USDA Natural Resources Conservation Service

Ecological site R083EY014TX
Sandy Flat

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.

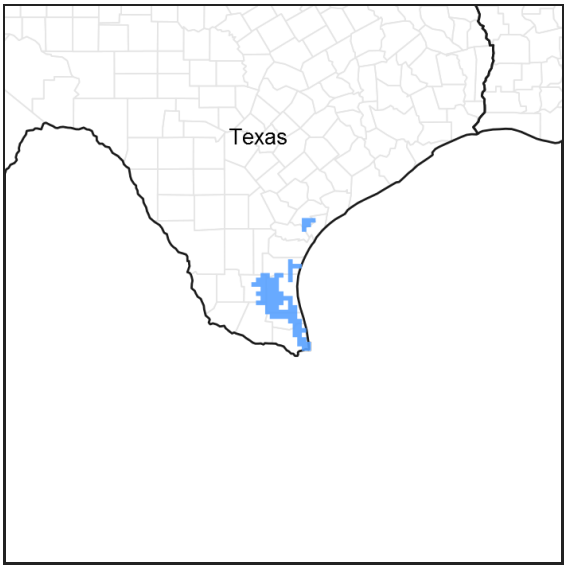


Figure 1. Mapped extent

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): 083E–Sandsheet Prairie

Major Land Resource Area (MLRA) 83E makes up about 4,300 square miles (11,150 square kilometers). The towns of Falfurrias, Premont, and Sarita are in this area. U.S. Highways 77 and 281 run through the area in a north-south direction.

Classification relationships

USDA-Natural Resources Conservation Service, 2006.
-Major Land Resource Area (MLRA) 83E

Ecological site concept

Sandy Flats have sandy surface soils and a seasonal high water table 6 to 18 inches below the surface. They are affected by inundation and an ever-changing plant community.

Associated sites

R083EY008TX	**Salty Prairie**
R083EY020TX	**Sand Hills**
R083EY021TX	**Sandy**
R083EY024TX	**Tight Sandy Loam**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Spartina spartinae* (2) *Schizachyrium littorale*

Physiographic features

The site is found on nearly level to gently sloping soils on the South Texas sand plain. Slope ranges from 0 to 1 percent. A seasonal water table occurs at depths of 6 to 18 inches below the surface and perched water tables can occur after heavy rains. Strong tropical storms can also cause rare flooding.

Table 2. Representative physiographic features

Landforms	(1) Sand plain > Sand sheet
Runoff class	Negligible to low
Flooding frequency	None to rare
Ponding frequency	None
Elevation	0–6 m
Slope	0–1%
Water table depth	0–46 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 83 has a subtropical subhumid climate. Winters are dry and fairly warm, and the summers are hot and humid. Tropical maritime air masses predominate throughout spring, summer and fall. Modified polar air masses exert considerable influence during winter, creating a continental climate characterized by large variations in temperature. Peak rainfall occurs late in spring and a secondary peak occurs early in fall. Heavy thunderstorm activities increase in April, May, and June. July is hot and dry with little weather variations. Rainfall increases again in late August and September as tropical disturbances increase and become more frequent. Tropical air masses from the Gulf of Mexico dominate during the spring, summer and fall. Prevailing winds are southerly to southeasterly throughout the year except in December when winds are predominately northerly.

Table 3. Representative climatic features

Frost-free period (characteristic range)	235-365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	610-737 mm
Frost-free period (actual range)	222-365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	559-762 mm
Frost-free period (average)	288 days
Freeze-free period (average)	365 days

Precipitation total (average)	660 mm

Climate stations used

- (1) FALFURRIAS [USC00413063], Encino, TX
- (2) MCCOOK [USC00415721], Edinburg, TX
- (3) RAYMONDVILLE [USC00417458], Raymondville, TX
- (4) SARITA 7 E [USC00418081], Sarita, TX
- (5) HEBBRONVILLE [USC00414058], Hebbronville, TX
- (6) KINGSVILLE NAAS [USW00012928], Kingsville, TX

Influencing water features

This ecological site is not influenced by water from a wetland or stream, but may experience periodic water inundation caused by storm surges from the Gulf of Mexico. flooding occurs rarely and a seasonal water table exists at 6 to 18 inches below the surface on some sites. An onsite investigation is needed to determine if a wetland is present.

Wetland description

An onsite investigation is needed to determine if a wetland is present.

Soil features

The soils are very deep, poorly drained, moderately slowly permeable formed in loamy eolian deposits derived from Holocene-age sediments. Sauz is only soil series correlated to this site and is classified as a coarse-loamy, mixed, active, hyperthermic Typic Natraqualf. They have a fine sand or loamy fine sand surface texture and dark grayish brown to gray colors. These soils are moderately and strongly saline, slightly to strongly alkaline and will be effervescent within the top 40 inches. A natric horizon can be found between 7 to 14 inches below the soil surface.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–sedimentary rock (2) Alluvium–sedimentary rock
Surface texture	(1) Fine sand (2) Loamy fine sand
Family particle size	(1) Coarse-loamy
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Slow
Soil depth	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)	0–10%
Electrical conductivity (0-101.6cm)	2–16 mmhos/cm
Sodium adsorption ratio (30.5-101.6cm)	13–90
Soil reaction (1:1 water) (0-101.6cm)	6.6–9

Subsurface fragment volume <=3" (Depth not specified)	0–8%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The first crude maps labeled this area of South Texas as Nuevo Santader (1746) and later as the Wild Horse Desert (1850). Now ecologists more commonly refer to it as the Tamaulipan Biotic Province or the Mesquite Acacia Woodland. The Sandy Flat ecological site can be found on the Sandsheet Prairie, and is a common plant community on the Gulf Coast Saline Prairie. This prairie community is different than most other grasslands in that a third of the plant composition is typically made up by a relatively unpalatable species, gulf cordgrass (*Spartina spartinae*). Periodic inundations by both fresh or salt water and a seasonal water table 6 to 18 inches below the soil surface have large impacts on this ecological site. These inundations can completely remove some plants, other than gulf cordgrass, by severely limiting growth or drowning out the other species. These unique ecological drivers play a large role in the structure and composition of the plant community.

Climate is an important, sometimes downplayed, force that affects the plant communities by impacting general plant composition and diversity at a regional scale. Over the past 130 years three climatic regimes have exhibited distinct weather patterns over the American South West that can be related to the establishment of different kinds of plants (e.g. C4 grasses versus C3 shrubs). Perennial warm season grasses and plants (usually C4) benefit most when spring and summer rainfall is consistent. On the opposite spectrum, mesquite, shrubs, and cool season annuals (usually C3) can take advantage of winter rains and can also conserve energy during hot dry summers.

Droughts are a common occurrence in South Texas and were often documented in letters and historical text. For example, Captain John S. “Rip” Ford mentioned the 1864 drought in his memoirs. He reported thousands of domestic animals dead around South Texas water holes and that the Nueces River was dry for miles. Maria Von Blucher commented in 1872 that, “as a result of the tremendous drought…half of all the cattle in Texas died…at every prominence where one can overlook the Nueces River, one might count more than 3,000 dead cattle.”

Despite the dry climate, this area of Texas was a mid/shortgrass prairie, which was attractive to ranchers and early settlers. In the mid-1800’s the number of grazing animals affecting the ecosystem began to rise dramatically. In general, numbers of wild horses and cattle increased from the 1840’s through the end of the Civil War. Sheep numbers expanded to outnumber both cattle and horses between 1867 and 1900, and peaked at numbers exceeding 2 million. Since that time sheep numbers have fallen dramatically and cattle have become the principal commercial livestock. The January 2013 Texas Livestock Inventory provided by the National Agricultural Statistics Service shows that less than 500,000 head of livestock including cattle, sheep, and goats are currently being raised south of the Nueces River.

Starting in the mid-1800’s the region saw wide anthropogenic changes in several environmental disturbance regimes. Research done to investigate the transition from grassland plant communities to shrubland communities in South Texas indicates that a significant successional change across the region began 100 to 200 years ago, and that stable carbon isotope ratios indicate C3 woody plants currently occupy sites once dominated by C4 grasses. When climate and/or other disturbance regimes change to favor the establishment and spread of woody plants a transition from grassland to shrubland will occur. As grazing use increases past sustainable levels mulch, litter, and other types of ground cover start to decrease, including standing herbaceous material. The plant community structure would also change slowly from a mid/shortgrass prairie to a short grass prairie with an increase in bare ground, annual forbs, and perennial woody species. This would have had a significant impact on water runoff and infiltration rates as well as soil temperatures and historic fire regimes.

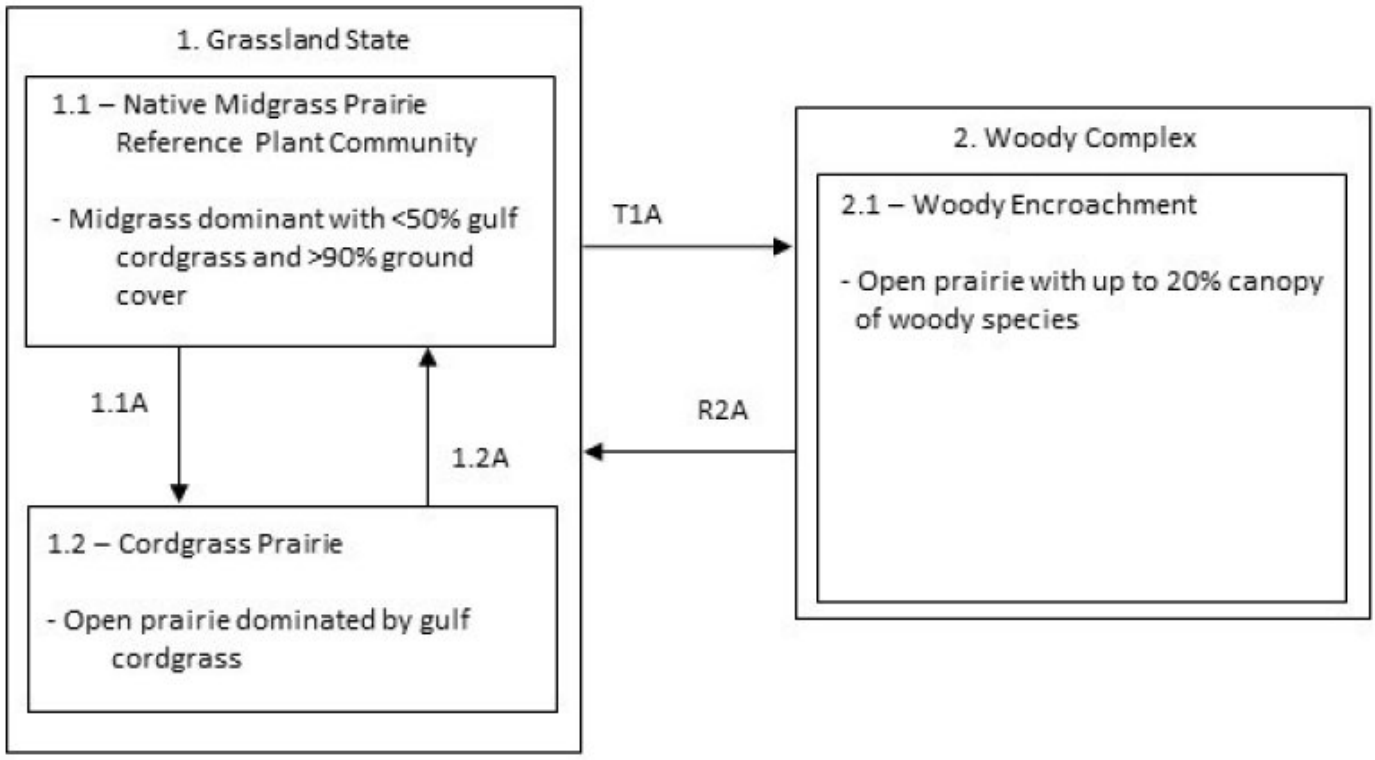
A grassland community has the intrinsic ability to compete with woody species for available water and nutrients in the soil when they are growing in the same space at the same time. Their fibrous and expansive root systems are better adapted to use the top 12 to 16 inches of the soil and there appears to be a critical one to two year period during which mesquite seedlings might be in acute competition with grasses for soil resources. As herbaceous cover decreases bare ground increases, providing more opportunity for woody species to germinate and establish. The amount of herbaceous ground cover can also have a large impact on soil surface temperatures. The higher temperature extremes of bare soil may prevent seed germination of both grasses and shrubs creating a negative

feedback loop which is only broken when some type of ground cover is established.

Climate and unsustainable grazing pressure have played large roles in the conversion of South Texas grasslands to what is now called “brush country”, but another important factor is a change in the historic fire regime. The range of woody species has not significantly changed in the past 300 to 500 years, but the stature and density of shrub species has greatly increased. The historic fire regime of South Texas was highly variable with fires every five to thirty years. The variability of fires across the region would have been driven by several factors including fine fuel load but, at a local level, fires would have been frequent enough to prevent woody plant seedlings from maturing and dominating a particular area. Grasses are much better adapted to survive periodic fires and have faster regrowth rates than most shrub species but, once established; brush species in South Texas have shown the tendency to survive fires because of their re-sprouting characteristics.

Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and aspect. The reference plant community is not necessarily the management goal; other vegetative states may be desired plant communities if the Range Health assessments are in the moderate and above category. The biological processes on this ecological site are complex. Therefore, representative values are presented in a land management context. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this ecological site. They are not intended to cover every situation or the full range of conditions, species, and responses for the ecological site.

State and transition model



Code	Practice
T1A	Woody plant germination between periods of inundation
R2A	Brush management, prescribed burning, and prescribed grazing
1.1A	Heavy grazing and/or long-term water inundation
1.2A	Grazing management and prescribed burning

Figure 8. STM

State 1
Grassland State

Community 1.1
Native Midgrass Prairie

Because of a lack of reference communities, the interpretive information for this plant community is derived from previously developed range site descriptions and professional consensus of range trained field staff. This plant community is a productive, open grassland with a relatively low abundance of forb species. The plant structure is driven by periodic water inundation and a seasonal water table, but is also maintained by a grazing and fire regime which allows upland grasses to compete with gulf cordgrass for resources. During periods of infrequent water inundation, upland grass species will increase and remain a large component of the plant community. The Grassland State (1) is resistant to change but the Reference Plant Community (1.1) is not very resilient and is highly affected by unsustainable grazing pressure and frequent periods of water inundation.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	2130	3727	5324
Forb	112	168	224
Shrub/Vine	–	28	56
Total	**2242**	**3923**	**5604**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-5%
Grass/grasslike foliar cover	85-95%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-10%
Surface fragments >0.25" and <=3"	0-2%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0-5%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	0-5%	85-95%	0-5%
>0.15 <= 0.3	–	0-5%	85-95%	0-5%
>0.3 <= 0.6	–	0-5%	85-95%	0-5%
>0.6 <= 1.4	–	0-5%	85-95%	0-5%
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 10. Plant community growth curve (percent production by month).

TX7751, Midgrass Prairie Community. Open grassland plain composed of mid-grasses with seacoast bluestem and gulfdune paspalum dominate the site..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	20	15	10	10	15	6	4	0

Community 1.2
Cordgrass Prairie Community

Figure 11. 1.2 Cordgrass Prairie Community

Gulf cordgrass dominates this plant community and will make up a significant portion of the total annual production. Grasess like purple dropseed (*Sporobolus purpurascens*), brownseed paspalum (Paspalum plicatum), Hartweg's paspalum (*Paspalum hartwegianum*), fringed signalgrass (*Urochloa ciliatissima*), and red lovegrass (*Eragrostis secundiflora*) will make up a portion of the plant composition. Gulf cordgrass can be an excellent emergency forage for cattle if managed through prescribed fire and prescribed grazing. Overall, bare ground and litter cover will remain relatively constant from the Reference Plant Community (1.1) to the Cordgrass Prairie Community (1.2) because of the high herbaceous production of gulf cordgrass.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	2186	3755	5324
Forb	56	140	224
Shrub/Vine	–	28	56
Total	**2242**	**3923**	**5604**

Figure 13. Plant community growth curve (percent production by month). TX7752, Midgrass Prairie (Degraded) Community. Midgrass Prairie with Degraded midgrass species..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	20	15	10	10	15	6	4	0

Pathway 1.1A
Community 1.1 to 1.2

This pathway represents a dramatic reduction in species diversity. Upland grasses begin to disappear and gulf cordgrass will account for the majority of the plant composition. Unsustainable grazing pressure and periods of long-term water inundation are the main drivers for this transition.

Pathway 1.2A

Community 1.2 to 1.1

Grazing management is key to restoring the Midgrass Prairie Community (1.1). Sustainable grazing keeps pressure off target grass species and allows enough fine fuel to build up and support prescribed burns. Uncontrollable factors, like periodic water inundation, will have a large impact on the successional direction of this plant community. The transition back to the Reference Plant Community (1.1) can take a very long time if seed sources for desirable grass species have been depleted.

State 2
Woody Complex

Community 2.1
Woody Encroachment

Figure 14. 2.1 Woody Encroachment Community

The woody plant species of this area are not well adapted to the edaphic conditions of this ecological site. Periodic water inundation and a seasonal water table create barriers to seedling germination and affect the longevity of plants that do establish. Under the right circumstances woody plants including mesquite and huisache (*Acacia farnesiana*) will grow on this ecological site, but their growth is stunted and plant mortality is high. A significant woody canopy cover is not typical for this ecological site. In rare circumstances, areas may not experience periodic water inundation or may no longer have a seasonal water table. Woody species will be more common and longer lived in these situations.

Table 9. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	2130	3643	5156
Shrub/Vine	56	140	224
Forb	56	140	224
Total	**2242**	**3923**	**5604**

Figure 16. Plant community growth curve (percent production by month). TX7752, Midgrass Prairie (Degraded) Community. Midgrass Prairie with Degraded midgrass species..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	20	15	10	10	15	6	4	0

Transition T1A
State 1 to 2

Woody plants will occasionally establish on this ecological site, but will not create a canopy cover over 20 percent.

Woody plants will germinate in between periods of water inundation, but are not typically a persistent part of the plant community.

Restoration pathway R2A
State 2 to 1

Land managers may want to restore this ecological site to the Native Grassland State (1). Once in the Woody Complex (2), mechanical or chemical brush control can be used to remove unwanted woody plants, but often the herbaceous component is the main focus. Prescribed burning will have positive impact on recruitment of desirable grass species. The restoration process is heavily dependent on favorable weather and patience. Land managers can plant native seed to speed up restoration efforts or can rely on seed that is already in the soil. Extensive soil disturbance is not recommended because of the salty nature of the subsoil. Grazing pressure on restoration sites should be deferred for a minimum of one growing season, but it is often necessary to defer livestock grazing completely or carefully graze for years before the desired plant community can develop.

Additional community tables

Table 10. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Midgrasses**			673–1681	
	gulf cordgrass	SPSP	*Spartina spartinae*	673–1681	–
2	**Mid/Tallgrasses**			785–1961	
	shore little bluestem	SCLI11	*Schizachyrium littorale*	336–953	–
	bushy bluestem	ANGLG2	*Andropogon glomeratus var. glomeratus*	224–560	–
	switchgrass	PAVI2	*Panicum virgatum*	224–560	–
3	**Mid/Shortgrasses**			673–1681	
	hooded windmill grass	CHCU2	*Chloris cucullata*	84–252	–
	gummy lovegrass	ERCU	*Eragrostis curtipedicellata*	84–252	–
	red lovegrass	ERSE	*Eragrostis secundiflora*	84–252	–
	tumble lovegrass	ERSE2	*Eragrostis sessilispica*	84–252	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	84–252	–
	Nealley's sprangletop	LENE2	*Leptochloa nealleyi*	84–252	–
	Judd's grass	LEVI4	*Leptochloa virgata*	84–252	–
	Hartweg's paspalum	PAHA3	*Paspalum hartwegianum*	84–252	–
	brownseed paspalum	PAPL3	*Paspalum plicatulum*	84–252	–
	alkali sacaton	SPAI	*Sporobolus airoides*	84–252	–
	purple dropseed	SPPU3	*Sporobolus purpurascens*	84–252	–
	fringed signalgrass	URCI	*Urochloa ciliatissima*	84–252	–
Forb					
4	**Forbs**			112–224	
	Forb, annual	2FA	*Forb, annual*	28–84	–
	partridge pea	CHFA2	*Chamaecrista fasciculata*	11–56	–
	gulf croton	CRPU6	*Croton punctatus*	11–56	–
	blanketflower	GAILL	*Gaillardia*	11–56	–
	littleleaf sensitive-briar	MIMI22	*Mimosa microphylla*	11–56	–
	snoutbean	RHYNC2	*Rhynchosia*	11–56	–
Shrub/Vine					
5	**Shrubs/Vines**			0–56	
	honey mesquite	PRGLG	*Prosopis glandulosa var. glandulosa*	0–56	–

Animal community

The animal community of this ecological site is typical of Coastal Prairie communities influenced by fresh and salt water inundations. Cattle (Bos spp.) and many species of wildlife make extensive use of this ecological site. White-tailed deer may be found scattered across the prairie, and are found in heavier concentrations where woody cover exists. Feral hogs (Sus scrofa) are present and, at times, become abundant. Coyotes (Canis latrans) are abundant, and probably have replaced the red wolf (Canis rufus) in this mammalian predator niche. Rodent populations rise during drier periods and fall during periods of inundation. Geese (family Anatidae) and sandhill cranes (Grus canadensis) abound during winter. Many species of avian predators including northern harriers (Circus cyaneus),

red-tailed hawks (Buteo jamaicensis), kestrels (Falco sparverius), white-tailed kites (Elanus leucurus), and, occasionally, swallow-tailed kites (Elanoides forficatus). Many species of grassland birds use the ecological site, including blue grosbeaks (Guiraca caerulea), dickcissels (Spiza americana), eastern meadowlarks (Sturnella magna), and several sparrows, including Cassin's sparrow (Aimophila cassinii), vesper sparrow (Pooecetes gramineus), lark sparrow (Chondestes grammacus), savannah sparrow (Passerculus sandwichensis), grasshopper sparrow (Ammodramus savannarum), and Le Conte's sparrow (Ammodramus leconteii).

Hydrological functions

This ecological site is periodically inundated with fresh or salt water and has a seasonal water table 6 to 18 inches below the soil surface from early fall to spring.

Recreational uses

The area is often used for hunting and photography.

Wood products

This ecological site does not produce a significant amount of woody vegetation.

Other products

Landowners have the opportunity to explore the many facets of ecotourism, and the potential of the natural resources of their property, to create value from their land.

Inventory data references

The data contained in this document is derived from analysis of inventories, clipping studies, and ecological interpretation from field evaluations.

Other references

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Contributors

Gary Harris, MSSL, NRCS, Robstown, Texas

Approval

Bryan Christensen, 9/21/2023

Acknowledgments

Technical reviewers and contributors include:
Clark Harshbarger, MSSL, NRCS, Robstown
Vivian Garcia, RMS, NRCS, Corpus Christi
Shanna Dunn, RSS, NRCS, Corpus Christi

Jason Hohlt, RMS, NRCS, Kingsville
Tyson Hart, RMS, NRCS, Nacogdoches

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)	David Hinojosa
Contact for lead author	361-241-0609, Zone 3 Rangeland Management Specialist
Date	09/23/2013
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:** Uncommon.

3. **Number and height of erosional pedestals or terracettes:** None.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Less than 20 percent bare ground.

5. **Number of gullies and erosion associated with gullies:** None.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Small-to-medium sized litter may move short distances during 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 horizons are 3 to 14 inches thick; light brownish gray (10YR 6/2) loamy fine sand; weak, medium subangular blocky structure; abrubt smooth boundary; SOM is les than three percent.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** A high canopy cover of bunch, rhizomatous, and stoliniferous grasses will help minimize runoff and maximize infiltration. Grasses should comprise approximately 90 percent of total annual production by weight. Shrubs will comprise less than five percent by weight.

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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: Mid/Tallgrasses >

    Sub-dominant: Midgrasses = Mid/Shortgrasses >> Forbs > Shrubs/Vines

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Potential for 5 to 15 percent plant mortality of perrenial bunchgrasses during extreme drought and greather than 50 percent mortality after periods of water inundation.

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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):** 2,000 to 5,000 pounder per acre.

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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:** Gulf cordgrass is a common invader.

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17. **Perennial plant reproductive capability:** All species should be capable of reproducing, except during periods of prolonged drought conditions.
