Ecological site R080BY146TX
Clay Loam
26-33" PZ

Last updated: 9/19/2023
Accessed: 06/05/2026

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.

MLRA notes

Major Land Resource Area (MLRA): 080B–Texas North-Central Prairies

MLRA 80B consists of gently rolling, dissected plains with very steep hillsides and sideslopes and narrow flood plains associated with small streams. Loamy and clayey soils range from very shallow to deep and developed in sandstones, shales, and limestones of Pennsylvanian age.

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 moderately deep to deep clay loam soils on terraces and slopes. The reference vegetation consists of a mixture of native tall and midgrasses with scattered forbs and very few woody species. Without fire or other brush management, woody species may increase and dominate the site. These sites are quite susceptible to mesquite invasion.

Associated sites

R080BY151TX	**Loamy Bottomland 26-33" PZ** Clay Loam site frequently occurs immediately adjacent to Loamy Bottomland site. Bottomland sites occur on alluvial soils.
R080BY155TX	**Redland 26-33" PZ** Clay Loam site frequently occurs immediately adjacent to Redland site. Redland sites are typically lower in carbonates.

Similar sites

R080BY607TX	**Clayey Upland 26-33" PZ** Similar position on the landscape. Higher clay content.

Table 1. Dominant plant species

Tree	Not specified

Shrub	Not specified
Herbaceous	(1) *Schizachyrium scoparium var. scoparium* (2) *Bouteloua curtipendula*

Physiographic features

This site occurs on linear to concave treads of stream terraces or paleoterraces and on base slopes and side slopes of hillslopes in the Texas North-Central Prairies. This site is characteristically a water distributing site. Slopes are typically less than 5 percent.

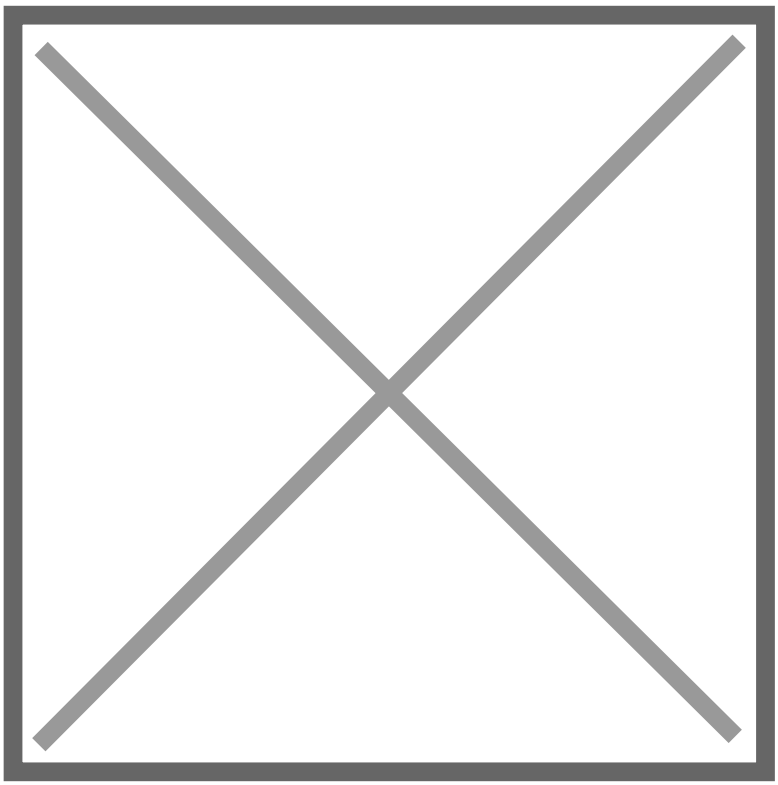

Figure 1.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Stream terrace (2) Alluvial plain > Paleoterrace (3) Hills > Hillslope (4) Hills > Ridge
Runoff class	Low to medium
Elevation	230 – 730 m
Slope	0 – 10 %

Aspect	Aspect is not a significant factor

Climatic features

The climate is subtropical subhumid and is characterized by hot humid summers and relatively mild winters. Tropical maritime air controls the climate during spring, summer and fall. In winter and early spring, frequent surges of polar Canadian air cause sudden drops in temperatures and add considerable variety to the daily weather. The average first frost generally occurs about November 5 and the last freeze of the season usually occurs about March 19. The average frost free period ranges from 215 days in the northern counties, to 240 days in the south.

The average relative humidity in mid-afternoon is about 60 percent in the summer months. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 75 percent of the time possible during the summer and 50 percent in winter. The prevailing wind direction is from the southwest and highest wind speeds occur during the spring months.

Approximately 75% of annual rainfall occurs between April 1 and October 31. Rainfall during the months of April through September typically occurs during thunderstorms which tend to be intense and brief, resulting in large amounts of rain in a short time. The wettest months of the year are May, June, September, and October. The driest months during the growing season are July and August. The winter months of November, December, January, and February are the driest months overall.

Average annual precipitation for the entire MLRA is approximately 28 inches. There is a noticeable difference in the average annual precipitation in the northern counties in comparison to the southern and western counties of this Major Land Resource Area. Jack, Young, and Palo Pinto Counties all have an average annual precipitation of more than 31 inches. Stephens, Eastland, McCulloch, and San Saba Counties all have an average annual precipitation of less than 28 inches.

Winters tend to be mild, with occasional periods of very cold temperatures which can be accompanied by strong northerly winds and freezing precipitation. Snow is infrequent and significant accumulations are rare. These periods of very cold weather are generally short-lived. Summers tend to be hot and dry. Drought conditions are common during most summers. Air temperatures of more than 95oF are common from mid-June through September. In the northern counties nearest to the Red River, temperatures are generally slightly cooler during winter months and slightly warmer during summer months than in the other counties in the North Central Prairie.

Table 3 Representative climatic features

Frost-free period (characteristic range)	180-200 days
Freeze-free period (characteristic range)	210-230 days
Precipitation total (characteristic range)	760-810 mm
Frost-free period (actual range)	180-200 days
Freeze-free period (actual range)	210-230 days
Precipitation total (actual range)	740-840 mm
Frost-free period (average)	190 days
Freeze-free period (average)	220 days
Precipitation total (average)	790 mm

- (1) SAN SABA 7NW [USC00417994], Richland Springs, TX
- (2) BROWNWOOD 2ENE [USC00411138], Early, TX
- (3) EASTLAND [USC00412715], Eastland, TX
- (4) MINERAL WELLS AP [USW00093985], Millsap, TX
- (5) BRECKENRIDGE [USC00411042], Breckenridge, TX
- (6) GRAHAM [USC00413668], Graham, TX
- (7) JACKSBORO [USC00414517], Jacksboro, TX

Influencing water features

These sites may receive some runoff water from adjacent sites and will also shed some water to areas downslope. The presence of good groundcover and deep rooted perennial grasses can help facilitate water infiltration into the soil. These sites are not associated with wetlands.

Wetland description

NA

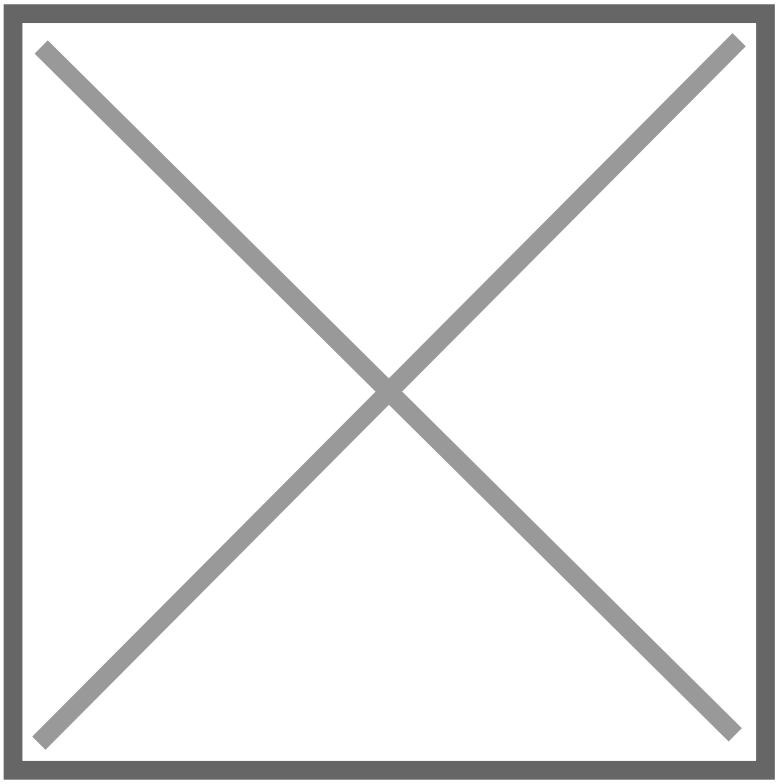

Figure 8.

Soil features

Representative soil components for this ecological site include: Sagerton, Velow

The site is characterized by deep to very deep, well drained, moderately slowly permeable soils that formed in calcareous loamy sediments.

Table 4. Representative soil features

Parent material	(1) Alluvium − limestone and shale
Surface texture	(1) Clay loam (2) Loam

Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	17.78 – 22.86 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 40 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4
Subsurface fragment volume <=3" (0-101.6cm)	0 – 10 %
Subsurface fragment volume >3" (0-101.6cm)	Not specified

Ecological dynamics

The reference plant community for the Clay Loam ecological site is a tallgrass/midgrass prairie. Tallgrass species are dominant in the eastern counties in areas receiving more than 30 inches of annual rainfall. Midgrasses are dominant in the western counties of the region in areas receiving less than 30 inches of annual precipitation. Evidence of the historic vegetation can be found in the journals and records of explorers, military expeditions, boundary survey teams, and scientists studying the vegetation.

Climate is a major factor influencing vegetation on the site. Long-term droughts lasting multiple years or growing seasons are infrequent, but when they do occur, they can have a negative impact on the vegetation. If abusive grazing occurs during or immediately following the

drought period, the results can be devastating. The effects of erratic seasonal moisture and short-term dry spells lasting a few months are not as severe as those caused by long-term droughts. However, the lower the ecological status of the site, the greater the negative impact will be during drought periods regardless of duration.

Fire was an important part of the ecosystem. Most ecosystems in the North Central Prairie developed in a 4 to 6 year regime of recurring fires. Many of these fires resulted from lightning strikes during thunderstorms. Native Americans frequently set fires to manipulate the movement of bison and other animals as well as a defensive or offensive technique when dealing with their enemies. These historic fires were usually severe because of the amount of grass fuel available to carry the fire. The intensity of fires kept shrubs and sapling trees suppressed and allowed grasses and forbs to flourish. Tallgrass species are fire tolerant and are enhanced by periodic burning. Forbs usually increase for a year or two following these fires before the grasses become dominant again.

Lack of fire allows herbaceous vegetation to become senescent and may eventually lead to the loss of the most desirable species. Seedlings of non-native brush species and invasive weeds may encroach on the site from adjacent areas.

Prior to settlement, this site was subject to periodic grazing and browsing by vast herds of bison, wild cattle, wild horses, and deer. Because of the relatively level and open terrain, vast acreages, quality and quantity of available forage species, and easy access, the Clay Loam site was one of the most frequently used sites by these free-ranging herds. At times these grazing and browsing episodes were intense and severe, but periods of heavy use were followed by long periods of non-use as the herds migrated to fresh grazing areas before returning to previously grazed areas. The grazed areas had an opportunity to rest, regrow, regain vigor, and reproduce prior to the next grazing event. Intervals between grazing periods were frequently influenced by the amount of time that had elapsed since the last fire on the area.

As the region was settled, fire was reduced or eliminated and grasslands were fenced off to control movement and facilitate grazing by domestic livestock. As a result of abusive grazing or lack of grazing and/or the elimination of fire, in association with extreme climatic events, the tallgrass plant community has been eliminated or severely reduced on most Clay Loam sites.

Further deterioration leads to the loss of the perennial warm-season midgrass and forb plant community and an increase in short grasses, annuals, and bare ground. This provides the opportunity for less desirable woody species such as mesquite and juniper to encroach from adjacent sites.

Selective individual removal of undesirable trees and shrubs is relatively easy and more practical when brush plants initially appear on the site. The increase of brush can be fairly rapid and the plants per acre will soon become too numerous for individual control to be feasible. Once woody plants become mature or develop into dense stands, control is expensive, uneconomical, impractical, and difficult to achieve. Brush management is most successful using a systems approach. Initial treatment by mechanical methods can be followed by using approved herbicides, and using prescribed fire as a maintenance technique. Prescribed grazing with a reasonable stocking rate can sustain the grass species composition and production at a near reference community level.

Changes in plant communities and vegetation states on the Clay Loam site are the result of the combined influences of natural events (rainfall, temperature, droughts, etc.) and the accompanying management systems implemented on the area (prescribed fire, grazing management, and brush management).

Rangeland Health Reference Worksheets have been posted for this site on the Texas NRCS website (www.tx.nrcs.usda.gov) in Section II of the eFOTG under (F) Ecological Site Descriptions.

State and Transitional Pathways:
The State and Transition Diagram which follows provides information on some of the most typical pathways that the vegetation on this site can follow as the result of natural events, management inputs, and application of conservation treatments. There may be other plant communities that can exist on this site under certain conditions. Consultation with local experts and professionals is recommended prior to application of practices or management strategies in order to ensure that specific objectives will be met.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	**Tallgrass**			729-2074	
	little bluestem	SCSC	*Schizachyrium scoparium*	729-2074	–
2	**Tallgrasses**			729-1401	

	Indiangrass	SONU2	*Sorghastrum nutans*	0-1401	–
	big bluestem	ANGE	*Andropogon gerardii*	0-1065	–
	switchgrass	PAVI2	*Panicum virgatum*	0-673	–
	eastern gamagrass	TRDA3	*Tripsacum dactyloides*	0-673	–
3	**Midgrasses**			336-1177	
	sideoats grama	BOCU	*Bouteloua curtipendula*	168-1177	–
	vine mesquite	PAOB	*Panicum obtusum*	0-729	–
4	**Midgrasses**			336-841	
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	112-673	–
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	0-504	–
	Arizona cottontop	DICA8	*Digitaria californica*	0-336	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	0-336	–
	Drummond's dropseed	SPCOD3	*Sporobolus compositus var. drummondii*	0-336	–
	purpletop tridens	TRFL2	*Tridens flavus*	0-224	–
	Texas cupgrass	ERSE5	*Eriochloa sericea*	0-224	–
	seep muhly	MURE2	*Muhlenbergia reverchonii*	0-112	–
	marsh bristlegrass	SEPA10	*Setaria parviflora*	0-112	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	0-112	–
	tall grama	BOHIP	*Bouteloua hirsuta var. pectinata*	0-112	–
5	**Cool-season grasses**			56-336	
	Texas wintergrass	NALE3	*Nassella leucotricha*	56-336	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0-168	–
	Virginia wildrye	ELVI3	*Elymus virginicus*	0-168	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0-112	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0-112	–
6	**Mid/Shortgrasses**			168-560	
	buffalograss	BODA2	*Bouteloua dactyloides*	56-560	–
	blue grama	BOGR2	*Bouteloua gracilis*	0-168	–
	white tridens	TRAL2	*Tridens albescens*	0-168	–
	slim tridens	TRMUE	*Tridens muticus var. elongatus*	0-112	–
	slim tridens	TRMUM	*Tridens muticus var. muticus*	0-112	–
	hooded windmill grass	CHCU2	*Chloris cucullata*	0-112	–
	fall witchgrass	DICO6	*Digitaria cognata*	0-112	–
	curly-mesquite	HIBE	*Hilaria belangeri*	0-112	–
	Hall's panicgrass	PAHAH	*Panicum hallii var. hallii*	0-112	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0-112	–
	purple threeawn	ARPU9	*Aristida purpurea*	0-112	–
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	0-112	–
	Texas grama	BORI	*Bouteloua rigidiseta*	0-56	–
	sedge	CAREX	*Carex*	0-56	–
	crowngrass	PASPA2	*Paspalum*	0-56	–
	hairy woollygrass	ERPI5	*Erioneuron pilosum*	0-56	–
	rosette grass	DICHA2	*Dichanthelium*	0-56	–
Forb					
7	**Forbs**			112-336	
	Texas Indian mallow	ABFR3	*Abutilon fruticosum*	0-224	–

	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0-224	–
	white sagebrush	ARLUM2	*Artemisia ludoviciana ssp. mexicana*	0-224	–
	milkvetch	ASTRA	*Astragalus*	0-224	–
	Berlandier's sundrops	CABE6	*Calylophus berlandieri*	0-224	–
	American star-thistle	CEAM2	*Centaurea americana*	0-224	–
	whitemouth dayflower	COER	*Commelina erecta*	0-224	–
	prairie clover	DALEA	*Dalea*	0-224	–
	purple prairie clover	DAPU5	*Dalea purpurea*	0-224	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	0-224	–
	ticktrefoil	DESMO	*Desmodium*	0-224	–
	Engelmann's daisy	ENPE4	*Engelmannia peristenia*	0-224	–
	Leavenworth's eryngo	ERLE11	*Eryngium leavenworthii*	0-224	–
	beeblossom	GAURA	*Gaura*	0-224	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	0-224	–
	hoary false goldenaster	HECA8	*Heterotheca canescens*	0-224	–
	starviolet	HEDYO2	*Hedyotis*	0-224	–
	Indian rushpea	HOGL2	*Hoffmannseggia glauca*	0-224	–
	trailing krameria	KRLA	*Krameria lanceolata*	0-224	–
	Texas skeletonplant	LYTE	*Lygodesmia texana*	0-224	–
	Nuttall's sensitive-briar	MINU6	*Mimosa nuttallii*	0-224	–
	yellow puff	NELU2	*Neptunia lutea*	0-224	–
	evening primrose	OENOT	*Oenothera*	0-224	–
	pitcher sage	SAAZG	*Salvia azurea var. grandiflora*	0-224	–
	false gaura	STLI2	*Stenosiphon linifolius*	0-224	–
	white heath aster	SYERE	*Symphyotrichum ericoides var. ericoides*	0-224	–
	slender greenthread	THSI	*Thelesperma simplicifolium*	0-224	–
	prairie spiderwort	TROC	*Tradescantia occidentalis*	0-224	–
	Texas vervain	VEHA	*Verbena halei*	0-224	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	0-112	–
Shrub/Vine					
8	**Trees/Shrubs/Vines**			56-224	
	sugarberry	CELAL	*Celtis laevigata var. laevigata*	0-224	–
	netleaf hackberry	CELAR	*Celtis laevigata var. reticulata*	0-224	–
	pricklypear	OPUNT	*Opuntia*	0-112	–
	honey mesquite	PRGL2	*Prosopis glandulosa*	0-112	–
	fragrant sumac	RHAR4	*Rhus aromatica*	0-112	–
	prairie sumac	RHLA3	*Rhus lanceolata*	0-112	–
	bully	SIDER2	*Sideroxylon*	0-112	–
	pricklyash	ZANTH	*Zanthoxylum*	0-112	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	0-112	–
	catclaw acacia	ACGRG3	*Acacia greggii var. greggii*	0-112	–
	jointfir	EPHED	*Ephedra*	0-56	–

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 9. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 10. Community 4.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Animal community

Historically, the Clay Loam site was inhabited permanently and intermittently by a variety of grassland mammals, reptiles, and birds. Several historical references and journals written in the 18th and 19th century by explorers, survey parties, and military expeditions refer to herds of bison, wild cattle, wild horses, deer, and antelope roaming freely across the North Central Prairie and adjacent regions. The Clay Loam site was one of the most frequently used sites by these free-ranging herds because of the relatively level and open terrain, quality and quantity of available forage species, vast acreages, and easy access. Currently, the site is utilized by quail, dove, numerous species of grassland birds, and a variety of small fur-bearing mammals. Quail and dove utilize the site more frequently in the midgrass, Shortgrass, and shrubland plant community phases. White-tailed deer and turkey use the site intermittently in association with adjacent sites if sufficient shrub and tree canopy exists. Feral hogs are also frequent visitors to the site in some areas. Animal species and populations fluctuate as the vegetation cycles through temporary phases and different ecological stages. Livestock grazing should be controlled by implementing grazing management systems that incorporate frequent and timely deferment periods to prevent abusive grazing.

Hydrological functions

When herbaceous vegetation and ground cover are maintained in a healthy and vigorous status, water infiltration into the soil profile is increased significantly, resulting in less runoff. A thick, healthy grass cover also results in improved water quality because it serves as a filter or trap to reduce sediments and pollutants before the water flows offsite.

Recreational uses

The Clay Loam ecological site provides limited outdoor activities such as bird watching, hiking, camping, horseback riding, and off-road vehicle use. Some Clay Loam sites provide good habitat for quail and dove hunting. Deer and turkey hunting is severely limited by the lack of browse, mast, and escape cover.

Wood products

Mesquite wood can be used for firewood and fence posts.

Other products

None.

Other information

None.

Inventory data references

Vegetation data for this site was obtained from existing Range Site Descriptions, SCS-RANGE -417 Production and Composition Records for Native Grazing Lands, and on-site inventories by the author and local experts including ranchers, natural resource specialists from federal and state agencies, and personnel from cooperating agencies and organizations. A total of 14 SCS-RANGE-417's containing data collected from 4 counties (Lampasas, Palo Pinto, Throckmorton, and Young) during the period 12/30/1981 to 12/12/1986 were reviewed for this site.

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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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Date	10/17/2007
Approved by	
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:** **Deposition or erosion is uncommon during normal rainfall events, but may occur in limited areas during intense rainfall events.**

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):** **Expect no more than 10% bare ground scattered randomly throughout the site.**

5. **Number of gullies and erosion associated with gullies:** **Few rills and no gullies should occur.**

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

7. **Amount of litter movement (describe size and distance expected to travel):** Little or no litter movement or deposition during normal rainfall events.

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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 in HCPC is resistant to wind erosion. Stability range is expected to be 5-6.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** 0-8 inches of brown clay loam. SOM is 1-6%. See soil survey for more information.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The tallgrass/midgrass prairie with adequate litter, and little bare ground provides for maximum infiltration and negligible runoff.

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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: Warm-season tallgrasses > Warm-season midgrasses >

    Sub-dominant: Warm-season shortgrasses >

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

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Perennial grasses will naturally exhibit a minor amount (less than 5%) of senescence and some mortality every year.

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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):** 3,600 to 6,200 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, lotebush, pricklypear, tasajillo, pricklyash, juniper, King Ranch bluestem, annual broomweed.

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17. **Perennial plant reproductive capability: All perennial species should be capable of reproducing every year unless disrupted by extended drought, overgrazing, wildfire, insect damage, or other events occuring immediately prior to, or during the reproductive phase.**
