USDA Natural Resources
Conservation Service

Ecological site R077DY039TX
Draw 12-17" PZ

Last updated: 9/11/2023
Accessed: 05/06/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 077D–Southern High Plains, Southwestern Part

This area is characterized by nearly level to gently undulating plains with scattered playa depressions. Soil temperature regime is thermic and soil moisture regime is aridic bordering on ustic. Sandy and loamy soils are generally well drained and range from shallow to deep and medium- to coarse-textured. Native vegetation is short- to mid-grasses and sandy sites support tall-grasses with sand shin oak and mesquite. Current land use is mainly rangeland, although irrigated cropland is expanding.

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 nearly level, loamy soils on drainageways. The reference plant community consists of midgrasses, shortgrasses, forbs, and few shrubs. Production is usually higher than adjacent sites due to the collection of additional runoff water. Abusive grazing practices can alter the species composition and cause a shift in the plant community.

Associated sites

R077DY042TX	**Limy Upland 12-17" PZ** In parts of the watershed above the Draw sites, Limy Upland sites can be found along both sides of the Draw site. Midgrasses dominate but there is a good mixture of shortgrasses occur on this site. Production is lower than on the Draw site.
R077DY047TX	**Sandy Loam 12-17" PZ** Sandy Loam sites are the most common upland site above the Draw sites, providing the majority of the watershed drainage. Sandy Loam sites can be found along both sides of the Draw site. Midgrasses dominate but some tallgrasses occur on this site. Production is lower than on the Draw site.
R077DY046TX	**Sandy 12-17" PZ** In parts of the watershed above the Draw sites, Sandy sites can be found along both sides of the Draw site. Tallgrasses dominate but a good mixture of midgrasses occurs on this site. Production is lower than on the Draw site.

Similar sites

R077EY052TX	**Draw 16-24" PZ** Similar to the Draw site in MLRA 77D is the Draw site in MLRA 77E. Midgrasses dominate but a good mixture of shortgrasses can be found on this site along with a few tallgrasses in sandy areas. Mean annual precipitation is higher (16 - 24 inches). Production is higher than on the MLRA 77D Draw site.
R077CY023TX	**Draw 16-21" PZ** Similar to the Draw site in MLRA 77D is the Draw site in MLRA 77C. Midgrasses dominate but a good mixture of shortgrasses can be found on this site along with a few tallgrasses in sandy areas. Mean annual precipitation is higher (16 - 21 inches). Production is higher than on the MLRA 77D Draw site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Mimosa aculeaticarpa*
Herbaceous	(1) *Bouteloua curtipendula* (2) *Bothriochloa saccharoides*

Physiographic features

The Draw site occurs in the ancient drainageways that dissect the area. There are very few of these features in 77D as most occur farther north. The draws that are present have received considerable amounts of material from adjacent uplands due to wind erosion since cultivation began. Slopes are nearly level to very gently sloping and the site may or may not be channeled. Runoff generated into these draws generally depends on the amount of vegetative cover of adjacent areas and intensity of the precipitation event. These are upper drainages of the Colorado River System and the eastern drainages of the Pecos River System.

Table 2. Representative physiographic features

Landforms	(1) Plateau > Drainageway (2) Plateau > Draw
Runoff class	Negligible to low
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare
Ponding frequency	None
Elevation	640–1,554 m
Slope	0–2%
Water table depth	183–203 cm
Aspect	W, SE, S, SW

Climatic features

Continental Steppe climate is prevalent in MLRA 77D. This climate type is typical of interiors of continents and is characterized by large variations in the magnitude of ranges in daily temperature extremes, low relative humidity, and irregularly spaced rainfall of moderate amounts. This climate regime is also known for being semi-arid with mild winters.

Droughts occur with monotonous frequency although there will be years having excessive precipitation resulting in large accumulations of water that little benefit is obtained from the rainfall events. If good rains occur in the spring and summer months, annual production will be favorable even if the remainder of the year is not favorable. Most of the annual precipitation occurs as a result from spring and early summer thunderstorms. Due to the fact that the area is mainly flat, local flooding may occur but only of short duration. There is very little precipitation and infrequent snowfall amounts in the winter.

During the late winter and early spring months, dust storms occur very frequently. The flat plains of the area

contribute very little resistance to the strong winds. Dust in many of these storms remains in the air for several days after the storms have passed.

Daytime temperatures are warm in the summer but there is a large diurnal range and most nights are comfortable. In summers, the normal daily maximum temperatures are in the low to mid 90s and the normal minimum temperatures are in the upper 60s and low 70s. Even though the temperatures may be high, the low humidity and high evaporation rates create a cooling effect during the nighttime hours. Fall months exhibit extremely variable weather. Winters are mild and are characterized by frequent cold fronts accompanied by strong, gusty, northerly winds. Most of the cold fronts are dry as they pass through the area.

Table 3. Representative climatic features

Frost-free period (characteristic range)	154-191 days
Freeze-free period (characteristic range)	181-194 days
Precipitation total (characteristic range)	381-432 mm
Frost-free period (actual range)	147-195 days
Freeze-free period (actual range)	171-213 days
Precipitation total (actual range)	381-432 mm
Frost-free period (average)	167 days
Freeze-free period (average)	190 days
Precipitation total (average)	406 mm

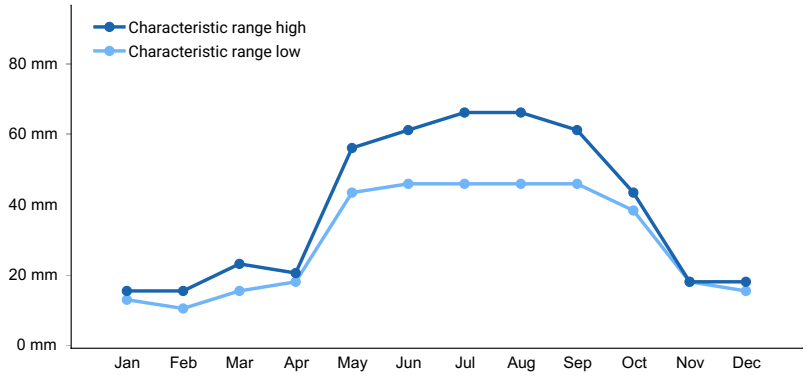


Figure 1. Monthly precipitation range

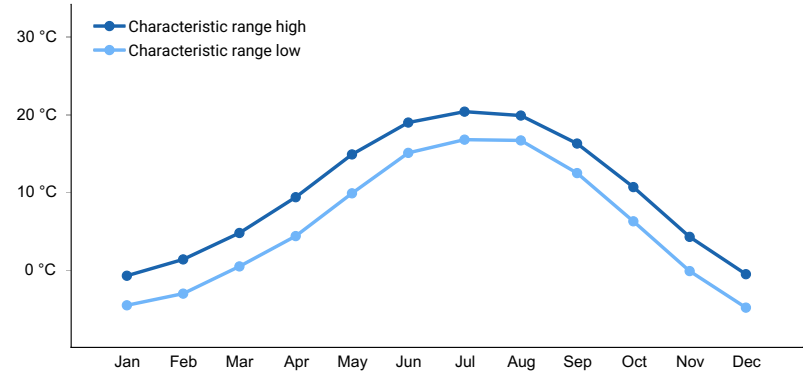


Figure 2. Monthly minimum temperature range

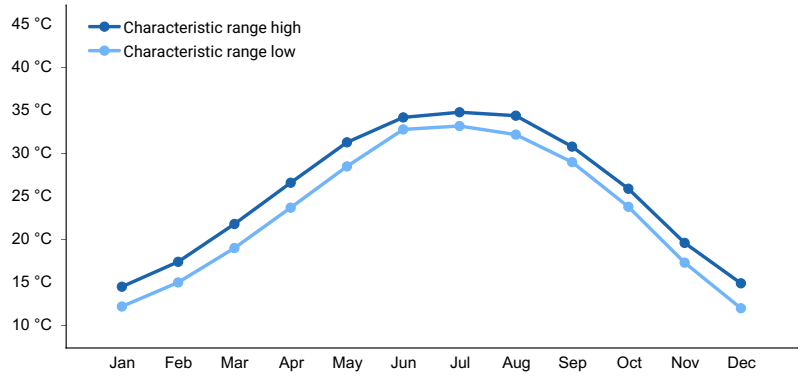


Figure 3. Monthly maximum temperature range

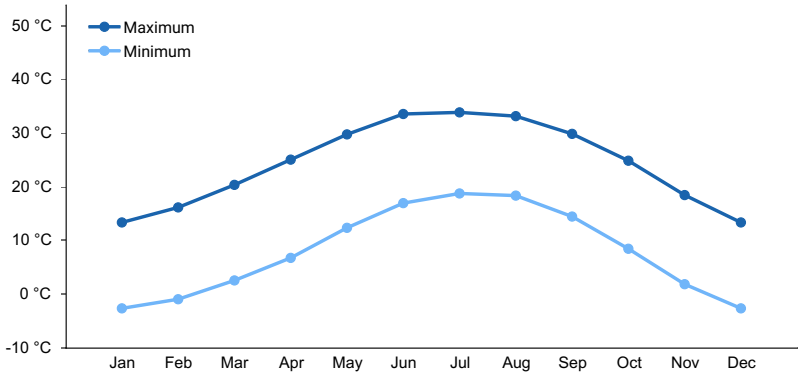


Figure 4. Monthly average minimum and maximum temperature

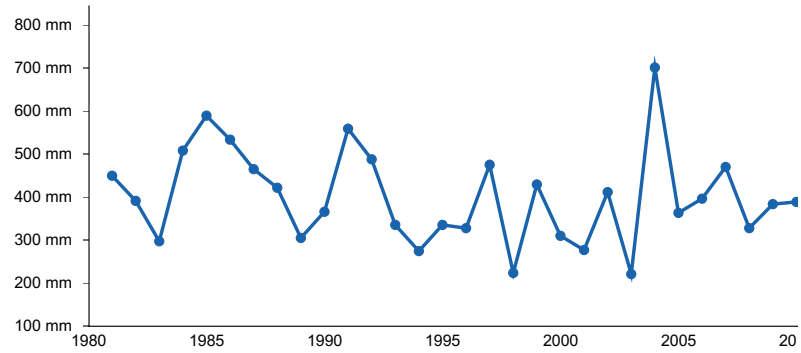


Figure 5. Annual precipitation pattern

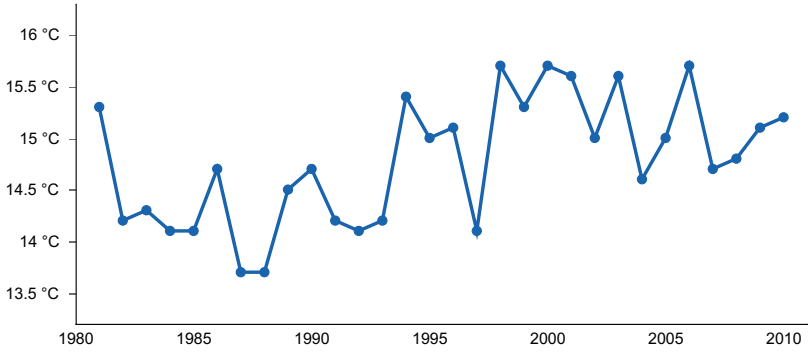


Figure 6. Annual average temperature pattern

Climate stations used

- (1) MELROSE [USC00295617], Melrose, NM
- (2) ELIDA [USC00292854], Elida, NM
- (3) CROSSROADS 2 [USC00292207], Crossroads, NM

- (4) CAPROCK [USC00291445], Caprock, NM
- (5) TATUM [USC00298713], Tatum, NM
- (6) HOBBS 13W [USC00294030], Lovington, NM
- (7) ANDREWS [USC00410248], Andrews, TX
- (8) ODESSA SCHLEMEYER FLD [USW00003031], Odessa, TX
- (9) K-BAR RCH [USC00414710], Odessa, TX

Influencing water features

Water features are not an influencing factor in this site. This site receives runoff from upland sites above. This site can flood briefly during or after high rainfall events due to high intensity thunderstorms.

Wetland description

None.

Soil features

The Draw site is made up of deep, nearly level, calcareous soils on nearly level flood plains. They formed in moderately textured calcareous alluvial materials. The subsurface horizons are loam to clay loam with thin strata of darker and lighter colored clay loam to loamy sand. Visible calcium carbonate ranges from 0 to about 5 percent. Below this is dominantly sandy loam or loamy sand, with many thin strata of loam, sandy clay loam, and clay loam materials. Due to the fine sandy loam to clay loam surface texture, wind and water erosion is moderate without vegetative cover.

Major Soil Taxonomic Units correlated to this site include: Sprone clay loam, Baileyboro loam, Bippus clay loam, and Levelland fine sandy loam.

Parent Material Kind: Moderately coarse textured calcareous alluvial sediments

Parent Material Origin: Recent eolian sediments of Holocene age and the Blackwater Draw Formation of Pleistocene age overlying alluvial Ogallala sediments of Pliocene and Miocene age.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous, metamorphic and sedimentary rock
Surface texture	(1) Fine sandy loam (2) Loam (3) Clay loam
Family particle size	(1) Fine-loamy (2) Coarse-loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	17.78–25.4 cm
Calcium carbonate equivalent (0-101.6cm)	0–14%
Electrical conductivity (0-101.6cm)	0–3 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2

Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (0-101.6cm)	0–5%
Subsurface fragment volume >3" (0-101.6cm)	0%

Ecological dynamics

The Reference Plant Community for this site consists of a mixture of Mid/Shortgrass species along with a respectable amount of forbs and scattered woody plants. The productivity is fairly high compared to upland sites due to a deep soil and extra runoff from adjacent upland sites. Due to limited rainfall (14 – 20 in.) in MLRA 77D and the fact that most of this precipitation occurs in mid to late summer with little if any snowfall, Draw sites in MLRA 77D will not be as productive as Draw sites in MLRA 77C. The main grass species are sideoats grama (*Bouteloua curtipendula*), cane and silver bluestems (Bothriochloa spp.), vine mesquite (*Panicum obtusum*), plains bristlegrass (*Setaria leucopila*), blue grama (*Bouteloua gracilis*), and buffalograss (*Bouteloua dactyloides*). Smaller components of tobosagrass (*Pleuraphis mutica*), alkali sacaton (*Sporobolus airoides*), Arizona cottontop (*Digitaria californica*), perennial threeawn (*Aristida purpurea*), black grama (*Bouteloua eriopoda*), and occasionally white tridens (*Tridens albescens*) also occur. Cool-season grasses such as needle & thread (Stipa comata) may be present but it occurs in relatively small amounts in the reference community. Alkali sacaton may become predominate in areas on this site where salinity increases.

More commonly found forbs are gaura (Gaura spp.), western ragweed (*Ambrosia psilostachya*), Baldwin ironweed (*Vernonia baldwinii*), scarlet globemallow (*Sphaeralcea coccinea*), Engelmann daisy (*Engelmannia peristenia*), silverleaf nightshade (*Solanum elaeagnifolium*), Texas croton (*Croton texensis*), curlycup gumweed (*Grindelia squarrosa*), heath aster (*Symphyotrichum ericoides*), prairie coneflower (*Ratibida columnifera*) and numerous annuals. Forbs accounted for 5% or less of the annual herbage production. Scattered sand sagebrush (*Artemisia filifolia*), western soapberry (*Sapindus saponaria*), fourwing saltbush (*Atriplex canescens*), broom snakeweed (*Gutierrezia sarothrae*), lotebush (*Ziziphus obtusifolia*), catclaw mimosa (Mimosa biuncifera) and winterfat (*Krascheninnikovia lanata*) are the characteristic woody plants that make up approximately 5% of the total site production. Hackberry (Celtis spp.) may occur but is not as prevalent as on loamy or wet bottomland sites. A few shrubs such as baccharis (Baccharis spp.), and occasional yucca (Yucca spp.) may be present on some draw sites. At times there may be small holes of water present in the drainage channels. These provide a good source of water for wildlife and occasionally some plants such as curly dock (Rumex spp.) and smartweed (Polygonum spp.) may be found growing in wetter years. Since the site occupies a location lower on the landscape, animals prefer to take shelter from wind during the colder part of the year.

Grazing by large herbivores played a major role in shaping the site vegetatively. It is well documented that large herds of bison often grazed the site and domestic livestock prefer it as well. As bison migrated with the seasons, these sites received heavy grazing pressure from time to time but had long recovery periods. There is considerable evidence of haying of these sites by early day settlers. The increased productivity was recognized and the quality of the forage was good. Natural fire also played a major role in grassland ecology. The general role of fire seems to have been to perpetuate grasslands and keep any encroaching woody vegetation at bay. Woody plants were scattered along the channels where they could often escape fires, but there is little doubt that fire kept the number of woody plants controlled. Fires may have occurred as often as every 5 to 7 years on the average and this site usually had an above average fuel load compared to other plains sites.

Good grass cover and a variety of plant species make this site desirable for deer, quail, and many ground nesting birds. Small mammals and predators such as coyotes and bobcats find the site attractive as well.

When long-term overgrazing occurs on the draw site, there will be a reduction in midgrass species, a decline in mulch and organic matter, and a corresponding reduction in the intensity and frequency of fires. This site will move towards the Shortgrass/Midgrass Community (1.2). Many midgrass species will give way to increasing amounts of perennial threeawn, buffalograss, and blue grama. These shortgrasses can adapt better to grazing pressure. Grasses still dominate annual herbage production, but encroaching woody species such as mesquite may invade the site as wildlife and livestock spread the seeds. The more desirable forbs decrease rapidly with abuse and western ragweed increases with a host of annual forbs. With prescribed grazing (3-5 years), prescribed burning and

selective brush management this state can return to the reference state.

With continued heavy grazing over a long period of time and no natural fire this site will move towards the Shortgrass Community (2.1). Perennial threeawn will dominate with lesser amounts of low vigor blue grama and buffalograss, with few if any midgrass species remaining. Western ragweed can increase to the point of being subdominant. Bare areas will increase with annuals filling the voids. Many draw sites will see a dramatic increase in mesquite and possible invasion of pricklypear as a result of reduced grass cover, increased exposed soil and limited grass fuel for fire. Sand sagebrush, yucca, broom snakeweed and lotebush may become common throughout the site. This phase can not be reversed with management alone, a threshold has been crossed. Once woody species begin to establish, it is difficult to return to the reference state. Prescribed grazing (including growing season rest) along with brush and pest management (>4-5 years) and possibly range seeding will be required. Due to the lack of fine fuel prescribed burning is usually not an option at this stage of regression.

If heavy continuous grazing continues for extended periods combined with long term drought, this site will continue to regress towards the Shortgrass/Shrub Community (2.2). Existing shortgrass species will be in low vigor with large components of annual grasses and forbs present. Shrubs/halfshrub species can exceed 40 - 50% canopy on some draw sites. If good plant cover is not maintained on this site, erosion from water can become a problem. Poor cover and decreased plant diversity brought about by poor grazing management disrupts the natural processes such as the water cycle and nutrient cycle. Since this site receives runoff water from surrounding areas, good cover is essential to prevent gully and sheet erosion. Gullies may appear in the channels devoid of grass cover. The site has the capacity to store a good deal of water in the soil profile but poor vegetative cover inhibits this process. If little water enters the soil, then the taller grass species tend to do poorly. Opportunistic plants such as weedy forbs and annual grasses decrease the long term stability of the site. In some cases, cool-season annual grasses such as Japanese brome (Bromus spp.) and little barley (*Hordeum pusillum*) have become excessive and will compete strongly with the perennials. Major economic and energy inputs will be required to return this state to the reference state(1). Prescribed grazing with growing season rest, major brush and pest management over 5 – 7 years and range planting will be required. Some mechanical shaping may be required to repair gully areas followed by re-seeding. The success of the restoration is dependant on near mean average precipitation during this period.

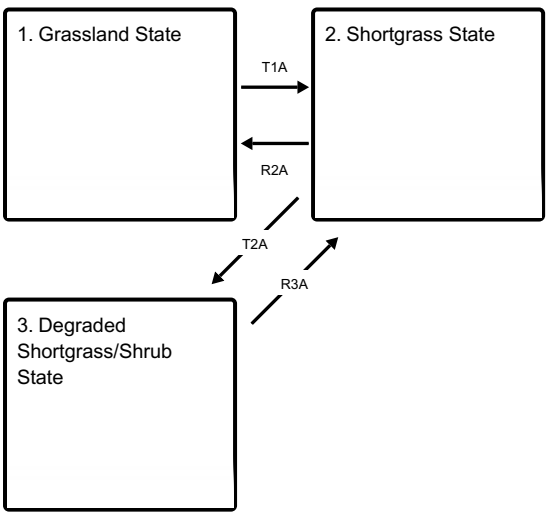
NOTE: Rangeland Health Reference Worksheets have been posted for this site on the Texas NRCS website (www.tx.nrcs.usda.gov) in Section II of the eFOTG under (F) Ecological Site Descriptions.

STATE AND TRANSITIONAL PATHWAYS: (DIAGRAM)

Narrative:
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



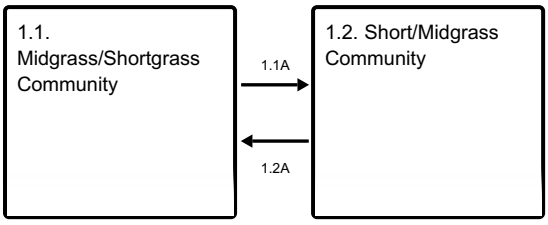
T1A - Absence of disturbance and natural regeneration over time, may be coupled with excessive grazing pressure and prolong drought conditions

R2A - Adequate rest from defoliation and removal of woody canopy, followed by reintroduction of historic disturbance regimes

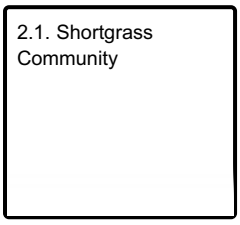
T2A - Absence of disturbance and natural regeneration over time, may be coupled with excessive grazing pressure

R3A - Adequate rest from defoliation and removal of woody canopy, followed by rangeland seeding

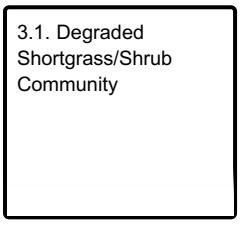
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1
Grassland State

The Midgrass/Shortgrass Community (1.1) is the interpretive plant community for the Draw site in MLRA 77D. Midgrass species found on the site include sideoats grama, cane/silver bluestem, vine mesquite and plains bristlegrass making up approximately 45% of the total site production. Blue grama, black grama, and buffalograss are the primary shortgrass species producing approximately 25% of the total production. It generally averages from 1,500 to 3,000 pounds per acre depending upon the timing and amount of precipitation. Diversity and productivity is consistent with the site potential. This site will move towards the Shortgrass/Midgrass Community (1.2). Many midgrass species will give way to increasing amounts of perennial threeawn, buffalograss, and blue grama. These shortgrasses can adapt better to grazing pressure. On draw sites where salinity has increased, alkali sacaton and fourwing saltbush can become predominate. Grasses still dominate annual herbage production, but encroaching woody species such as mesquite may invade the site as wildlife and livestock spread the seeds.

Dominant plant species

- sideoats grama (*Bouteloua curtipendula*), grass
- silver bluestem (*Bothriochloa saccharoides*), grass

Community 1.1
Midgrass/Shortgrass Community

Figure 7. 1.1 Midgrass/Shortgrass Community

The Midgrass/Shortgrass Community (1.1) is the interpretive or "reference" plant community for the Draw site in MLRA 77D. Midgrass species found on the site include sideoats grama, cane/silver bluestem, vine mesquite and plains bristlegrass making up approximately 45% of the total site production. Blue grama, black grama, and buffalograss are the primary shortgrass species producing approximately 25% of the total production. Lesser amounts of tobosagrass, alkali sacaton, Arizona cottontop, perennial threeawn and white tridens can also be found contributing to 20% of the production. Cool-season grasses such as needle & thread may be present but it occurs in relatively small amounts in this plant community. Forbs accounted for 5% or less of the annual herbage production with shrubs/trees making up the remaining 5% of the total site production. Production on this site is higher than other upland sites in MLRA 77D. It generally averages from 1,500 to 3,000 pounds per acre depending upon the timing and amount of precipitation. Diversity and productivity is consistent with the site potential. Good grass cover and a variety of plant species make this site desirable for deer, quail, and many ground nesting birds, especially in locations where small pools of water exist. Small mammals and predators such as coyotes and bobcats find the site attractive as well. Livestock prefer the site making it prone to grazing abuse without proper grazing management. In isolated areas there may be trees large enough to provide shade for picnics, etc. These areas are sometimes good archaeological sites.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1513	2270	3026
Forb	90	129	168
Shrub/Vine	45	67	90
Tree	34	50	67
Microbiotic Crusts	6	9	11
Total	**1688**	**2525**	**3362**

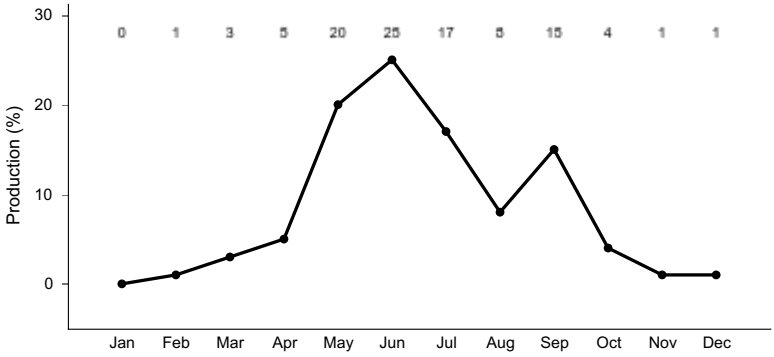


Figure 9. Plant community growth curve (percent production by month). TX1256, Midgrass/Shortgrass Community. Warm season mid/shortgrass species, few forbs and <5% shrubs..

Community 1.2
Short/Midgrass Community

Figure 10. 1.2 Short/Midgrass Community

As long-term overgrazing occurs on the draw site, there will be a reduction in midgrass species, a decline in mulch and organic matter, and a corresponding reduction in the intensity and frequency of fires. This site will move towards the Shortgrass/Midgrass Community (1.2). Many midgrass species will give way to increasing amounts of perennial threeawn, buffalograss, and blue grama. These shortgrasses can adapt better to grazing pressure. On draw sites where salinity has increased, alkali sacaton and fourwing saltbush can become predominate. Grasses still dominate annual herbage production, but encroaching woody species such as mesquite may invade the site as wildlife and livestock spread the seeds. The more desirable forbs decrease rapidly with abuse and western ragweed increases with a host of annual forbs. Plant cover, litter and mulch have been reduced. Bare ground has increased slightly exposing the soil to erosion. There may be some mulch and litter movement during rainfall events but due to gentle slopes, little soil movement would take place in this vegetative stage. Total annual production is approximately 1,120 to 2,200 pounds per acre. Diversity and productivity will be less than site potential. With prescribed grazing (3-5 years), prescribed burning and selective brush management the site may be shifted back to the reference plant community.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1009	1513	2018
Forb	112	168	224
Shrub/Vine	78	106	135
Tree	45	56	67
Microbiotic Crusts	11	17	22
Total	**1255**	**1860**	**2466**

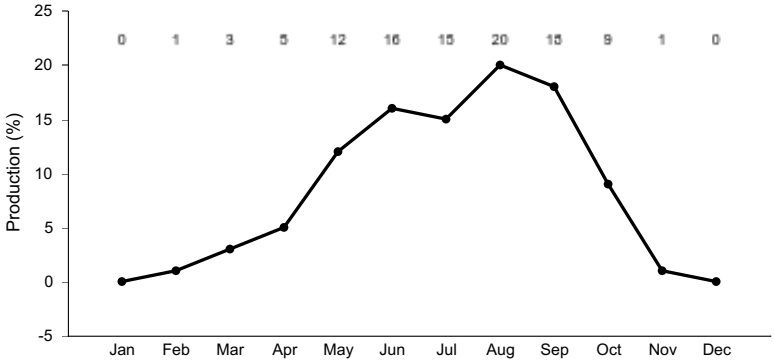


Figure 12. Plant community growth curve (percent production by month). TX1251, Warm-season bunchgrasses w/ forbs & shrubs. Warm-season bunchgrasses with forbs and shrubs..

Pathway 1.1A
Community 1.1 to 1.2

Midgrass/Shortgrass Community

Short/Midgrass Community

Due to heavy continuous grazing and no fires over a ten to twenty year period, the Mid/Shortgrass Community will shift to the Short/Midgrass Community.

Pathway 1.2A
Community 1.2 to 1.1

Short/Midgrass Community

Midgrass/Shortgrass Community

With prescribed grazing (3-5 years), prescribed burning and selective brush management the Short/Midgrass Community can return to the reference community (Mid/Shortgrass Community).

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

State 2
Shortgrass State

There is a continued decline in the diversity of the grassland component and an increase in woody plants. The grass component is a mixture of perennial threeawn dominating with lesser amounts of low vigor blue grama and buffalograss, few if any midgrass species remaining. Because of grazing pressure and competition for nutrients and water from woody plants the grassland component shows a lack of plant vigor and productivity.

Dominant plant species

- threeawn (*Aristida*), grass
- blue grama (*Bouteloua gracilis*), grass

Community 2.1
Shortgrass Community

Figure 13. 2.1 Shortgrass Community

With continued heavy grazing over a long period of time and no natural fire this site will move towards the Shortgrass Community (2.1). There is a continued decline in the diversity of the grassland component and an increase in woody plants. The grass component is a mixture of perennial threeawn dominating with lesser amounts of low vigor blue grama and buffalograss, few if any midgrass species remaining. Because of grazing pressure and competition for nutrients and water from woody plants the grassland component shows a lack of plant vigor and productivity. Western ragweed can increase to the point of sub-domination. Bare areas will increase with annuals filling the voids. Many draw sites may see a dramatic increase in mesquite density and size along with possible invasion of pricklypear as a result of reduced grass cover, increased exposed soil and limited grass fuel for fire. Many of the climax shrubs such as sand sagebrush, catclaw mimosa, yucca, broom snakeweed and lotebush will still be present. Soil erosion can be excessive to the point of gully formations. Annual herbage production has decreased due to a decline in soil structure and litter cover. Total annual production is approximately 1,060 to 1,790 pounds per acre with grass production reduced to <50% of site potential, forbs and woody production nearly equal. This phase can not be reversed with management alone, a threshold has been crossed. Once woody species begin to establish, it is difficult to return to the reference state(1). Prescribed grazing (including growing season rest) along with brush and pest management (>4-5 years) and range seeding will be required. Due to the lack of fine fuel prescribed burning is usually not an option at this stage of regression. In some cases mechanical shaping followed by re-seeding may be needed to re-establish active gullies.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	673	841	1009
Forb	224	336	448
Shrub/Vine	224	336	448
Tree	56	67	78
Microbiotic Crusts	11	17	22
Total	**1188**	**1597**	**2005**

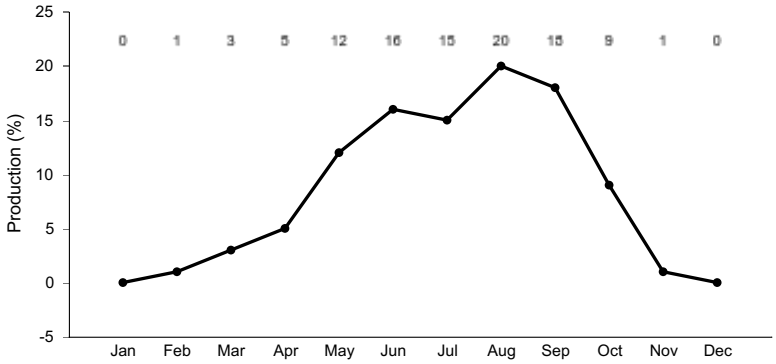


Figure 15. Plant community growth curve (percent production by month).

TX1252, Shortgrass Dominant/Invading Shrub Community. Warm-season shortgrasses with increasing shrubs and forbs..

State 3
Degraded Shortgrass/Shrub State

Existing shortgrass species will be in low vigor with large components of annual grasses and forbs present. Shrubs/halfshrub species can exceed 40 - 50% canopy on some draw sites. If good plant cover is not maintained on this site, erosion from water can become a problem.

Dominant plant species

- buffalograss (*Bouteloua dactyloides*), tree
- broom snakeweed (*Gutierrezia sarothrae*), shrub
- yucca (*Yucca*), shrub

Community 3.1
Degraded Shortgrass/Shrub Community

Figure 16. 3.1 Degraded Shortgrass/Shrub Community

If heavy continuous grazing continues for extended periods combined with long-term drought, this site will continue to regress towards the Degraded Shortgrass/Shrub Community (3.1). Existing shortgrass species will be in low vigor with large components of annual grasses and forbs present. Shrubs/halfshrub species can exceed 40 - 50% canopy on some draw sites. If good plant cover is not maintained on this site, erosion from water can become a problem. Poor cover and decreased plant diversity brought about by poor grazing management disrupts the natural processes such as the water cycle and nutrient cycle. Since this site receives runoff water from surrounding areas, good cover is essential to prevent gully and sheet erosion. Gullies may appear in the channels devoid of grass cover. The site has the capacity to store a good deal of water in the soil profile but poor vegetative cover inhibits this process. If little water enters the soil, then the taller grass species tend to do poorly. Opportunistic plants such as weedy forbs and annual grasses decrease the long term stability of the site. In some cases, cool-season annual grasses such as Japanese brome and little barley have become excessive and will compete strongly with the perennials. Total annual production is approximately 1,260 to 1,890 pounds per acre with grass and woody production nearly equal. Major economic and energy inputs will be required to return this state to the reference state(1). Prescribed grazing with growing season rest, major brush and pest management over 5 – 7 years and range planting will be required. Some mechanical shaping may be required to repair gully areas followed by re-seeding. The success of the restoration is dependant on near mean average precipitation during this period.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	560	673	785
Shrub/Vine	448	560	673
Forb	336	448	560
Tree	56	67	78
Microbiotic Crusts	11	17	22
Total	**1411**	**1765**	**2118**

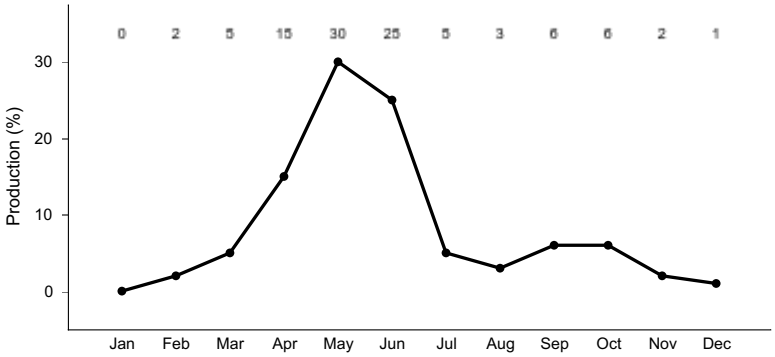


Figure 18. Plant community growth curve (percent production by month). TX1258, Degraded Shortgrass/Shrubs Community. Community has degraded shortgrasses and shrubs..

Transition T1A
State 1 to 2

With heavy continuous grazing, no fires, brush invasion, long-term drought conditions, no brush or pest management, and no rest periods, the Grassland State of the Draw ecological site will transition into the Shortgrass State.

Restoration pathway R2A
State 2 to 1

With the implementation of prescribed grazing (growing season rests), selective brush and pest management, and range planting conservation practices, the Shortgrass State can be restored back to the Grassland State. This restoration may take 4 to 5 years or longer.

Conservation practices

Brush Management
Range Planting
Integrated Pest Management (IPM)
Prescribed Grazing

Transition T2A
State 2 to 3

With heavy continuous grazing, long-term drought conditions, brush invasion, no brush management, and no pest management, the Shortgrass State will further transition into the Degraded Shortgrass/Shrub State.

Restoration pathway R3A
State 3 to 2

Major economic and energy inputs will be required to return this state to the Shortgrass State. Prescribed grazing

with growing season rest, major brush and pest management over 5 – 7 years and range planting will be required. Some mechanical shaping may be required to repair gully areas followed by re-seeding. The success of the restoration is dependent on near mean average precipitation during this period.

Conservation practices

Brush Management
Prescribed Grazing
Grazing Land Mechanical Treatment
Range Planting
Integrated Pest Management (IPM)

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Midgrasses**			762–1524	
	sideoats grama	BOCU	*Bouteloua curtipendula*	342–673	–
	vine mesquite	PAOB	*Panicum obtusum*	140–280	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	140–280	–
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	140–280	–
2	**Mid/Shortgrasses**			336–560	
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	84–135	–
	Arizona cottontop	DICA8	*Digitaria californica*	84–135	–
	tobosagrass	PLMU3	*Pleuraphis mutica*	84–135	–
	alkali sacaton	SPAI	*Sporobolus airoides*	84–135	–
	white tridens	TRAL2	*Tridens albescens*	0–22	–
3	**Shortgrasses**			420–841	
	buffalograss	BODA2	*Bouteloua dactyloides*	168–336	–
	blue grama	BOGR2	*Bouteloua gracilis*	168–336	–
	black grama	BOER4	*Bouteloua eriopoda*	84–168	–
4	**Cool-season grasses**			0–112	
	needle and thread	HECO26	*Hesperostipa comata*	0–112	–
Forb					
5	**Forbs**			90–168	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	9–17	–
	Texas croton	CRTE4	*Croton texensis*	9–17	–
	Engelmann's daisy	ENPE4	*Engelmannia peristenia*	9–17	–
	beeblossom	GAURA	*Gaura*	9–17	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	9–17	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	9–17	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	9–17	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	9–17	–
	white heath aster	SYERE	*Symphyotrichum ericoides var.*	9–17	–

			ericoides		
	Baldwin's ironweed	VEBA	*Vernonia baldwinii*	9–17	–
Shrub/Vine					
6	**Trees, Shrubs, Vines**			78–157	
	sand sagebrush	ARFI2	*Artemisia filifolia*	20–45	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	11–22	–
	baccharis	BACCH	*Baccharis*	0–11	–
	hackberry	CELTI	*Celtis*	0–11	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	8–11	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	8–11	–
	catclaw mimosa	MIACB	*Mimosa aculeaticarpa var. biuncifera*	8–11	–
	western soapberry	SASAD	*Sapindus saponaria var. drummondii*	8–11	–
	soapweed yucca	YUGL	*Yucca glauca*	8–11	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	8–11	–

Animal community

Good grass cover and a variety of plant species make this site desirable for deer, quail, and many ground nesting birds. Small mammals and predators such as coyotes and bobcats find the site attractive as well.

Hydrological functions

This site acts like a conduit for the drainage areas through the high plains to the major creeks and rivers. With good vegetative cover, water quality from runoff is good. If cover is poor, then erosion on the site can be substantial and off site effects will be negative. Poor vegetative cover can contribute to flooding and sediment deposition over down slope roads and highways.

Recreational uses

Hunting, camping, hiking, birdwatching, photography, and horseback riding.

Wood products

None.

Other products

None.

Other information

Along the draws throughout the plains, significant archeological sites exist. Early Native Americans often camped along these draws and hunted game that grazed and watered there.

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, 9/11/2023

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.

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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.

Author(s)/participant(s)	Stan Bradbury, Zone RMS, NRCS, Lubbock, Texas
Contact for lead author	806-791-0581
Date	09/04/2007
Approved by	Bryan Christensen

Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Slight to moderate.

2. **Presence of water flow patterns:** Slight to moderate.

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20-25% bare ground.

5. **Number of gullies and erosion associated with gullies:** Slight to moderate.

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

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):** Moderate resistance to surface erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Loam to clay loam; friable surface; high SOM.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Basal cover and density with moderate interspaces should make rainfall impact minimal. This site has moderately permeable soil, runoff is slow to medium and available water holding capacity is high.

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 shortgrasses >

Other: Warm-season tallgrasses > Warm-season midgrasses > Forbs > Shrubs/Vines > Trees

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Grasses due to their growth habit will exhibit some mortality and decadence, though 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):** 1,500 to 2,600 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:** Yucca, sand sagebrush, mesquite and broom snakeweed can become invasive.

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17. **Perennial plant reproductive capability:** All plant species should be capable of reproduction, except during prolonged periods of drought conditions, heavy natural herbivory or intense wildfires.
