

Ecological site R084CY192TX Sandstone Hill 37-43 PZ

Last updated: 9/21/2023
Accessed: 09/23/2026

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): 084C–East Cross Timbers

MLRA 84C is characterized by ridges, hillsides and valleys underlain by interbedded sandstones and shales of Cretaceous age. Most soils support oak savannah vegetation, however much of the area has been subject to fragmentation and urban sprawl.

Classification relationships

This ecological site is correlated to soil components at the Major Land Resource Area (MLRA) level which is further described in USDA AgHandbook 296.

Ecological site concept

These sites occur on shallow soils over hard sandstone. The reference vegetation includes a mosaic of mid and tallgrasses and oak trees with various forbs and legumes. Without periodic fire or brush management, woody canopy cover will increase and lead to a significant shift in the plant community. Production is often limited by the shallow soil resources.

Associated sites

R084CY195TX	Tight Sandy Loam 37-43 PZ Savannah site with clayey subsoils.
-------------	---

Similar sites

R084AY088OK	Shallow Savannah Similar site in Northern Cross Timbers.
-------------	--

Table 1. Dominant plant species

Tree	(1) <i>Quercus marilandica</i> (2) <i>Quercus stellata</i>
Shrub	Not specified
Herbaceous	(1) <i>Schizachyrium scoparium</i>

Physiographic features

This site occurs on crests, nose slopes, and side slopes of hillslopes in the East Cross Timbers MLRA. This site is characteristically a water shedding site. Slopes are typically less than 20 percent.

Table 2. Representative physiographic features

Landforms	(1) Hills > Hillslope (2) Hills > Ridge
Runoff class	High to very high
Elevation	120 – 310 m
Slope	10 – 20 %
Aspect	Aspect is not a significant factor

Climatic features

The climate is subhumid subtropical and is characterized by hot summers and relatively mild winters. Tropical maritime air controls the climate during spring, summer and fall. In winter and early spring, frequent surges of polar Canadian air cause sudden drops in temperatures and add considerable variety to the daily weather. The average first frost should occur around November 5 and the last freeze of the season should occur around March 19.

The average relative humidity in mid-afternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 75 percent of the time possible during the summer and 50 percent in winter. The prevailing wind direction is from the south and highest wind speeds occur during the spring months.

Approximately two-thirds of annual rainfall occurs during the April to September period. Rainfall during this period generally falls during thunderstorms, and fairly large amounts of rain may fall in a short time. The driest months are usually July and August.

Table 3 Representative climatic features

Frost-free period (characteristic range)	200-220 days
Freeze-free period (characteristic range)	230-250 days
Precipitation total (characteristic range)	940-1,040 mm
Frost-free period (actual range)	200-220 days
Freeze-free period (actual range)	220-260 days
Precipitation total (actual range)	910-1,090 mm
Frost-free period (average)	210 days

Freeze-free period (average)	240 days
Precipitation total (average)	990 mm

- (1) ARLINGTON SIX FLAGS [USC00410337], Arlington, TX
- (2) GAINESVILLE 5 ENE [USC00413420], Gainesville, TX
- (3) GRAPEVINE DAM [USC00413691], Grapevine, TX
- (4) PILOT POINT ISL DU BOI [USC00417028], Pilot Point, TX
- (5) DALLAS FT WORTH AP [USW00003927], Dallas, TX
- (6) DENISON DAM [USC00412394], Cartwright, TX
- (7) WHITNEY DAM [USC00419715], Clifton, TX
- (8) BURLESON [USC00411246], Burleson, TX
- (9) CLEBURNE [USC00411800], Cleburne, TX
- (10) DENTON 2 SE [USC00412404], Denton, TX
- (11) HILLSBORO [USC00414182], Hillsboro, TX

Influencing water features

These upland sites may shed some water via runoff during heavy rain events. The presence of good ground cover and deep rooted grasses can help facilitate infiltration and reduce sediment loss.

Wetland description

NA

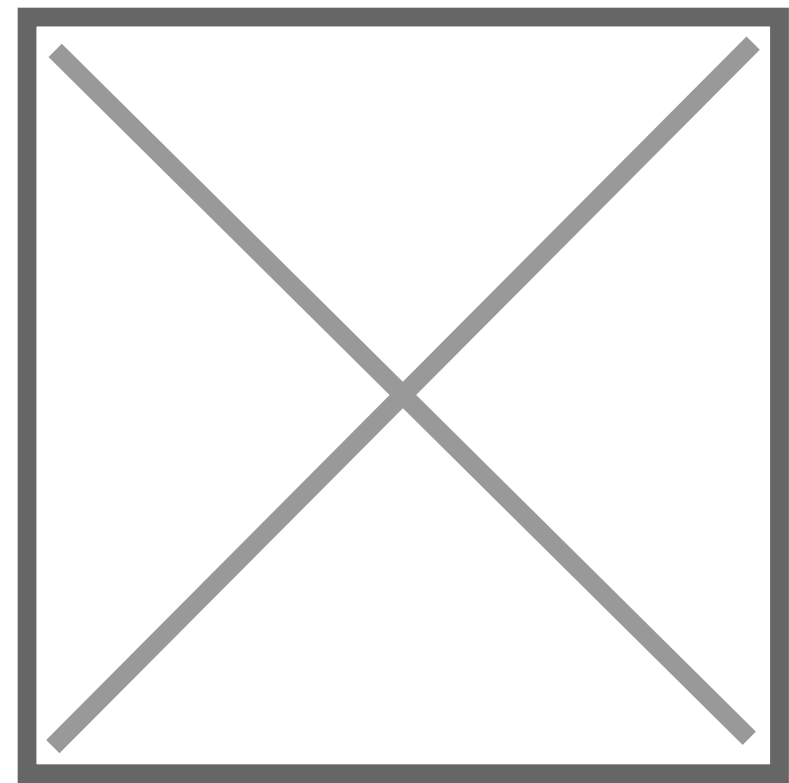


Figure 7.

Soil features

Representative soil components for this ecological site include: Rayex

The site is characterized by shallow, slightly gravelly to stony, acid soils with low water holding capacity.

Table 4. Representative soil features

Parent material	(1) Residuum – sandstone and shale
Surface texture	(1) Stony, gravelly, gravelly fine sandy loam
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	30 – 50 cm
Surface fragment cover $\leq 3"$	0 – 20 %
Surface fragment cover $> 3"$	0 – 10 %
Available water capacity (0-101.6cm)	2.54 – 5.08 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	4.5 – 7.3
Subsurface fragment volume $\leq 3"$ (Depth not specified)	0 – 30 %
Subsurface fragment volume $> 3"$ (Depth not specified)	0 – 20 %

Ecological dynamics

Like many sites across the Great Plains, changes in disturbance initiated by permanent settlements has had a profound impact on the ecological dynamics of the Sandstone Hill ecological site. Historically, the site was influenced by periodic fires during all seasons of growth. These fires were often the result of dry lightning strikes or anthropogenic fires set by Native Americans. The fire frequency during the period prior to settlement is estimated between 2 to 5 years for the southern Great Plains. These frequent fires were often followed by grazing of migratory bison herds attracted to the new growth of grass. This led to a shifting mosaic between burned and grazed and unburned and ungrazed landscapes.

With the removal if fire and the introduction of conventional livestock fencing, the landscape began to change to more homogeneous vegetation patterns and altered plant communities. Gently sloping sites were often broken out for crop production also. This led to a highly fragmented, highly disturbed landscape we see today across much of MLRA 84C.

While parts of the MLRA are still intact prairie, they often lack the evolutionary fire and grazing interactions that help shape the historic reference plant communities.

State and Transitional Pathways:

The following diagram suggests some pathways that vegetation on the ecological site might take in response to various treatments or natural stimuli over time. There may be other states that are not shown on this diagram. This information identifies the changes in plant communities that occur due to management practices and natural factors. The plant communities described here are commonly observed on this ecological site. The local NRCS field office has information available to assist with planning and development of the plant community for specific purposes.

Changes in plant community makeup may be due to many factors. Change may occur slowly or in some cases, fairly rapidly. As vegetative changes occur, certain thresholds are crossed. A threshold means that once a certain point is reached during the transition of one community to another, a return to the previous state may not be possible without the input of some form of energy. This often means intervention with practices that are not part of natural processes. An example might be the application of herbicide to control some woody species to reduce their population and encourage more grass and forbs growth. Merely adjusting grazing practices would probably not accomplish any significant change in a plant community once certain thresholds are crossed. The amount of energy required to effect change in community would depend on the present vegetative state and the desired change.

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 (%)
-------	-------------	--------	-----------------	----------------------	------------------

Animal community

Domestic livestock and white-tail deer are the dominant grazers and browsers of the site. Various songbirds and small mammals may also find use of these areas. As the site changes towards the woody dominated community, the quality of the habitat may improve for some species and decline for others. Management must be applied to maintain a vegetative state in optimum habitat quality for the desired animal species.

Hydrological functions

These sites occur on upland and shed water to adjacent sites lower on the landscape. Due to the coarse textured soils, infiltration should be fairly rapid depending on total overstory canopy. Some sites may also receive some run-on water. The presence of deep rooted tallgrasses can help facilitate percolation of water into the soil profile.

Recreational uses

NA

Wood products

NA

Other products

NA

Other information

NA

Inventory data references

Soil Survey Manuscript Tarrant County, TX Soil Survey Manuscript Denton County, TX

References

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

Other 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.

Contributors

Colin Walden, Soil Survey Region 9

Approval

Bryan Christensen, 9/21/2023

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, and 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	09/23/2026
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:
