USDA Natural Resources Conservation Service

Ecological site R087AY006TX
Sandy

Last updated: 9/21/2023
Accessed: 05/08/2024

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.

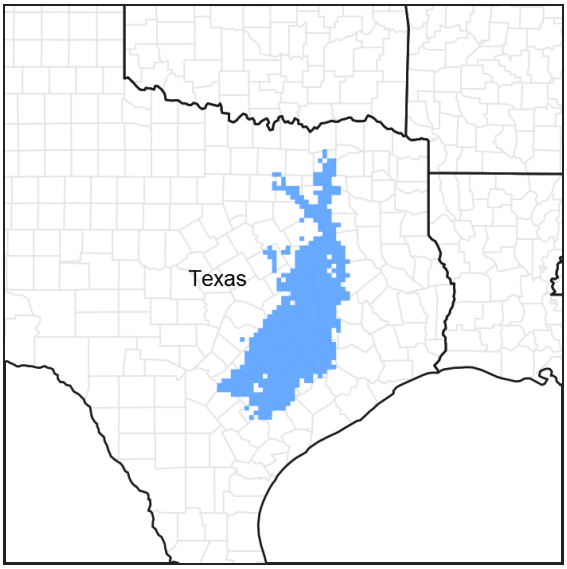


Figure 1. Mapped extent

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 sites are characterized by a sandy surface layer that extends 20 to 40 inches to a loamy subsurface layer. The sites are more productive and less droughty than soils with deeper sands, but not as productive as soils with a higher clay content.

Associated sites

R087AY003TX	**Claypan Savannah** Claypan Savannah
R087AY004TX	**Deep Redland** Deep Redland
R087AY005TX	**Sandy Loam** Sandy Loam
R087AY007TX	**Deep Sand** Deep Sand
R087AY008TX	**Very Deep Sand** Very Deep Sand
R087AY011TX	**Loamy Bottomland** Loamy Bottomland
R087AY012TX	**Clayey Bottomland** Clayey Bottomland
R087AY001TX	**Gravelly** Gravelly
R087AY002TX	**Sandstone Hill** Sandstone Hill

Similar sites

R087AY008TX	**Very Deep Sand** Very Deep Sand
R087AY007TX	**Deep Sand** Deep Sand
R087AY002TX	**Sandstone Hill** Sandstone Hill
R087BY004TX	**Sandy** Different MLRA

Table 1. Dominant plant species

Tree	(1) *Quercus stellata* (2) *Quercus marilandica*
Shrub	(1) *Ilex vomitoria* (2) *Callicarpa americana*
Herbaceous	(1) *Schizachyrium scoparium* (2) *Sorghastrum nutans*

Physiographic features

These soils are on gently sloping to strongly sloping ridges and stream terraces. Slopes range from 0 to 12 percent, but are typically between 1 and 8 percent. Some soils have a perched water table up to 30 inches. The water table is highest in later winter and early spring, or during extremely wet precipitation periods.

Table 2. Representative physiographic features

Landforms	(1) Plains > Ridge (2) Plains > Stream terrace
Runoff class	Very low to high
Flooding frequency	None

Ponding frequency	None
Elevation	61–229 m
Slope	1–8%
Water table depth	76–203 cm
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	0–12%
Water table depth	Not specified

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

Climate stations used

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

Influencing water features

A high water table may exist after periods of heavy rainfall.

Wetland description

A stream or wetland does not influence the plant community of this site.

Soil features

The soils are deep to very deep, fine sands and loamy fine sands with a surface 20 to 40 inches thick over loamy subsoils. Water soaks rapidly into the open soils. Even light showers penetrate below the evaporation zone and are more effective on this site than sites with deeper sands. Water retention is relatively low but the soils give up a high percent of their moisture to growing plants. Although air, water, and plant roots move through the soil with ease, frequent rains are needed to produce optimum plant growth. Inherent low fertility causes these soils to produce forage of lower quantity than associated sites with higher clay content. The site is subject to erosion where adequate herbaceous cover is not maintained and on heavy use areas such as roads and livestock trails. Soils correlated to this site include: Dubina, Dutek, Heaton, Newulm, Nimrod, Rader, Rehburg, Robco, Silstid, Straber, Styx, Tanglewood, and Tremona.

Table 5. Representative soil features

Parent material	(1) Alluvium–sandstone and shale
Surface texture	(1) Loamy fine sand (2) Fine sand
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to slow
Soil depth	114–203 cm
Surface fragment cover <=3"	0–1%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.08–12.7 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–4
Soil reaction (1:1 water) (0-101.6cm)	4–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–6%
Subsurface fragment volume >3" (Depth not specified)	0–1%

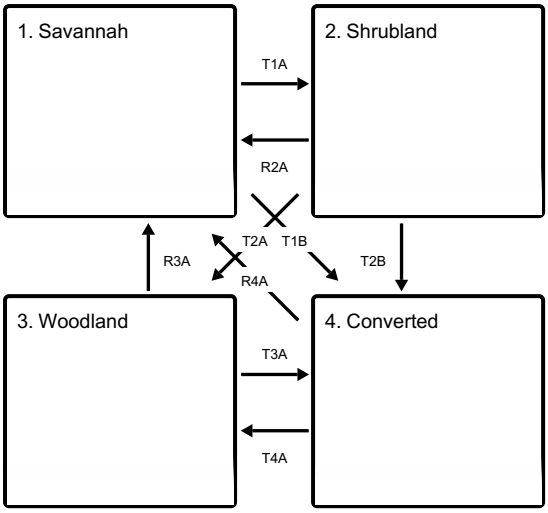
Ecological dynamics

The Sandy site evolved and was maintained by the grazing and herding effects of native wild large ungulates, periodic fires, and extreme climatic fluctuations. Conversion of this site to cropland and the subsequent abandonment of cropping removed the natural native vegetation, organic matter, and fertility and allowed woody species to dominate the site. Continuous grazing by confined 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 tephrosia (Tephrosia spp.) and prairie clover (Dalea spp.).

Less productive perennial and annual grasses and forbs will replace these plants. Years of continuous grazing generally lead to periods of prolonged rest for 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*), yaupon (*Ilex vomitoria*), post oak (*Quercus stellata*), and eastern red cedar (*Juniperus virginiana*).

State and transition model

Ecosystem states



T1A - Heavy continuous grazing, no brush management, abandonment

T1B - Brush management, crop cultivation, pasture planting

R2A - Brush management, prescribed grazing, prescribed burning

T2A - Heavy continuous grazing, no brush management, abandonment

T2B - Brush management, crop cultivation, pasture planting

R3A - Brush management, range planting, prescribed grazing

T3A - Brush management, crop cultivation, pasture planting

R4A - Range planting, prescribed grazing, prescribed burning

T4A - Heavy continuous grazing, no brush management, abandonment

State 1 submodel, plant communities

1.1. Tallgrass/Oak Savannah

State 2 submodel, plant communities

2.1. Oak Scrub/Shrubland

State 3 submodel, plant communities

3.1. Post Oak/Elm Woodland

State 4 submodel, plant communities

4.1. Converted Land

State 1
Savannah

One community exists in the Savannah State, the 1.1 Tallgrass/Oak Savannah Community. The State is dominated by warm season perennial grasses and the overstory canopy cover is less than 25 percent.

Community 1.1
Tallgrass/Oak Savannah

Figure 6. Tallgrass/Oak Savannah Community

The characteristic plant community of this site is the reference plant community. This site is an open savannah of post oak and blackjack oak (*Quercus marilandica*) trees that shade 20 to 25 percent of the ground. The herbaceous component is mid and tallgrasses and is dominated by little bluestem which usually makes up 50 to 75 percent of the total annual production. Indiangrass, purpletop tridens (*Tridens flavus*), switchgrass, beaked panicum (*Panicum anceps*), sand lovegrass (*Eragrostis trichodes*), brownseed paspalum (*Paspalum plicatulum*), and thin paspalum (*Paspalum setaceum*) also occur. Cool season forage plants are scarce on this site. A variety of shrubs, vines, and forbs occur in this community. Grazing prescriptions that permit acceptable grazing periods and allow adequate rest periods along with prescribed fire every five to seven years are important in the maintenance of the reference herbaceous plant community and the savannah landscape structure. Continuous overgrazing or over rest and the absence of fire tend to allow a vegetative shift towards woody species. Without corrective measures, this shift will continue to the Shrubland State.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	2690	3138	3587
Tree	336	392	448
Forb	168	196	224
Shrub/Vine	168	196	224
Total	**3362**	**3922**	**4483**

State 2

Shrubland

One community exists in the Shrubland State, the 2.1 Oak Scrub/Shrubland Community. The herbaceous production is not as great compared to the Savannah State, and overstory canopy has increased between 25 and 50 percent.

Community 2.1
Oak Scrub/Shrubland

Figure 8. Oak Scrub/Shrubland Community

This plant community is a transitional community between the Savannah and Woodland States. It develops in the absence of fire or mechanical or chemical brush management treatments. It is usually the result of abandonment following either cropping or yearly continuous grazing. Trees and shrubs begin to encroach onto pastureland or replace the grassland component of the Tallgrass/Oak Savannah Community. In addition to the naturally occurring oaks, other woody species such as eastern persimmon, winged elm, and eastern red cedar increase in density and canopy coverage (25 to 50 percent). Remnants of little bluestem and Indiangrass may still occur but the herbaceous component of the community becomes dominated by lesser producing grasses and forbs. Initially, species such as brownseed paspalum (*Paspalum plicatulum*), tall dropseed (*Sporobolus compositus*), and fall witchgrass (*Digitaria cognata*) replace the taller grasses. As the site continues to transition, the plants which increase or invade on the site include sandbur (Cenchrus spp.), red lovegrass (*Eragrostis secundiflora*), Yankeeweed (*Eupatorium compositifolium*), bullnettle (*Cnidoscolus texanus*), croton (Croton spp.), snake cotton (Froelichia spp.), prickly pear (Opuntia spp.), queen's delight (*Stillingia texana*), beebalm (Monarda spp.), and baccharis (Baccharis spp.). Prescribed burning on a three to five year interval in conjunction with prescribed grazing may be a viable option for returning this site to the Savannah State providing woody canopy cover is less than 50 percent and adequate herbaceous fine fuel still exists. When this threshold is exceeded, mechanical or chemical brush control becomes necessary to move this transitional community back towards the Savannah State.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1513	1765	2018
Tree	1009	1177	1345
Shrub/Vine	673	785	897
Forb	168	196	224
Total	**3363**	**3923**	**4484**

State 3
Woodland

One community exists in the Woodland State, the Post Oak/Elm Woodland Community. The site is characterized by little herbaceous production. The overstory canopy is over 50 percent and shrubs also limit light to the surface.

Community 3.1
Post Oak/Elm Woodland

Figure 10. Post Oak/Elm Woodland Community

This plant community is a closed overstory (50 to 80 percent) woodland dominated by post oak, winged elm, blackjack oak, black hickory (*Carya texana*), and eastern red cedar. Understory shrubs and sub-shrubs include yaupon, farkleberry, possumhaw (*Ilex decidua*), and American beautyberry (*Callicarpa americana*). Woody vines also occur and include poison ivy (*Toxicodendron radicans*), grape (Vitis spp.), greenbriar (Smilax spp.), Virginia creeper (*Parthenocissus quinquefolia*), and peppervine (Ampelopsis arborea). A herbaceous understory is almost nonexistent, but shade-tolerant species including longleaf woodoats (*Chasmanthium sessiliflorum*), cedar sedge (*Carex planostachys*), ironweed (Veronia baldwinii), and goldenrod (Solidago spp.) may occur in small amounts. Prescribed burning in conjunction with prescribed grazing may be used to convert this site back to a Savannah State but generally it takes many consecutive years of burning due to light fine fuel loads comprised mainly of hardwood tree leaves. Weather conditions are rarely condusive to burning this fuel type in this region. Chemical brush control on a large scale is not a viable treatment option on this site due to the resistance of yaupon to broadcast herbicide applications. However, individual plant treatment with herbicides on small acreage is a viable option. Mechanical treatment of this site, along with seeding, is the most viable option for reversion back to the reference community. Although, the economic viability of this option is questionable.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Tree	1513	1765	2018
Shrub/Vine	1177	1373	1569
Grass/Grasslike	504	588	673
Forb	168	196	224
Total	**3362**	**3922**	**4484**

State 4
Converted

The Converted Land State contains one community, the 4.1 Converted Land Community. The state is characterized by the land manager farming crops or planted grasses.

Community 4.1
Converted Land

Figure 12. Converted Land Community

Conversion of this site to cropland occurred from the middle 1800's to the early 1900's. Some remains in cropland today, typically cotton (Gossypium spp.), corn (*Zea mays*), sorghum (Sorghum spp.), and soybeans (*Glycine max*). Specifically, this site is used for watermelons, peas, sweet potatoes, and peanuts. Ditching, land leveling, and levee construction has significantly changed the topography and hydrology on many acres of this site. While restoration of this site to a semblance of the reference plant community is possible with seeding and prescribed grazing, complete restoration of the reference community in a reasonable time is very unlikely. Following crop production, this site is often planted to native or introduced grasses and legumes for livestock grazing or hay production. Typical species planted include improved Bermudagrass varieties, bahiagrass, switchgrass, dallisgrass, eastern gamagrass, annual ryegrass (Lolium multiflorum), and white clover. Many of the introduced species (bahiagrass, Bermudagrass, and dallisgrass) are invasive-moving by wind, water, and animals. Once established, they are extremely difficult to remove and will hinder the reestablishment of native species. The establishment and maintenance of these species requires cultivation, fertilization, weed control, and prescribed grazing management.

Transition T1A
State 1 to 2

The Savannah State will transition to the Shrubland State when continued heavy grazing pressure, no brush management, and/or field abandonment continues. The transition is evident when woody species canopy cover exceeds 25 percent and grasses shift composition to more shade-tolerant species.

Transition T1B
State 1 to 4

The transition to the Converted State occurs when the site is plowed for planting crops or pasture. The driver for the transition is the land manager's decision to farm the site.

Restoration pathway R2A
State 2 to 1

Restoration back to the Savannah State requires brush management, prescribed grazing and/or prescribed fire. Mechanical or chemical controls can be used to remove the woody overstory species and shrubs. Prescribed grazing may require destocking and/or deferment.

Transition T2A
State 2 to 3

The Shrubland State will transition to the Woodland State when continued heavy grazing pressure, no brush management, and/or field abandonment continues. The transition is evident when woody species canopy cover exceeds 50 percent and grasses shift composition to more shade-tolerant species.

Transition T2B

State 2 to 4

The transition to the Converted State occurs when the site is plowed for planting crops or pasture. The driver for the transition is the land manager's decision to farm the site.

Restoration pathway R3A
State 3 to 1

Restoration back to the Savannah State requires substantial energy inputs. Brush management and prescribed grazing will be needed to shift the community back to the reference state. Mechanical or chemical controls can be used to remove the woody overstory species back below 25 percent. Prescribed grazing may require destocking and/or deferment to manage the understory grasses back to those found in the reference community. Fire may be an option, but only if adequate amounts of fine fuel exist in the understory.

Transition T3A
State 3 to 4

The transition to the Converted State occurs when the site is plowed for planting crops or pasture. The driver for the transition is the land manager's decision to farm the site.

Restoration pathway R4A
State 4 to 1

The restoration to State 1 can occur when the land manager ceases agronomic practices. Range planting of native species found in the reference community will be required to bring back a similar community as the State 1 plant composition. The extent of previous soil disturbances will determine how much seedbed preparation will be needed, as well as the ability to be restored. Proper grazing and brush management will be required to ensure success.

Transition T4A
State 4 to 3

The Converted Land State will transition to the Woodland State when continued heavy grazing pressure, no brush management, and/or field abandonment continues. The transition is evident when woody species canopy cover exceeds 50 percent and grasses shift composition to more shade-tolerant species.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tallgrasses**			2354–3026	
	little bluestem	SCSC	*Schizachyrium scoparium*	2354–3026	–
	Indiangrass	SONU2	*Sorghastrum nutans*	2354–3026	–
2	**Midgrasses**			196–308	
	sand lovegrass	ERTR3	*Eragrostis trichodes*	196–308	–
	beaked panicgrass	PAAN	*Panicum anceps*	196–308	–
	brownseed paspalum	PAPL3	*Paspalum plicatulum*	196–308	–
	switchgrass	PAVI2	*Panicum virgatum*	196–308	–
3	**Mid/Shortgrasses**			112–168	
	fall witchgrass	DICO6	*Digitaria cognata*	112–168	–
	thin paspalum	PASE5	*Paspalum setaceum*	112–168	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	112–168	–

	purpletop tridens	TRFL2	*Tridens flavus*	112–168	–
4	**Mid/Shortgrasses**			28–84	
	splitbeard bluestem	ANTE2	*Andropogon ternarius*	28–84	–
	woollysheath threeawn	ARLA6	*Aristida lanosa*	28–84	–
	sedge	CAREX	*Carex*	28–84	–
	Hall's panicgrass	PAHA	*Panicum hallii*	28–84	–
Forb					
5	**Forbs**			140–168	
	Atlantic pigeonwings	CLMA4	*Clitoria mariana*	140–168	–
	Virginia dayflower	COVI3	*Commelina virginica*	140–168	–
	ticktrefoil	DESMO	*Desmodium*	140–168	–
	coastal indigo	INMI	*Indigofera miniata*	140–168	–
	lespedeza	LESPE	*Lespedeza*	140–168	–
	littleleaf sensitive-briar	MIMI22	*Mimosa microphylla*	140–168	–
	prairie snoutbean	RHLA5	*Rhynchosia latifolia*	140–168	–
	fuzzybean	STROP	*Strophostyles*	140–168	–
	multibloom hoarypea	TEON	*Tephrosia onobrychoides*	140–168	–
	Virginia tephrosia	TEVI	*Tephrosia virginiana*	140–168	–
	prairie spiderwort	TROC	*Tradescantia occidentalis*	140–168	–
6	**Forbs**			28–56	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	28–56	–
	partridge pea	CHFA2	*Chamaecrista fasciculata*	28–56	–
	Texas bullnettle	CNTE	*Cnidoscolus texanus*	28–56	–
	hogwort	CRCA6	*Croton capitatus*	28–56	–
	plains snakecotton	FRFL	*Froelichia floridana*	28–56	–
	Carolina woollywhite	HYSCC	*Hymenopappus scabiosaeus var. corymbosus*	28–56	–
	giant goldenrod	SOGI	*Solidago gigantea*	28–56	–
Shrub/Vine					
7	**Shrubs/Vines**			168–224	
	American beautyberry	CAAM2	*Callicarpa americana*	168–224	–
	parsley hawthorn	CRMA5	*Crataegus marshallii*	168–224	–
	yaupon	ILVO	*Ilex vomitoria*	168–224	–
	winged sumac	RHCO	*Rhus copallinum*	168–224	–
	southern dewberry	RUTR	*Rubus trivialis*	168–224	–
	cat greenbrier	SMGL	*Smilax glauca*	168–224	–
	farkleberry	VAAR	*Vaccinium arboreum*	168–224	–
	muscadine	VIRO3	*Vitis rotundifolia*	168–224	–
Tree					
8	**Trees**			336–448	
	blackjack oak	QUMA3	*Quercus marilandica*	336–448	–
	post oak	QUST	*Quercus stellata*	336–448	–

	post oak	QUST	*Quercus stellata*	336–448	–

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 migratory birds find suitable habitat in these savannahs today. Domestic livestock and exotic ungulates are the dominant grazers and browsers on this site. As the savannah transitions through the various vegetative states towards the 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 systems as well as frontal passages. Rainfall amounts may be high (three to five inches per event) and events may be intense. Extended periods (60 days) of little to no rainfall during the growing season are common. Because of the gently sloping to sloping topography with a rapid intake rate of the surface sands and very rapid permeability of the soils, there is usually little to no runoff on this site. Water from these somewhat excessively drained soils provides groundwater recharge.

Recreational uses

Hunting, camping, bird watching, and equestrian are all common activities.

Wood products

Oaks are used for firewood. Hickory and mesquite are used for barbecue wood. Yaupon is used for landscaping.

Other products

Fruit 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.

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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.

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Date	06/08/2004
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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2. **Presence of water flow patterns:** Water flow patterns are uncommon on this site.

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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 25 percent bare ground randomly distributed in small patches.

5. **Number of gullies and erosion associated with gullies:** No gullies should be present.

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 highly permeable soils with high infiltration rates. Only small-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 0 to 40 inches thick with colors from pale brown fine sand 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, 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 >>

    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.

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):** 3,000 pounds per acre for below average moisture years to 4,000 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, post oak, yaupon, eastern persimmon, and winged elm.

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17. **Perennial plant reproductive capability:** All perennial plants should be capable of reproducing except during periods of prolonged drought conditions, heavy natural herbivory or intense wildfires.
