Ecological site R080AY001OK
Alkali Bottomland

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 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 along floodplains of streams and tributaries and are often mapped in complexes with other soils/ecological sites. The vegetation may vary depending on the local sodium content and overall salinity of the specific site. Occasionally, these sites may be dominated by Alkali Sacaton Sporobolus airoides, Inland saltgrass Distichlis spicata, or other salt tolerant species. Historically, the reference plant community was dominated by primarily herbaceous plant due to the frequency of fires on the prairie.

Associated sites

R080AY050OK	**Loamy Bottomland** Alkali Bottomland intermingles with Clay and Loamy Bottomland ecological sites. It is difficult to separate these intermingled ecological sites into individual management units.

Similar sites

R080AY091OK	**Slickspot** Slickspot vegetation can vary due to differences in salt content and to the degree of compaction of the clay loam subsoil. Vegetation is primarily alkali sacaton, blue grama and buffalograss along with the various combinations of sideoats grama, windmillgrass, silver bluestem, tumblegrass, fall witchgrass, gummy lovegrass, and Texas grama. During extremely cool, wet spring years, Japanese brome (introduced), prairie threeawn and western ragweed increase to more than normal levels. Some Slickspots are so salty and droughty that vegetation will not grow. Conversely, other sites can support several different plant communities. Slickspots in Comanche county are associated with Hinkle soil series. In other areas of MLRA 80A, Slickspots are associated with Buttermilk, Wing and Drummond soil series.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Sporobolus airoides* (2) *Cleomella angustifolia*

Physiographic features

Nearly level to gently sloping bottomlands that support inland saltgrass, alkali sacaton, and other alkali tolerant plants. Some small areas are barren. Often, the alkali bottomlands are interspersed within more productive loamy bottomland.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Flood plain (2) Alluvial plain > Backswamp (3) Alluvial plain > Terrace
Runoff class	Low to high
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	210 – 460 m
Slope	0 %
Ponding depth	0 cm
Water table depth	90 – 180 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 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.

Data was collected from the El Reno, Chickasha, Wichita Falls, and Anthony climate stations.

Table 3 Representative climatic features

Frost-free period (characteristic range)	190-190 days
Freeze-free period (characteristic range)	200-220 days
Precipitation total (characteristic range)	790-910 mm
Frost-free period (actual range)	180-200 days
Freeze-free period (actual range)	200-230 days
Precipitation total (actual range)	760-940 mm
Frost-free period (average)	190 days
Freeze-free period (average)	210 days
Precipitation total (average)	840 mm

- (1) EL RENO 1 N [USC00342818], El Reno, OK
- (2) CHICKASHA EXP STATION [USC00341750], Chickasha, OK
- (3) WICHITA FALLS MUNI AP [USW00013966], Sheppard AFB, TX
- (4) ANTHONY [USW00013980], Anthony, KS

Influencing water features

Alkali Bottomlands are rarely flooded to frequently flooded. The may receive some run on water from adjacent sites uphill. However, the soil properties on these sites greatly affect hydrological processes.

Wetland description

NA

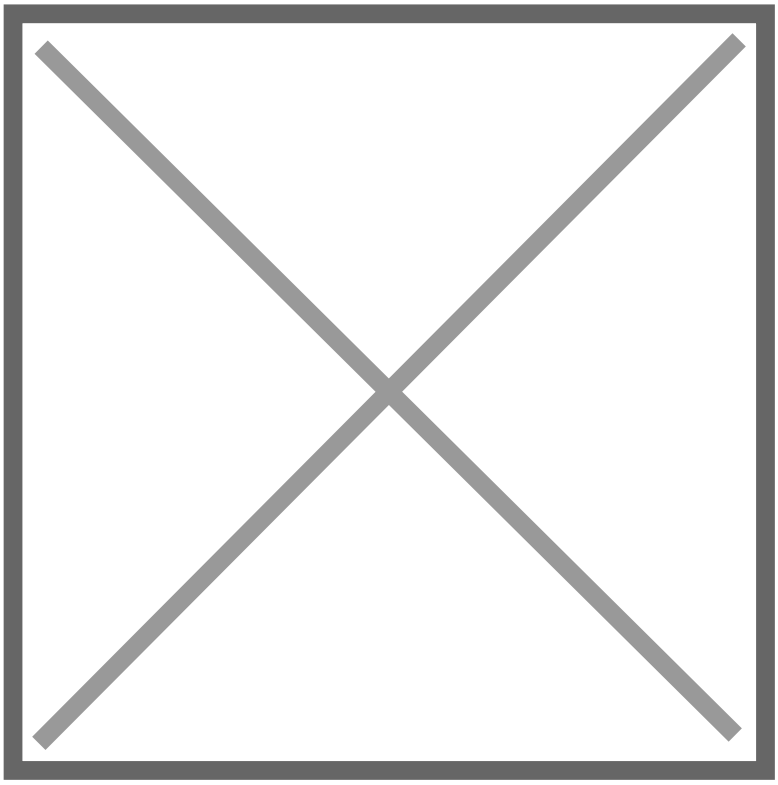

Figure 7.

Soil features

Alkali Bottomland soils are deep alluvial soils with crusty-loamy to clayey surface horizons and dense loamy to clayey subsoils. Subsoil density, combined with surface crusting, results in very slow infiltration. Very slow infiltration results in vegetation lacking subsoil moisture during drouthy periods.

Representative soils:
Drummond, Miller, Oscar and Slickspots.

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone and shale
Surface texture	(1) Clay (2) Loam (3) Silt loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Very slow to slow
Soil depth	150 – 200 cm

Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	7.11 – 15.75 cm
Electrical conductivity (0-101.6cm)	0 – 20 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 80
Soil reaction (1:1 water) (0-101.6cm)	5.6 – 10
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

This ecological site consists of deep, nearly level to very gently sloping soils on flood plains. Concentrations of salts, primarily sodium, along with the compacted subsoils limit vegetation varieties to drought resistant and salt-tolerant plants. Due to extreme variations in salt content, plant presence and vegetation amounts can vary drastically. This site is usually intermingled in complexes with loamy bottomland that has narrow transition zones. These zones will manifest themselves by abrupt changes in vegetation. Nearly bare areas can occur on 10 to 75% of this site.

The most significant plant communities occurring on this site are midgrass/tallgrass alkali sacaton dominated, inland saltgrass dominated and rhombopod dominated. In the mid-south to southern extremities of the MLRA (southern Oklahoma and northern Texas), mesquite may dominate the site.

When this site becomes mesquite or salt cedar dominated, it has crossed a threshold. It will be extremely difficult, and probably economically unfeasible, to return this particular site to the reference state (Everitt, 1980).

STATE AND TRANSITIONAL PATHWAYS (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 will happen the same way in every instance. Local professional guidance should always be sought before pursuing a treatment scenario.

As a site changes in the structure and makeup of the plant community, the changes may be due to management, or to natural occurrences, or both. At some point in time, thresholds may be crossed. This means that once plant community changes have progressed to a certain point, the balance of the community has been altered to the extent that a return to the former state is not possible,

that is, not possible unless some form of outside energy is applied to make it happen. These changes take place on all ecological sites, but some sites support communities that are more resistant to change. Also, some sites are more resilient, that is, they tend to heal or restore themselves more easily. Changes in management practices alone, such as prescribed grazing, will not be sufficient to restore former plant communities. An example of an outside energy input might be the implementation of prescribed chemical brush management to decrease the amount of woody shrubs and increase the amount of grasses and forbs. This shift in plant community balance could not be brought about with prescribed grazing alone. The amount of energy required to bring about a change in the plant community balance may vary a great deal depending on the present plant community state and the desired community state.

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				908-2018	
	alkali sacaton	SPAI	*Sporobolus airoides*	908-2018	–
2				202-448	
	switchgrass	PAVI2	*Panicum virgatum*	202-448	–
	eastern gamagrass	TRDA3	*Tripsacum dactyloides*	202-448	–
3				303-673	
	saltgrass	DISP	*Distichlis spicata*	303-673	–
4				101-224	
	Canada wildrye	ELCA4	*Elymus canadensis*	17-37	–
	vine mesquite	PAOB	*Panicum obtusum*	17-37	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	17-37	–
	white tridens	TRAL2	*Tridens albescens*	17-37	–
	longspike tridens	TRST2	*Tridens strictus*	17-37	–
5				202-448	
	dropseed	SPORO	*Sporobolus*	38-56	–
	pricklypear	OPUNT	*Opuntia*	11-43	–
	prairie threeawn	AROL	*Aristida oligantha*	19-28	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	19-28	–
	blue grama	BOGR2	*Bouteloua gracilis*	19-28	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	19-28	–
	Texas grama	BORI	*Bouteloua rigidiseta*	19-28	–
	silver bluestem	BOSA	*Bothriochloa saccharoides*	19-28	–
	tumble windmill grass	CHVE2	*Chloris verticillata*	19-28	–
	gummy lovegrass	ERCU	*Eragrostis curtipedicellata*	19-28	–
	little barley	HOPU	*Hordeum pusillum*	19-28	–
	tumblegrass	SCPA	*Schedonnardus paniculatus*	19-28	–
	Carrizo Creek globemallow	SPOR	*Sphaeralcea orcuttii*	19-28	–
Forb					
6				202-448	
	narrowleaf rhombopod	CLAN	*Cleomella angustifolia*	202-448	–
7				81-179	
	common yarrow	ACMI2	*Achillea millefolium*	10-22	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	10-22	–

	yellowspine thistle	CIOC2	*Cirsium ochrocentrum*	10-22	–
	Texas croton	CRTE4	*Croton texensis*	10-22	–
	dotted blazing star	LIPU	*Liatris punctata*	10-22	–
	littleleaf sensitive-briar	MIMI22	*Mimosa microphylla*	10-22	–
	white heath aster	SYER	*Symphyotrichum ericoides*	10-22	–
	Baldwin's ironweed	VEBA	*Vernonia baldwinii*	10-22	–
Shrub/Vine					
8				4-9	
	pricklypear	OPUNT	*Opuntia*	4-9	–
Tree					
9				18-36	
	willow baccharis	BASA	*Baccharis salicina*	4-9	–
	black willow	SANI	*Salix nigra*	4-9	–
	American elm	ULAM	*Ulmus americana*	4-9	–

Table 6. Community 1.2 plant community composition

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

Table 7. Community 2.1 plant community composition

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

Table 8. Community 2.2 plant community composition

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

Animal community

Cattle, deer, turkey, quail and various other animals and birds frequent this site. There is grazing plants for cattle, browse for deer, food for quail and birds and cover for all. This site is, however, usually less desirable habitat because of its salinity than the surrounding associated sites. Individual species habitat quality is generally determined by the salinity of the site. There can be a wide variation of desirable habitat present on individual sites for different species. Therefore, Alkali Bottomland animal and bird species habitat quality is site specific .

Hydrological functions

Surface crusting is common. Medium to high runoff is common. Infiltration to lower profiles is usually very poor, therefore long-term drouth resistance is poor.

Wood products

Mesquite is cut for cooking (logs) and, occasionally, heating wood. Mesquite is also commercially processed into mesquite chips that are added to charcoal cookers to add mesquite flavor to foods. There are few other, if any, wood products produced on this site.

Inventory data references

Information presented here has been derived from SCS clipping data done in Jefferson County, Oklahoma in 1959 by Chester Fry, Robert Maples and Phillip Hager, and the field observations of rangeland trained personnel.

References

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

Everitt, B. 1980. Ecology of Saltcedar- A Plea for Research.

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

This site was included in an update project during 2013. A vegetative name was added and PE was dropped. Climate data was also updated and the S&T model was formatted. The concepts and vegatative data contained therein was not altered. The entire ESD will be reviewed, updated, and subjected to the QC/QA processes as part of a future project. CW

Contributors

Dr. Jack Eckroat, Grazing Lands Specialist, NRCS, Oklahoma
John O. Pewthers
Edits by Colin Walden, Soil Survey Region 9

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, Harry Fritzler, Steve Glasgow, Jack Eckroat
Contact for lead author	
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.

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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.

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

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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 bottomland soils with slickspots occupying 10-25% of the area. There should generally be <10% bare ground. In the more saline portions, bare ground varies due to sodium content, but may range from 10% to 50%.

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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.

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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):** 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.

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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 moderately stabilized (Stability Score 4 or greater). 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 5 inches; light brown silt loam, dark brown, weak fine platy structure in the upper part, massive in lower part. Btn horizon: 5 to 12 inches; reddish brown silt clay loam, dark reddish brown, moderate coarse prismatic structure. 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 and runoff are not affected by any changes in plant community composition and distribution. (Midgrass dominated). Any changes in infiltration and runoff can be attributed to other factors (e.g. compaction).

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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 within the surface soil, but a compaction layer can occur in the subsoil,

which can have an impact on water movement, root penetration and plant growth.

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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, Tallgrasses

    Sub-dominant: Shortgrasses, 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):** **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 1800 – 4000 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, salt cedar, annuals and non-natives.**

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17. **Perennial plant reproductive capability:** **All plants capable of reproducing at least every 3 years. Seed stalks, stalk length, and seedheads are numerous and what would be expected. Overall health of plants is what would be expected.**
