Ecological site R080AY091OK
Slickspot

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.

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

The Slickspot ecosite occurs on depressed areas of lighter colored surface soils over compact clay layers. Salinity and sodicity is often high and surface crusting is common. These sites are commonly mapped as complexes within other soils/sites. Salt tolerant vegetation dominates these areas. Due to the nature of the soils, these areas may be particularly sensitive to erosion following soil disturbances.

Associated sites

R080AY056OK	**Loamy Upland** Loamy upland soils. No sodium issues.

Similar sites

R080AY097OK	**Saline Bottomland** Bottomland sites with high salinity
R080AY001OK	**Alkali Bottomland** Sodic areas on bottomlands

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Sporobolus airoides* (2) *Bouteloua gracilis*

Physiographic features

The Slickspot site occurs on level to low slopes on hills and plains. Although slopes are relatively low, from 0 to 3 percent, the nature of the soils can result in accelerated runoff.

Figure 1. Slickspot

Table 2. Representative physiographic features

Landforms	(1) Hills > Hillslope (2) Plains > Hillslope
Runoff class	High to very high
Elevation	260 – 460 m
Slope	0 %
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)	170-190 days
Freeze-free period (characteristic range)	190-200 days
Precipitation total (characteristic range)	840-940 mm
Frost-free period (actual range)	160-190 days

Freeze-free period (actual range)	190-210 days
Precipitation total (actual range)	810-990 mm
Frost-free period (average)	180 days
Freeze-free period (average)	200 days
Precipitation total (average)	890 mm

- (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

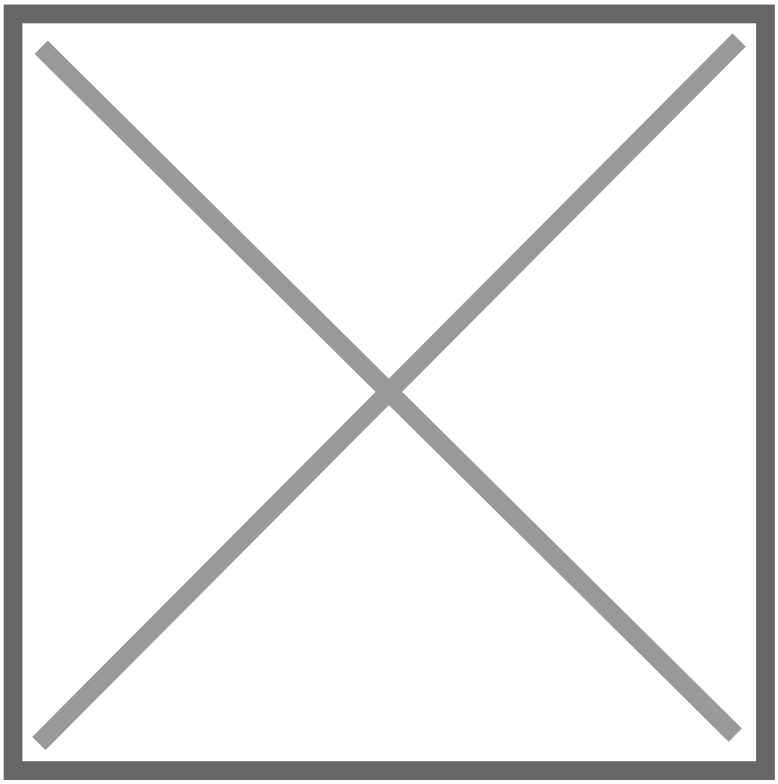

Figure 6.

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:
Huska & Pawhuska

Slickspot soils occur in complexes. These sites are small depressed areas and usually light colored on the surface. Slickspots are easily recognized because of the contrast with adjacent ecological sites. Normally, the surface soil is 2 to 4 inches thick over compact clay. Infiltration is very slow and soil aeration is unfavorable for plant growth. Crusting restricts vegetative yields.

Figure 7. Huska

Table 4. Representative soil features

Parent material	(1) Residuum – sandstone and shale
Surface texture	(1) Loam (2) Silt loam
Drainage class	Moderately well drained
Permeability class	Very slow to slow
Soil depth	100 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	7.62 – 20.32 cm
Electrical conductivity (0-101.6cm)	0 – 10 mmhos/cm

Sodium adsorption ratio (0-101.6cm)	10 – 20
Soil reaction (1:1 water) (0-101.6cm)	10 – 7.5
Subsurface fragment volume <=3" (0-5.1cm)	0 – 10 %

Ecological dynamics

Many sites across the Great Plains, including the Slickspot ecological site evolved with periodic disturbances such as wildfire, drought, and grazing(Frost 1998, Fuhlendorf 2009). The high sodium content makes vegetative growth difficult for most species. The compact clay soils and run-off upland position make the site susceptible to drought. However, the reference state of this site is resilient to natural disturbances. Due to the relatively small size of this site they are often mapped with other sites/soils.

Vegetation on this site can vary due to differences in salt content and the degree of compaction. Vegetation is primarily alkali sacaton, blue grama and buffalograss with various combinations and amounts of sideoats grama, windmillgrass, silver bluestem, tumblegrass, fall witchgrass, gummy lovegrass, and Texas grama (in the south). During extremely cool, wet spring years, prairie threeawn and western ragweed may increase above normal levels. Some Slickspots are so salty and droughty that vegetation will not grow while other Slickspot sites support diverse plant communities.

Historically, the focus of conservation efforts has been on restoring woody encroached sites across the Great Plains. However, new data 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 State and Transition Model suggests pathways vegetation might take depending on how ecological processes are changed. Local professional guidance should always be sought before pursuing a treatment scenario.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1				953-2074	
	alkali sacaton	SPAI	*Sporobolus airoides*	336-1277	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	112-426	–
	blue grama	BOGR2	*Bouteloua gracilis*	112-426	–
	buffalograss	BODA2	*Bouteloua dactyloides*	112-426	–
2				381-1448	
	lovegrass	ERAGR	*Eragrostis*	56-213	–
	silver beardgrass	BOLA2	*Bothriochloa laguroides*	56-213	–
	tumble windmill grass	CHVE2	*Chloris verticillata*	56-213	–
	witchgrass	PACA6	*Panicum capillare*	56-213	–
	field paspalum	PALA10	*Paspalum laeve*	56-213	–
	tumblegrass	SCPA	*Schedonnardus paniculatus*	56-213	–

	saltgrass	DISP	*Distichlis spicata*	11-43	–
	Texas grama	BORI	*Bouteloua rigidiseta*	11-43	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	11-43	–
3				123-469	
	prairie threeawn	AROL	*Aristida oligantha*	45-170	–
	sedge	CAREX	*Carex*	45-170	–
	purple threeawn	ARPUP6	*Aristida purpurea var. purpurea*	11-43	–
Forb					
4				45-170	
	common yarrow	ACMI2	*Achillea millefolium*	45-170	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	45-170	–
	yellowspine thistle	CIOC2	*Cirsium ochrocentrum*	45-170	–
	Texas croton	CRTE4	*Croton texensis*	45-170	–
	dotted blazing star	LIPU	*Liatris punctata*	45-170	–
	white heath aster	SYER	*Symphyotrichum ericoides*	11-45	–
Shrub/Vine					
5				11-43	
	pricklypear	OPUNT	*Opuntia*	11-43	–

Table 6. Community 1.2 plant community composition

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

Table 7. Community 1.3 plant community composition

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

Animal community

This site may have some value to certain wildlife species, however, since they are quite small in scale, habitat quality is dependent on adjacent areas. These areas are usually dominated by species of low grazing value for cattle operations.

Hydrological functions

The Slickspot ecological site gets its name from the fact that it appears to be very dry on the surface, but because it has a compacted clay loam subsoil and permeability class of impermeable to slow, it is usually boggy (slick) just below the surface. Many farmers and ranchers have mistakenly rode, plowed, walked, or driven across one of these areas only to become stuck; hence the name, Slickspot. Infiltration can be very low in the subsurface. Run off is common. Due to the high sodium content, the soils may be dispersive and susceptible to erosion if vegetative cover is removed.

Recreational uses

N/A

Wood products

N/A

Other products

N/A

Other information

N/A

Inventory data references

Data Source: Clipping Data Number of Records: 15 Sample Period: 10/59 – 12/70 State: OK County: Jefferson SCS Range – 417 clipping records These records are filed at the Stillwater, OK State Office and should be available as vegplot data in NASIS.

Type locality

Location 1: Jefferson County, OK

References

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Other references

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Shantz, H. L. (1923). The natural vegetation of the Great Plains region. Annals of the Association of American Geographers, 13(2), 81-107.

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Acknowledgments

Site Development and Testing Plan Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document. Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team.

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be

verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	Harry Fritzler, Steve Glasgow, Jack Eckroat, Mark Moseley
Contact for lead author	
Date	07/01/2005
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** **Due to flatter slopes, there are usually few, if any, rills and there is no active headcutting and sides are covered with vegetation.**

2. **Presence of water flow patterns:** **There is some distinct evidence of soil deposition or erosion, (typically around bunchgrasses); otherwise water generally flows evenly over the entire landscape.**

3. **Number and height of erosional pedestals or terracettes:** **Pedestals are rare, usually not more than 1 inch deep (usually around rocks and bunchgrasses). Terracettes are absent .**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** **These sites are complexes comprised of Loamy Prairie and Claypan Prairie soils with slickspots occupying 10-30% of the area. There should generally be ~10% bare ground. In the more saline portions, bare ground varies due to sodium content, but may be as much as 30%.**

5. **Number of gullies and erosion associated with gullies:** **Rare, due to flatter slopes and sodium content.**

6. **Extent of wind scoured, blowouts and/or depositional areas:** **None.**

7. **Amount of litter movement (describe size and distance expected to travel):** Distribution of litter is variable due to sodium content. If the amount of bare ground is high, then litter movement will be greater. On the average, litter can move ~12-18 inches, then only during high intensity storms.

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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):** Surface soil is stabilized (Stability Score 5-6). Stability scores based on a minimum of 6 samples tested.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A horizon: 0 to 6 inches; brown silt loam, hard and friable with a very abrupt boundary. B horizon: 6 to 50 inches; reddish brown silty clay to yellowish red to red clay, columnar structure to blocky structure, very hard and firm. 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:** Infiltration capacity of this soil is naturally low and runoff is very high. The plant community composition and distribution is a Midgrass and Shortgrass community randomly dispersed. Slowly permeable soils result in high runoff. M

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** There is usually no compaction layer. Fine texture and hard, firm structure can be mistaken for a compaction layer, but this is a natural characteristic.

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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: Midgrasses Shortgrasses

    Sub-dominant: Forbs

    Other: Shrubs Annuals

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Plant mortality and decadence is highly variable on this site due to the droughty nature of the clayey soils, (especially after a severe drought), but will primarily average ~5-10%, especially in the absence of fire and herbivory.

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14. **Average percent litter cover (%) and depth (in):** Litter should cover ~60% of the area between plants with accumulations of up to 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 1000 – 3800 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: mesquite, prickly pear, annuals and non-natives.

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17. **Perennial plant reproductive capability:** All plants capable of reproducing at least every 2 years. Seed stalks, stalk length, and seedheads are numerous and what would be expected. Overall health of plants is what would be expected.
