USDA Natural Resources
Conservation Service

Ecological site R080AY083OK
Shallow Upland

Last updated: 9/19/2023
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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): 080A–Central Rolling Red Prairies

MLRA 80A is characterized by dark red Permian sandstones or shales that are exposed on gently sloping plains. The dominant soil order in this MLRA is Mollisols. The soils in the area dominantly have a thermic soil temperature regime, an ustic soil moisture regime, and mixed, siliceous, or smectitic mineralogy. They generally are shallow to very deep, are well drained, and generally are loamy or clayey. These plains are dissected by rivers that flow from northwest to southeast. Major rivers of this MLRA include the Chickaskia and Bluff rivers in KS, the Salt Fork, Cimarron, North and South Canadian, Washita, Cache, Red River in OK, and branches of the Wichita River in TX.

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 loamy soils over sandstone. The loamy soils are well suited for herbaceous plant growth, however, shallow depth to bedrock can limit the water holding capacity. Also, the position of these sites on upland ridges and hills can result in shedding of water to lower adjacent sites. The reference state consists of

tallgrass and midgrass species with forbs and very few woody species. Shortgrasses will persist on the areas with the more shallow soils. Historically, a combination of frequent fires and the shallow soils have limited woody plant encroachment on these sites. However, in the absence of fire, these sites are susceptible invasion by Eastern Redcedar.

Associated sites

R080AY080OK	**Shallow Clay Upland** Shallow clay soils over shale.

Similar sites

R080AY080OK	**Shallow Clay Upland** Shallow clay soils over shale.

Table 1. Dominant plant species

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

Physiographic features

This ecological site consists of gently sloping to moderately steep soils on hills. Slopes range from 5 to 25 percent. Surface rock is typically less than 10 percent.

Table 2. Representative physiographic features

Landforms	(1) Upland > Hill
Runoff class	High to very high
Elevation	152–457 m
Slope	2–25%
Aspect	Aspect is not a significant factor

Climatic features

The climate is characterized by moist, cool, springs; hot, often dry summers; mild autumns; and mild to cold winters. Variation in timing and amounts of precipition from year to year is quite common. Drought cycles range from three to five years duration with occasionally longer periods occurring at unpredictable intervals. Above normal rainfall cycles are usually just as random, but shorter in duration.

Table 3. Representative climatic features

Frost-free period (characteristic range)	173-187 days
Freeze-free period (characteristic range)	194-203 days
Precipitation total (characteristic range)	838-940 mm
Frost-free period (actual range)	157-192 days
Freeze-free period (actual range)	191-208 days
Precipitation total (actual range)	813-991 mm
Frost-free period (average)	179 days
Freeze-free period (average)	199 days
Precipitation total (average)	889 mm

Climate stations used

- (1) WATONGA [USC00349364], Watonga, OK
- (2) PAULS VALLEY 4 WSW [USC00346926], Pauls Valley, OK
- (3) ANTHONY [USW00013980], Anthony, KS
- (4) STILLWATER 5 WNW [USW00053927], Stillwater, OK
- (5) OKEENE [USC00346629], Okeene, OK
- (6) WALTERS [USC00349278], Walters, OK
- (7) KINGFISHER [USC00344861], Kingfisher, OK
- (8) JEFFERSON [USC00344573], Medford, OK
- (9) CHEROKEE 4W [USC00341724], Cherokee, OK

Influencing water features

These sites occur in upland positions that are not subject to flooding or wetland influences.

Wetland description

N/A

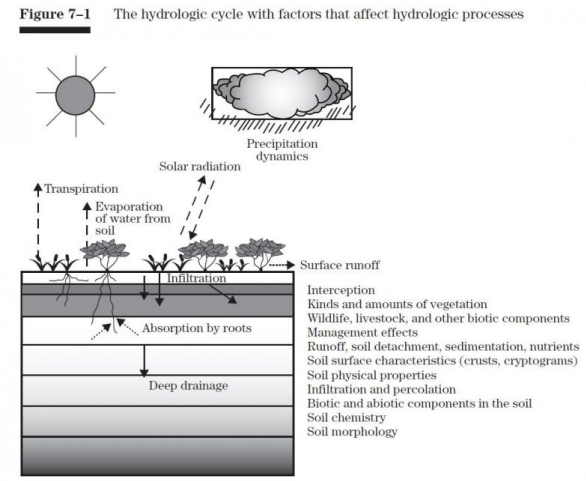


Figure 6.

Soil features

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.

Representative soil components for this site include:
Ironmound & Lucien

The Lucien series consists of shallow, well drained soils on the summits and shoulders of low hills that formed in

material weathered from sandstone, interbedded with clay, siltstone, or sandy shale of Permian age.

The Ironmound series consists of shallow, well drained soils that formed in material weathered from sandstone, or sandstone interbedded with siltstone or shale, of Permian age.

Surface textures range from silt loam to fine sandy loam.

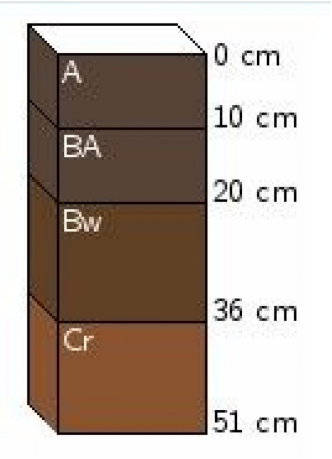


Figure 7.

Table 4. Representative soil features

Parent material	(1) Residuum–sandstone and shale
Surface texture	(1) Loam (2) Silt loam (3) Fine sandy loam
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	25–51 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	2.54–10.16 cm
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6–7
Subsurface fragment volume <=3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0–6%

Ecological dynamics

Like many sites across the Great Plains, this Shallow Upland site evolved under periodic disturbances by fire, drought, and grazing(Frost 1998,Fuhlendorf 2009). The soils are well suited for herbaceous plant growth but are limited by their depth to sandstone bedrock. The shallow soils and run-off upland position make the shallow site susceptible to influence by drought. However, the reference state of this site is very resilient to natural disturbances. Alternative states include a woody encroached state and a converted state.

The reference state is dominated by native warm season tallgrasses and midgrasses. These grass species are tightly intermixed and well distributed over the site. Forbs are abundant. A limited variety of shrubs occur in sparse amounts. This plant community evolved under periodic grazing by large herbivores and a fire frequency of once every two to four years(Frost 1998). Shallow Prairie sites are well suited to grazing by domestic livestock. Soils typically are shallow, ranging from seven to twenty inches in depth over sandstone. In areas where underlying bedrocks are fragmented, roots of perennial grasses have deep penetration and vegetative production is significantly enhanced.

In addition to the reference community, other plant communities can exist on this site and are usually the result of management practices, or lack thereof. After the absence of fire for five or more years, shrub species will usually begin to increase. There are various transitional stages on this site, and transitional stage may result in a stable community for many years. While grazing may not, by itself, lead to an increase in shrubs or shrub canopy cover, it can reduce fuel loads necessary to carry a fire and thus restrict woody plant dominance.

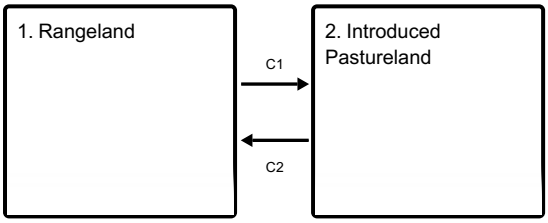
Historically, the focus of conservation efforts has been on proper stocking rates and restoration of the woody encroached sites across the Great Plains. However, new research suggests that a more effective strategy involves addressing woody plants in the seed dispersal stage prior to the change in ecological states. Preserving intact prairie for both agricultural production and ecosystem services must become a priority for land managers and conservationist alike.

State and Transition Diagram:

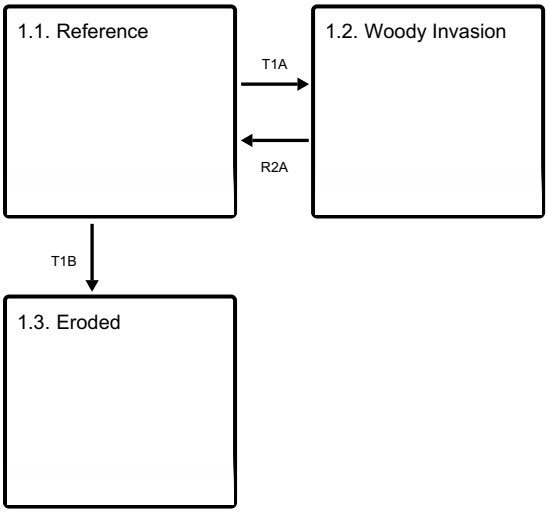
The following diagram suggests some pathways that the vegetation on this site might take. There may be other states not shown on the diagram. This information is intended to show what might happen in a given set of circumstances. It does not mean that this would happen the same way in every instance.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

State and transition model

Land uses

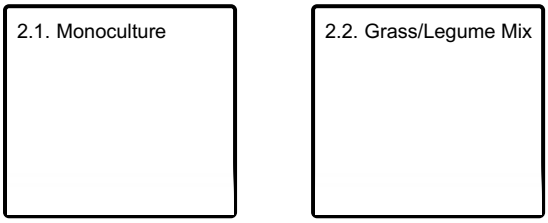


Land use 1 submodel, ecosystem states



State 1 submodel, plant communities

Land use 2 submodel, ecosystem states



Land use 1
Rangeland

This land use is native rangeland. Dominant use is grazing by ruminant livestock.

State 1.1
Reference

The reference state is dominated by native warm season tallgrasses and midgrasses. These grass species are tightly intermixed and well distributed over the site. Forbs are abundant. A limited variety of shrubs occur in sparse amounts. This plant community evolved under periodic grazing by large herbivores and a fire frequency of once every two to four years(Frost). Shallow Upland sites are well suited to grazing by domestic livestock. Soils typically are shallow, ranging from seven to twenty inches in depth over sandstone. In areas where underlying bedrocks are fragmented, roots of perennial grasses have deep penetration and vegetative production is significantly enhanced.

Characteristics and indicators. This state is dominated by native, herbaceous species. The soils are shallow, but intact and show minimal sign of disturbance.

Resilience management. With a fire return interval of less than 4 years and managed grazing that is balanced with the carrying capacity, this state may be maintained as a grassland reference state.

Dominant plant species

- little bluestem (*Schizachyrium scoparium*), grass
- big bluestem (*Andropogon gerardii*), grass

Community 1.1.1
Tallgrass, Midgrass

The reference plant community is dominated by a mixture of big bluestem, little bluestem, Indiangrass and switchgrass. These grasses comprise nearly 70 percent of the vegetation. Secondary grasses include composite dropseed, sideoats grama, bluegrama, hairy grama and Canada wildrye. Following periods of abundant rainfall, broad seeps are common along rock outcrops especially at the base of steeper slopes. Palatable perennial forbs are well represented over the site. These forbs include sensitive-brier, Maximilian sunflower, compassplant, pale purple coneflower, tall blazing star and fringeleaf wild petunia. Yellow sundrops, leadplant and Jersey tea are common. Shrub species including skunkbush sumac, roughleaf dogwood, and flameleaf sumac are usually present in small amounts. The amount of woody species on site is minimized through occasional fires.

Resilience management. Community phase 1.1 is a very resilient system under period, managed disturbance through fire and grazing. With a fire return interval of 3-5 years and grazing management within the carrying capacity, the community can be maintained in phase 1.1.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	2410	3026	4035
Forb	336	448	560
Shrub/Vine	56	112	168
Total	**2802**	**3586**	**4763**

Figure 9. Plant community growth curve (percent production by month). OK0001, Native, Warm Season Grasses. Typically, the summer growing season for warm season grasses begins April 5 to 15 and ends October 15 to 25. Nearly three-fourths of the season production will occur before the first of July. This varies from year to year depending upon temperatures and precipitation..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	5	10	20	30	10	5	10	6	2	1

Community 1.1.2
Midgrass/ Shortgrass

This plant community is dominated by a mixture of midgrasses and increased amount of shortgrass. The dominant midgrass little bluestem, produce 50 - 75 percent of the vegetation on the site. Other midgrasses are composite dropseed, sideoats grama, marsh bristlegrass, and silver bluestem. Shortgrasses make up 10 to 30 percent of the vegetation and include blue grama, buffalograss, hairy grama, Carolina crabgrass, Scribner’s rosette grass, windmill grass and tumblegrass. Many of the more palatable forbs such as Maximilian sunflower and compassplant have decreased significantly in abundance. Forbs that have increased include white heath aster, Missouri goldenrod, Cuman ragweed, slimflower scurfpea, blue wild indigo, and sagewort. The tallgrass species may remain in a state of relatively low vigor when grazing occurs. Annuals common to the site are lanceleaf ragweed, prairie broomweed, prairie threeawn and Japanese brome (introduced). Shrubs, including roughleaf dogwood, buckbrush, blackberry

and flameleaf sumac usually increases in abundance where prescribed burning is not practiced. Prescribed grazing, involving deferment during all or a part of the growing season may revive the vigor and stature of the taller grasses. This type of grazing management, coupled with favorable growing season moisture may restore the vegetation to near reference proportions in two to five years.

Resilience management. With periodic use of prescribed fire and managed grazing that is balanced with carrying capacity, this community phase can be quite resilient and begin to move back towards community 1.1. Without fire, this community is at risk of transitioning to the woody state.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1905	2690	3699
Forb	168	224	448
Shrub/Vine	168	224	336
Total	**2241**	**3138**	**4483**

Figure 11. Plant community growth curve (percent production by month). OK0001, Native, Warm Season Grasses. Typically, the summer growing season for warm season grasses begins April 5 to 15 and ends October 15 to 25. Nearly three-fourths of the season production will occur before the first of July. This varies from year to year depending upon temperatures and precipitation..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	5	10	20	30	10	5	10	6	2	1

Community 1.1.3
Midgrass/Shortgrass

This site has a long history of severe overgrazing by cattle. The plant composition is predominately midgrasses and shortgrasses. Little bluestem, sideoats grama, composite dropseed, western wheatgrass, thin paspalum and sand dropseed are the dominant grasses. Scattered throughout the site are remnants of big bluestem, Indiangrass and switchgrass. Generally, they are in a state of low vigor. Shortgrasses, including hairy grama, blue grama and buffalograss, are common and can comprise up to 30 to 40 percent of the total vegetation. Introduced Japanese brome, along with cheatgrass, sixweeks fescue and little barley are cool season annual grasses prevalent in fall and spring months depending on precipitation patterns. Most of the palatable forbs have been eliminated. They have been replaced by Cuman ragweed, white sagebrush, white heath aster, Missouri goldenrod, slimflower scurfpea, upright prairie coneflower, and Baldwin’s ironweed. With prescribed management this site can be restored to a plant community resembling the reference in fifteen to twenty years. The time period for complete restoration, if possible, is dependent upon the abundance and distribution of the remnant tallgrasses and the level of management applied.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1345	2018	2802
Forb	224	336	560
Shrub/Vine	224	336	448
Total	**1793**	**2690**	**3810**

Figure 13. Plant community growth curve (percent production by month). OK0001, Native, Warm Season Grasses. Typically, the summer growing season for warm season grasses begins April 5 to 15 and ends October 15 to 25. Nearly three-fourths of the season production will occur before the first of July. This varies from year to year depending upon temperatures and precipitation..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	5	10	20	30	10	5	10	6	2	1

Pathway 1.1A
Community 1.1.1 to 1.1.2

Through continuous heavy grazing that exceeds carrying capacity, this plant community may diverge to community phase 1.2. This may also occur under moderate grazing during periods of long term drought.

Pathway 1.2B
Community 1.1.2 to 1.1.1

Through an established prescribed grazing program with proper stocking rates, periodic rest, and adequate soil moisture, this community phase may be restored to the reference community 1.1.

Pathway 1.2A
Community 1.1.2 to 1.1.3

If carrying capacity is exceeded for an extended period of time, the plant community may shift to one that is dominated by less desirable midgrass and shortgrass species. Witthout the use of prescribed fire, woody species may begin to encroach this plant community.

Pathway 1.3A
Community 1.1.3 to 1.1.2

Through the establishment of a prescribed grazing progam that includes extended periods of deferment or "rest" from grazing, this community phase may be reverted to community 1.2. With the accumilation of fine fuels through grazing deferment, a prescribed fire program may be implemented to address the encroaching woody species.

State 1.2
Woody Invasion

In this state, eastern redcedar, mesquite and various shrubs or some other invasive species, has invaded the plant community. Extreme energy input must be introduced to the site to clear the tree and shrub species to return the plant community to state 1. This site still has remnant midgrasses and shortgrasses, but now with a substantial amount of shrubs and trees. Usually, this plant community is the result of long term overgrazing and no fire which encourages an increase of woodies. Midgrasses are little bluestem, composite dropseed, sand dropseed, sideoats grama, purple lovegrass and purpletop tridens. Shortgrasses include blue grama, buffalograss and hairy grama. Remnants of tallgrasses occur throughout the site. Major shrubs are sumac, dogwood, blackberry and buckbrush. Other woody plants include skunkbush sumac, plum, elm, mesquite and easter redcedar. In general, the more abundant perennial forbs have a low grazing preference by livestock. These perennial forbs include goldenrods, mountainmint, Cuman ragweed, green antelopehorn and Baldwin’s ironweed. Annual ragweeds and prairie broomweed are abundant when the site is closely grazed. Prescribed brush control using herbicides and mechanical removal will help drive the community towards plant community towards the grass dominant state. Prescribed burning will provide satisfactory brush control in most cases, however, in some circumstances, due to the mixture of woody species present and their relative susceptibility to different brush control methods, a combination of methods may be required for complete and acceptable brush control. An example of this situation might be the combination of eastern redcedar and sumac. Fire is relatively effective on young redcedar, but not effective on sumac species. This situation will require a prescribed combination of controls. Prescribed grazing, affording periods of deferred grazing during the summer growing season, will be needed to restore overall productivity of the site.

Dominant plant species

- eastern redcedar (*Juniperus virginiana*), tree
- sumac (*Rhus*), shrub
- silver beardgrass (*Bothriochloa laguroides*), grass

State 1.3
Eroded

Once the soil is disturbed and vegetation is removed, these site are prone to soil erosion. Water erosion can leave a devastating impact on these sites due to the shallow soils. It is difficult to predict the vegetation response on these eroded sites. Site specific evaluations are need to access remaining soil resources.

Resilience management. With time, eroded sites may revegetate or be reseeded with native species. While the plant communities can resemble the reference state, the soil physical, chemical, and biological properties may take many years to recover.

Dominant plant species

- threeawn (*Aristida*), grass

Transition T1A
State 1.1 to 1.2

In the absence of fire or other brush management strategies, woody species may begin to encroach on the site. If left unchecked, some woody species will begin to dominate the ecological functions of the site such as nutrient cycling and hydrologic cycle.

Transition T1B
State 1.1 to 1.3

Through soil disturbance with heavy equipment or prior cultivation attempts, the site becomes suscetible to water erosion. The result of this erosion is displacement of the A horizon and transition to the Eroded State.

Restoration pathway R2A
State 1.2 to 1.1

Through the implementation of a prescribed burning program or alternative forms of brush management, the site may be restored to the reference state. Careful grazing management is often required to ensure proper fuel loads and allow for the recovery of herbaceous species.

Land use 2
Introduced Pastureland

While not common, this site is sometimes planted to introduced grasses such as bermudagrass. Primary use is livestock and/or hay production. Often, this land use is managed as a monoculture with little biotic diversity. However, in some cases, forb/legume/grass mixtures are maintained with may increase soil and ecosystem health.

State 2.1
Monoculture

This community consists of a planted monoculture of an introduced pasture grass used predominately for grazing and/or hay production. Adapted species include bermudagrass, old world bluestems, and weeping lovegrass (only on well drained sites). These species require a higher level of management inputs than native rangeland species. Soil tests should be performed prior to planting and or subsequent fertilizer applications. Without persistent nutrient management and proper grazing, some undesired "weedy" species may invade the site. While biodiversity can be beneficial to both plants, animals, and soil, it may be undesirable under certain management systems such as certified hay production. Proper grazing should be planned to allow for adequate residual heights in order to ensure the vigor of the grass. These heights vary by species and grazing system. They can be found in the OK NRCS Prescribed Grazing practice specification. Average yields are listed below as representative for the MLRA. These yields can vary greatly depending on precipitation amount and timing. As with any pasture management program, site specific evaluation and monitoring is essential. Yields are represented AUMs or Animal Unit Months. This represents the amount of dry matter required by one Animal Unit Equivalent for one month. For more on AUEs and

AUMs consult local extension service fact sheets and publications. Keep in mind these yields are estimated under a high level of management which includes annual additions of nitrogen and other nutrients as required. It is important to note that while these introduced species can provide good grazing potential, often wildlife habitat is limited. These species are also known to expand offsite and become invasive in adjacent native ecosystems.

Dominant plant species

- Bermudagrass (*Cynodon dactylon*), grass

State 2.2
Grass/Legume Mix

This community represents a planted mixture of introduced grasses and forbs/legumes. Bermudagrass and introduced clover is the most common pasture mix. Incorporation of a legume into the system can help offset inputs associated with nitrogen additions. Special strategies should be used to ensure the health and vigor of both the cool season legumes and warm season grasses. Yields for these pasture mixes are not available as the mixtures and ratios vary from site to site so yields for a monoculture community should be used as a baseline estimate.

Dominant plant species

- Bermudagrass (*Cynodon dactylon*), grass
- clover (*Trifolium*), other herbaceous

Conversion C1
Land use 1 to 2

With the cultivation and planting of perennial introduced forage grasses, this land use is converted to Introduced Pastureland.

Conversion C2
Land use 2 to 1

This land use conversion is achieved through reseeding native grasses and forbs or allowing native species to repopulate the site by reducing management of introduced species. While the site may be converted back to a rangeland land use, some soil properties and ecological function may not return to pre-disturbance levels.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				897–2018	
	big bluestem	ANGE	*Andropogon gerardii*	807–1311	–
	Indiangrass	SONU2	*Sorghastrum nutans*	224–364	–
	switchgrass	PAVI2	*Panicum virgatum*	179–291	–
2				673–1345	
	little bluestem	SCSC	*Schizachyrium scoparium*	762–1233	–
	composite dropseed	SPCO16	*Sporobolus compositus*	112–560	–
	beaked panicgrass	PAAN	*Panicum anceps*	45–73	–
	Florida paspalum	PAFL4	*Paspalum floridanum*	45–73	–
3				224–560	
	sideoats grama	BOCU	*Bouteloua curtipendula*	179–291	–
	blue grama	BOGR2	*Bouteloua gracilis*	90–146	–

	sand dropseed	SPCR	*Sporobolus cryptandrus*	45–73	–
	white tridens	TRAL2	*Tridens albescens*	45–73	–
	purpletop tridens	TRFL2	*Tridens flavus*	45–73	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	45–73	–
	silver beardgrass	BOLA2	*Bothriochloa laguroides*	45–73	–
	purple lovegrass	ERSP	*Eragrostis spectabilis*	45–73	–
	plains muhly	MUCU3	*Muhlenbergia cuspidata*	45–73	–
	thin paspalum	PASE5	*Paspalum setaceum*	45–73	–
4				90–135	
	sedge	CAREX	*Carex*	45–73	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	45–73	–
	Canada wildrye	ELCA4	*Elymus canadensis*	45–73	–
	Virginia wildrye	ELVI3	*Elymus virginicus*	45–73	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	17–28	–
Forb					
5				168–280	
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	168–291	–
	compassplant	SILA3	*Silphium laciniatum*	168–291	–
	wholeleaf rosinweed	SIIN2	*Silphium integrifolium*	126–219	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	84–146	–
	yellow sundrops	CASE12	*Calylophus serrulatus*	84–146	–
	pale purple coneflower	ECPA	*Echinacea pallida*	84–146	–
	eastern daisy fleabane	ERAN	*Erigeron annuus*	84–146	–
	yellow sundrops	CASE12	*Calylophus serrulatus*	84–146	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	84–146	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	84–146	–
	pale purple coneflower	ECPA	*Echinacea pallida*	84–146	–
	white heath aster	SYER	*Symphyotrichum ericoides*	84–146	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	58–102	–
	Canada goldenrod	SOCA6	*Solidago canadensis*	50–87	–
	tall blazing star	LIAS	*Liatris aspera*	41–73	–
	dotted blazing star	LIPU	*Liatris punctata*	41–73	–
	cobaea beardtongue	PECO4	*Penstemon cobaea*	41–73	–
	narrowleaf mountainmint	PYTE	*Pycnanthemum tenuifolium*	41–73	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	41–73	–
	fringeleaf wild petunia	RUHU	*Ruellia humilis*	41–73	–
	azure blue sage	SAAZ	*Salvia azurea*	41–73	–
	ashy sunflower	HEMO2	*Helianthus mollis*	41–73	–
	prairie spiderwort	TROC	*Tradescantia occidentalis*	41–73	–
	Indian paintbrush	CASTI2	*Castilleja*	41–73	–
	flowering spurge	EUCO10	*Euphorbia corollata*	41–73	–
	hairy sunflower	HEHI2	*Helianthus hirsutus*	41–73	–

	groovestem Indian plantain	ARPL4	*Arnoglossum plantagineum*	41–73	–
	butterfly milkweed	ASTU	*Asclepias tuberosa*	41–73	–
	button eryngo	ERYU	*Eryngium yuccifolium*	41–73	–
	flowering spurge	EUCO10	*Euphorbia corollata*	41–73	–
	Indian paintbrush	CASTI2	*Castilleja*	41–73	–
	groovestem Indian plantain	ARPL4	*Arnoglossum plantagineum*	41–73	–
	butterfly milkweed	ASTU	*Asclepias tuberosa*	41–73	–
6				168–280	
	fourvalve mimosa	MIQU2	*Mimosa quadrivalvis*	112–224	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	84–146	–
	roundhead lespedeza	LECA8	*Lespedeza capitata*	84–146	–
	Virginia tephrosia	TEVI	*Tephrosia virginiana*	56–101	–
	trailing lespedeza	LEPR	*Lespedeza procumbens*	39–73	–
	slender lespedeza	LEVI7	*Lespedeza virginica*	39–73	–
	purple dalea	DALA4	*Dalea lasiathera*	39–73	–
	blue wild indigo	BAAU	*Baptisia australis*	39–73	–
	white prairie clover	DACA7	*Dalea candida*	39–73	–
	purple dalea	DALA4	*Dalea lasiathera*	39–73	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	39–73	–
	silverleaf Indian breadroot	PEAR6	*Pediomelum argophyllum*	22–45	–
	large Indian breadroot	PEES	*Pediomelum esculentum*	22–45	–
	groundplum milkvetch	ASCR2	*Astragalus crassicarpus*	22–45	–
Shrub/Vine					
7				56–112	
	leadplant	AMCA6	*Amorpha canescens*	56–112	–
	Jersey tea	CEHE	*Ceanothus herbaceus*	56–112	–
	roughleaf dogwood	CODR	*Cornus drummondii*	28–56	–
	winged sumac	RHCO	*Rhus copallinum*	28–56	–
	skunkbush sumac	RHTR	*Rhus trilobata*	28–56	–
	eastern poison ivy	TORA2	*Toxicodendron radicans*	28–56	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				796–1569	
	big bluestem	ANGE	*Andropogon gerardii*	637–1255	–
	switchgrass	PAVI2	*Panicum virgatum*	119–235	–
	Indiangrass	SORGH	*Sorghastrum*	119–235	–
2				597–1177	
	little bluestem	SCSC	*Schizachyrium scoparium*	596–1177	–
3				359–706	
	composite dropseed	SPCO16	*Sporobolus compositus*	159–314	–

	compacte dropseed	SPCO10	*Sporobolus compositus*	100–311	
	sideoats grama	BOCU	*Bouteloua curtipendula*	119–235	–
	blue panicum	PAAN4	*Panicum antidotale*	80–157	–
	purpletop tridens	TRFL2	*Tridens flavus*	80–157	–
	thin paspalum	PASE5	*Paspalum setaceum*	55–110	–
	marsh bristlegrass	SEPA10	*Setaria parviflora*	55–110	–
	purple lovegrass	ERSP	*Eragrostis spectabilis*	55–110	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	39–78	–
	silver bluestem	BOSA	*Bothriochloa saccharoides*	39–78	–
4				239–471	
	fall witchgrass	DICO6	*Digitaria cognata*	80–157	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	80–157	–
	tumblegrass	SCPA	*Schedonnardus paniculatus*	55–110	–
	windmill grass	CHLOR	*Chloris*	55–110	–
	prairie threeawn	AROL	*Aristida oligantha*	39–56	–
5				40–78	
	winter bentgrass	AGHY	*Agrostis hyemalis*	39–78	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	39–78	–
	Canada wildrye	ELCA4	*Elymus canadensis*	39–78	–
Forb					
6				168–448	
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	84–224	–
	white heath aster	SYER	*Symphyotrichum ericoides*	84–224	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	84–224	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	84–224	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	84–224	–
	eastern daisy fleabane	ERAN	*Erigeron annuus*	84–224	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	84–224	–
	lespedeza	LESPE	*Lespedeza*	84–224	–
	groovestem Indian plantain	ARPL4	*Arnoglossum plantagineum*	58–157	–
	prairie clover	DALEA	*Dalea*	50–135	–
	prairie broomweed	AMDR	*Amphiachyris dracunculoides*	50–135	–
	pale purple coneflower	ECPA	*Echinacea pallida*	41–112	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	41–112	–
	blue wild indigo	BAAU	*Baptisia australis*	41–112	–
	dotted blazing star	LIPU	*Liatris punctata*	41–112	–
Shrub/Vine					
7				168–336	
	blackberry	RUBUS	*Rubus*	168–336	–
	buckbrush	CECU	*Ceanothus cuneatus*	168–336	–
	roughleaf dogwood	CODR	*Cornus drummondii*	168–336	–
	winged sumac	RHCO	*Rhus copallinum*	168–336	–
	skunkbush sumac	RHTR	*Rhus trilobata*	84–168	–

	skunkbush sumac	RHTR	*Rhus trilobata*	84–168	–
	Jersey tea	CEHE	*Ceanothus herbaceus*	84–168	–
	leadplant	AMCA6	*Amorpha canescens*	84–168	–

Table 10. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Midgrass/Shortgrass**			601–1255	
	composite dropseed	SPCO16	*Sporobolus compositus*	225–471	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	150–314	–
	thin paspalum	PASE5	*Paspalum setaceum*	112–235	–
	western wheatgrass	PASM	*Pascopyrum smithii*	75–157	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	75–157	–
	purpletop tridens	TRFL2	*Tridens flavus*	75–157	–
	purple lovegrass	ERSP	*Eragrostis spectabilis*	75–157	–
	silver bluestem	BOSA	*Bothriochloa saccharoides*	37–78	–
	white tridens	TRAL2	*Tridens albescens*	37–78	–
2	**Tallgrasses**			188–392	
	big bluestem	ANGE	*Andropogon gerardii*	112–235	–
	little bluestem	SCHIZ4	*Schizachyrium*	75–157	–
	Indiangrass	SORGH	*Sorghastrum*	37–78	–
	switchgrass	PAVI2	*Panicum virgatum*	37–78	–
3	**Midgrasses/Shortgrasses**			489–1020	
	blue grama	BOGR2	*Bouteloua gracilis*	225–471	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	150–314	–
	windmill grass	CHLOR	*Chloris*	75–157	–
	fall witchgrass	DICO6	*Digitaria cognata*	75–157	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	75–157	–
	tumblegrass	SCPA	*Schedonnardus paniculatus*	75–157	–
4				75–157	
	prairie threeawn	AROL	*Aristida oligantha*	75–157	–
	cheatgrass	BRTE	*Bromus tectorum*	75–157	–
	little barley	HOPU	*Hordeum pusillum*	75–157	–
Forb					
5				168–448	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	150–381	–
	prairie broomweed	AMDR	*Amphiachyris dracunculoides*	75–191	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	75–191	–
	white heath aster	SYER	*Symphyotrichum ericoides*	75–191	–
	Baldwin's ironweed	VEBA	*Vernonia baldwinii*	37–95	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	37–95	–
	annual ragweed	AMAR2	*Ambrosia artemisiifolia*	37–95	–
	green antelopehorn	ASVI2	*Asclepias viridis*	37–95	–

	snow on the mountain	EUMA8	*Euphorbia marginata*	37–95	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	37–95	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	37–95	–
	blue wild indigo	BAAU	*Baptisia australis*	22–57	–
	Texas goldentop	EUGY	*Euthamia gymnospermoides*	22–57	–
	groundplum milkvetch	ASCR2	*Astragalus crassicarpus*	22–57	–
	hoary verbena	VEST	*Verbena stricta*	22–57	–
	yarrow	ACHIL	*Achillea*	15–38	–
Shrub/Vine					
6				225–437	
	buckbrush	CECU	*Ceanothus cuneatus*	150–291	–
	roughleaf dogwood	CODR	*Cornus drummondii*	150–291	–
	smooth sumac	RHGL	*Rhus glabra*	150–291	–
	pricklypear	OPUNT	*Opuntia*	75–146	–
	American plum	PRAM	*Prunus americana*	75–146	–

Animal community

Domestic livestock and white-tail deer are the dominant grazers and browsers of the site. Various songbirds and small mammals may also find use of these areas. As the site changes towards the woody dominated community, 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

These sites occur on uplands and shed water to adjacent sites lower on the landscape. The presence of deep rooted tallgrasses can help facilitate percolation of water into the soil profile. Minimizing bare ground is very important in reducing soil erosion by water movement.

Recreational uses

Camping, fishing, hunting, hiking, bird watching, horseback riding and many other outdoor recreational practices.

Wood products

There are no significant wood produts from this site.

Other products

N/A

Other information

N/A

Inventory data references

Information presented has been derived from NRCS clipping data, research from Oklahoma State University, field observations and measurements by trained range personnel. Most of the clipping data was gathered by a team consisting of a range conservationist and a soil scientist and was site/soil specific. Yields were taken at the end of the growing season and, as near as possible, were obtained from areas that were un-grazed that year. Clipping data repository is in the NRCS State Office in Stillwater, OK.

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Approval

Bryan Christensen, 9/19/2023

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, Jack Eckroat
Contact for lead author	100 USDA Suite 206, Stillwater, OK 74074 (405)742-1235
Date	05/24/2004
Approved by	Colin Walden
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Very few.

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2. **Presence of water flow patterns:** Few, usually only after high intensity rains.

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3. **Number and height of erosional pedestals or terracettes:** Some, but rarely more than 1 inch depth.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Variable, but should average less than 15%.

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5. **Number of gullies and erosion associated with gullies:** Very few. Stabilized sides and base.

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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):** Less than 12 inches, and usually only after 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 score 5 – 6.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Dark reddish brown 0 – 6 inches. Subangular blocky structure, very hard.

   Refer to specific description for component sampled.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Mid and shortgrass community. Tallgrasses random, occurring in drains and scattered along slopes. Slow permeability and moderate cover can results in high runoff.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None, fine textured, hard soils can be mistaken for compaction.

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Midgrass (little bluestem)

    Sub-dominant: shortgrasses

    Other: tall grasses warm-season perennial forbs shrubs cool season grasses and grasslikes.

    Additional: Midgrass (little bluestem) shortgrasses tall grasses warm-season perennial forbs shrubs cool season grasses and grasslikes.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** There can be some plant loss due to droughty nature of the site, especially after severe drought, but should be less than 10%.

14. **Average percent litter cover (%) and depth (in):** Litter cover should average 40 - 60% at a depth not more than ½ inch. Basal cover around 22%.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Reference production is 2,500-4,250#/acre, annually.

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:** Eastern redcedar with a lack of regular burning. Mesquite in the south.

17. **Perennial plant reproductive capability:** All plants capable of reproducing at least every 2 – 3 years.