USDA Natural Resources Conservation Service

Ecological site R077EY058TX
Loamy Bottomland 16-24" PZ

Last updated: 9/12/2023
Accessed: 05/02/2024

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.

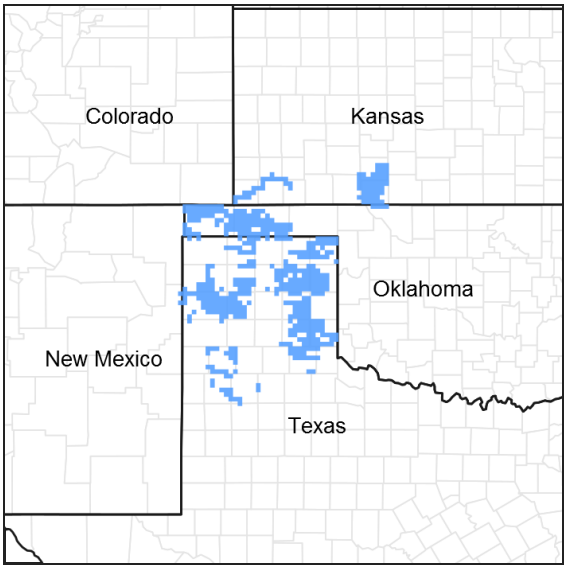


Figure 1. Mapped extent

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): 077E–Southern High Plains, Breaks

MLRA 77E occurs along moderately sloping breaks and steep escarpments associated with dissecting river systems and erosional margins of the Southern High Plains. Soil temperature regime is thermic and soil moisture regime is ustic bordering on aridic. Loamy and sandy soils are generally well drained, range from shallow to deep, and developed in Ogallala Formation sediments.

Classification relationships

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

Ecological site concept

This site occurs on very deep loamy alluvial soils on floodplains. The reference vegetation consists of a tallgrass dominated plant community with forbs and scattered trees. Continued abusive grazing may have a negative impact on the palatable tallgrass species and lead to a decline. Woody species may increase in density and canopy cover if periodic prescribed fire or alternative brush management is not implemented.

Associated sites

R077EY098OK	**Depression 16-24" PZ** Nearly level clayey soils on lower concave closed depressions. Water is ponded for various lengths of time. Vegetation may fluctuate as a result of the duration and depth of ponding and include hyrophytes.
R077EY065TX	**Sandy Bottomland 16-24" PZ** Level to slightly undulating very deep sandy soils on adjacent floodplains. Tallgrasses, forbs, and scattered trees and shrubs.
R077EY571TX	**Wet Bottomland 16-24" PZ** Nearly level to slightly concave loamy subirrigated soils on lower adjacent floodplains. The reference vegetation consists of native tallgrasses, forbs, and scattered trees.

Similar sites

R077EY052TX	**Draw 16-24" PZ** Loamy alluvial soils slightly higher in the landscape on draws, generally drier and without any subsurface water table.
R078CY103TX	**Loamy Bottomland 23-31" PZ** A similar site in MLRA 78C.

Table 1. Dominant plant species

Tree	(1) *Populus deltoides*
Shrub	Not specified
Herbaceous	(1) *Panicum virgatum* (2) *Sorghastrum nutans*

Physiographic features

This site occurs in stream flood plains or drainageways along major streams. Parent materials are loamy alluvium with loamy surfaces and subsoils. Usually they are intermittently flooded but are above the main stream channel. They occupy the lowest position on the landscape and receive runoff water from upland sites. Slopes are nearly level to very gently sloping.

Table 2. Representative physiographic features

Landforms	(1) Plains > Flood plain
Runoff class	Negligible to low
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	610–1,372 m
Slope	0–3%
Water table depth	203 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Negligible to low
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to frequent
Ponding frequency	None

Elevation	610–1,372 m
Slope	0–3%
Water table depth	152–203 cm

Climatic features

Climate is a cold semi-arid steppe (Koppen-Geiger classification BSk). Summers are hot and winters are cold. Temperature extremes are common. Humidity is generally low, evaporation is high, and short-term droughts are common. Average annual wind speed is 12 mph with highest winds in early spring. The prevailing wind direction is south. Summertime brings strong high pressure systems that build into heat domes with highs in the upper 90 to mid-100 degree F range. Evaporation in summer is high and open pan evaporation exceeds 6 feet per year. Early autumn temperatures are mild, with Canadian and Pacific cold fronts bringing cold air in mid-autumn throughout winter. Arctic air can settle in and dominate for several weeks during winter with very cold air in place for 2 to 3 weeks at a time.

Most of the precipitation comes in the form of rain from May through September. Rainfall events often occur as intense showers of relatively short duration. Snowfall average is about 17 inches but is also variable from 8 to 36 inches annually. Long term droughts are likely to occur every 15 to 20 years and may last 4 to 5 years. Mean precipitation is around 21 inches but varies significantly from year to year. Rainfall amounts over the last 100 years have varied from as little as 9 inches to as much as 37 inches. The probability is about 70% that precipitation will fall between 14 to 24 inches. Growing season averages 190 days. Average first frost is around October 22, and the last freeze of the season occurs around April 15.

Table 4. Representative climatic features

Frost-free period (characteristic range)	146-164 days
Freeze-free period (characteristic range)	184-194 days
Precipitation total (characteristic range)	508-610 mm
Frost-free period (actual range)	144-176 days
Freeze-free period (actual range)	180-198 days
Precipitation total (actual range)	483-660 mm
Frost-free period (average)	156 days
Freeze-free period (average)	189 days
Precipitation total (average)	559 mm

Climate stations used

- (1) REYDON 2SSE [USC00347579], Reydon, OK
- (2) CLARENDON [USW00023072], Clarendon, TX
- (3) GATE [USC00343489], Gate, OK
- (4) FOLLETT [USC00413225], Follett, TX
- (5) CANADIAN [USC00411412], Canadian, TX
- (6) GUYMON MUNI AP [USW00003030], Guymon, OK
- (7) BEAVER [USC00340593], Beaver, OK
- (8) MEADE [USC00145171], Meade, KS
- (9) BOYS RANCH [USC00411000], Vega, TX
- (10) LIPSCOMB [USC00415247], Booker, TX
- (11) CHANNING 2 [USC00411649], Channing, TX
- (12) MIAMI [USC00415875], Miami, TX
- (13) COLDWATER [USC00141704], Coldwater, KS
- (14) SANFORD DAM [USC00418040], Fritch, TX

Influencing water features

The site will flood frequently to rarely. Some new sediment deposition can occur with major flood events.

Wetland description

Soils in this ecological site are not part of wetland ecosystems.

Soil features

Soils are mapped for each county within the MLRA. Mapunits are representations of the major soil series component(s) and named accordingly. Each Mapunit is spatially represented on a digital soils map as polygons of different shapes and sizes. Within these Mapunits, there are often minor soil series components included. These minor components are soils that occur within a Mapunit polygon but are of small extent (15% or less of the Mapunit area). However, it is difficult to separate these minor soils spatially due to the scale of soil mapping.

Ecological sites are correlated at the component level of the soil survey. Therefore, a single Mapunit may contain multiple Ecological Sites just as it may contain multiple soil components. This is important to understand when investigating soils and Ecological Sites. A soil survey Mapunit may be correlated to a single Ecological Site based on the major component; however, there may be inclusions of areas of additional Ecological Sites which are correlated to the minor components of that particular soil Mapunit.

The soils are very deep and alluvial in nature. Surface textures are loam, clay loam, silt loam and fine sandy loam with fine-loamy subsoils. Permeability is moderate to moderately rapid. Fertility is moderate and organic matter can be fairly high. Plant roots can easily penetrate the soil and productive potential is high.

Representative soil components for this site include: Wespur. Older surveys may have Cass, Bridgeport, and Spur.

Table 5. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Loam (2) Clay loam (3) Fine sandy loam
Family particle size	(1) Fine-loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	203 cm
Surface fragment cover <=3"	0–2%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.92–20.07 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (0-101.6cm)	0–3%

Subsurface fragment volume >3" (0-101.6cm)	0%

Ecological dynamics

The information contained in the State and Transition Diagram (STD) and the Ecological Site Description was developed using archeological and historical data, professional experience, and scientific studies. The information presented is representative of a very complex set of plant communities. Not all scenarios or plants are included. Key indicator plants, animals and ecological processes are described to inform land management decisions.
The reference plant community for this site is tallgrass dominant with a few shrubs and scattered trees of moderate to tall stature. The majority of species are warm-season grasses. The site is more productive than the Sandy Bottomland ecological site because of greater soil development and greater fertility. There is usually a water table within reach of deep-rooted grasses and forbs. Trees can obtain sufficient water so as to attain their growth potential. Grasses dominate the community. Switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum nutans*) and smaller amounts of little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*) and Canada wildrye (*Elymus canadensis*) are also found. Midgrasses common to the site are western wheatgrass (*Pascopyrum smithii*), vine mesquite (*Panicum obtusum*), meadow dropseed (*Sporobolus compositus* var. drummondii), and sideoats grama (*Bouteloua curtipendula*). A few shortgrass species are present which include blue grama (*Bouteloua gracilis*), inland saltgrass (*Distichlis spicata*), and buffalograss (*Bouteloua dactyloides*).

There are some perennial forbs present although the variety is limited. Major forbs include Illinois bundleflower (*Desmanthus illinoensis*), Maximilian sunflower (*Helianthus maximiliani*), heath aster (*Chaetopappa ericoides*) and primrose (Oenothera spp.). Shrubs that occur in small quantities include skunkbush sumac (*Rhus trilobata*), leadplant (*Amorpha canescens*), and willow baccharis (*Baccharis salicina*). Trees are mainly cottonwood (*Populus deltoides*) and hackberry (*Celtis laevigata* var. reticulata). Salt cedar (*Tamarix ramosissima*) and baccharis can invade the site if poor management reduces grass cover and seed sources are present.

This site is preferred by livestock for grazing and is often overused due to plant preference and due to the presence of water. Management must be careful in order to maintain plant diversity and productivity and keep invasive species from becoming aggressive. The site is very important as a buffer along streams and contributes to good water quality provided good plant cover is maintained. Many species of wildlife utilize this site as nesting and escape cover, roosting sites and for general browsing.

If this site is abused by inappropriate heavy grazing for long periods of time, the tallgrasses will disappear and mid and shortgrasses will dominate. Further abuse will see shortgrasses and annual forbs making up most of the plant cover. Woody shrubs such as salt cedar and baccharis will act as invaders and form a significant canopy cover. The site is very productive but needs careful management in order to sustain the historic climax community. If the site declines in ecological condition and shrubs invade, restoration can often be accomplished with proper grazing treatment and judicious brush and weed control measures. If degradation has progressed very far, this process of restoration may take several years. Care must be taken using herbicides due to possible damage to valuable trees. Prescribed fire can be used but trees need to be protected. In general, fire should be applied before the cottonwoods bud out in the spring.

In addition to abusive grazing, this site has declined in ecological condition in some cases due to lowered water tables and decreased spring flow. If water table depths decrease, then mid and shortgrasses sometimes increase due to less water requirement. Heavy stands of shrubs can also lower water tables in certain instances. It is also possible that pumping of ground water for agricultural and municipal use has had an adverse effect on site soil/water/plant relationships.

State and Transition Diagram:
A State and Transition Diagram for the Loamy Bottomland (R077EY058TX) site is depicted below. Thorough descriptions of each state, transition, and pathway follow the model. Experts base this model on available experimental research, field observations, professional consensus, and interpretations. It is likely to change as knowledge increases.
Plant communities will differ across the MLRA because of the natural variability in weather, soils, and aspect. The Reference Plant Community is not necessarily the management goal; other vegetative states may be desired plant communities as long as the Range Health assessments are in the moderate and above category.

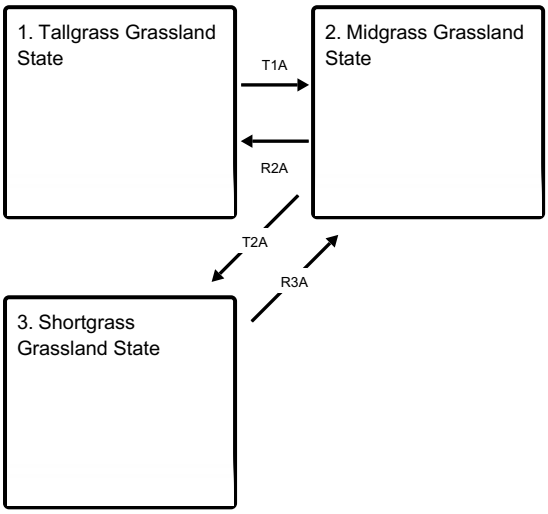
The biological processes on this site are complex. Therefore, representative values are presented in a land management context. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

Composition by dry weight and percent canopy cover are provided to describing the functional groups. Most observers find it easier to visualize or estimate percent canopy for woody species (trees and shrubs).

The following diagram suggests some pathways that the vegetation on this site might take. There may be other states not shown on the diagram. This information is intended to show what might happen in a given set of circumstances. It does not mean that this would happen the same way in every instance. Local professional guidance should always be sought before pursuing a treatment scenario.

State and transition model

Ecosystem states



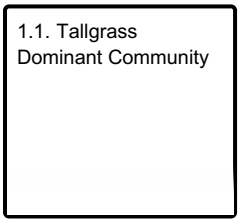
T1A - Prolonged excessive grazing pressure and introduction of non-native species

R2A - Removal of non-natives and reintroduction of historic disturbance return intervals

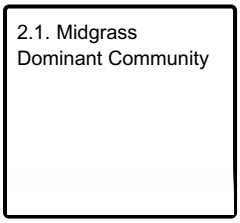
T2A - Absence of disturbance and natural regeneration over time, coupled with excessive grazing pressure

R3A - Adequate rest from defoliation and proper grazing management

State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities

3.1.
Shortgrass/Annuals
Community

State 1
Tallgrass Grassland State

This is the reference or diagnostic community for the site. The description is based on early range site descriptions, clipping data, professional consensus of experienced range specialists, and analysis of field work.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- switchgrass (*Panicum virgatum*), grass
- Indiangrass (*Sorghastrum nutans*), grass

Community 1.1
Tallgrass Dominant Community

Figure 8. 1.1 Tallgrass Dominant Community

The interpretive plant community for this site is the reference plant community. Tallgrasses dominate this site. The number of cottonwood trees is perhaps more than normal and may be a result of several years of no grazing. Major grasses include switchgrass, Indiangrass, and various midgrasses. Shrubs are few and forbs limited to a few perennial species such as Illinois bundleflower, prairie acacia, and gaura species. This community has almost total cover and high productive capacity. The ecological processes are functioning at peak efficiency.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1681	2914	3363
Tree	112	191	336
Forb	67	224	269
Shrub/Vine	22	34	56
Microbiotic Crusts	–	–	1
Total	**1882**	**3363**	**4025**

Figure 10. Plant community growth curve (percent production by month). TX1512, HCPC - Warm Season Natives. "Historic Climax Plant Community

with warm season natives, scattered forbs and woody species.".

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	4	7	19	23	17	8	12	5	2	1

State 2
Midgrass Grassland State

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- western wheatgrass (*Pascopyrum smithii*), grass
- vine mesquite (*Panicum obtusum*), grass

Community 2.1
Midgrass Dominant Community

Figure 11. 2.1 Midgrass Dominant Community

This site is a western wheatgrass-vine mesquite dominant community with some encroaching woody shrubs such as the Tamarix species. Production is lower than that of the historic climax. There are only a moderate amount of tallgrass species present with a dominant presence of midgrasses. There is an increase in annual forbs and certain shortgrass species. Perennial forbs are few. Diversity is less than the reference community and wildlife habitat is less desirable.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1457	2018	2802
Forb	45	112	168
Tree	28	56	140
Shrub/Vine	34	56	90
Microbiotic Crusts	–	–	1
Total	**1564**	**2242**	**3201**

Figure 13. Plant community growth curve (percent production by month). TX1524, Midgrasses with few invasive shrubs. Midgrasses with few forbs and invasive shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	6	16	22	20	10	4	3	6	5	4	2

State 3
Shortgrass Grassland State

This is a degraded plant community which is composed of western ragweed, annual forbs, and shortgrass species. Woody shrubs are also increasing.

Dominant plant species

- blue grama (*Bouteloua gracilis*), grass
- ragweed (*Ambrosia*), other herbaceous

Community 3.1
Shortgrass/Annuals Community

Figure 14. 3.1 Shortgrass/Annuals Community

This is a degraded plant community which is composed of western ragweed, annual forbs, and shortgrass species. Woody shrubs are also increasing. There is a low production potential. Ecological processes are not functioning well. Poor hydrologic conditions prevail. This site has lost much of its wildlife benefit and is not producing much forage for livestock.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	560	785	1009
Forb	224	392	448
Tree	112	224	224
Shrub/Vine	22	34	45
Microbiotic Crusts	–	–	–
Total	**918**	**1435**	**1726**

Figure 16. Plant community growth curve (percent production by month). TX1516, Degraded shortgrass/annuals. Low vigor shortgrasses with annual invasion, limited production potential, and high erosion potential..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	5	15	30	25	5	3	6	6	2	1

Transition T1A
State 1 to 2

With heavy continuous grazing pressure, brush invasion of tamarix species, and no fires, the Tallgrass Dominant Community will transition into the Midgrass Dominant Community.

Restoration pathway R2A
State 2 to 1

With the implementation of conservation practices such as Prescribed Grazing (with periodic rests during the growing season of perennial warm-season grasses), Brush Management of Tamarix and baccharis species, and Prescribed Burning, the Midgrass Grassland State can be restored back to the Tallgrass Grassland State.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

Transition T2A
State 2 to 3

With heavy continuous grazing, brush invasion of Tamarix and baccharis species, no fires, and no brush management, the Midgrass Dominant Community will transition into the Shortgrass/Annuals Community.

Restoration pathway R3A
State 3 to 2

With Prescribed Grazing over a one to four year period, Pest Management, Brush Management (Individual Plant Treatments), the Shortgrass Grassland State can be restored to the Midgrass Grassland State.

Conservation practices

Brush Management
Prescribed Grazing
Integrated Pest Management (IPM)

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					
0	**Midgrass**			336–588	
1	**Tallgrasses**			1177–2018	
	switchgrass	PAVI2	*Panicum virgatum*	757–1300	–
	Indiangrass	SONU2	*Sorghastrum nutans*	336–588	–
	sand bluestem	ANHA	*Andropogon hallii*	84–135	–
2	**Midgrasses**			202–364	
	western wheatgrass	PASM	*Pascopyrum smithii*	112–196	–
	vine mesquite	PAOB	*Panicum obtusum*	56–101	–
	Canada wildrye	ELCA4	*Elymus canadensis*	34–67	–
3	**Midgrasses**			56–101	
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	34–67	–
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	22–34	–

4	**Mid/Shortgrasses**			157–280	
	blue grama	BOGR2	*Bouteloua gracilis*	34–56	–
	saltgrass	DISP	*Distichlis spicata*	34–56	–
	creeping muhly	MURE	*Muhlenbergia repens*	34–56	–
	white tridens	TRAL2	*Tridens albescens*	11–28	–
	tumble windmill grass	CHVE2	*Chloris verticillata*	11–28	–
5	**Tallgrass**			0–1	
	prairie cordgrass	SPPE	*Spartina pectinata*	0–1	–
6	**Tallgrass**			39–67	
	eastern gamagrass	TRDA3	*Tripsacum dactyloides*	39–67	–
Forb					
7	**Forbs**			67–269	
	Forb, annual	2FA	*Forb, annual*	0–28	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–28	–
	aster	ASTER	*Aster*	0–28	–
	bundleflower	DESMA	*Desmanthus*	0–28	–
	Engelmann's daisy	ENGEL	*Engelmannia*	0–28	–
	beeblossom	GAURA	*Gaura*	0–28	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	0–28	–
	evening primrose	OENOT	*Oenothera*	0–28	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	0–28	–
	Baldwin's ironweed	VEBA	*Vernonia baldwinii*	0–28	–
8	**Forbs**			0–1	
	bluebell bellflower	CARO2	*Campanula rotundifolia*	0–1	–
Shrub/Vine					
9	**Shrubs**			22–56	
	leadplant	AMCA6	*Amorpha canescens*	0–17	–
	false indigo bush	AMFR	*Amorpha fruticosa*	0–17	–
	saltwater false willow	BAAN	*Baccharis angustifolia*	0–17	–
	Oklahoma plum	PRGR	*Prunus gracilis*	0–17	–
	fragrant sumac	RHAR4	*Rhus aromatica*	0–17	–
Tree					
10	**Trees**			112–336	
	eastern cottonwood	PODE3	*Populus deltoides*	101–224	–
	hackberry	CELTI	*Celtis*	45–101	–
	black willow	SANI	*Salix nigra*	0–6	–
	western soapberry	SASAD	*Sapindus saponaria var. drummondii*	0–6	–

Animal community

This site is important habitat since it provides a good variety of browse, and grazing for a variety of species of wildlife. Water is often present as well, making it a highly desirable site. Roosting trees are available for turkey and sufficient nesting and escape cover exists for ground nesting birds. Many small mammals and predators inhabit the

site. If the site is degraded, much of the benefits to wildlife are lost.

Hydrological functions

The sites acts as a buffer along streams that occasionally flood. With good cover, water quality downstream is enhanced. Silt is reduced and streambank erosion is less. The site also aids in ground water recharge provided the plant community is near reference condition. With good management, spring flow is often enhanced.

Recreational uses

Hunting, Camping, Hiking, Birdwatching, Photography, and Horseback Riding.

Wood products

None.

Other products

None.

Other information

None.

Inventory data references

NRCS FOTG – Section II of the FOTG Range Site Descriptions and numerous historical accounts of vegetative conditions at the time of early settlement in the area were used in the development of this site description. Vegetative inventories were made at several site locations for support documentation.

Inventory Data References (documents):
NRCS FOTG – Section II - Range Site Descriptions
NRCS – NRI data
NRCS Clipping Data summaries over a 20 year period

Other references

Natural Resources Conservation Service - Range Site Descriptions
USDA-Natural Resources Conservation Service - Soil Surveys & Website soil database
Rathjen, Frederick W., The Texas Panhandle Frontier, Rev. 1998, Univ. of Texas Press
Hatch, Brown and Ghandi, Vascular Plants of Texas (An Ecological Checklist)
Texas A&M Exp. Station, College Station, Texas
Texas Tech University – Range,Wildlife & Fisheries Dept.

Technical Review:
Mark Moseley, Oklahoma State RMS, NRCS, Stillwater, Oklahoma
Homer Sanchez, State RMS, NRCS, Temple, Texas
Tony Garcia, Zone RMS, NRCS, Lubbock, Texas
Clint Rollins, RMS, NRCS, Amarillo, Texas
Dr. Jack Eckroat, Grazing Lands Specialist, NRCS, Stillwater, Oklahoma
Justin Clary, RMS, NRCS, Temple, Texas

Contributors

J.R. Bell, RMS, NRCS, Amarillo, Texas (retired)
Steven McGowen, MLRA Office Leader, NRCS, Woodward, OK

Approval

Bryan Christensen, 9/12/2023

Acknowledgments

Site Development and Testing Plan
Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.
Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team.

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	Stan Bradbury, Zone RMS, NRCS, Lubbock, Texas
Contact for lead author	806-791-0581
Date	09/04/2007
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. **Presence of water flow patterns:** Well defined water flow patterns.

3. **Number and height of erosional pedestals or terracettes:** Common due to concentrated water flow.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10-15% along banks, up to 50% in channel areas.

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** Frequent and extensive during heavy rainfall events.

---

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Moderate resistance to surface erosion.

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Fine sandy loam to silt loam; friable surface; moderate SOM.

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Extensive basal cover and density with small interspaces will make rainfall impact minimal. This site is a moderately permeable soil, runoff is slow and available water holding capacity is high.

---

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: Cool-season midgrasses > Cool-season tallgrasses > Warm-season midgrasses > Trees >

    Other: Shrubs/Vines

    Additional:

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Mortality and decadence is moderate due to high herbaceous vegetative canopy.

---

14. **Average percent litter cover (%) and depth (in):** Litter is dominantly herbaceous.

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1,700 to 3,600 pounds per acre.

---

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:** Willow baccharis, salt cedar, elm, and Russian olive can be invasive.

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