as necessary throughout this ecological site project as more data is collected and historical data is validated.

Resilience management. This community can be maintained with proper grazing management and periodic fire at a return interval of less than five years.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1780	2535	3100
Tree	590	790	890
Forb	230	325	420
Shrub/Vine	100	150	190
Total	**2700**	**3800**	**4600**

Figure 11. Plant community growth curve (percent production by month). OK0003, Warm season tallgrasses, forbs, and a few woody species.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	6	9	21	24	14	6	11	4	2	1

Community 1.2
Midgrass Savannah

Within this community phase, the more palatable tallgrasses and forbs have decreased. They have been replaced by species such as tall dropseed, silver bluestem, and sideoats grama. The less palatable annual forbs, such as broomweed and western ragweed have increased also. Total herbacious production may remain the same as the reference community, however, the composition has been altered significantly.

Resilience management. As long as fire or alternative brush management is continued, this community may persist.

Pathway 1.1A
Community 1.1 to 1.2

Tallgrass Savannah (Reference Community)

Midgrass Savannah

Continuously grazing above carrying capacity without adequate rest may push the plant community to 1.2 Midgrass Savannah. This pathway may also lead to a reduction in fuel which could also negatively impact the effectiveness of

prescribed fire.

Pathway 1.2
Community 1.2 to 1.1

Midgrass Savannah

Tallgrass Savannah
(Reference Community)

With adequate growing season rest from grazing, the plant community may begin to shift back to phase 1.1. The length of grazing deferment is dependent upon severity of previous grazing events and precipitation patterns.

State 2
Woodland

This vegetative state is composed of an overstory of trees and shrubs that will slowly eliminate most herbaceous vegetation from the plant community if left unchecked.

Characteristics and indicators. The major species are post oak and black jack oak elm and hackberry. Litter has increased due to increased leaf production and often exceeds one inch deep. Herbaceous plants are sparse and limited to shade tolerant species.

Resilience management. There is a high potential for encroachment by eastern redcedar in this ecological state if proper management is not applied. The longer the time since fire, the more mesophication occurs. This process can further hinder restoration to the reference state.

Dominant plant species

- post oak (*Quercus stellata*), tree
- blackjack oak (*Quercus marilandica*), tree
- sugarberry (*Celtis laevigata*), tree
- American elm (*Ulmus americana*), tree
- winged sumac (*Rhus copallinum*), shrub
- skunkbush sumac (*Rhus trilobata*), shrub
- Chickasaw plum (*Prunus angustifolia*), shrub
- sedge (*Carex*), grass
- Canada wildrye (*Elymus canadensis*), grass
- purpletop tridens (*Tridens flavus*), grass

Community 2.1
Tree/Shrub Dominant

This plant community is composed of a moderately closed tree canopy with an understory of tallgrasses and midgrasses. The absence of fire has allowed post oak and blackjack oak to increase in abundance. The overstory tree canopy is closing and now ranges from 50 to 70 percent. The shading and competition for moisture from trees has resulted in a decrease in herbaceous understory plants. Little bluestem is now the dominant grass. Other grasses include big bluestem, Indiangrass, switchgrass, purpletop, purple lovegrass, Scribner’s panicum, Texas bluegrass and Canada wildrye. More abundant legumes are lespedezas, tickclovers, prairieclovers, trailing wildbean and American deervetch. Hairy sunflower, Fendler’s aster, wildbuckwheats, fleabanes and goldenrods are the more common forbs. Shrub species such as buckbrush, smooth sumac, greenbrier, dewberry and vines including poison ivy and Carolina snailseed are common in the understory. To restore the site to near historic conditions would require an extended plan of proper grazing and prescribed burning. Some mechanical or chemical brush control may be needed to facilitate the process.

Community 2.2

Closed Canopy Woodland

This plant community is characterized by oak trees closing the overstory canopy to 70 to 85 percent. Understory vegetation production is greatly reduced and composed almost entirely of shade tolerant grasses, forbs, shrubs and vines. Post oak and blackjack oak are the dominant species. Grasses and grasslike plants are sparse and include Scribner's panicum, Virginia wildrye, sedges, nimblewill muhly, fringeleaf paspalum, little bluestem, broomsedge bluestem and purpletop. Major forbs include goldenrods, pussytoes, fendler's aster, blackeyed susan, snake cotton and showy partridgepea. Woody plants in the understory include greenbrier, buckbrush, dewberry, beautyberry, eastern redcedar and chittamwood. Eastern redcedar is beginning to seriously invade the open areas of the savannah. Forage production for cattle grazing is very limited. Deer, turkey and small mammals utilize this site for cover and will benefit seasonally from acorn and berry production. To restore this community to near historic conditions requires a management plan including herbicide or mechanical brush control treatments, accompanied by a prescribed burning and prescribed grazing. When heavy stands of eastern redcedar or greenbrier occur in the understory a combination of control treatments is required. When the oaks are controlled with herbicides, cedar and greenbrier are released and flourish unless other control measures are employed. As redcedar reaches a height of six feet or more, control usually requires some form of mechanical means. Cedar, six feet or less in height, can often be controlled with fire. In most situations remnant tallgrasses and midgrasses are present in sufficient numbers to provide recovery following brush control treatment. Grazing deferment immediately following treatment application is essential to assure recovery of the desired plants.

Pathway 2.1A
Community 2.1 to 2.2

Without fire or brush management, the woody species will continue to encroach, resulting in a shift to community phase 2.2.

Pathway 2.2A
Community 2.2 to 2.1

Implementation of prescribed fire or brush management can reduce the woody species canopy and shift the plant community back towards 2.1.

State 3
Converted

This state is the result of a change in land use. Native vegetation has been tilled and crops or introduced perennial vegetation has been planted.

Characteristics and indicators. This state is often planted to weeping lovegrass or bermudagrass.

Resilience management. Sites in this state are often maintained as open pasture through mechanical or chemical brush management. Without these measures, woody species may encroach on the site.

Dominant plant species

- Bermudagrass (*Cynodon dactylon*), grass
- weeping lovegrass (*Eragrostis curvula*), grass

Community 3.1
Cropland/Tame Pasture

The deep sand savannah site can support a variety of introduced grasses and commodity crops. Through land clearing and tillage these sight may be quite productive crop or pasture fields. As with any tillage system, proper precaution should be taken to limit soil erosion.

State 4
Eroded

This state is the result of wind erosion over bare soil. These areas are often referred to as blowouts.

Characteristics and indicators. Most of the "A" horizon of the soil profile has been displaced.

Resilience management. The remaining subsoil is very low in fertility. Some native grasses and forbs will persist in this state, however, production is greatly reduced.

Dominant plant species

- threeawn (*Aristida*), grass

Transition T1A
State 1 to 2

If fire is removed from the ecosystem, woody species may encroach and begin to dominate the ecological processes on the site. These processes include the water and nutrient cycling and energy flow. Once this occurs, the site has transitioned to the woodland state.

Constraints to recovery. The threshold for this transition is estimated to occur as the woody species increase beyond 40% canopy cover. Common woody invaders include Eastern Redcedar, Hackberry, and Elm. The longer the time since fire, the more mesophication occurs. This process can further hinder restoration to the reference state.

Transition T1C
State 1 to 3

These sites were sometimes cleared and cultivated by homesteaders in the early 20th century. Once the site is cultivated, soil properties are altered and it transitions to the converted state. These alterations affect soil hydrology, chemistry and biota.

Constraints to recovery. Some may still be in cultivation. However, many have been replanted to bermudagrass or weeping lovegrass for pasture use. Although many communities are quite resilient to disturbance, mechanical soil disturbance greatly alters soil structure, chemistry and biology. Returning to the pre-cultivation state may not be feasible for a long period of time.

Restoration pathway R2A
State 2 to 1

Implementing a brush management plan that includes mechanical thinning and the use of prescribed fire can restore the woodland state to an open canopy savannah state. This removal of woody canopy can allow for the restoration of the hydrology, energy and nutrient flow of the reference state.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

Transition T4A
State 3 to 4

If this ecological site is subjected to soil disturbances such as land clearing, ripping, or plowing that leave large amounts of exposed soil, the site may become very susceptible to water erosion.

Constraints to recovery. Once the "A" horizon has been displace through erosion, this site has transitioned to an Eroded Sate.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Tallgrasses**			715–1400	
	sand bluestem	ANHA	*Andropogon hallii*	670–1130	–
	Indiangrass	SONU2	*Sorghastrum nutans*	110–190	–
	switchgrass	PAVI2	*Panicum virgatum*	75–125	–
2	**Little Bluestem**			740–1260	
	little bluestem	SCSC	*Schizachyrium scoparium*	740–1260	–
3	**Mid/Shortgrasses**			250–430	
	sand lovegrass	ERTR3	*Eragrostis trichodes*	75–125	–
	dropseed	SPORO	*Sporobolus*	60–100	–
	purpletop tridens	TRFL2	*Tridens flavus*	35–65	–
	beaked panicgrass	PAAN	*Panicum anceps*	35–65	–
	tufted lovegrass	ERPEP2	*Eragrostis pectinacea var. pectinacea*	35–65	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	35–65	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	35–65	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–53	–
	cylinder jointtail grass	COCY	*Coelorachis cylindrica*	25–40	–
	splitbeard bluestem	ANTE2	*Andropogon ternarius*	15–25	–
	broomsedge bluestem	ANVI2	*Andropogon virginicus*	15–25	–
	purple threeawn	ARPU9	*Aristida purpurea*	15–25	–
	gummy lovegrass	ERCU	*Eragrostis curtipedicellata*	15–25	–
	red lovegrass	ERSE	*Eragrostis secundiflora*	15–25	–
	tumble lovegrass	ERSE2	*Eragrostis sessilispica*	15–25	–
	hairawn muhly	MUCA2	*Muhlenbergia capillaris*	15–25	–
4	**Cool-Season Grasses**			185–440	
	Virginia wildrye	ELVI3	*Elymus virginicus*	115–190	–
	Texas bluegrass	POAR	*Poa arachnifera*	75–125	–
	Canada wildrye	ELCA4	*Elymus canadensis*	75–125	–
	sedge	CAREX	*Carex*	35–75	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	35–75	–
	flatsedge	CYPER	*Cyperus*	35–65	–
5	**Other Grasses**			7–15	
	nimblewill	MUSC	*Muhlenbergia schreberi*	7–15	–
Forb					
6	**Forbs**			260–450	
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	70–130	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	35–65	–
	hairy sunflower	HEHI2	*Helianthus hirsutus*	35–65	–
	button eryngo	ERYU	*Eryngium yuccifolium*	20–40	

	button eryngo	ERYU	*Eryngium yuccifolium*	20–40	–
	Carruth's sagewort	ARCA14	*Artemisia carruthii*	20–40	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	20–40	–
	butterfly milkweed	ASTU	*Asclepias tuberosa*	20–40	–
	Virginia dayflower	COVI3	*Commelina virginica*	20–40	–
	pale purple coneflower	ECPA	*Echinacea pallida*	20–40	–
	shiny goldenrod	OLNI	*Oligoneuron nitidum*	20–40	–
	stiff goldenrod	OLRI	*Oligoneuron rigidum*	20–40	–
	cobaea beardtongue	PECO4	*Penstemon cobaea*	20–40	–
	queen's-delight	STSY	*Stillingia sylvatica*	20–40	–
	aromatic aster	SYOB	*Symphyotrichum oblongifolium*	20–40	–
	prairie spiderwort	TROC	*Tradescantia occidentalis*	20–40	–
	tenfinger menodora	MEDE	*Menodora decemfida*	20–40	–
	bush morning-glory	IPLE	*Ipomoea leptophylla*	20–40	–
	fringeleaf wild petunia	RUHU	*Ruellia humilis*	20–40	–
	pitcher sage	SAAZG	*Salvia azurea var. grandiflora*	20–40	–
	Texas vervain	VEHA	*Verbena halei*	15–25	–
	hoary verbena	VEST	*Verbena stricta*	15–25	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	15–25	–
	pussytoes	ANTEN	*Antennaria*	15–25	–
	Arkansas dozedaisy	APSK	*Aphanostephus skirrhobasis*	7–13	–
	Virginia threeseed mercury	ACVI	*Acalypha virginica*	7–13	–
	Drummond's snakecotton	FRDR	*Froelichia drummondii*	7–13	–
	plains snakecotton	FRFLC	*Froelichia floridana var. campestris*	7–13	–
	lanceleaf blanketflower	GAAEA	*Gaillardia aestivalis var. aestivalis*	7–13	–
	southwestern bedstraw	GAVI	*Galium virgatum*	7–13	–
	Carolina geranium	GECA5	*Geranium carolinianum*	7–13	–
	spotted sandmat	CHMA15	*Chamaesyce maculata*	7–13	–
	heartsepal buckwheat	ERMU4	*Eriogonum multiflorum*	7–13	–
	redroot buckwheat	ERRA3	*Eriogonum racemosum*	7–13	–
	prairie fleabane	ERST3	*Erigeron strigosus*	7–13	–
	redwhisker clammyweed	PODO3	*Polanisia dodecandra*	7–13	–
	blackeyed Susan	RUHI2	*Rudbeckia hirta*	7–13	–
	standing-cypress	IPRU2	*Ipomopsis rubra*	7–13	–
	hairy pinweed	LEMU3	*Lechea mucronata*	7–13	–
	turk's-cap lily	LISU	*Lilium superbum*	7–13	–
	fourpoint evening primrose	OERH	*Oenothera rhombipetala*	7–13	–
	hairy hawkweed	HILO2	*Hieracium longipilum*	7–13	–
	Texas star	SACA3	*Sabatia campestris*	7–13	–
7	**Legumes**			110–200	
	roundhead lespedeza	LECA8	*Lespedeza capitata*	35–65	–
	white prairie clover	DACA7	*Dalea candida*	35–65	–

	white prairie clover	DACA7	*Dalea candida*	35–65	–
	purple prairie clover	DAPUP	*Dalea purpurea var. purpurea*	35–65	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	35–65	–
	tall lespedeza	LEST5	*Lespedeza stuevei*	35–65	–
	slender lespedeza	LEVI7	*Lespedeza virginica*	35–65	–
	prairie acacia	ACAN	*Acacia angustissima*	35–65	–
	Virginia tephrosia	TEVI	*Tephrosia virginiana*	35–65	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	20–40	–
	Illinois ticktrefoil	DEIL2	*Desmodium illinoense*	20–40	–
	sessileleaf ticktrefoil	DESE	*Desmodium sessilifolium*	20–40	–
	New Jersey tea	CEAM	*Ceanothus americanus*	0–33	–
	plum	PRUNU	*Prunus*	0–33	–
	sumac	RHUS	*Rhus*	0–33	–
	roundleaf snowberry	SYRO	*Symphoricarpos rotundifolius*	0–33	–
	blackberry	RUBUS	*Rubus*	0–25	–
	eastern milkpea	GARE2	*Galactia regularis*	15–25	–
	trailing lespedeza	LEPR	*Lespedeza procumbens*	15–25	–
	Maryland senna	SEMA11	*Senna marilandica*	15–25	–
	yellow puff	NELU2	*Neptunia lutea*	15–25	–
	dwarf chinquapin oak	QUPR	*Quercus prinoides*	0–23	–
	partridge pea	CHFA2	*Chamaecrista fasciculata*	7–13	–
Shrub/Vine					
8	**Shrubs**			100–200	
	eastern redbud	CECA4	*Cercis canadensis*	0–150	–
	American beautyberry	CAAM2	*Callicarpa americana*	50–100	–
	Virginia creeper	PAQU2	*Parthenocissus quinquefolia*	50–100	–
	winged sumac	RHCO	*Rhus copallinum*	50–100	–
	smooth sumac	RHGL	*Rhus glabra*	50–100	–
	skunkbush sumac	RHTR	*Rhus trilobata*	50–100	–
	Carolina rose	ROCA4	*Rosa carolina*	50–100	–
	southern dewberry	RUTR	*Rubus trivialis*	50–100	–
	greenbrier	SMILA2	*Smilax*	50–100	–
	western poison ivy	TORY	*Toxicodendron rydbergii*	50–100	–
	grape	VITIS	*Vitis*	50–100	–
	coralberry	SYOR	*Symphoricarpos orbiculatus*	50–100	–
Tree					
9	**Trees**			650–950	
	post oak	QUST	*Quercus stellata*	460–670	–
	blackjack oak	QUMA3	*Quercus marilandica*	153–225	–
	American elm	ULAM	*Ulmus americana*	23–35	–
	Oklahoma plum	PRGR	*Prunus gracilis*	23–35	–
	black hickory	CATE9	*Carya texana*	23–35	–
	common hackberry	CEOC	*Celtis occidentalis*	23–35	–
	eastern redcedar	JUVI	*Juniperus virginiana*	15–25	–

Table 8. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)

Animal community

This plant community has value for grazing cattle. It also provides cover and food for many species of wildlife including whitetail deer, turkey and bobwhite quail. Coyote, red fox, squirrel, cottontail rabbit, opossum and raccoon are common. Numerous song birds and woodpeckers are found on the site.

Hydrological functions

These upland site may shed some water via runoff during heavy rain events. The presence of good ground cover and deep rooted grasses can help facilitate infiltration and reduce sediment loss. Reduction in ground cover can lead to increased sediment loss during heavy rain events.

Recreational uses

Deep Sand Savannah sites offer scenic opportunities for outdoor recreation including photography, trail rides, camping, and hunting.

Wood products

Wood products include firewood, fence posts and cedar products (mulch and lumber).

Other products

NA

Other information

NA

Inventory data references

Clipping data and other observations on file in the Oklahoma NRCS State Office:
Suite 206
100 USDA
Stillwater, Oklahoma 74074

The original information presented here was derived from field observations of Dr. Jack Eckroat, in the summer of 2007, correlated to office files and old Rangesite Technical Descriptions (1961 USDA/SCS). Species compositions are as complete as possible. Production will vary by species from within years, from year to year, and from site to site.

Type locality

Location 1: Payne County, OK	
General legal description	Payne County, Oklahoma; about 3 miles west and 3 miles south of Yale; 2,200 feet south and 200 feet west of the northeast corner of sec. 3, T. 18 N., R. 5 E

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Contributors

Colin Walden, Soil Survey Region 9, Stillwater, OK
Dr. Jack Eckroat, Grazing Lands Specialist, NRCS, Oklahoma
Harland Dietz, Range Conservationist, NRCS, Oklahoma, (Retired)

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)	Mark Moseley, Harry Fritzler, Steve Glasgow, Jack Eckroat, (CW Edits)
Contact for lead author	100 USDA Suite 206 Stillwater, Oklahoma 74074
Date	04/01/2005
Approved by	Bryan Christensen

Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** There are none on this site due to high infiltration rates

2. **Presence of water flow patterns:** There are none on this site due to high infiltration rates.

3. **Number and height of erosional pedestals or terracettes:** There should not be any evidence of erosional pedestals or terracettes on this site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** There is some variability, but it should average less than 20% bare ground on this site. Bare areas are small and not connected.

5. **Number of gullies and erosion associated with gullies:** None, drainages are represented as natural stable channels; vegetation is common with no signs of erosion.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None, because plants and litter block the wind.

7. **Amount of litter movement (describe size and distance expected to travel):** Very little movement due to water because of high infiltration. Twelve inches maximum, and only with strong storms.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Surface soil is moderately stabilized (Average Stability Score 4.5 or higher). Stability scores based on a minimum of 6 samples tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A horizon 0 to 9 inches; brown fine sandy loam, weak fine granular structure. A2 horizon: 9 to 20 inches; light brown loamy fine sand, single grained; loose. *Refer to specific description for component sampled.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Infiltration and runoff are not affected by any changes in plant community composition and distribution. (Tallgrass/Midgrass dominated with scattered trees/shrubs).

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be**

mistaken for compaction on this site): There is no compaction layer due to sandy soils.

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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: Tallgrasses, Tree, Little Bluestem

    Sub-dominant: Midgrass, Shrubs

    Other: Shortgrasses Forbs Cool-Season Grasses

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** There is some plant mortality and decadence on the perennial grasses, especially in the absence of fire and herbivory, but usually <10%.

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14. **Average percent litter cover (%) and depth (in):** Litter should cover 50-75% of the area between plants with accumulations of <1/2 inch deep.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Normal production is 3,000-5,000 pounds per year.

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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:** No invasive species. Invasives might include: eastern redcedar, annuals and non-natives.

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17. **Perennial plant reproductive capability:** All plants capable of reproducing at least every year.
