

Ecological site R078CY046OK

Saline Bottomland

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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): 078C—Central Rolling Red Plains, Eastern Part

MLRA 78C is characterized by moderately dissected, rolling plains with prominent ridges and valleys and numerous terraces adjacent to dissecting streams. Loamy and clayey soils are generally deep, well drained, and developed in calcareous and gypsiferous sediments of Permian age.

LRU notes

NA

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

This site is in areas of level to slightly depressional floodplains. The soils are very deep, somewhat poorly drained and have a saline subsoil. The reference vegetation includes alkali sacaton, inland saltgrass, and lesser amounts of switchgrass, knotroot bristlegrass, western wheatgrass, and wildrye. The plant community may be highly variable depending on the degree of salinity.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Sporobolus airoides</i> (2) <i>Distichlis spicata</i>

Physiographic features

These sites are on nearly level flood plains of minor drains of the Central Rolling Red Plains (MLRA-78B, 78C). Slope is 0 to 1 percent.

Table 2. Representative physiographic features

Landforms	(1) River valley > Flood plain
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Runoff class	Negligible to high
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	310 – 1,100 m
Slope	0 %
Water table depth	50 – 180 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 78C lies within the subtropical sub-humid climate regime. This regime is characterized by rapid changes in temperature; marked extremes, both daily and annual; and rather erratic rainfall. The weather is alternately influenced by cold dry air from the Arctic Circle, and warm moist air from the Gulf of Mexico.

Seasonal changes are gradual. Spring is a season of variable weather and relatively high precipitation with prevailing winds from the southwest. Summers are generally hot with low humidity. Fall has long periods of pleasant weather interspersed with moderate to heavy rains. Winter is open and moderate to cold with winds from the north and infrequent snows.

Wind speeds average more than eleven miles an hour with prevailing southern winds. Rather strong winds can occur in all months of the year. While strong gusty winds occur, severe dust storms are rare.

Approximately 75 percent of the rainfall occurs during the warm season, and much of it comes in storms of high intensity and short duration in May and June. These rains can be particularly erosive on sites where vegetation is sparse. Occasional droughts are to be expected. Lack of rainfall and hot, dry winds often curtail forage production during July and August.

Table 3 Representative climatic features

Frost-free period (characteristic range)	180-190 days
Freeze-free period (characteristic range)	200-220 days
Precipitation total (characteristic range)	710-790 mm
Frost-free period (actual range)	160-200 days
Freeze-free period (actual range)	200-220 days

Precipitation total (actual range)	710-810 mm
Frost-free period (average)	180 days
Freeze-free period (average)	210 days
Precipitation total (average)	740 mm

- (1) WATONGA [USC00349364], Watonga, OK
- (2) ALTUS IRIG RSCH STN [USC00340179], Elmer, OK
- (3) FREDERICK [USC00343353], Frederick, OK
- (4) WAYNOKA [USC00349404], Waynoka, OK
- (5) VERNON [USC00419346], Vernon, TX

Influencing water features

NA

Wetland description

NA

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:

Beckman & Rups

These soils were formed in calcareous and saline clayey and loamy alluvial deposits. They are very deep, however, vegetation is often sparse due to the high salinity.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silty clay (2) Silty clay loam (3) Clay
Family particle size	(1) Clayey

Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Very slow to moderately rapid
Soil depth	150 – 200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	3.05 – 18.8 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 20 %
Electrical conductivity (0-101.6cm)	0 – 20 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 30
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 10
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 archeological and 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 occurs on predominantly clayey, saline alluvial soils. The species occupying this site may vary greatly depending on the salinity. In the reference state, the dominant vegetation will consist of alkali sacaton (*Sporobolus airoides*) and inland Saltgrass (*Distichlis*

spicata). Other salt tolerant grasses and forbs may also occur on areas of lower salinity.

In many areas, seeds from the honey mesquite tree (*Prosopis glandulosa*) have been introduced and the trees have begun to invade the site. These trees do well on the fine textured soils and are tolerant of the saline soils. Once the mesquite trees have invaded a site, they may be quite difficult to eradicate.

Some areas of this site have been subjected to severe soil disturbance from either farming practices or construction activities. After such disturbance, these areas may be very slow to revegetate due to the salinity of the soils. This can result in a barren landscape for many years.

State and Transition Diagram:

A State and Transition Diagram for the Saline Bottomland (R078CY046OK) site 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 describing 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

Additional community tables

Other references

Unpublished draft ESDs from NRCS.

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

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

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Approval

Bryan Christensen, 9/15/2023

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)	
Contact for lead author	
Date	09/18/2026
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

2. Presence of water flow patterns:

3. Number and height of erosional pedestals or terracettes:

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):

5. Number of gullies and erosion associated with gullies:

6. Extent of wind scoured, blowouts and/or depositional areas:

7. Amount of litter movement (describe size and distance expected to travel):

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):

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:

Sub-dominant:

Other:

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):

14. Average percent litter cover (%) and depth (in):

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):

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:

17. Perennial plant reproductive capability:
