USDA Natural Resources Conservation Service

Ecological site R087AY010TX
Sandy Bottomland

Last updated: 9/21/2023
Accessed: 05/05/2024

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.

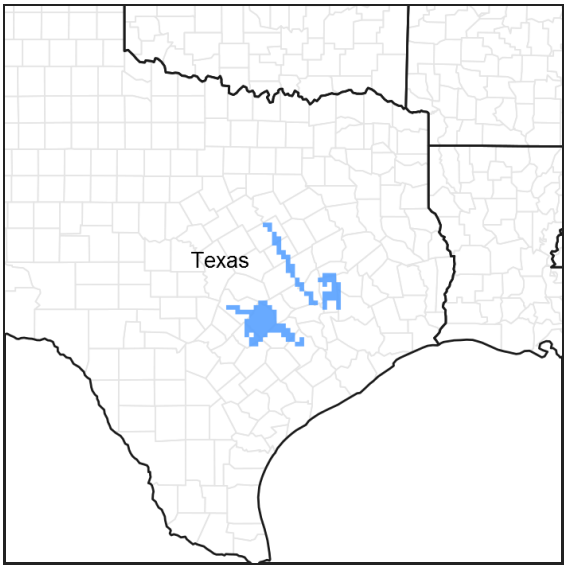


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

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 Bottomland site exists on floodplains along rivers, streams, and tributaries. The sandy soil texture allows water to drain quickly from the site. Consequently, the soils correlated are not hydric.

Associated sites

R087AY012TX	**Clayey Bottomland** Clayey Bottomland
R087AY011TX	**Loamy Bottomland** Loamy Bottomland

Similar sites

R087AY009TX	**Wet Sandy Draw** Wet Sandy Draw

Table 1. Dominant plant species

Tree	(1) *Populus deltoides* (2) *Ulmus americana*
Shrub	(1) *Ilex decidua* (2) *Crataegus viridis var. viridis*
Herbaceous	(1) *Panicum virgatum* (2) *Elymus virginicus*

Physiographic features

This site occupies nearly level to gently sloping flood plains of major rivers, streams, and their tributaries. It occurs parallel and adjacent to the watercourse. The site is typically long and narrow, commonly 100 to 500 feet wide, occurring in areas of 10 to 200 acres.

Table 2. Representative physiographic features

Landforms	(1) Plains > Flood plain
Runoff class	Negligible
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	61–229 m
Slope	0–2%
Water table depth	0–183 cm
Aspect	Aspect is not a significant factor

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 3. Representative climatic features

Frost-free period (average)	241 days
Freeze-free period (average)	276 days
Precipitation total (average)	1,041 mm

Climate stations used

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

Influencing water features

This site is adjacent to rivers and streams and receives overflow from watercourses and runoff from higher adjacent sites.

Wetland description

The soils of this site are not hydric, but onsite wetland delineations are necessary for verification.

Soil features

The soils of this site are very deep and formed from sandy alluvial sediments. They receive extra water from overflows or as runoff from higher sites. The soils are rapidly permeable and excessively drained. They may have gravel throughout the profile or a gravel stratum below. Deep rooted perennial plants are sometimes able to reach and use the moisture from the water table. However, due to the sandy subsoil, gravel content, lower water holding capacity, and inherent lower fertility, the site may be somewhat droughty and less productive than the Loamy and Clayey Bottomlands. Soils of this site include: Gad, Gaddy, and Sayers.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone
Surface texture	(1) Fine sand (2) Loamy fine sand (3) Fine sandy loam
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	152–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–10.16 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0

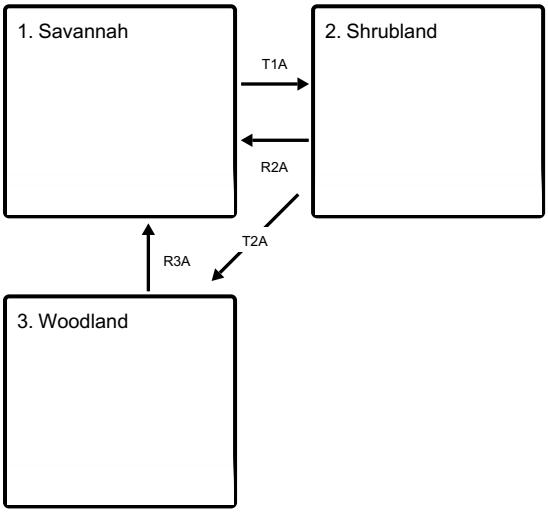
Soil reaction (1:1 water) (0-101.6cm)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–6%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Presence of shade and proximity to water make this bottomland site a preferred grazing area. Bison herds, scour erosion from flooding, and extreme climatic fluctuations probably had a major influence on the maintenance of the savannah landscape before European colonization. Fire may have had some influence on this site compared to the Loamy and Clayey Bottomland sites as the Sandy Bottomland site tends to be droughtier and more susceptible to fire. Switchgrass (*Panicum virgatum*), Virginia wildrye (*Elymus virginicus*), little bluestem (*Schizachyrium scoparium*), and big bluestem (*Andropogon gerardii*) decrease in abundance and are replaced by common Bermudagrass (*Cynodon dactylon*), bahiagrass (*Paspalum notatum*), partridge pea (Chamaechrista fasciculata), croton (Croton spp.), and yankeeweed (*Eupatorium compositifolium*) when continuous grazing occurs. Shrubs and hardwood saplings invade the site in the absence of proper grazing and brush management. Prolonged mismanagement or abandonment allows the site to become a hardwood forest dominated by eastern cottonwood (*Populus deltoides*), water oak (*Quercus nigra*), elm (Ulmus spp.), ash (Fraxinus spp.), and pecan (Carya illinoisensis).

State and transition model

Ecosystem states



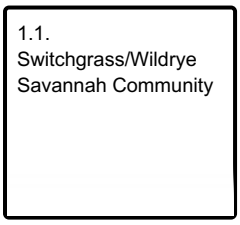
T1A - Abandonment, no fire, and/or no grazing management

R2A - Prescribed grazing, fire, and/or brush management

T2A - Abandonment, no fire, and/or no grazing management

R3A - Extensive brush management and/or herbicide applications

State 1 submodel, plant communities



State 2 submodel, plant communities

2.1. Elm/Shrubland Community

State 3 submodel, plant communities

3.1. Cottonwood/Elm Woodlands

State 1
Savannah

One community exists in the Savannah State, the Switchgrass/Wildrye Community. The site is dominated by tallgrasses and wildrye, and has a presence of up to 30 percent woody species.

Community 1.1
Switchgrass/Wildrye Savannah Community

The reference plant community of this site is a savannah. Cottonwood, elm, water oak, ash, pecan, black willow (*Salix nigra*), and sycamore (Plantanus occidentalis) trees provide about 30 percent canopy cover. The overstory canopy is denser immediately adjacent to the watercourse. The understory includes hawthorn (Crataegus spp.), greenbrier (Smilax spp.), Alabama supplejack (*Berchemia scandens*), peppervine (Ampelopsis arborea), grape (Vitis spp.), and honeysuckle (Symphorcarpos spp.). Switchgrass, Indiangrass (*Sorghastrum nutans*), beaked panicum (*Panicum anceps*), little bluestem, and big bluestem dominate the herbaceous plant community. Continuous yearlong grazing for a succession of years will tend to move the climax herbaceous plant community towards a herbaceous community of common Bermudagrass, bahiagrass, partridge pea, croton, and dog fennel (Eupatorium spp.).

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1849	2774	3699
Tree	841	1261	1681
Shrub/Vine	336	504	673
Forb	336	504	673
Total	**3362**	**5043**	**6726**

State 2
Shrubland

One community exists in the Shrubland State, the Elm/Shrubland Community. The state is defined by woody canopy cover from 30 to 50 percent. Herbaceous production is limited compared to the Savannah State (1).

Community 2.1
Elm/Shrubland Community

This plant community is a transitional community between the Savannah State and the Woodland State. It develops in the absence of proper grazing management and brush control treatments, mechanical or chemical. It is usually

the result of abandonment following yearly continuous grazing. Trees and shrubs begin to replace the herbaceous component of the Savannah State. Species whose seeds are windblown (elm, cottonwood, ash, or willow) or animal dispersed (pecan) are the first to colonize and dominate the site. Remnants of switchgrass and wildrye may still occur but the herbaceous component of the community becomes dominated by grasses and forbs such as common Bermudagrass and yankeeweed. Shade tolerant species such as Indian woodoats (*Chasmanthium latifolium*), longleaf woodoats (*Chasmanthium sessiliflorum*), sedges (Carex spp.), ironweed (Veronia spp.), and goldenrod (Solidago spp.) become the most abundant species as canopy cover increases. If the woody shrub canopy has not exceeded 50 percent, prescribed burning on a three to five year interval in conjunction with prescribed grazing is a viable option for returning this community to a savannah that may resemble the reference plant community. If the woody canopy exceeds 50 percent, chemical or mechanical brush control must be applied to move this transitional community back towards the savannah state.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Tree	1289	1905	2522
Grass/Grasslike	729	1121	1513
Shrub/Vine	560	673	785
Forb	168	252	336
Total	**2746**	**3951**	**5156**

State 3
Woodland

One community exists in the Woodland State, the Cottonwood/Elm Community. The site is defined by woody canopy cover over 50 percent. The site has reduced herbaceous production compared to the Savannah and Shrubland States.

Community 3.1
Cottonwood/Elm Woodlands

This plant community is a closed overstory (50 to 80 percent canopy) woodland dominated by cottonwood, American elm (*Ulmus americana*), cedar elm (*Ulmus crassifolia*), water oak, pecan, sycamore, and black willow. Understory shrubs and vines include Alabama supplejack, greenbriar, farkleberry (*Vaccinium arboreum*), green hawthorn (*Crataegus viridis*), peppervine (Ampelopsis arborea), grape (Vitis spp.), and yaupon (*Ilex vomitoria*). A herbaceous understory is almost nonexistent, but shade tolerant species including Indian woodoats, longleaf woodoats, sedges, ironweed, ice plant (*Verbesina virginica*), and goldenrod may occur in small amounts. Prescribed fire may be a viable treatment option for conversion of this site back to a semblance of the Switchgrass/Wildrye savannah Community during drought years. Chemical brush control on a large scale is not a treatment option; however, individual plant treatment with herbicides on small acreages may be. Mechanical treatment of this site, along with seeding, is the most viable treatment option, although probably not economical.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Tree	2522	3783	5044
Shrub/Vine	504	757	1009
Grass/Grasslike	168	252	336
Forb	84	112	140
Total	**3278**	**4904**	**6529**

Transition T1A
State 1 to 2

The driver for this transition is abandonment, lack of fire, and/or lack of prescribed grazing. Woody species are allowed to continue to grow until reaching over the threshold of 30 percent. This signifies the transition to the Shrubland State.

Transition R2A
State 2 to 1

Prescribed grazing, periodic fire, and brush management are practices that will restore the site back to the reference state. The key to successful restoration is controlling the growth of woody species throughout the site.

Transition T2A
State 2 to 3

The driver for the transition to the Woodland State is further abandonment, lack of fire, and lack of prescribed grazing. The woody species have grown to a canopy cover greater than 50 percent, which signifies this transition.

Restoration pathway R3A
State 3 to 1

The driver for restoration from the Woodland State to the Savannah State is management of woody species. Extensive brush management is required to open up the overstory canopy and allow for more herbaceous growth.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tallgrass**			1009–1345	
	switchgrass	PAVI2	*Panicum virgatum*	1009–1345	–
2	**Tallgrasses**			504–1009	
	big bluestem	ANGE	*Andropogon gerardii*	504–1009	–
	little bluestem	SCSC	*Schizachyrium scoparium*	504–1009	–
	Indiangrass	SONU2	*Sorghastrum nutans*	504–1009	–
3	**Midgrasses**			336–560	
	beaked panicgrass	PAAN	*Panicum anceps*	336–560	–
	purpletop tridens	TRFL2	*Tridens flavus*	336–560	–
4	**Cool-season grasses**			336–560	
	sedge	CAREX	*Carex*	336–560	–
	Virginia wildrye	ELVI3	*Elymus virginicus*	336–560	–
5	**Mid/Shortgrasses**			336–560	
	Indian woodoats	CHLA5	*Chasmanthium latifolium*	336–560	–
	longleaf woodoats	CHSE2	*Chasmanthium sessiliflorum*	336–560	–
	cylinder jointtail grass	COCY	*Coelorachis cylindrica*	336–560	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	336–560	–
	marsh bristlegrass	SEPA10	*Setaria parviflora*	336–560	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	336–560	–
	longspike tridens	TRST2	*Tridens strictus*	336–560	–
Forb					

6	**Forbs**			280–560	
	ticktrefoil	DESMO	*Desmodium*	280–560	–
	lespedeza	LESPE	*Lespedeza*	280–560	–
	prairie snoutbean	RHLA5	*Rhynchosia latifolia*	280–560	–
	fuzzybean	STROP	*Strophostyles*	280–560	–
7	**Forbs**			56–112	
	great ragweed	AMTR	*Ambrosia trifida*	56–112	–
	partridge pea	CHFA2	*Chamaecrista fasciculata*	56–112	–
	hogwort	CRCA6	*Croton capitatus*	56–112	–
	bigpod sesbania	SEHE8	*Sesbania herbacea*	56–112	–
	Baldwin's ironweed	VEBA	*Vernonia baldwinii*	56–112	–
	white crownbeard	VEVI3	*Verbesina virginica*	56–112	–
Shrub/Vine					
8	**Shrubs/Vines**			504–673	
	Alabama supplejack	BESC	*Berchemia scandens*	504–673	–
	green hawthorn	CRVI2	*Crataegus viridis*	504–673	–
	possumhaw	ILDE	*Ilex decidua*	504–673	–
	yaupon	ILVO	*Ilex vomitoria*	504–673	–
	roundleaf greenbrier	SMRO	*Smilax rotundifolia*	504–673	–
	farkleberry	VAAR	*Vaccinium arboreum*	504–673	–
	summer grape	VIAE	*Vitis aestivalis*	504–673	–
Tree					
9	**Trees**			841–1345	
	pecan	CAIL2	*Carya illinoinensis*	841–1345	–
	sugarberry	CELA	*Celtis laevigata*	841–1345	–
	green ash	FRPE	*Fraxinus pennsylvanica*	841–1345	–
	American sycamore	PLOC	*Platanus occidentalis*	841–1345	–
	eastern cottonwood	PODE3	*Populus deltoides*	841–1345	–
	water oak	QUNI	*Quercus nigra*	841–1345	–
	black willow	SANI	*Salix nigra*	841–1345	–
	American elm	ULAM	*Ulmus americana*	841–1345	–
	cedar elm	ULCR	*Ulmus crassifolia*	841–1345	–

Animal community

Historically, the Sandy Bottomland Site provided habitat to bison, deer, turkey, migratory birds and large predators such as wolves, coyotes, mountain lions, and black bear. White-tailed deer, turkey, fox squirrels, coyotes, bobcats, and migratory birds find suitable habitat in these savannahs today. The presence of shade and proximity to water attracts many species of wildlife during the hot dry summer months. Where old mast producing oaks and pecan trees are present, this site provides habitat for deer, turkey, squirrels, and ducks - especially during the winter months. As the savannah transitions through the various vegetative states or pathways, the quality of the habitat may improve for some species and decline for others. Management must be applied to maintain a plant community in optimum habitat quality for the desired species.

Hydrological functions

Peak rainfall periods occur in May and June from frontal passage thunderstorms and in September and October

from tropical 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 along adjacent stream banks where adequate cover is not maintained. The site may be periodically inundated from overflow water from adjacent watercourse and associated upland sites but is commonly droughty due to its limited water holding capacity.

Recreational uses

Hunting and bird watching are common.

Wood products

Water oak provides material for hardwood flooring, plywood, veneer, and cross ties. Green ash is used for bats, tool handles, and furniture. Pecan and other species are used for furniture. Pecan is used for barbeque wood.

Other products

Fruit from blackberries, grapes, and plums and nuts from pecans 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

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Contributors

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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)	Mike Stellbauer, David Polk and Bill Deauman
Contact for lead author	Mike Stellbauer, Zone RMS, NRCS, Bryan, Texas
Date	05/23/2005
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. **Presence of water flow patterns:** Water flow patterns are common and follow old stream meanders. Deposition or erosion is uncommon for normal rainfall but may occur during intense rainfall events.

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 throughout.

5. **Number of gullies and erosion associated with gullies:** Gullies are uncommon on this site.

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

7. **Amount of litter movement (describe size and distance expected to travel):** This is a flood plain with occasional out-of-bank flow. Under normal rainfall, little litter movement should be expected; however, litter of all sizes may move long distances, depending on obstructions under intense storm events.

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. 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 greater than 80 inches thick with colors of brown fine sandy loam to pale brown and weak fine granular to massive structure. SOM is approximately 0.1 to 1.0 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The savannah of trees, shrubs, vines, 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.

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 > Cool-season midgrasses >>

    Sub-dominant: Trees >

    Other: 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.

14. **Average percent litter cover (%) and depth (in):** Small to large woody litter is common on this site.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 3,000 pounds per acre for below average moisture years to 6,000 pounds per acre for above average moisture years.

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 for this site includes elm, cottonwood, sycamore, black willow, Bermudagrass and Johnsongrass.

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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.
