

Ecological site R078BY084TX

Rough Breaks

19-26" PZ

Last updated: 9/15/2023
Accessed: 09/14/2026

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): 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 shallow soils on steep slopes and escarpments. The reference vegetation is mid and shortgrasses with forbs and scattered woody species. These site are often protected from most fires and don't experience heavy grazing due to slope. However, in some instances these ecological drivers still play an important roll.

Associated sites

R078BY075TX	Gravelly 20-24" PZ The Gravelly site is located near the base of the Rough Breaks site. Occurs as small hills and rolling slopes.
R078BY076TX	Gyp 19-26" PZ Generally Gyp sites occurs as small pockets within very shallow sites near the top edge of the Rough Breaks site.
R078BY090TX	Shallow Clay 19-26" PZ May be found on the upland area or near the base of the Rough Breaks site.
R078BY091TX	Very Shallow 19-26" PZ Located along the upper edge of the Rough Breaks rim. Narrow shallow bands of soils.

Table 1. Dominant plant species

Tree	(1) <i>Juniperus pinchotii</i>
Shrub	(1) <i>Dalea formosa</i>
Herbaceous	(1) <i>Schizachyrium scoparium</i>

Physiographic features

This site occurs on rough broken terrain including the escarpments and scarp slopes along the caprock separating the high plains from the rolling plains, and in rough river breaks in the rolling plains. Slopes are steep and soil development is limited. Runoff is rapid due to slope and infiltration minimal. Accessibility to livestock is generally limited and grazing pressure is usually light. Vegetative production is low to moderate due to limited moisture regime. South and west exposures usually have less vegetative production than do the north and east facing exposures.

Table 2. Representative physiographic features

Landforms	(1) Breaks > Escarpment (2) Breaks > Scarp (3) Breaks > Scarp slope
Runoff class	Very high
Flooding frequency	None
Ponding frequency	None
Elevation	310 – 910 m
Slope	10 – 60 %
Water table depth	150 – 200 cm
Aspect	Aspect is not a significant factor

Climatic features

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)	190-190 days
Freeze-free period (characteristic range)	200-220 days
Precipitation total (characteristic range)	580-610 mm
Frost-free period (actual range)	180-200 days
Freeze-free period (actual range)	200-220 days
Precipitation total (actual range)	560-640 mm
Frost-free period (average)	190 days
Freeze-free period (average)	210 days
Precipitation total (average)	580 mm

- (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

Rapid runoff from steep slopes can cause considerable erosion, especially where plant cover is sparse. Runoff is picked up by streams and drainages and has influence downstream.

Wetland description

NA

Soil features

The soils of this site are shallow, steeply sloping and often rocky or gravelly. Textures range from clay loams to sandy loams. Slopes range from 8 to 60 %. Fertility is generally low and water holding capacity limited. Infiltration is limited and runoff rapid. Soil development is limited due to slope and moisture regime. The site occurs along the break between the high and rolling plains and along escarpments formed by major drainages. It also is found on the slopes of erosional remnants, steep side slopes and knolls.

Major Soil Taxonomic Units correlated to this site include: Rough broken land, Burson – Quinlan complex, Burson soils.

Table 4. Representative soil features

Parent material	(1) Residuum – sandstone and siltstone
Surface texture	(1) Clay loam (2) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderately rapid
Depth to restrictive layer	10 – 50 cm
Soil depth	10 – 50 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	4.06 – 20 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %

Subsurface fragment volume >3" (Depth not specified)	Not specified
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Ecological dynamics

The plant community for this site is quite variable depending on aspect and location. The reference plant community includes woody shrubs, small trees, perennial and annual forbs and tall, mid and shortgrass species. Diversity is actually quite high compared to many other sites. Production is low because of slope and moisture regime. Density is generally low and bare ground fairly high. The site is important from an aesthetic point of view and also from a wildlife habitat standpoint. Many species of plants found on the site do not usually occur elsewhere. The rough terrain has a limiting effect on grazing accessibility. The draws and canyons associated with the site offer protection from the wind and cold for wildlife and livestock. Runoff from the site contributes to the flow of many streams which originate in the area. The different exposures of the site vary in both productive capacity and species composition. More mesic exposures (north and east) generally produce more woody shrubs and more tall grass species than do the dryer (south and west) exposures. In general, the site is not heavily grazed or browsed although certain species of browse can show considerable use in areas of greater deer populations.

Redberry juniper (*Juniperus pinchotti*) has most certainly increased on a majority of the rough breaks sites in the rolling plains since settlement times. This has not been the result of overgrazing for the most part. Lack of fire no doubt has played a part in shrub increase as periodic fire can suppress juniper although very little redberry juniper is actually killed by fires. The ecology of woody shrubs in this former grassland region is not fully understood. Long term droughts followed by wet conditions lasting several days may be a climatic episode needed for maximum germination and survival of seedling of juniper as well as some other woody species. Finding a plant community that would typify the natural community at time of settlement is very difficult. Other woody plants that have shown increase include Mohr's oak (*Quercus mohriana*), in some locations, and mesquite (*Prosopis glandulosa*).

The more common grasses found on the Rough Breaks ecological site include: little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), big bluestem (*Andropogon gerardii*), Indiangrass (*Sorghastrum nutans*) Canada wildrye (*Elymus canadensis*), hairy grama (*Bouteloua hirsuta*), blue grama (*Bouteloua gracilis*) black grama (*Bouteloua eriopoda*), slim tridens (*Tridens muticus*), sand dropseed (*Sporobolus cryptandrus*) and wright threeawn (*Aristida wrightii*).

Major forbs include: halfshrub sundrop (*Calylophus serrulatus*), longleaf buckwheat (*Eriogonum longifolium*), plains blackfoot (*Melampodium leucanthum*), dotted gayfeather (*Liatris punctata*), primroses (*Oenothera* spp.), baby white aster (*Leucelene ericoides*), ratany (*Krameria lanceolata*), plains actinea (*Tetaneurus scaposa*), broom nailwort (*Paronychia jamesii*), and Mexican sagewort (*Artemisia ludoviciana*).

The more frequently found woody shrubs include: feather dalea (*Dalea formosa*), skunkbush sumac (*Rhus trilobata*), elbowbush (*Forestiera pubescens*), Mohr's oak, plains greasebush (*Forsellesia planitierum*), littleleaf sumac (*Rhus microphylla*), catclaw mimosa (*Mimosa nuttallii*), hoptree (*Ptelea trifoliata*), mimosa (*Mimosa biuncifera*), prickly pear (*Opuntia polycantha*), broom snakeweed (*Gutierrezia sarothrae*), and occasionally winterfat (*Ceratoides lanata*) and mountain mahogany (*Cercocarpus montanus*). Some mesquite is found on the dryer slopes. Trees include: hackberry (*Celtis reticulata*), redberry juniper and occasional one-seeded juniper (*Juniperus monosperma*).

Early day settlers depended on this site as a source of wood for fence posts and for firewood. Often times, dugouts were constructed using the side of a steep slope. The value of protection from the elements was much on the minds of early day pioneers and they tended to settle where some rough terrain protected their homes.

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

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Tall/Midgrasses			392	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	224	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	168	–

2	Mid/Shortgrasses			118	
	Wright's threeawn	ARPUW	<i>Aristida purpurea</i> var. <i>wrightii</i>	17	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	17	–
	slim tridens	TRMU	<i>Tridens muticus</i>	17	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	11	–
	silver beardgrass	BOLAT	<i>Bothriochloa laguroides</i> ssp. <i>torreyana</i>	11	–
	fall witchgrass	DICO6	<i>Digitaria cognata</i>	11	–
	large-spike bristlegrass	SEMA5	<i>Setaria macrostachya</i>	11	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	11	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	11	–
3	Tallgrasses			62	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	28	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	22	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	11	–
4	Cool-season Grasses			45	
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	22	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	22	–
Forb					
5	Forbs			112	
	stemmy four-nerve daisy	TESC2	<i>Tetraneuris scaposa</i>	11	–
	white sagebrush	ARLUM2	<i>Artemisia ludoviciana</i> ssp. <i>mexicana</i>	11	–
	yellow sundrops	CASE12	<i>Calylophus serrulatus</i>	11	–
	trailing krameria	KRLA	<i>Krameria lanceolata</i>	11	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	6	–
	plains blackfoot	MELE2	<i>Melampodium leucanthum</i>	6	–
	littleleaf sensitive-briar	MIMI22	<i>Mimosa microphylla</i>	6	–
	evening primrose	OENOT	<i>Oenothera</i>	6	–
	rose heath	CHER2	<i>Chaetopappa ericoides</i>	6	–
	shortray fleabane	ERLO	<i>Erigeron lonchophyllus</i>	6	–
	hoary false goldenaster	HECA8	<i>Heterotheca canescens</i>	6	–
	Rocky Mountain zinnia	ZIGR	<i>Zinnia grandiflora</i>	6	–
	slimflower scurfpea	PSTE5	<i>Psoraleidium tenuiflorum</i>	6	–
	Drummond's skullcap	SCDR2	<i>Scutellaria drummondii</i>	6	–
	Forb, annual	2FA	<i>Forb, annual</i>	6	–
	Chalk Hill hymenopappus	HYTE2	<i>Hymenopappus tenuifolius</i>	0-1	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0-1	–
	James' nailwort	PAJA	<i>Paronychia jamesii</i>	0-1	–
Shrub/Vine					
6	Shrubs/Vines			112	
	fragrant sumac	RHAR4	<i>Rhus aromatica</i>	28	–
	mesquite	PROSO	<i>Prosopis</i>	17	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	11	–
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa</i> var. <i>biuncifera</i>	11	–
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	11	–
	featherplume	DAFO	<i>Dalea formosa</i>	11	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	6	–

	Mohr oak	QUMO	<i>Quercus mohriana</i>	6	–
	littleleaf sumac	RHMI3	<i>Rhus microphylla</i>	6	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	6	–
	common hoptree	PTTR	<i>Ptelea trifoliata</i>	0-1	–
	stretchberry	FOPU2	<i>Forestiera pubescens</i>	0-1	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0-1	–
Tree					
7	Trees			135-168	
	Pinchot's juniper	JUPI	<i>Juniperus pinchotii</i>	135	–
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	22	–
	hackberry	CELT1	<i>Celtis</i>	11	–

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 4.1 plant community composition

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

Animals that use the site for habitat are Whitetail deer and Mule deer, Aoudad sheep, coyotes, raccoon, small mammals, songbirds, bobcats, raptors, lizards, various species of snakes. The site offers cover and protection from the elements, bedding areas for deer and sheep and much needed shade during summer heat. Mud swallows sometimes use the sheer cliff walls to build their nests. In certain locations there are small caves in steep walls that are attractive to bats.

Hydrological functions

Contributes fast runoff to surrounding streams and drainages.

Recreational uses

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

Wood products

At times, juniper has been used for posts.

Other products

None.

Other information

Early native Americans frequented these sites utilizing the woody plants for tools and for shelter.

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 , 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.

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

Indicators

1. **Number and extent of rills:** Due to the percent slopes, rills will be common.
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2. Presence of water flow patterns: Due to the percent slopes, water flow patterns will be common.

3. Number and height of erosional pedestals or terracettes: Due to the percent slopes, pedestals/terraces will be common.

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):
25-35% mineral soil.

5. Number of gullies and erosion associated with gullies: Due to the percent slopes, gullies will be common.

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): Slight to moderate.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Not very resistant to surface erosion.

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Very gravelly loam; friable; low SOM.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Lack of vegetative cover and slope increases the erosion potential. This site is a moderately permeable soil, rapid runoff, and available water holding 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 midgrasses >

Sub-dominant: Warm-season tallgrasses > Shrubs/Vines >

Other: Warm-season shortgrasses > Cool-season grasses > Forbs > Trees

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.
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14. Average percent litter cover (%) and depth (in): Litter is dominantly herbaceous.
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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):
750 to 1,200 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: Juniper can be invasive.
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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.
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