

Ecological site R087BY001TX

Depression

Last updated: 9/21/2023

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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): 087B–Texas Claypan Area, Northern Part

This area is in northeastern Texas (79 percent) and southeastern Oklahoma (21 percent). It makes up about 4,480 square miles (11,610 square kilometers). The towns of Greenville, Sulphur Springs, Paris, Mount Vernon, Canton, and Athens, Texas, and Durant, Oklahoma, are in this MLRA. Interstates 30 and 20 and Highways 69, 70, 80, and 82 cross the area. The Caddo National Grasslands is in the north end of the area.

Classification relationships

USDA-Natural Resources Conservation Service, 2006. -Major Land Resource Area (MLRA) 87B

Ecological site concept

Depressions occur on isolated flats of upland and terraces. Their drainage patterns are poor and result in long periods of water retention. Their vegetation more closely resembles wetter areas as opposed to the surrounding uplands.

Associated sites

R087BY002TX	Claypan Savannah
R087BY003TX	Sandy Loam

Similar sites

F133BY001TX	Depression
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Table 1. Dominant plant species

Tree	(1) <i>Quercus nigra</i> (2) <i>Quercus phellos</i>
Shrub	Not specified

Herbaceous	(1) <i>Carex</i>
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Physiographic features

The landform associated with these sites are closed upland depressions and small drainageways. Slopes range from 0 to 3 percent. The sites are prone to ponding after rainfall events.

Table 2. Representative physiographic features

Landforms	(1) Plains > Depression (2) Plains > Drainageway
Runoff class	Negligible to high
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Occasional to frequent
Elevation	80 – 230 m
Slope	0 %
Ponding depth	0 – 20 cm
Water table depth	0 – 90 cm
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation is 47 inches in most of this area, but it can be higher or lower depending on the exact location. Most of the rainfall occurs in spring and winter. The average annual temperature is 62 to 66 degrees F. The freeze-free period averages 235 days and frost-free period averages 210 days.

Table 3 Representative climatic features

Frost-free period (average)	210 days
Freeze-free period (average)	240 days
Precipitation total (average)	1,190 mm

- (1) BONHAM 3NNE [USC00410923], Bonham, TX
- (2) DENISON DAM [USC00412394], Cartwright, TX
- (3) LAKE FORK RSVR [USC00414976], Quitman, TX
- (4) MT VERNON [USC00416119], Mount Vernon, TX
- (5) DURANT [USC00342678], Durant, OK
- (6) CLARKSVILLE 2NE [USC00411772], Clarksville, TX
- (7) MT PLEASANT [USC00416108], Mount Pleasant, TX
- (8) PARIS [USC00416794], Paris, TX
- (9) BOSWELL 1 S [USC00340980], Boswell, OK
- (10) EMORY [USC00412902], Emory, TX

Influencing water features

This is a wet site receiving water from adjacent sites. It often has a perched water table at or near the surface for much of the year. Sites also pond occasionally to frequently.

Wetland description

The soils are considered hydric, although onsite delineations are required to determine if they meet the definition of a wetland.

Soil features

The Depression site consists of very deep, poorly drained, moderately slowly to very slowly permeable soils. They formed in sandy, loamy, and clayey sediments. The Derly series is correlated to the site with a taxonomic classification of fine, smectitic, thermic Typic Glossaqualf. Leagueville is also correlated to the site with a classification of loamy, siliceous, semiactive, thermic Arenic Paleaquult. Both soils are wet with Derly have more clay content in the soil profile while Leagueville is overall more sandy. Ashford and Porum are also correlated to this site.

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone and shale
Surface texture	(1) Silt loam (2) Loamy fine sand
Family particle size	(1) Loamy
Drainage class	Poorly drained
Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	10.16 – 15.24 cm

Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	3.5 – 7.3
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

This site resembles a wet prairie occupied by a predominance of hydrophytic plants. The dominant herbaceous species include sedges (*Carex* sp.), flatsedges (*Cyperus* sp.), rushes (*Juncus* sp.), and smartweeds (*Polygonum* spp.). Tallgrasses like little bluestem (*Schizachyrium scoparium*) and switchgrass (*Panicum virgatum*) may exist on the outer edges of the site. Woody species such as water oak (*Quercus nigra*), willow oak (*Quercus phellos*), elms (*Ulmus* spp.), wax myrtle (*Morella cerifera*), and eastern baccharis occur on the site. The Depression sites are intermingled and surrounded by upland savannahs, so the structure of this site was probably influenced by the herding and grazing effects of bison and cattle. Wildfires occurring during extreme drought may also have played a role in the maintenance of the savannah landscape.

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 (%)
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Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 3.1 plant community composition

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

The favorable moisture regimes of this site provide conditions that keep plants green and growing during dry summer months and periods of drought. The site is attractive to domestic livestock as well as many species of wildlife including white-tailed deer, bobcat, raccoon, raptors, rodents, song birds, and feral hogs. Animal species use may change as the plant community changes on this site. Livestock have a higher preference for the site in a Savannah State where white-tailed deer and feral hogs may prefer the site in a Woodland State.

Management should be applied to the site to produce the habitat for the species of concern.

Hydrological functions

This site is a closed depression water coming from the adjacent uplands. Ponding may occur for periods throughout the year.

Recreational uses

This site may be used for wildlife viewing or hunting.

Wood products

In the Woodland State, willow oak and water oak could provide timber products for firewood, cross ties, hardwood flooring, and lumber. The wetness of the site make logging and access to the site by log trucks difficult.

Other products

Fruit from blackberries and grapes may be harvested on this site.

Inventory data references

These site descriptions were developed as part a Provisional Ecological Site project using historic soil survey manuscripts, available site descriptions, and low intensity field traverse sampling. Future work to validate the information is needed. This will include field activities to collect low, medium, and high-intensity sampling, soil correlations, and analysis of that data. A final field review, peer review, quality control, and quality assurance review of the will be needed to produce the final document.

Other references

1. Archer, S. 1994. Woody plant encroachment into southwestern grasslands and savannas: rates, patterns and proximate causes. In: Ecological implications of livestock herbivory in the West, pp. 13-68. Edited by M. Vavra, W. Laycock, R. Pieper. Society for Range Management Publication, Denver, CO.
2. Archer, S. and F.E. Smeins. 1991. Ecosystem-level Processes. Chapter 5 in: Grazing Management: An Ecological Perspective. Edited by R.K. Heitschmidt and J.W. Stuth. Timber Press, Portland, OR.
3. Bestelmeyer, B.T., J.R. Brown, K.M. Havstad, R. Alexander, G. Chavez, and J.E. Herrick. 2003. Development and use of state-and-transition models for rangelands. J. Range Manage. 56(2): 114-126.
4. Brown, J.R. and S. Archer. 1999. Shrub invasion of grassland: recruitment is continuous and not regulated by herbaceous biomass or density. Ecology 80(7): 2385-2396.
5. Foster, J.H. 1917. Pre-settlement fire frequency regions of the United States: a first approximation. Tall Timbers Fire Ecology Conference Proceedings No. 20.
6. Gould, F.W. 1975. The Grasses of Texas. Texas A&M University Press, College Station, TX. 653p.
7. Hamilton, W. and D. Ueckert. 2005. Rangeland Woody Plant Control: Past, Present, and Future. Chapter 1 in: Brush Management: Past, Present, and Future. pp. 3-16. Texas A&M University Press.
8. Scifres, C.J. and W.T. Hamilton. 1993. Prescribed Burning for Brush Management: The South Texas Example. Texas A&M University Press, College Station, TX. 245 p.
9. Smeins, F., S. Fuhlendorf, and C. Taylor, Jr. 1997. Environmental and Land Use Changes: A Long Term Perspective. Chapter 1 in: Juniper Symposium 1997, pp. 1-21. Texas Agricultural Experiment Station.
10. Stringham, T.K., W.C. Krueger, and P.L. Shaver. 2001. State and transition modeling: and ecological process approach. J. Range Manage. 56(2):106-113.
11. Texas Agriculture Experiment Station. 2007. Benny Simpson's Texas Native Trees (<http://aggie-horticulture.tamu.edu/ornamentals/natives/>).
12. Texas A&M Research and Extension Center. 2000. Native Plants of South Texas (<http://uvalde.tamu.edu/herbarium/index.html>).
13. Thurow, T.L. 1991. Hydrology and Erosion. Chapter 6 in: Grazing Management: An Ecological Perspective. Edited by R.K. Heitschmidt and J.W. Stuth. Timber Press, Portland, OR.
14. USDA/NRCS Soil Survey Manuals counties within MLRA 8BA.
15. USDA, NRCS. 1997. National Range and Pasture Handbook.
16. USDA, NRCS. 2007. The PLANTS Database (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
17. Vines, R.A. 1984. Trees of Central Texas. University of Texas Press, Austin, TX.
18. Vines, R.A. 1977. Trees of Eastern Texas. University of Texas Press, Austin, TX. 538 p.
19. Wright, H.A. and A.W. Bailey. 1982. Fire Ecology: United States and Southern Canada. John Wiley & Sons, Inc.

Contributors

Approval

Bryan Christensen, 9/21/2023

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	09/17/2026
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:
