USDA Natural Resources Conservation Service

Ecological site R083DY007TX
Lakebed

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.

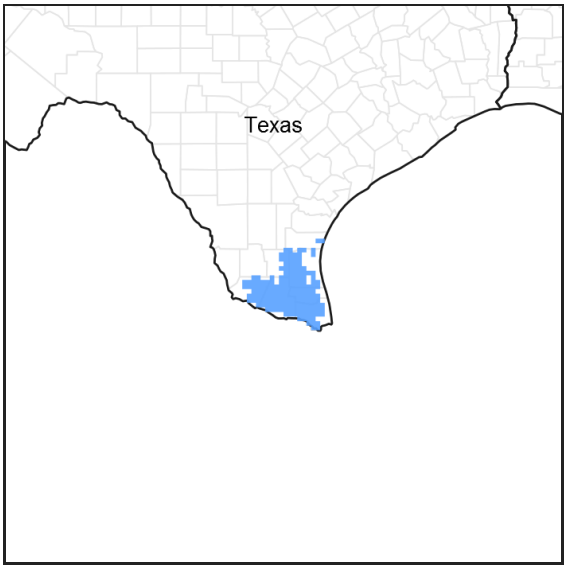


Figure 1. Mapped extent

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): 083D–Lower Rio Grande Plain

Major Land Resource Area (MLRA) 83D makes up about2,500 square miles (6,475 square kilometers). The towns of Brownsville, Edinburg, Harlingen, McAllen, and Raymondville are in this area. U.S. Highways 77 and 281 terminate in Brownsville and McAllen, respectively. The Santa Ana National Wildlife Area is along the Rio Grande in this area.

Classification relationships

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

Ecological site concept

Lakebeds are shallow depressions that support moist soil plant communities. They stay inundated after heavy rainfall events.

Associated sites

R083DY003TX	**Gravelly Ridge**
R083DY006TX	**Fresh Marsh**
R083DY012TX	**Ramadero**
R083DY023TX	**Sandy Loam**
R083DY024TX	**Tight Sandy Loam**
R083DY015TX	**Saline Clay**
R083DY019TX	**Gray Sandy Loam**
R083DY025TX	**Clay Loam**

Similar sites

R083EY007TX	**Lakebed**
R083AY007TX	**Lakebed**
R083CY007TX	**Lakebed**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Trichloris pluriflora* (2) *Paspalum hartwegianum*

Physiographic features

The sites are found in closed depressions on the Rio Grande delta plain. Ponding occurs up to 12 inches after heavy rainfall events for brief to long periods. Slope ranges from 0 to 1 percent.

Table 2. Representative physiographic features

Landforms	(1) Delta plain > Depression
Runoff class	Negligible
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	Occasional to frequent
Elevation	10–900 ft
Slope	0–1%
Ponding depth	0–12 in
Water table depth	20–52 in
Aspect	Aspect is not a significant factor

Climatic features

MLRA 83 has a subtropical, subhumid climate. Winters are dry and 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)	365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	22-26 in
Frost-free period (actual range)	271-365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	21-27 in
Frost-free period (average)	348 days
Freeze-free period (average)	365 days
Precipitation total (average)	24 in

Climate stations used

- (1) RAYMONDVILLE [USC00417458], Raymondville, TX
- (2) SANTA ROSA 3 WNW [USC00418059], Edcouch, TX
- (3) WESLACO [USC00419588], Weslaco, TX
- (4) HARLINGEN [USC00413943], Harlingen, TX
- (5) MISSION 4 W [USC00415972], Mission, TX
- (6) BROWNSVILLE [USW00012919], Brownsville, TX
- (7) MCALLEN [USC00415701], McAllen, TX
- (8) MERCEDES 6 SSE [USC00415836], Mercedes, TX
- (9) MCALLEN MILLER INTL AP [USW00012959], McAllen, TX
- (10) LA JOYA [USC00414911], Mission, TX
- (11) RIO GRANDE CITY [USC00417622], Rio Grande City, TX

Influencing water features

Following rainfall events this site will pond water for varying lengths of time. Saturation occurs in the upper part of the soil and will have reduced conditions during the wet months of the year. Water is received from runoff and seepage from adjacent sites. Each site will need to be visited individually to determine wetland criteria.

Wetland description

Onsite investigation is needed to determine wetland eligibility.

Soil features

The soils are very deep, somewhat poorly to poorly drained, and very slowly permeable to impermeable. They formed in in clayey alluvium. Although horizons may differ in surface textures, all have nearly impermeable subsoils that pond water. Soil series correlated to this site include: Jarron, Montealto, Rio, and Tiocano.

Table 4. Representative soil features

Parent material	(1) Alluvium–sedimentary rock
Surface texture	(1) Clay (2) Clay loam (3) Sandy clay loam (4) Fine sandy loam
Family particle size	(1) Fine
Drainage class	Poorly drained to somewhat poorly drained

Permeability class	Very slow
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3–7 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–16 mmhos/cm
Sodium adsorption ratio (0-40in)	0–12
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–3%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

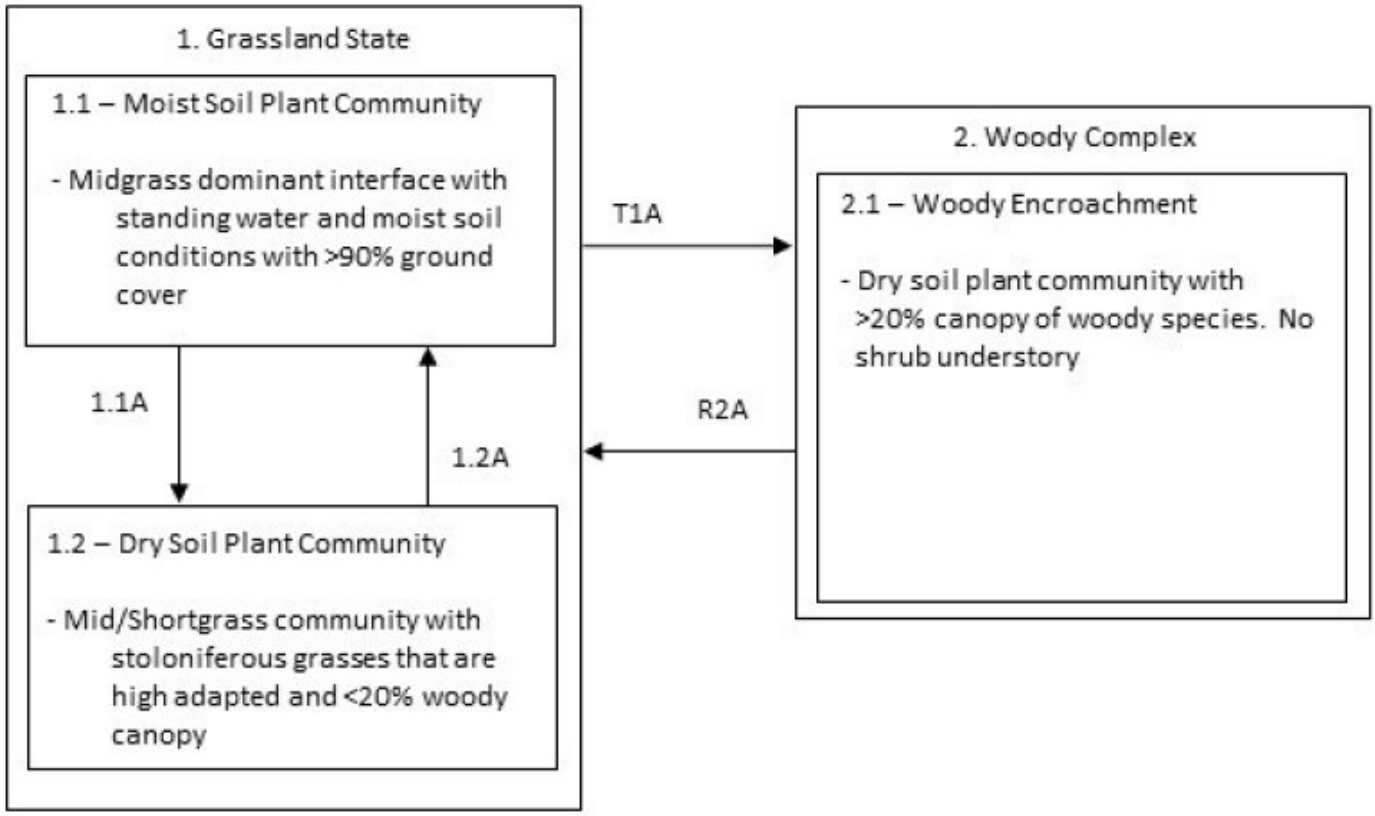
The Lower Rio Grande (MLRA 83D) was a disturbance-maintained system. Prior to European settlement (pre-1825), fire and grazing were the two primary forms of disturbance. Grazing by large herbivores included antelope, deer, and small herds of bison. The infrequent but intense, short-duration grazing by these species suppressed woody species and invigorated herbaceous species. The herbaceous savannah species adapted to fire and grazing disturbances by maintaining belowground tissues. Wright and Bailey (1982) report that there are no reliable records of fire frequency for the Rio Grande Plains because there are no trees to carry fire scars from which to estimate fire frequency. Because savannah grassland is typically of level or rolling topography, a natural fire frequency of three to seven years seems reasonable for this area.

Historical accounts prior to 1800 identify grazing by herds of wild horses, followed by heavy grazing by sheep and cattle as settlement progressed. Grazing on early ranches changed natural graze-rest cycles to continuous grazing and stocking rates exceeded the carrying capacity. These shifts in grazing intensity and the removal of rest from the system reduced plant vigor for the most palatable species, which on this site were midgrasses and palatable forbs. Shortgrasses and less palatable forbs began to dominate the site. This shift resulted in lower fuel loads, which reduced fire frequency and intensity. The reduction in fires resulted in an increase in size and density of woody species.

The open grassland in this area supports mid prairie grasses with scattered woody plants, perennial forbs, and legumes on soils in the uplands. Twoflower and fourflower trichloris, plains bristlegrass, and lovegrass tridens are among the dominant grasses on these soils. Desert yaupon, spiny hackberry, and blackbrush are the major woody plants. In bottomland areas, tallgrasses and midgrasses, such as switchgrass, giant sacaton, fourflower trichloris, big sandbur, little bluestem, and southwestern bristlegrass, are dominant. Hackberry, mesquite, elm, and palm trees are the major woody plants. Forbs are important but minor components of all plant communities.

Most of this area is cropland or improved pasture that is extensively irrigated. Large acreages of rangeland are grazed mainly by beef cattle and wildlife. The major crops are cotton, grain sorghum, citrus, onions, cabbage, and other truck crops. Almost all the crops are grown under irrigation. Hunting leases for white-tailed deer, quail, white-winged dove, and mourning dove are an important source of income in the area. Some of the major wildlife species in this area are white-tailed deer, javelina, coyote, fox, bobcat, raccoon, skunk, opossum, jackrabbit, cottontail, turkey, bobwhite quail, scaled quail, white-winged dove, and mourning dove.

State and transition model



Code	Practice
T1A	Lack of water and germination by woody species
R2A	Brush management or natural restoration through inundation
1.1A	Depressions drying and increased grazing pressure
1.2A	Inundation returns and wet-adapted species return

State 1
Grassland

Dominant plant species

- multiflower false Rhodes grass (*Trichloris pluriflora*), grass
- Hartweg's paspalum (*Paspalum hartwegianum*), grass

Community 1.1
Moist Soil

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 grassland community develops when soils in the shallow depressions of the Sandsheet Prairie maintain a degree of wetness because of periodic rainfall events. Mid/tallgrasses thrive on this ecological site and will follow the waterline as water evaporates out of the ponded areas. Hartweg's paspalum (*Paspalum hartwegianum*) represents a significant proportion of the plant. The forb community will vary based on rainfall and fluctuations in the ponded status of the depression, but commonly include Texas frog fruit (*Phyla nodiflora*) and wood sorrel (Oxalis spp.). Areas of bare ground that are exposed by water evaporation during the fall and winter will typically have more forbs than if the bare ground is exposed during the spring and summer, which will favor grass species. Rattlebush (*Sesbania drummondii*) is a common shrub that will make up a trace amount of the plant composition. The duration of time this ecological site has standing water is highly variable and driven by local weather patterns.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1900	2750	3600
Forb	100	150	200
Shrub/Vine	0	75	150
Tree	0	25	50
Total	**2000**	**3000**	**4000**

Table 6. Ground cover

Tree foliar cover	0-5%
Shrub/vine/liana foliar cover	0-10%
Grass/grasslike foliar cover	85-95%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	10-25%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	25-90%
Bare ground	0-10%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	0%	0-5%	85-95%	5-10%
>0.5 <= 1	0%	0-5%	85-95%	5-10%
>1 <= 2	0%	0-5%	85-95%	5-10%
>2 <= 4.5	0-5%	0-10%	75-85%	5-10%
>4.5 <= 13	–	–	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Figure 9. Plant community growth curve (percent production by month). TX8501, Midgrass Grassland Community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	5	15	20	20	5	5	10	10	5	3

Community 1.2
Dry Soil

In this phase of the Grassland State (1) species from the surrounding landscape begin to increase in abundance because the shallow depression has dried out and seeds that were carried onto the site by overland water flow and animals will germinate. Perennial forbs that are common on the Sandy and Loamy Sand ecological sites will

become a larger part of the plant composition but will be highly variable from location to location. Over time the tall/midgrasses will lose dominance as the ecological site becomes extremely dry and plants like buffalograss (*Bouteloua dactyloides*) and creeping lovegrass (Neeagrostis reptans) will increase and can become the most abundant species. In modern times, this phase of the plant community has become susceptible to the invasion of bermudagrass (*Cynodon dactylon*) and Kleberg bluestem (*Dichanthium annulatum*), which are aggressive grass species that can be introduced into the plant composition and will quickly dominate the plant community.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	800	1400	2000
Forb	500	600	700
Shrub/Vine	100	250	400
Tree	0	100	200
Total	**1400**	**2350**	**3300**

Figure 11. Plant community growth curve (percent production by month). TX8504, Shortgrass Dominant Community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	5	15	20	20	5	5	10	10	5	3

Pathway 1.1A
Community 1.1 to 1.2

This pathway represents the shallow depressions becoming dry and a reduction in Hartweg's paspalum, the most dominant grass of the reference plant community (1.1). Drought and grazing pressure are the main drivers for this transition. During dry weather this ecological site can become the focus of grazing pressure which will contribute to the reduction of plant species that are not as tolerant of moderate-to-heavy grazing pressure.

Pathway 1.2A
Community 1.2 to 1.1

This transition is driven by water returning to the system. Plants that proliferate in moist soils like Hartweg's paspalum, knotroot bristlegrass (*Setaria parviflora*), and knotgrass (*Paspalum distichum*) will increase in abundance. Taller grasses like switchgrass (*Panicum virgatum*), seacoast bluestem (*Schizachyrium littorale*), and multi-flowered false Rhodesgrass (*Trichloris pluriflora*) will increase along the edges of the ecological site. Other plants that were recruited from adjoining ecological sites during dry periods will decrease because they are not adapted to survive in moist soil conditions or standing water. Many different species of sedges and rushes will also fill in the plant composition.

State 2
Woody Complex

Dominant plant species

- honey mesquite (*Prosopis glandulosa*), shrub
- sweet acacia (*Acacia farnesiana*), shrub

Community 2.1
Woody Encroachment

This plant community is typified by the encroachment of woody species on the ecological site. Seed can be introduced by large rainfall events and/or by grazing animals. Mesquite (*Prosopis glandulosa*), huisache (*Acacia farnesiana*), and retama (Parkinsonia aculeate) are the most common species found on this ecological site because of their ability to survive in moist soils. These plants will establish where seed was deposited and continue to

expand in numbers as long as growing conditions are conducive. An understory of shrubs does not form under the tree canopy on this ecological site. Grass species and composition will mimic the Grassland State (1). Bermudagrass and Kleberg bluestem are common invasive grasses in this phase and in some cases, may be the most abundant grasses in the plant community.

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	800	1400	2000
Tree	100	500	900
Forb	500	600	700
Shrub/Vine	100	250	400
Total	**1500**	**2750**	**4000**

Figure 13. Plant community growth curve (percent production by month). TX8503, Wooded Grassland Community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	5	15	20	20	5	5	10	10	5	3

Transition T1A
State 1 to 2

The transition from the Grassland State (1) to the Woody Complex (2) is driven by the lack of water in the shallow depressions. If conditions are right, woody species can germinate and grow simultaneously within the extent of the ecological site and create mottes of trees that grow with, but do not greatly affect, the herbaceous plant community.

Restoration pathway R2A
State 2 to 1

Land managers may want to restore this ecological site to the Grassland State (1). Once in the Woody Complex (2) mechanical or chemical brush control is usually necessary to remove the trees from the plant community. The Lakebed ecological site naturally controls woody species; if the ecological site has standing water for a long period of time the subsoil is totally saturated and tree mortality will occur because of the anaerobic conditions in the root zone.

Additional community tables

Table 10. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Mid/Tallgrasses**			475–1440	
	multiflower false Rhodes grass	TRPL3	*Trichloris pluriflora*	150–600	–
	switchgrass	PAVI2	*Panicum virgatum*	150–600	–
	shore little bluestem	SCLI11	*Schizachyrium littorale*	0–450	–
2	**Midgrasses**			760–1260	
	Hartweg's paspalum	PAHA3	*Paspalum hartwegianum*	760–1260	–
3	**Mid/Shortgrasses**			300–540	
	buffalograss	BODA2	*Bouteloua dactyloides*	75–150	–
	saltgrass	DISP	*Distichlis spicata*	75–150	–
	creeping lovegrass	NERE3	*Neeragrostis reptans*	75–150	–
	knotgrass	PADI6	*Paspalum distichum*	75–150	–
	marsh bristlegrass	SEPA10	*Setaria parviflora*	75–150	–
4	**Grasslikes**			190–360	
	sedge	CAREX	*Carex*	90–175	–
	spikerush	ELEOC	*Eleocharis*	90–175	–
Forb					
5	**Forbs**			100–200	
	Forb, annual	2FA	*Forb, annual*	25–75	–
	woodsorrel	OXALI	*Oxalis*	25–75	–
	turkey tangle fogfruit	PHNO2	*Phyla nodiflora*	25–75	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	10–40	–
Shrub/Vine					
6	**Shrubs**			0–150	
	poisonbean	SEDR	*Sesbania drummondii*	0–150	–
Tree					
7	**Trees**			0–50	
	sweet acacia	ACFA	*Acacia farnesiana*	0–50	–
	Jerusalem thorn	PAAC3	*Parkinsonia aculeata*	0–50	–
	honey mesquite	PRGLG	*Prosopis glandulosa var. glandulosa*	0–50	–

Animal community

As a historic tall/midgrass prairie, this site was occupied by bison, antelope, deer, quail, turkey, and dove. This site was also used by many species of grassland songbirds, migratory waterfowl, and coyotes. This site now provides forage for livestock and is still used by quail, dove, migratory waterfowl, grassland birds, coyotes, and deer.

Feral hogs (Sus scrofa) can be found on most ecological sites in Texas. Damage caused by feral hogs each year includes, crop damage by rutting up crops, destroyed fences, livestock watering areas, and predation on native wildlife, and ground-nesting birds. Feral hogs have few natural predators, thus allowing their population to grow to high numbers.

Wildlife habitat is a complex of many different plant communities and ecological sites across the landscape. Most animals use the landscape differently to find food, shelter, protection, and mates. Working on a conservation plan

for the whole property, with a local professional, will help managers make the decisions that allow them to realize their goals for wildlife and livestock.

Grassland State (1): This state provides the maximum amount of forage for livestock such as cattle. It is also utilized by deer, quail and other birds as a source of food. When a site is in the reference plant community phase (1.1) it will also be used by some birds for nesting, if other habitat requirements like thermal and escape cover are near.

Tree/Shrubland Complex (2): This state can be maintained to meet the habitat requirements of cattle and wildlife. Land managers can find a balance that meets their goals and allows them flexibility to manage for livestock and wildlife. Forbs for deer and birds like quail will be more plentiful in this state. There will also be more trees and shrubs to provide thermal and escape cover for birds as well as cover for deer.

This rating system provides general guidance as to animal preference for plant species. It also indicates possible competition between kinds of herbivores for various plants. Grazing preference changes from time to time, especially between seasons, and between animal kinds and classes. Grazing preference does not necessarily reflect the ecological status of the plant within the plant community. For wildlife, plant preferences for food and plant suitability for cover are rated. Refer to habitat guides for a more complete description of a species habitat needs.

Hydrological functions

This ecological site is in a water receiving position and ponded water is common after rainfall events. Because of the level terrain, water erosion is seldom a problem. Saturation occurs in the upper part and will have reducing conditions for some time during the wet months of the year. This is a moist ecological site receiving water from runoff and seepage from adjacent sites. Each site will need to be visited individually to determine wetland criteria.

Recreational uses

The area is often used for hunting and photography.

Wood products

In the Grassland State (1), no wood products are available. In the Wooded Complex, large numbers of mesquite trees and can be cut for firewood and barbecue wood.

Inventory data references

Information presented was derived from the revised Range Site, literature, limited NRCS clipping data (417s), field observations, and personal contacts with range-trained personnel.

Other references

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Rangeland health reference sheet

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

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Date	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:** None.

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 five 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.

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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 4 to 6.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface horizons are 0 to 12 inches thick; light brownish gray (10YR 6/2) loamy fine sand or fine sandy loam; weak, fine subangular blocky structure; abrubt smooth boundary; SOM is less 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 about 0 to 5 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: Midgrasses >>

    Sub-dominant: Mid/Tallgrasses > Mid/Shortgrasses >> Grasslikes > Forbs > Shrubs/Vines >> Trees

    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 5-15% plant mortality of perrenial bunchgrasses during extreme drought.

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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 4,000 pounds 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: Mesquite, huisache, bermudagrass and Kleberg bluestem are common invaders.

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