

Ecological site R078BY087TX Sandy Bottomland 19-26" PZ

Last updated: 9/15/2023
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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.

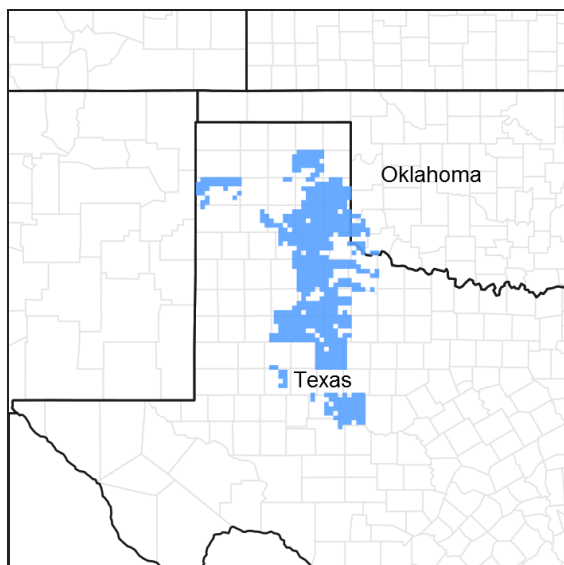


Figure 1. Mapped extent

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): 078B—Central Rolling Red Plains, Western Part

MLRA 78B is characterized by strongly dissected, rolling plains with prominent ridges and valleys and rolling to steep irregular topography. Loamy soils are generally well drained, range from shallow to deep, and developed in sediments of Triassic and Permian age.

LRU notes

NA

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

These sites occur on deep sandy soils on floodplains. The reference vegetation consists of tall grasses with forbs and scattered shrubs and trees. Abusive grazing practices can lead to a shift in the plant community and a decline

in the more palatable tallgrasses. Without periodic fire or alternative brush management, woody species may increase.

Associated sites

R078BY085TX	Sand Hills 19-26" PZ Windblown dunes above the floodplain
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Similar sites

R078BY080TX	Loamy Bottomland 19-26" PZ Loamy soils on floodplains
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Table 1. Dominant plant species

Tree	(1) <i>Populus deltoides</i>
Shrub	Not specified
Herbaceous	(1) <i>Andropogon hallii</i>

Physiographic features

This site occurs along sandy stream channels and on fluvial terraces along streams 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. There is usually a water table at a fairly shallow depth but the soil is not usually wet to the surface.

Table 2. Representative physiographic features

Landforms	(1) River valley > Terrace (2) River valley > Stream terrace
Runoff class	Negligible
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Elevation	518–701 m
Slope	0–1%
Water table depth	102–203 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is semi-arid to dry sub-humid. The growing season is approximately 220 days. First frost occurs approx. Nov. 3 and last frost approx. Apr. 1. 66% of the yearly rainfall occurs between May and September. The climate of the western rolling plains is dry, sub-humid with hot summers and mild winters. Temperatures often reach 100 degrees F for several consecutive days during summer. Cold spells with temperatures less than 20 degrees F only last short periods of time. The soil is not frozen below the 3-inch depth for more than 2 to 3 days. Humidity is low during the winter and early spring months. Sometimes relative humidity is high enough to make summer days seem uncomfortable. Most of the precipitation comes in the form of rain and that in the spring and early summer principally. May is the wettest month followed by June. July and August are dryer and much hotter. Rainfall often comes as intense showers of relatively short duration. Rainfall rate per hour is often high and runoff is significant. Infiltration is diminished due to lack of opportunity time. The growing season begins in April and ends with the first killing frost in November. There is little snowfall with the average being about 10 inches. Rainfall averages about 22 inches.

There is a 70% chance that yearly precipitation will fall between 16 and 24 inches. About 55% of the time, the yearly rainfall is below the mean. Dry spells during the growing season are common and long-term droughts occur in

cycles of about 20 years. Native vegetation is principally warm season.

Table 3. Representative climatic features

Frost-free period (characteristic range)	189-194 days
Freeze-free period (characteristic range)	204-222 days
Precipitation total (characteristic range)	584-610 mm
Frost-free period (actual range)	184-201 days
Freeze-free period (actual range)	202-223 days
Precipitation total (actual range)	559-635 mm
Frost-free period (average)	192 days
Freeze-free period (average)	213 days
Precipitation total (average)	584 mm

Climate stations used

- (1) WELLINGTON [USC00419565], Wellington, TX
- (2) PADUCAH [USC00416740], Paducah, TX
- (3) JAYTON [USC00414570], Jayton, TX
- (4) SNYDER [USC00418433], Snyder, TX
- (5) ROBERT LEE [USC00417669], Robert Lee, TX

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 well drained to the surface. There may be a high water table within a few feet of the surface. The presence of a high water table does influence the vegetative makeup of the site.

Wetland description

NA

Soil features

The soils of this site are alluvial and very 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 water influences the density and the amount of vegetation present. The productive potential of the site is moderate.

Major Soil Taxonomic Units correlated to this site include: Lincoln fine sand (some surveys call these soils “sandy alluvial land”).

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Fine sand (2) Coarse sand
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Soil depth	183 cm

Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	3.3–16.51 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	1–8%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site is a tallgrass community with a few midgrasses, a good perennial forb component, and scattered short shrubs and a few trees, mainly cottonwood. 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 as are 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 and common reedgrass can also increase and dominate portions of the site. Forbs such as Illinois bundleflower (*Desmanthus illinoensis*), catclaw sensitivebriar (*Mimosa* spp.), gaura (*Gaura* spp.) 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. Tall grasses provide nesting cover for turkey and screening cover for whitetail 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.

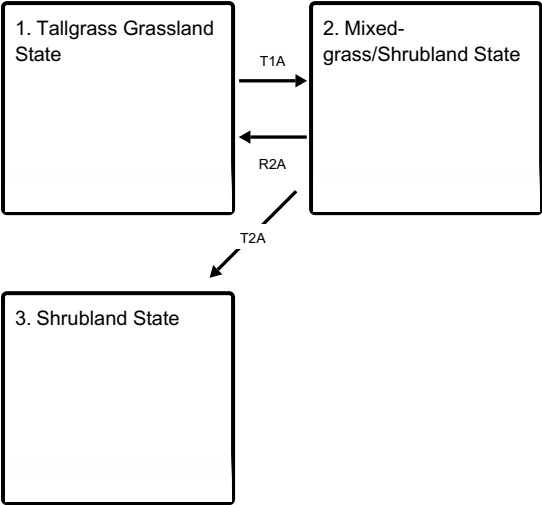
Plant Communities and Transitional Pathways (diagram):

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

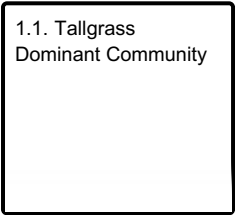


T1A - Absence of disturbance and natural regeneration over time, may be coupled with excessive grazing pressure

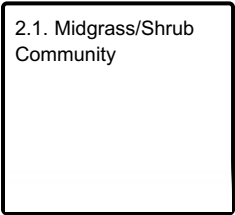
R2A - Adequate rest from defoliation, followed by reintroduction of historic disturbance regimes

T2A - Absence of disturbance, excessive grazing pressure, and introduction of non-native species

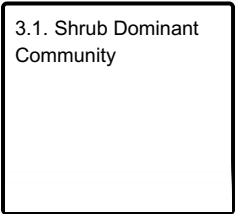
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1 Tallgrass Grassland State

The Tallgrass Dominant Community consisted of tallgrasses, scattered shrubs and trees along with a good variety of perennial forbs were part of the reference vegetative structure for the Sandy Bottomland site in MLRA78B. Sand bluestem, switchgrass, and dropseeds are the main grasses found at the site. Scattered cottonwood trees are also common.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- sand bluestem (*Andropogon hallii*), grass

Community 1.1

Tallgrass Dominant Community



Figure 8. 1.1 Tallgrass Dominant Community

Tallgrasses, scattered shrubs and trees along with a good variety of perennial forbs were part of the reference vegetative structure for the Sandy Bottomland site in MLRA78B. Sand bluestem, switchgrass, and dropseeds are the main grasses found at the site. Scattered cottonwood trees are also common. Production is good for the site's capabilities.

Table 5. 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
Total	1541	2241	3116

Figure 10. Plant community growth curve (percent production by month). TX2034, Tallgrass climax community. Tall grasses with scattered shrubs and trees. Also some forbs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	4	8	20	28	15	8	8	5	2	0

State 2

Mixed-grass/Shrubland State

The Midgrass/Shrubs Community occurs when tallgrasses are in decline and that there is an increase in shrub cover. Annual forbs become more frequent. The annual production is lower and there is decreased diversity of species.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- skunkbush sumac (*Rhus trilobata*), shrub
- Chickasaw plum (*Prunus angustifolia*), shrub
- sand dropseed (*Sporobolus cryptandrus*), grass

Community 2.1

Midgrass/Shrub Community



Figure 11. 2.1 Midgrass/Shrubs Community

The Midgrass/Shrubs Community occurs when tallgrasses are in decline and that there is an increase in shrub cover. There is an increasing amount of midgrasses seen. Annual forbs become more frequent. The annual production is lower and there is decreased diversity of species. There is also an increase in bare ground associated with this community.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	885	1384	1480
Shrub/Vine	224	336	504
Forb	112	224	258
Tree	56	84	101
Microbiotic Crusts	11	17	22
Total	1288	2045	2365

Figure 13. Plant community growth curve (percent production by month). TX2021, Midgrass/Shrubs. Midgrasses and some remnants of tall grasses with shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	5	8	24	25	12	7	10	5	2	0

State 3

Shrubland State

The Shrub Dominant Community is noted for having only a few tallgrasses remaining and dominated by various shrubs.

Dominant plant species

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

Community 3.1

Shrub Dominant Community



Figure 14. 3.1 Shrub Dominant Community

Shrubs dominate with only a few perennial tallgrasses remaining. There is an invasion of brush species including salt cedar and willow baccharis. This community has a very limited diversity of plants. The picture above illustrates an area within the site where the water table is slightly higher.

Table 7. 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	112	140	224
Tree	56	84	112
Total	1345	1569	2130

Figure 16. Plant community growth curve (percent production by month). TX2035, Shrub Dominated Community. Shrubs dominant with only a few grasses remaining..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	4	16	30	25	5	5	6	4	2	1

Transition T1A State 1 to 2

With Heavy Continuous Grazing, Brush Invasion, No Brush Management, and no fires, the Tallgrass Grassland State will transition into the Mixed-grass/Shrubland State.

Restoration pathway R2A State 2 to 1

With the implementation of various conservation practices including Prescribed Grazing, Brush Management, Prescribed Burning, and Pest Management, the Mixed-grass/Shrubland 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

With Heavy Continuous Grazing, Brush Invasion, and No Brush Management, the Mixed-grass/Shrubland State will transition into the Shrubland State.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Tallgrasses			1121–1345	
	switchgrass	PAVI2	<i>Panicum virgatum</i>	426–516	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	213–258	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	213–258	–
	sand bluestem	ANHA	<i>Andropogon hallii</i>	213–258	–
2	Midgrasses			224–308	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	84–123	–
	Drummond's dropseed	SPCOD3	<i>Sporobolus compositus</i> var. <i>drummondii</i>	45–62	–
	sand lovegrass	ERTR3	<i>Eragrostis trichodes</i>	45–62	–
	coral bristlegrass	SEMA4	<i>Setaria macrosperma</i>	22–34	–
	fall witchgrass	DICO6	<i>Digitaria cognata</i>	22–34	–
3	Cool season grasses			179–213	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	90–106	–
	Texas wintergrass	NALE3	<i>Nassella leucotricha</i>	45–62	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	39–56	–
4	Midgrasses			112–140	
	giant sandreed	CAGI3	<i>Calamovilfa gigantea</i>	90–112	–
	purpletop tridens	TRFL2	<i>Tridens flavus</i>	11–28	–
5	Midgrasses			101–123	
	Grass, annual	2GA	<i>Grass, annual</i>	17–28	–
	sedge	CAREX	<i>Carex</i>	17–28	–
	sandbur	CENCH	<i>Cenchrus</i>	17–28	–
	saltgrass	DISP	<i>Distichlis spicata</i>	17–28	–
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	17–28	–
6	Tallgrass			28–56	
	common reed	PHAU7	<i>Phragmites australis</i>	28–56	–
Forb					
7	Forbs			191–258	
	Forb, annual	2FA	<i>Forb, annual</i>	0–67	–
	snowball sand verbena	ABFR2	<i>Abronia fragrans</i>	0–67	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–67	–
	aster	ASTER	<i>Aster</i>	0–67	–
	whitemouth dayflower	COFRA	<i>Commelina erecta</i> var. <i>angustifolia</i>	0–67	–

	nineanther prairie clover	DAEN	<i>Dalea enneandra</i>	0–67	–
	purple dalea	DALA4	<i>Dalea lasiathera</i>	0–67	–
	bundleflower	DESMA	<i>Desmanthus</i>	0–67	–
	Indian blanket	GAPU	<i>Gaillardia pulchella</i>	0–67	–
	beeblossom	GAURA	<i>Gaura</i>	0–67	–
	gilia	GILIA	<i>Gilia</i>	0–67	–
	Maximilian sunflower	HEMA2	<i>Helianthus maximiliani</i>	0–67	–
	grassland blazingstar	MEST3	<i>Mentzelia strictissima</i>	0–67	–
	sensitive plant	MIMOS	<i>Mimosa</i>	0–67	–
	evening primrose	OENOT	<i>Oenothera</i>	0–67	–
	queen's-delight	STSY	<i>Stillingia sylvatica</i>	0–67	–
	prairie spiderwort	TROC	<i>Tradescantia occidentalis</i>	0–67	–
Shrub/Vine					
8	Shrubs/Vines			112–168	
	false indigo bush	AMFR	<i>Amorpha fruticosa</i>	28–45	–
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	28–45	–
	saltwater false willow	BAAN	<i>Baccharis angustifolia</i>	28–45	–
	common buttonbush	CEOC2	<i>Cephalanthus occidentalis</i>	28–45	–
	Oklahoma plum	PRGR	<i>Prunus gracilis</i>	28–45	–
	fragrant sumac	RHAR4	<i>Rhus aromatica</i>	28–45	–
Tree					
9	Trees			56–112	
	eastern cottonwood	PODE3	<i>Populus deltoides</i>	17–45	–
	black willow	SANI	<i>Salix nigra</i>	17–45	–
	western soapberry	SASAD	<i>Sapindus saponaria var. drummondii</i>	17–45	–
	French tamarisk	TAGA	<i>Tamarix gallica</i>	17–45	–

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 available provide a diverse wildlife habitat situation.

Hydrological functions

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

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 and NRCS Clipping Data summaries over a 20 year period.

Other references

J.R. Bell, USDA-NRCS Rangeland Management Specialist (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)
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Approval

Bryan Christensen, 9/15/2023

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.

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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 and up to 50% in channeled 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:** Extensive basal cover, density with small interspaces should make rainfall impact minimal. This site is a rapidly permeable soil, runoff is slow, and available water holding capacity is low.
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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.
-
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 = Forbs > Shrubs/Vines > Cool-season grasses
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Plant mortality and decadence is minimal.
-
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):** 1,400 to 2,800 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.
-