USDA Natural Resources
Conservation Service

Ecological site R077EY065TX
Sandy Bottomland 16-24" PZ

Last updated: 9/12/2023
Accessed: 05/09/2024

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 sandy soils on floodplains. The reference vegetation consists of tallgrasses, forbs, and scattered trees and shrubs. In the absence of fire or other brush management, woody species may expand across the site. Due to the proximity to waterways, this site is at risk of invasion by salt cedar. A seasonal high water table may range from 20 to 60 inches below the soil surface.

Associated sites

R077EY058TX	**Loamy Bottomland 16-24" PZ** Nearly level to very gently sloping, very deep loamy alluvial soils on floodplains. Tallgrass dominated plant community with forbs and scattered trees.
R077EY063TX	**Sand Hills 16-24" PZ** Very sandy soils on higher undulating to steep dune topography with a mixture of tall and midgrasses, forbs, and few shrub species and bare ground.
R077EY571TX	**Wet Bottomland 16-24" PZ** Nearly level to slightly concave loamy subirrigated soils on adjacent floodplains. The reference vegetation consists of native tallgrasses, forbs, and scattered trees.

Similar sites

R078CY068OK	**Sandy Bottomland** A similar site in MLRA 78C.

Table 1. Dominant plant species

Tree	(1) *Populus deltoides*
Shrub	Not specified
Herbaceous	(1) *Panicum virgatum* (2) *Andropogon hallii*

Physiographic features

This site occurs on sandy flood plains, drainageways, and draws and is intermittently flooded. The site developed from alluvial deposits and may exhibit some minor reworking by wind. The slopes are generally level to slightly undulating.

Table 2. Representative physiographic features

Landforms	(1) Plains > Flood plain (2) Plains > Drainageway (3) Plains > Draw
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	0–2%
Water table depth	51–152 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	0–2%

Water table depth	51–203 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) BEAVER [USC00340593], Beaver, OK
- (2) CANADIAN [USC00411412], Canadian, TX
- (3) GATE [USC00343489], Gate, OK
- (4) BOYS RANCH [USC00411000], Vega, TX
- (5) FOLLETT [USC00413225], Follett, TX
- (6) SANFORD DAM [USC00418040], Fritch, TX
- (7) GUYMON MUNI AP [USW00003030], Guymon, OK
- (8) MEADE [USC00145171], Meade, KS
- (9) CLARENDON [USW00023072], Clarendon, TX
- (10) LIPSCOMB [USC00415247], Booker, TX
- (11) CHANNING 2 [USC00411649], Channing, TX
- (12) MIAMI [USC00415875], Miami, TX
- (13) COLDWATER [USC00141704], Coldwater, KS
- (14) REYDON 2SSE [USC00347579], Reydon, OK

Influencing water features

This site is adjacent to streams that are occasionally flooded but are not classified as wetlands. There is no predominance of hydrophytic vegetation on the site and the soils are somewhat poorly drained to well drained with

seasonal high water tables.

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 of this site are alluvial and sandy in texture. There is little horizon development. They are very low in organic matter and low in fertility. They are subject to wind erosion if good cover is not present. Infiltration of moisture is rapid and is plant available but storage capacity is very low. Depth to seasonal high water table influences the density and the amount of vegetation present. The productive potential of the site is moderate.

Representative soil components for this site include: Guadalupe, Happyditch, and Touzalin.
Older surveys include the Lincoln and Yahola series.

Table 5. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Fine sandy loam (2) Loamy fine sand (3) Loamy sand (4) Sand
Family particle size	(1) Sandy (2) Coarse-loamy
Drainage class	Somewhat poorly drained to somewhat excessively drained
Permeability class	Moderate to very rapid
Soil depth	203 cm
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	1.27–14.99 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–1
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (0-101.6cm)	0–7%

Subsurface fragment volume >3" (0-101.6cm)	0–2%

Ecological dynamics

This site is basically a tallgrass climax with a few midgrasses, a good perennial forb component, and scattered short shrubs and a few trees, mainly cottonwood (Populus spp.). The site occurs along sandy streambeds usually as a stream terrace, slightly higher on the landscape than the stream channel. Water tables are usually within 2 to 4 feet of the surface and plant roots can easily reach water. The soils consist of layers of sandy alluvium. Since there has been little soil development, the soil is not as strong in its ability to sustain a good cover of vegetation compared to more loamy soils.

This bottomland site is not as productive as the Loamy Bottomland site which has had more opportunity for soil development and is higher in finer textured soil particles and in organic matter. Occasional severe floods played a major role in the ecological development of the sandy bottomland site. Vegetation might be severely damaged in the event of a major flood and the rebuilding process might take several years. In time, tallgrasses such as sand bluestem (*Andropogon hallii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*) and Indiangrass (*Sorghastrum nutans*) form a moderate cover. Several midgrasses such as sand dropseed (*Sporobolus cryptandrus*), sand paspalum (*Paspalum distichum*), and sand lovegrass (*Eragrostis trichodes*) are also present. On the small dune areas, Giant sandreed (*Calamovilfa gigantea*) will be found. In some cases, common reedgrass (*Phragmites australis*) may occur in small aggregations. Common shrubs are skunkbush sumac (*Rhus trilobata*) and sand plum (*Prunus angustifolia*). Cottonwood (Populus deltoids) is the most prevalent tree with western soapberry (*Sapindus saponaria*) occurring in small groves. Occasional shrubby hackberry is also present. In western streams, salt cedar (*Tamarix ramosissima*) has become a major invading woody species and is often found on the site. Willow baccharis (*Baccharis salicina*) and common reedgrass can also increase and dominate portions of the site. Forbs such as Illinois bundleflower (*Desmanthus illinoensis*), catclaw sensitivebriar (*Mimosa aculeaticarpa* var. biuncifera), gaura (*Gaura suffulta*) and primrose species (Oenothera spp.) along with western ragweed (*Ambrosia psilostachya*) and various annual forbs make up about 10% of the vegetative component on a dry matter basis.

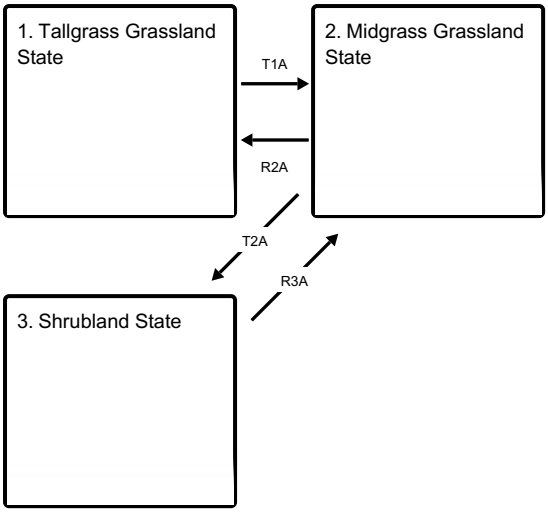
Good cover of tallgrasses can soon deteriorate if grazing pressure is too great. An excessive amount of animal impact can have an adverse effect on the sandy soils. This site is influenced by changes in the water table as well as by management. Maintaining good vegetative cover on this site makes for better water quality downstream with less sedimentation and increased aquifer recharge. This site is very important for many wildlife species which use the cover adjacent to water for critical habitat needs. Wild turkey often roost in the cottonwood trees along streams. Tallgrasses provide nesting cover for turkey and screening cover for white-tailed deer. Many sandy bottomland sites are showing a lack of cottonwood regeneration. Controlled grazing by fencing off riparian areas and allowing limited access by livestock may help improve the diversity and productivity of these sites.

Plant Communities and Transitional Pathways (diagram):

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



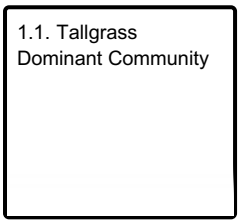
T1A - Absence of disturbance and excessive grazing pressure

R2A - Reintroduction of historic disturbance return intervals

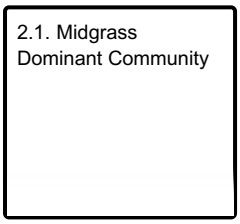
T2A - Absence of disturbance, introduction of non-native species, natural regeneration over time, and prolonged excessive grazing pressure

R3A - Chemical/physical removed of woody canopy, coupled with adequate rest from defoliation

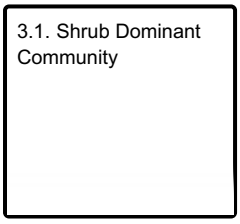
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



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. The Tallgrass Grassland State has a good diversity of tallgrasses, perennial forbs, scattered shrub cover and motts or groves of trees scattered throughout the ecological site.

Dominant plant species

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

- sand bluestem (*Andropogon hallii*), grass

Community 1.1
Tallgrass Dominant Community

Figure 8. 1.1 Tallgrass Dominant Community

Tallgrasses dominate the ecological site along with scattered shrubs and trees. Sand bluestem, switchgrass and dropseeds are the main grasses. Scattered cottonwoods also exist. Some salt cedar has become established on the site which would not typify the reference community. Production is good for the site's capabilities. The site has minimal bare soil and moderate to high productivity.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1345	1905	2578
Forb	112	168	258
Shrub/Vine	56	112	168
Tree	28	56	112
Microbiotic Crusts	–	–	–
Total	**1541**	**2241**	**3116**

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

Tallgrasses are in decline while midgrasses are increasing. There is also an increase in shrub cover. Forbs are also increasing in this plant community. The annual production potential is lower compared to the Tallgrass Grassland State.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- fragrant sumac (*Rhus aromatica*), tree
- saltgrass (*Distichlis spicata*), grass
- thin paspalum (*Paspalum setaceum*), grass
- sedge (*Carex*), grass

Community 2.1
Midgrass Dominant Community

Figure 11. 2.1 Midgrass Dominant Community

Declining amounts of tallgrasses, increasing midgrass species, and increasing shrub cover. Annual forbs more frequently found. Increase in bare soil and a drop in plant annual productivity. There is also a decrease in plant diversity that is pronounced.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	953	1457	1457
Shrub/Vine	168	280	504
Forb	112	224	258
Tree	56	90	101
Microbiotic Crusts	–	–	–
Total	**1289**	**2051**	**2320**

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
Shrubland State

There are few tallgrasses and midgrasses remaining in this plant community. There is an invasion of exotic species such as salt cedar and willow baccharis have formed a shrubland type community and are dominating the site.

Dominant plant species

- saltcedar (*Tamarix ramosissima*), shrub
- willow baccharis (*Baccharis salicina*), shrub
- sedge (*Carex*), grass

Community 3.1
Shrub Dominant Community

Figure 14. 3.1 Shrub Dominant Community

There are few tallgrasses and midgrasses remaining in this plant community. There is an invasion of exotic species such as salt cedar and willow baccharis have formed a shrubland type community and are dominating the site. There is a very limited plant diversity in the Shrub Dominant Community.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	841	897	1121
Grass/Grasslike	336	448	673
Forb	269	336	404
Tree	56	84	112
Microbiotic Crusts	–	–	–
Total	**1502**	**1765**	**2310**

Figure 16. Plant community growth curve (percent production by month). TX1525, Shrub Dominant with little grasses/forbs remaining. Invasion of shrubby species such as salt cedar and baccharis. A shrubland with little grasses and forbs remaining..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	5	16	30	25	5	5	5	4	2	1

Transition T1A
State 1 to 2

The Tallgrass/Grassland State transitions to the Midgrass Grassland State due to no fires, heavy continuous grazing and brush invasion of salt cedar.

Restoration pathway R2A
State 2 to 1

With Prescribed Grazing, Brush Management, Pest Management, and Prescribed Burning conservation practices implemented, the Midgrass Grassland State can be restored back to the Tallgrass Grassland State.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

Integrated Pest Management (IPM)

Transition T2A
State 2 to 3

Due to heavy continuous grazing pressure, brush invasion of exotic species such as salt cedar, and no fires, the Midgrass Grassland State will transition to the Shrubland State.

Restoration pathway R3A
State 3 to 2

With the implementation of various conservation practices such as Prescribed Grazing, Brush Management, Individual Plant Treatment, and Pest Management, the Shrubland State can be restored back 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					
1	**Tallgrasses**			1121–1597	
	switchgrass	PAVI2	*Panicum virgatum*	280–532	–
	little bluestem	SCSC	*Schizachyrium scoparium*	135–269	–
	Indiangrass	SONU2	*Sorghastrum nutans*	135–269	–
	sand bluestem	ANHA	*Andropogon hallii*	135–269	–
2	**Midgrasses**			224–359	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	67–135	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	34–73	–
	sand lovegrass	ERTR3	*Eragrostis trichodes*	34–67	–
	bristlegrass	SETAR	*Setaria*	17–34	–
	fall witchgrass	DICO6	*Digitaria cognata*	17–34	–
3	**Cool Season Grasses**			179–252	
	western wheatgrass	PASM	*Pascopyrum smithii*	56–112	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	34–56	–
	Canada wildrye	ELCA4	*Elymus canadensis*	28–50	–
4	**Tallgrasses**			112–168	
	giant sandreed	CAGI3	*Calamovilfa gigantea*	56–112	–
	purpletop tridens	TRFL2	*Tridens flavus*	11–22	–
5	**Midgrasses**			90–135	
	Grass, annual	2GA	*Grass, annual*	17–28	–
	sedge	CAREX	*Carex*	17–28	–

	sandbur	CENCH	*Cenchrus*	17–28	–
	saltgrass	DISP	*Distichlis spicata*	17–28	–
	thin paspalum	PASE5	*Paspalum setaceum*	17–28	–
6	**Tallgrass**			28–67	
	common reed	PHAU7	*Phragmites australis*	28–67	–
Forb					
7	**Forbs**			112–258	
	Forb, annual	2FA	*Forb, annual*	0–22	–
	snowball sand verbena	ABFR2	*Abronia fragrans*	0–22	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–22	–
	aster	ASTER	*Aster*	0–22	–
	dayflower	COMME	*Commelina*	0–22	–
	nineanther prairie clover	DAEN	*Dalea enneandra*	0–22	–
	purple dalea	DALA4	*Dalea lasiathera*	0–22	–
	bundleflower	DESMA	*Desmanthus*	0–22	–
	Indian blanket	GAPU	*Gaillardia pulchella*	0–22	–
	beeblossom	GAURA	*Gaura*	0–22	–
	gilia	GILIA	*Gilia*	0–22	–
	bractless blazingstar	MENUS	*Mentzelia nuda var. stricta*	0–22	–
	sensitive plant	MIMOS	*Mimosa*	0–22	–
	evening primrose	OENOT	*Oenothera*	0–22	–
	queen's-delight	STSY	*Stillingia sylvatica*	0–22	–
	prairie spiderwort	TROC	*Tradescantia occidentalis*	0–22	–
Shrub/Vine					
8	**Shrubs/Vines**			56–168	
	false indigo bush	AMFR	*Amorpha fruticosa*	0–34	–
	sand sagebrush	ARFI2	*Artemisia filifolia*	0–34	–
	saltwater false willow	BAAN	*Baccharis angustifolia*	0–34	–
	common buttonbush	CEOC2	*Cephalanthus occidentalis*	0–34	–
	Oklahoma plum	PRGR	*Prunus gracilis*	0–34	–
	fragrant sumac	RHAR4	*Rhus aromatica*	0–34	–
Tree					
9	**Trees**			28–112	
	eastern cottonwood	PODE3	*Populus deltoides*	0–39	–
	black willow	SANI	*Salix nigra*	0–39	–
	western soapberry	SASAD	*Sapindus saponaria var. drummondii*	0–39	–
	French tamarisk	TAGA	*Tamarix gallica*	0–39	–

Animal community

Turkey, deer, squirrel, quail and many small mammals utilize the site for critical habitat. Roosting and nesting cover are critical for turkey. Deer and quail utilize the site for nesting, escape cover and bedding. The variety of plant species provides a diverse wildlife habitat situation.

Hydrological functions

Good vegetation of tallgrasses, forbs and woody plants decrease evaporation and eliminate excessive use of ground water. The vegetation acts as a filter to reduce siltation down stream. Good cover reduces damage from intermittent flooding.

Recreational uses

Hunting, Camping, Hiking, Birdwatching, Photography, 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 Clipping Data summaries over a 20 year period

Other references

J.R. Bell, RMS, NRCS, Amarillo, Texas (retired)
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, 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 patterns.

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

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):** Not resistant to surface erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Loamy fine sand single grained surface; medium SOM.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Basal cover and density with small interspaces should make rainfall impact minimal. This site has rapid permeability, runoff is slow and available water capacity is low.

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: Cool-season grasses > Trees = Shrubs/Vines = Forbs

    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):** 1400 to 2800 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 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.
