

Ecological site R080AY011OK Claypan Upland (South)

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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 rocks that are exposed on gently sloping plains. 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. Soils are generally well drained, loamy or clayey deposits overlying Permian sandstones or shales.

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 upland topography and consist of open grasslands. The reference plant community is a mixture of tallgrasses, midgrasses, and forbs. Shrub species also occur and can exceed 10% canopy coverage if prescribed fire is not periodically applied. It can be difficult to find an intact Claypan Upland (S) site as many of them have been farmed to small grains. The site differs from the Loamy Upland site due to the dense clay subsoils (Claypan) and the lower productivity. This site occurs on similar soils as the Claypan Upland (North) ESD. However, it differs in production, plant species, and response to management due to the warmer average temperatures.

Associated sites

R080AY056OK	<p>Loamy Upland</p> <p>Loamy Upland soils. No restrictive claypan</p>
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Similar sites

R080AY010OK	<p>Claypan Upland (North)</p> <p>Similar site in the cooler northern portion of MLRA 80A.</p>
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified

Herbaceous	(1) <i>Schizachyrium scoparium</i> (2) <i>Panicum virgatum</i>
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Physiographic features

Claypan Upland South ecological sites are on deep, nearly level to gently sloping soils on uplands.

Table 2. Representative physiographic features

Landforms	(1) Plains > Hill (2) Alluvial plain remnant > Terrace (3) Plains > Interfluve
Runoff class	High to very high
Elevation	210 – 460 m
Slope	0 – 10 %
Water table depth	110 – 150 cm
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 precipitation 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)	190-190 days
Freeze-free period (characteristic range)	210-220 days
Precipitation total (characteristic range)	810-890 mm
Frost-free period (actual range)	180-200 days
Freeze-free period (actual range)	200-230 days
Precipitation total (actual range)	790-970 mm

Frost-free period (average)	190 days
Freeze-free period (average)	220 days
Precipitation total (average)	860 mm

- (1) LAWTON [USC00345063], Lawton, OK
- (2) WAURIKA [USC00349395], Waurika, OK
- (3) ARCHER CITY 1E [USC00410313], Archer City, TX
- (4) WALTERS [USC00349278], Walters, OK
- (5) PAULS VALLEY 4 WSW [USC00346926], Pauls Valley, OK
- (6) HENRIETTA [USC00414093], Henrietta, TX

Influencing water features

These upland sites are not associated with wetlands or flooding.

Wetland description

NA

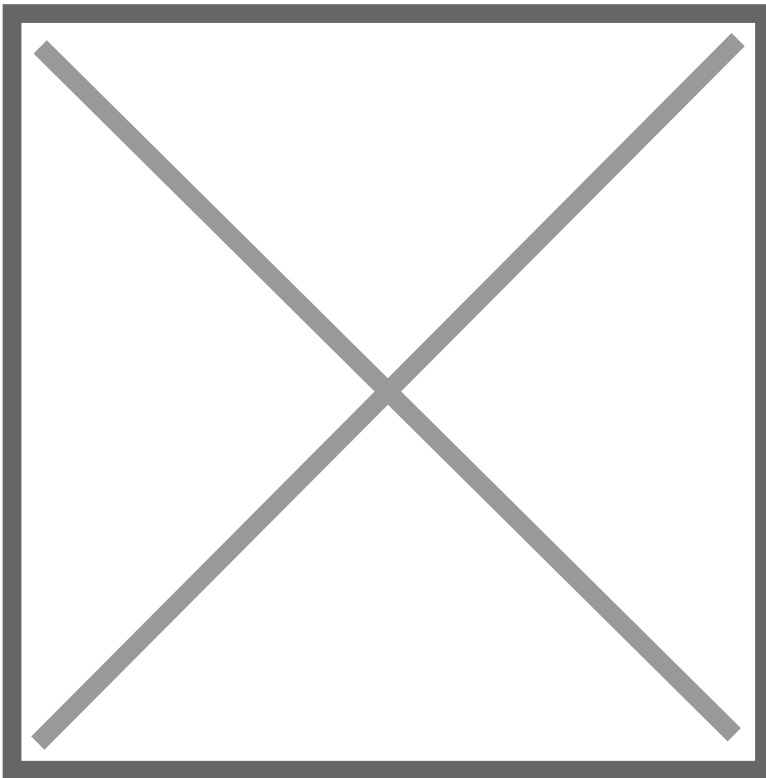


Figure 7.

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:
Agra, Kirkland, Renfrow

These soils have silt to silty clay surfaces with very compact clay subsoils. These subsoils restrict root and moisture penetration and cause poor internal drainage and poor aeration.

Table 4. Representative soil features

Parent material	(1) Residuum – clayey shale
Surface texture	(1) Silt loam (2) Silty clay loam (3) Silty clay
Drainage class	Moderately well drained to well drained
Permeability class	Very slow
Soil depth	160 – 200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	15.24 – 17.27 cm
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	5.6 – 8.4

Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The information contained in the State and Transition Diagram (STD) and the Ecological Site Description was developed using historical data, professional experience, and scientific studies. The information presented is representative of a very complex set of plant communities. Not all scenarios or plants are included. Key indicator plants, animals and ecological processes are described to inform land management decisions.

This site is nearly level to moderately sloping found on divides and upland slopes between natural drains. Soils have a loamy surface layer and loamy or clayey subsoil. The clayey subsoil restricts the penetration of water and roots. Due to the drouthy nature of the site, production is usually not very high. Vegetation recovery is very slow after site deterioration. Mesquite and cedar (*Juniperus* spp.) are the primary woody invaders in MLRA 080 South. Several plant communities can exist on this site. The significant plant communities are:

- 1) Tallgrass/Midgrass
- 2) Midgrass/Shortgrass
- 3) Shortgrass with Mesquite and/or Cedar dominance

State and Transition Diagram:

A State and Transition Diagram for the Clay Upland (South) (R080AY11OK) 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

Figure 8. R080AY011OK

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 4.1 plant community composition

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

This site is excellent for grazing cattle. Quail utilize the site for food and occasional cover. Quail have been observed flying into large colonies of big bluestem and Indiangrass for escape cover. Coyote, badger, skunk, cottontail rabbit and ground squirrels are common. There is some site use by whitetail deer. Long-billed curlew visit the site in late spring and early summer. Hawks, including the red-tailed hawk, Coopers' hawk, Rough-legged hawk, sparrow hawk and marsh hawk utilize this site for hunting prey. The marsh hawk often nests in clumps of tallgrasses.

Hydrological functions

These sites shed water to lower adjacent sites. The presence of good ground cover and perennial grass can help aid water infiltration into the soil.

Recreational uses

NA

Wood products

There are few, if any, wood products derived from this ecological site. There may be occasional wood cut for firewood and fence posts.

Other products

NA

Other information

NA

Inventory data references

These site descriptions were developed as part a Provisional ESD project using historic soil survey manuscripts, available range site descriptions, and low intensity field traverse sampling.

Type locality

Location 1: Stephens County, OK	
Township/Range/Section	T3S R9W S15
General legal description	15-T3S-R9W Waurika WMA

References

. 2021 (Date accessed). **USDA PLANTS Database**. <http://plants.usda.gov>.

Frost, C.C. 1998. Presettlement Fire Frequency Regimes of the United States: A First Approximation. Plant Conservation Program. North Carolina Department of Agriculture and Consumer Services, Raleigh, NC.

Other references

USDA-NRCS (Formerly Soil Conservation Service) Range Site Descriptions (1960s)

USDA-NRCS (Formerly Soil Conservation Service) Ag Handbook 296 (2006)

Contributors

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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. This ESD is in need of an update project to both verify the concepts and validate production numbers. Following the 2015-2020 Provisional ES push, this will be a high priority project for MLRA 80A. 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
Contact for lead author	100 USDA Suite 206 Stillwater, OK 74074
Date	04/01/2005
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** There are 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 evidence of soil deposition or erosion, particularly after significant rain events, but water generally flows evenly over the entire landscape.

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 ~5% 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.

7. **Amount of litter movement (describe size and distance expected to travel):** Uniform distribution of litter. Litter rarely moves >6 inches on flatter slopes and may be as much as doubled on steeper slopes, then only during high intensity 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 stabilized (Stability Score 5 – 6). 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 13 inches; silt loam, clay loam, medium granular structure. Btssl horizon: 13 to 25 inches; reddish brown clay, moderate medium blocky structure. 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 dominated). Any changes in infiltration and runoff can be attributed to other factors (e.g. compaction).

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. Naturally dense subsoil may be mistaken for a compaction layer.

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

Sub-dominant: Midgrasses, Shortgrasses

Other: Forbs, Cool-Season Perennial Grasses, Shrubs

Additional:

- 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 <5%.
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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 .25-1 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 2838-4964 pounds per acre.
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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, bois d'arc, mesquite, 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.
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