

Ecological site R087AY005TX

Sandy Loam

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): 087A–Texas Claypan Area, Southern Part

This area is entirely in south-central Texas. It makes up about 10,535 square miles (27,295 square kilometers). The towns of Bastrop, Bryan, Centerville, College Station, Ennis, Fairfield, Franklin, Giddings, Gonzales, Groesbeck, La Grange, Madisonville, and Rockdale are in this MLRA. Interstate 45 crosses the northern part of the area, and Interstate 10 crosses the southern part. A number of State Parks are located throughout this area. The parks are commonly associated with reservoirs.

Classification relationships

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

Ecological site concept

The Sandy Loam site are upland sites with sandy surface soils over loamy subsoils. The surface soils are usually less than 10 inches deep. The site is one of most vegetatively productive uplands sites in the MLRA.

Associated sites

R087AY002TX	Sandstone Hill Sandstone Hill
R087AY003TX	Claypan Savannah Claypan Savannah
R087AY006TX	Sandy Sandy
R087AY011TX	Loamy Bottomland Loamy Bottomland
R087AY012TX	Clayey Bottomland Clayey Bottomland

Similar sites

R087AY003TX	Claypan Savannah Claypan Savannah
R087AY004TX	Deep Redland Deep Redland
R087BY003TX	Sandy Loam Different MLRA.

Table 1. Dominant plant species

Tree	(1) <i>Quercus stellata</i> (2) <i>Ulmus alata</i>
Shrub	(1) <i>Ilex vomitoria</i> (2) <i>Callicarpa americana</i>
Herbaceous	(1) <i>Schizachyrium scoparium</i> (2) <i>Sorghastrum nutans</i>

Physiographic features

The topography of this site is nearly level to undulating with slopes ranging from 0 to 15 percent, but are mainly 1 to 8 percent.

Table 2. Representative physiographic features

Landforms	(1) Plains > Stream terrace (2) Plains > Ridge
Runoff class	Low to very high
Flooding frequency	None
Ponding frequency	None
Elevation	60 – 230 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	Not specified
Slope	0 – 20 %

Climatic features

The climate for MLRA 87A is humid subtropical and is characterized by hot summers, especially in July and August, and relatively mild winters. The summer months have little variation in day-to-day weather except for occasional thunderstorms that dissipate the afternoon heat. The moderate temperatures in spring and fall are characterized by long periods of mild days and cool nights. The average annual precipitation in this area is 41 inches. Most of the rainfall occurs in spring and fall. The freeze-free period averages about 276 days and the frost-free period 241 days.

Table 4 Representative climatic features

Frost-free period (average)	240 days
Freeze-free period (average)	280 days
Precipitation total (average)	1,040 mm

- (1) LA GRANGE [USC00414903], La Grange, TX
- (2) MADISONVILLE [USC00415477], Madisonville, TX
- (3) SMITHVILLE [USC00418415], Smithville, TX
- (4) FAIRFIELD 3W [USC00413047], Fairfield, TX
- (5) COLLEGE STN [USW00003904], College Station, TX
- (6) BARDWELL DAM [USC00410518], Ennis, TX
- (7) CROCKETT [USC00412114], Crockett, TX
- (8) ELGIN [USC00412820], Elgin, TX
- (9) SOMERVILLE DAM [USC00418446], Somerville, TX
- (10) FRANKLIN [USC00413321], Franklin, TX
- (11) BELLVILLE 6NNE [USC00410655], Bellville, TX
- (12) GONZALES 1N [USC00413622], Gonzales, TX

Influencing water features

The plant community of this site is not influenced by a stream.

Wetland description

Wetlands are not associated with this site.

Soil features

The soils are moderately deep to very deep fine sandy loams and loamy fine sands with a minimum thickness of 10 inches. The sandy surface is underlain by clay, clay loam, or sandy clay loam subsoil. Moisture from light showers is readily absorbed by the surface soil, and the subsoil takes in water moderately well. Fertility and water holding capacity are moderate in the surface and high in the subsoil. Air, water, and plant roots move through the soil readily. The soils give up water generously to growing plants. Surface crusts, slower water intake, and increased runoff are characteristics of the soils in a deteriorated condition. Soils correlated to this site include: Alum, Bastrop, Bigbrown, Blum, variant, Chaney, Chazos, Chickasha, Dubina, Freestone, Garcitas, Gasil, Gause, Gholson, Gibbonscreek, Gibbonscreek, variant, Gredge, Groesbeck, Hammond, Hearne, Inez, Jedd, Konawa, Lavender, Marquez, Menard, variant, Minerva, Minwells, Personville, Rader, Rosanky, Rutersville, Shiro, Silawa, Smithville, Spiller, Straber, Tabor, Travis, and Windthorst.

Table 5. Representative soil features

Parent material	(1) Residuum – sandstone and shale (2) Alluvium – mudstone
Surface texture	(1) Fine sandy loam (2) Loamy fine sand (3) Very fine sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to very slow
Soil depth	80 – 200 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	7.62 – 15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified

Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	4.5 – 7.8
Subsurface fragment volume <=3" (Depth not specified)	0 – 20 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

Ecological dynamics

The sandy loam site evolved and was maintained by the grazing and herding of native wild large ungulates, periodic fires, and climatic fluctuations. Conversion of this site to cropland and the subsequent abandonment of cropping removed the native vegetation, organic matter and fertility, and allowed woody species to dominate the site. Continuous grazing by domestic livestock and the suppression of fire on non-cropland sites removes little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), and preferred forbs such as Engelmann daisy (*Engelmannia pinnatifida*) and gayfeather (*Liatris* spp.). Less productive perennial grasses, annual grasses, and forbs will replace these plants. Years of continuous grazing generally lead to periods of prolonged rest or recovery of the perennial herbaceous plant component. These prolonged rest periods with no fire or brush management lead toward a community dominated by woody species such as winged elm (*Ulmus alata*), eastern persimmon (*Diospyros virginiana*), mesquite (*Prosopis glandulosa*), yaupon (*Ilex vomitoria*), post oak (*Quercus stellata*), and eastern red cedar (*Juniperus virginiana*).

State and transition model

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Tallgrass			1569-2466	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	1569-2466	–
2	Tallgrasses			785-1233	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	785-1233	–
	Florida paspalum	PAFL4	<i>Paspalum floridanum</i>	785-1233	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	785-1233	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	785-1233	–
3	Midgrasses			471-740	
	silver beardgrass	BOLAT	<i>Bothriochloa laguroides</i> ssp. <i>torreyana</i>	471-740	–
	longleaf woodoats	CHSE2	<i>Chasmanthium sessiliflorum</i>	471-740	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	471-740	–
	beaked panicgrass	PAAN	<i>Panicum anceps</i>	471-740	–
	brownseed paspalum	PAPL3	<i>Paspalum plicatulum</i>	471-740	–
	composite dropseed	SPCOC2	<i>Sporobolus compositus</i> var. <i>compositus</i>	471-740	–
	purpletop tridens	TRFL2	<i>Tridens flavus</i>	471-740	–
4	Shortgrasses			314-493	

	arrowfeather threeawn	ARPU8	<i>Aristida purpurascens</i>	314-493	–
	sedge	CAREX	<i>Carex</i>	314-493	–
	fall witchgrass	DICO6	<i>Digitaria cognata</i>	314-493	–
	plains lovegrass	ERIN	<i>Eragrostis intermedia</i>	314-493	–
	Hall's panicgrass	PAHA	<i>Panicum hallii</i>	314-493	–
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	314-493	–
Forb					
5	Forbs			196-308	
	Illinois bundleflower	DEIL	<i>Desmanthus illinoensis</i>	196-308	–
	ticktrefoil	DESMO	<i>Desmodium</i>	196-308	–
	Engelmann's daisy	ENPE4	<i>Engelmannia peristenia</i>	196-308	–
	lespedeza	LESPE	<i>Lespedeza</i>	196-308	–
	pinkscale blazing star	LIEL	<i>Liatris elegans</i>	196-308	–
	littleleaf sensitive-briar	MIMI22	<i>Mimosa microphylla</i>	196-308	–
	yellow puff	NELU2	<i>Neptunia lutea</i>	196-308	–
	prairie snoutbean	RHLA5	<i>Rhynchosia latifolia</i>	196-308	–
	fuzzybean	STROP	<i>Strophostyles</i>	196-308	–
	multibloom hoarypea	TEON	<i>Tephrosia onobrychoides</i>	196-308	–
	prairie spiderwort	TROC	<i>Tradescantia occidentalis</i>	196-308	–
	Atlantic pigeonwings	CLMA4	<i>Clitoria mariana</i>	196-308	–
	Virginia dayflower	COVI3	<i>Commelina virginica</i>	196-308	–
	croton	CROTO	<i>Croton</i>	0-17	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0-17	–
	partridge pea	CHFA2	<i>Chamaecrista fasciculata</i>	0-17	–
Shrub/Vine					
6	Shrubs/Vines			196-308	
	Alabama supplejack	BESC	<i>Berchemia scandens</i>	196-308	–
	American beautyberry	CAAM2	<i>Callicarpa americana</i>	196-308	–
	parsley hawthorn	CRMA5	<i>Crataegus marshallii</i>	196-308	–
	yaupon	ILVO	<i>Ilex vomitoria</i>	196-308	–
	winged sumac	RHCO	<i>Rhus copallinum</i>	196-308	–
	southern dewberry	RUTR	<i>Rubus trivialis</i>	196-308	–
	cat greenbrier	SMGL	<i>Smilax glauca</i>	196-308	–
	muscadine	VIRO3	<i>Vitis rotundifolia</i>	196-308	–
Tree					
7	Trees			392-616	
	black hickory	CATE9	<i>Carya texana</i>	392-616	–
	blackjack oak	QUMA3	<i>Quercus marilandica</i>	392-616	–
	water oak	QUNI	<i>Quercus nigra</i>	392-616	–
	post oak	QUST	<i>Quercus stellata</i>	392-616	–
	gum bully	SILAL3	<i>Sideroxylon lanuginosum ssp. lanuginosum</i>	392-616	–
	winged elm	ULAL	<i>Ulmus alata</i>	392-616	–
	Alabama supplejack	BESC	<i>Berchemia scandens</i>	196-308	–
	American beautyberry	CAAM2	<i>Callicarpa americana</i>	196-308	–
	parsley hawthorn	CRMA5	<i>Crataegus marshallii</i>	196-308	–
	yaupon	ILVO	<i>Ilex vomitoria</i>	196-308	–

	winged sumac	RHCO	<i>Rhus copallinum</i>	196-308	–
	southern dewberry	RUTR	<i>Rubus trivialis</i>	196-308	–
	cat greenbrier	SMGL	<i>Smilax glauca</i>	196-308	–
	muscadine	VIRO3	<i>Vitis rotundifolia</i>	196-308	–

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

The historic savannah provided habitat to bison, deer, turkey, migratory birds and large predators such as wolves, coyotes, mountain lions, and black bear. White-tailed deer, turkey, coyotes, bobcats, and resident and migratory birds find suitable habitat in these savannahs today. Domestic livestock and exotic ungulates are the dominant grazers and browsers of this site. As the savannah transitions through the various vegetative states towards oak woodlands, 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

Peak rainfall periods occur in May and June from frontal passage thunderstorms and in September and October from tropical weather systems as well as frontal passages. Rainfall amounts may be high (three to five inches per event) and events may be intense. The site is subject to erosion where adequate herbaceous cover is not maintained and on heavy use areas such as roads and livestock trails. Extended periods (60 days) of little to no rainfall during the growing season are common. The hydrology of this site may be manipulated through management to yield higher runoff volumes or greater infiltration to groundwater. Management for less herbaceous cover will favor higher surface runoff while dense herbaceous cover and litter will favor ground water recharge. Potential pollution from sediment, pesticides, and both organic and inorganic fertilizers should always be considered when managing for higher volumes of surface runoff.

Recreational uses

Hunting, hiking, camping, equestrian, bird watching, and off road vehicle use such as atv, dirt bikes, and mountain biking are common activities.

Wood products

Oaks are used for firewood. Hickory and mesquite are used for barbecue wood. Eastern red cedar is used for posts. Yaupon is used for landscaping.

Other products

Fruits from dewberries, grapes, and plums are harvested.

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 87A.

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

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Approval

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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)	Mike Stellbauer, David Polk, and Bill Deauman
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Date	06/08/2004
Approved by	
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production
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Indicators

- 1. Number and extent of rills:** None.

- 2. Presence of water flow patterns:** Some water flow patterns may be present on this site due to landscape position and slopes.

- 3. Number and height of erosional pedestals or terracettes:** Pedestals or terracettes are uncommon for this site when occupied by the reference community.

- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Expect no more than 20 percent bare ground randomly distributed in small patches.

- 5. Number of gullies and erosion associated with gullies:** Some gullies associated with seeps, springs and intermittent streams may be present. Head and side slopes should be vegetated and stable.

- 6. Extent of wind scoured, blowouts and/or depositional areas:** None.

- 7. Amount of litter movement (describe size and distance expected to travel):** This site has slowly permeable subsoils. Small to medium-sized litter will move short distances with intense storms.

- 8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil surface is resistant to erosion. Soil Stability class range is expected to be 3 to 5.

- 9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is less than 10 inches thick with colors from brown fine sandy loam to dark brown loamy fine sand and generally weak fine granular structure. SOM is less than one percent.

- 10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The savannah of trees, vines, shrubs, grasses, and forbs, along with adequate litter and little bare ground, provides for maximum infiltration and little runoff under normal rainfall events.

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

Sub-dominant: Warm-season midgrasses >

Other: Trees > Shrubs/Vines > Forbs

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): There should be little mortality or decadence for any functional groups.
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14. Average percent litter cover (%) and depth (in): Litter is primarily herbaceous.
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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production): 3,500 pounds per acre for below average moisture years to 5,500 pounds per acre for above average moisture years.
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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: Potential invasive species include bahiagrass, common Bermudagrass, yellow bluestem, elm, post oak, yaupon, huisache, mesquite, eastern persimmon, and eastern red cedar.
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17. Perennial plant reproductive capability: All perennial plants should be capable of reproducing except for periods of prolonged drought conditions, heavy natural herbivory and intense wildfires.
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