Ecological site R042AE279TX
Loamy Swale, Mixed Prairie

Accessed: 09/21/2024

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.

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.

Associated sites

R042AE272TX	**Clay Flat, Mixed Prairie**
R042AE273TX	**Draw, Mixed Prairie**
R042AE694TX	**Loamy Slope, Mixed Prairie**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs as nearly level to gently sloping intermountain concave swales on valley floors and stream terraces. Slopes range from 0 to 2 percent.

Table 2. Representative physiographic features

Landforms	(1) Swale
Flooding frequency	None
Ponding frequency	None
Elevation	1,372–1,707 m
Slope	0–2%
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 15 to 17 inches and the annual total is highly variable from 8 to 30 inches. Most of the precipitation occurs as widely scattered thunderstorms of high intensity and short duration during the summer. Occasional precipitation occurs as light rainfall during the cool season. Annual snowfall ranges from 1-3 inches.

Mean annual air temperature is 61° F. Frost-free period ranges from 199 to 215 days (April-October). However, the optimal growing season occurs July through September as this period coincides with greater rainfall.

The average relative humidity in mid-afternoon is about 25 percent. Relative humidity is higher at night, and the average at dawn is about 57 percent. The sun shines 81 percent of the time in summer and 75 percent in winter. The prevailing wind is from the southwest. Average wind speed is highest, around 11 miles per hour, in March and April. The annual Class-A pan evaporation is approximately 82 inches.

Table 3. Representative climatic features

Frost-free period (average)	215 days
Freeze-free period (average)	230 days
Precipitation total (average)	432 mm

Influencing water features

There are no wetlands or streams influencing this site.

Soil features

Soil series of the Marfa and Musquiz soils are assigned to in this ecological site. These soils developed from loamy and clayey alluvium derived from igneous and sedimentary rocks, Perdiz igneous conglomerate rocks as well as eolian material. These soils receive large amounts of run-in water.

Representative Soil map units:
Marfa clay loam, 0 to 2 percent slopes
Marfa-Berrendo complex, 1 to 5 percent slopes (Marfa component)
Musquiz clay loam, 0 to 3 percent slopes
Musquiz association, nearly level

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderately slow
Soil depth	183 cm
Surface fragment cover <=3"	18%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	12.7–15.24 cm
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Subsurface fragment volume <=3" (Depth not specified)	30%
Subsurface fragment volume >3" (Depth not specified)	4%

Ecological dynamics

This site receives moisture from surrounding areas higher in the watershed. The vegetation dynamics of the site

reflect this. Because of the increased water entering the site, the site has remained somewhat resistant to degradation. Historically, it is believed the site supported a variety of herbaceous species, primarily grasses with some forbs. Determination of the Historical Climax Plant Community is based upon informed conjecture, as no relict sites have been located. Annual forbs were common on years with spring rains. Most common grass was blue grama (*Bouteloua gracilis*), which comprised 35 percent of the community by weight. A mixture of mixed midgrasses: vine-mesquite (*Panicum obtusum*), cane bluestem (*Bothriochloa barbinodis*), sideoats grama (*Bouteloua curtipendula*), bristlegrass (*Setaria leucopila*) comprised 42 percent of the community by weight. Other species present in smaller amounts were tobosa (*Pleuraphis mutica*) comprising 5 percent of the community by weight, buffalograss (*Bouteloua dactyloides*), curly-mesquite (*Hilaria belangeri*), and burro grass (*Scleropogon brevifolius*) comprised 5 percent of the community by weight. Sand muhly (*Muhlenbergia arenicola*), three-awns (Aristida species), and ear muhly *Muhlenbergia arenacea*) comprised 5 percent of the community by weight. Forbs would have comprised approximately five percent of the community by weight. Butterflybush (Buddleja murrubiifolia) comprised 2 percent of the community by weight. Lotebush (*Ziziphus obtusifolia*), wolf berry (*Lycium berlandieri*), western honey mesquite (*Prosopis glandulosa* var. torreyana), yucca (Yucca species) and cactus (mostly Opuntia species) were probably present, but in small amounts comprising 1 percent or less of the community by weight). Most growth occurs June through October. 20 percent or less of bare ground would be observed.

Grazing would have played a role in the alterations within this site. Although production on the site could remain fairly high, species composition is altered. Heavy grazing, combined with drought, results in the loss of sideoats grama, bristlegrass, cane bluestem, and vine-mesquite. The site would degrade to one dominated by blue grama. Grasses such as sand muhly, three-awns, and ear muhly would increase. Shrub vegetation would increase as well. Fire may have also played a role in the retaining of species composition as most grasses respond favorably to fire, provided soil moisture is good when burning takes place and providing ample precipitation follows burning.

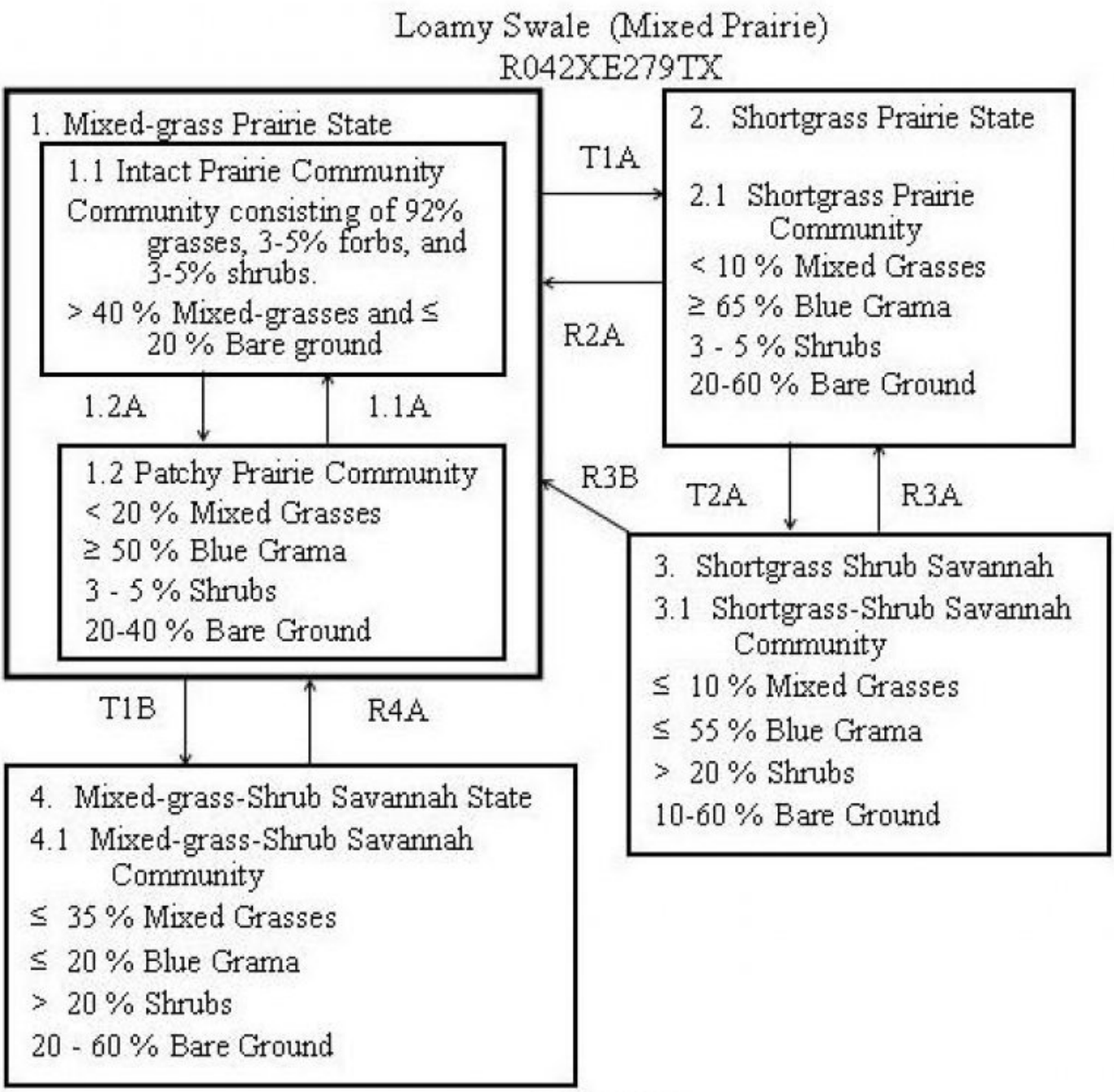
As retrogression occurs, vegetative cover would decrease leaving more bare ground and providing for a patchy prairie. Species diversity is still apparent, but composition has been altered. Less than 20 percent of the community, by weight is represented by mixed grasses. 50 Percent of the community, by weight, is blue grama. The patchy aspect of this community is due to the increase bare ground, up to 40 percent exposed. Annuals, which would have opportunity for germination with precipitation, would increase, occupying the bare areas left by the removal of the bunchgrasses.

As retrogression continues, it appears one of two transformations are possible. If mixed grasses are heavily impacted, a Shortgrass Prairie is determined. This state is dominated by blue grama with low amounts of mixed grasses. Shrub percentage by weight may still be small. 20 to 60 percent bare ground may be observed. From this state, should further degradation occur, a Shortgrass Shrub Savannah is determined. The primary change in this state is the increase of shrubs, by weight, in the community to over 20 percent. In this state, several ecological processes may have been altered. Nutrient cycling has been altered due to the removal of the preferred grazing species.

From the HCPC, if mixed grasses remain a fairly large component of the community within the Patchy Prairie, shrubs may increase, filling in the bare ground areas. This leads to a Mixed-Grass Shrub Savannah. More than 20 percent of the community by weight is composed of shrubs. 20 to 60 percent of bare ground is exposed. In this state, as well, several ecological processes may have been altered. Nutrient cycling has been altered due to the reduction of the preferred grazing species. Fire behavior has been altered due to the increased bare ground. Hydrologic patterns have been altered as bare ground patches have been enlarged. Even with the resilience of the site, a reversal of these effects is difficult without accelerating practices.

State and Transition Diagram:
The following diagram suggests some pathways that the vegetation on this site might take. There may be other states not shown in the diagram. This information is intended to illustrate what might happen in a given set of circumstances. This does not mean that this process would happen the same way in every instance. Local professional guidance should be sought before pursuing any treatment scenario.

State and transition model



LEGEND

1.1A Heavy Continuous Grazing, Drought

1.2A Prescribed Grazing, Timely Rain Events

T1A Heavy Continuous Grazing, Drought

R2A Grazing Lands Mechanical Treatment, Range Planting, Prescribed Grazing

T2A Heavy Continuous Grazing, Drought, Invader Species

R3A Brush Management, Grazing Lands Mechanical Treatment, Range Planting, Prescribed Grazing

R3B Brush Management, Grazing Lands Mechanical Treatment, Range Planting, Prescribed Grazing

T1B Heavy Continuous Grazing, Drought, No Fire, Invader Species

R4A Brush Management, Grazing Lands Mechanical Treatment, Range Planting, Prescribed Grazing

Figure 4. MLRA 42 - Loamy Swale (MP) - State & Transition

State 1
Mixed-grass Prairie State

Community 1.1
Mixed-grass Prairie Community (Intact)

Figure 5. 1.1 Mixed-grass Prairie Community (Intact)

Undisturbed landscapes that retain vegetation patterns, pre-European settlement, have not yet been found to sample. Therefore, statements regarding the Historic Climax Plant Community (HCPC) are based on tacit knowledge, current observations, and informed conjecture, not sampled vegetation. The HCPC is dominated by mixed grasses including: blue grama, vine–mesquite, sideoats grama, cane bluestem, and bristlegrass. Other grasses are present, buffalograss, curly mesquite, and burrograss, tobosa, sand muhly, three-awns, and ear muhly. Annuals are present especially in years with early spring rains. By weight, approximately ninety-two percent of the community is comprised of grasses, approximately five percent is comprised of forbs and approximately three percent is comprised of shrub species. The occasional shrubs include butterfly bush, lotebush, yucca and cactus. Up to twenty percent of bare ground may be exposed. Diversity is maintained by prescribed grazing, preferably with deferment and the continuation of additional water supplied by run-off onto the site because of the landscape position. The diversity of the preferred grasses such as sideoats grama, cane bluestem, and bristlegrass, as well as others, decrease with continuous heavy grazing. Heavy grazing and/or drought can alter this from the HCPC Mixed-Grass Prairie to a Patchy Prairie.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1547	2062	2578
Forb	84	112	140
Shrub/Vine	50	67	84
Tree	–	–	–
Microbiotic Crusts	–	–	–
Total	**1681**	**2241**	**2802**

Figure 7. Plant community growth curve (percent production by month). TX0028, Mixed-grass Prairie - Intact Prairie (MP). Mixed prairie rangeland of warm-season mid and shortgrasses and forbs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	5	15	20	25	20	10	0	0

Community 1.2
Mixed-grass Prairie - Patchy Community

Figure 8. 1.2 Mixed-grass Prairie - Patchy Community

This plant community maintains, by weight, approximately twenty percent mixed grasses and fifty percent blue grama. Other grasses, buffalograss, curly mesquite, and burrograss, tobosa, sand muhly, three-awns, and ear muhly round out the remaining twenty-two percent by weight of grasses in the community. Forbs comprise five percent of the community, while shrubs provide approximately three percent of the biomass yet. Bare ground has increased however to twenty to forty percent. The increase in bare ground is largely the reason for determining this community. Modifying grazing practices at this point in succession to prescribed grazing, however allows this community to return to intact prairie conditions. In this plant community, there is usually a sufficient seed source and old rootstocks of the mixed grasses remaining to allow for this return.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1237	1456	1676
Forb	67	80	91
Shrub/Vine	40	47	55
Tree	–	–	–
Microbiotic Crusts	–	–	–
Total	**1344**	**1583**	**1822**

Table 7. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-1%
Grass/grasslike foliar cover	60-80%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	50-60%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	20-40%

Table 8. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	0-5%
>0.15 <= 0.3	–	–	25-50%	–
>0.3 <= 0.6	–	0-2%	–	–
>0.6 <= 1.4	–	0-1%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 10. Plant community growth curve (percent production by month). TX0029, Mixed-grass Prairie - Patchy Prairie (MP). Mixed prairie rangeland consisting of mid and shortgrasses and forbs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	5	15	20	25	20	10	0	0

Pathway 1.1A
Community 1.1 to 1.2

Mixed-grass Prairie Community (Intact)

Mixed-grass Prairie - Patchy Community

Heavy Continuous Grazing and Droughts shift the Intact Mixed-grass Prairie Community to the Patchy Mixed-grass Prairie Community.

Pathway 1.2A
Community 1.2 to 1.1

Mixed-grass Prairie - Patchy Community

Mixed-grass Prairie Community (Intact)

Prescribed Grazing and timely rainfall events can restore the patchy prairie community to the intact prairie community.

Conservation practices

Prescribed Grazing

State 2
Shortgrass Prairie State

Community 2.1
Shortgrass Prairie Community

Figure 11. 2.1 Shortgrass Prairie Community

This plant community is largely the result of heavy continuous grazing combined with drought. Grass diversity has been reduced. This plant community maintains, by weight, approximately ten percent mixed grasses and sixty-five percent blue grama. Other grasses, buffalograss, curly-mesquite, burrograss, tobosa, sand muhly, three-awns, and ear muhly and annual grasses round out the remaining seventeen percent, by weight, of grasses in the community. Forbs comprise five percent of the community, while shrubs still provide approximately three percent of the biomass. Bare ground has increased however to twenty to sixty percent. Forage quality has been reduced, as well as forage quantity. Wildlife habitat values have been lessened. Due to the dominance of shorter grass species such blue grama, cover for various wildlife species such as birds and mammals is decreased. Due to diversity loss and bare ground increase, accelerating practices will need to be employed to return this state to the HCPC. Grazing Land Mechanical Treatment may be necessary in bare areas, combined with seeding. Rest from grazing, followed by prescribed grazing would also be necessary to assure restoration is successful. Continuous heavy grazing, if continued, combined with drought, will lead to further loss of grass dominance. If a seed source is present for invasive shrub species, this state will deteriorate further to a Shortgrass Shrub Savannah.

Table 9. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	928	1366	1805
Forb	50	74	99
Shrub/Vine	30	45	58
Tree	–	–	–
Microbiotic Crusts	–	–	–
Total	**1008**	**1485**	**1962**

Table 10. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-1%
Grass/grasslike foliar cover	10-75%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	20-70%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%

Water	0%
Bare ground	20-60%

Table 11. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	5-10%
>0.15 <= 0.3	–	–	10-65%	–
>0.3 <= 0.6	–	0-2%	0-10%	–
>0.6 <= 1.4	–	0-1%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 13. Plant community growth curve (percent production by month). TX0023, Mid/Shortgrass/Shrubs Community - Mixed Prairie. Prairie with cool and warm-season mid and shortgrasses with scattered shrubs and trees..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	2	2	3	8	8	18	23	15	15	2

State 3
Shortgrass Shrub Savannah State

Community 3.1
Shortgrass-Shrub Savannah Community

Figure 14. 3.1 Shortgrass-Shrub Savannah Community

This plant community is largely the result of heavy continuous grazing combined with drought and the introduction of shrub seed to the community. Grass dominance has been reduced. This plant community is comprised of, by weight, less than 10 percent mixed grasses and less than 55 percent blue grama. Other grasses, such as burrograss, curly-mesquite, buffalograss, tobosa, sand muhly, three-awns, ear muhly and annual grasses complete the remaining 19 percent, by weight, of the grass community. Forbs comprise 5 percent of the community, while shrubs now comprise greater than twenty percent of the biomass. Bare ground is now present at ten to sixty percent cover levels. Accelerating practices will need to be employed to return this state to the HCPC. Grazing Land Mechanical Treatment as well as brush management may be necessary, combined with seeding. Brush management could be in the form of mechanical treatment, chemical treatment, or prescribed burning. Rest from

grazing, followed by prescribed grazing would also be necessary to assure restoration is successful.

Table 12. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	746	1098	1450
Shrub/Vine	212	313	412
Forb	50	74	99
Tree	–	–	–
Microbiotic Crusts	–	–	–
Total	**1008**	**1485**	**1961**

Table 13. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-20%
Grass/grasslike foliar cover	10-60%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	10-60%

Table 14. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	5-10%
>0.15 <= 0.3	–	–	10-60%	–
>0.3 <= 0.6	–	0-5%	0-10%	–
>0.6 <= 1.4	–	0-10%	–	–
>1.4 <= 4	–	0-5%	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 16. Plant community growth curve (percent production by month). TX0023, Mid/Shortgrass/Shrubs Community - Mixed Prairie. Prairie with cool and warm-season mid and shortgrasses with scattered shrubs and trees..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	2	2	3	8	8	18	23	15	15	2

State 4

Mixed-grass Shrub Savannah State

Community 4.1
Mixed-Grass Shrub Savannah Community

Figure 17. 4.1 Mixed-Grass Shrub Savannah Community

This community has maintained diversity of mid-grasses, but shrub encroachment is apparent. Blue grama has decreased. This plant community is largely the result of heavy continuous grazing combined with drought, a reduction in fire frequency and the introduction of shrub seed to the community. Grass dominance has been reduced. This plant community is comprised of, by weight, less than thirty-five percent mixed grasses and less than twenty percent blue grama. Other grasses, such as burrograss, curly mesquite, buffalograss, tobosa, sand muhly, three-awns, ear muhly annual grasses complete the remaining 19 percent, by weight, of the grass community. Forbs comprise five percent of the community, while shrubs now comprise greater than twenty percent of the biomass. Bare ground is now present at twenty to sixty percent cover levels. Accelerating practices will need to be employed to return this state to the HCPC. Grazing Land Mechanical Treatment as well as brush management may be necessary, combined with seeding. Brush management could be in the form of mechanical treatment, chemical treatment, or prescribed burning. Rest from grazing, followed by prescribed grazing would also be necessary to assure restoration is successful.

Table 15. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	968	1291	1614
Shrub/Vine	309	412	516
Forb	67	90	112
Tree	–	–	–
Microbiotic Crusts	–	–	–
Total	**1344**	**1793**	**2242**

Table 16. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-20%
Grass/grasslike foliar cover	20-25%
Forb foliar cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%

Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	20-60%

Table 17. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	5-10%
>0.15 <= 0.3	–	–	10-65%	–
>0.3 <= 0.6	–	0-5%	0-10%	–
>0.6 <= 1.4	–	0-10%	–	–
>1.4 <= 4	–	0-5%	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 19. Plant community growth curve (percent production by month). TX0023, Mid/Shortgrass/Shrubs Community - Mixed Prairie. Prairie with cool and warm-season mid and shortgrasses with scattered shrubs and trees..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	2	2	3	8	8	18	23	15	15	2

Transition T1A
State 1 to 2

Heavy Continuous Grazing and Drought transitions to Shortgrass Prairie State.

Transition T1B
State 1 to 4

With heavy continuous grazing, droughts, no fire, and invader species, the Mixed-grass Prairie State converts to Mixed-grass-Shrub Savannah State.

Restoration pathway R2A
State 2 to 1

Grazing Lands Mechanical Treatment, Range Planting, and Prescribed Grazing can assist in the restoration of the Mixed-grass Prairie State.

Conservation practices

Prescribed Grazing
Grazing Land Mechanical Treatment
Range Planting

Transition T2A
State 2 to 3

Heavy Continuous Grazing and Droughts would convert the Shortgrass Prairie State to the Shortgrass Shrub

Savannah State.

Restoration pathway R3B
State 3 to 1

Brush Management, Grazing Lands Mechanical Treatment, Range Planting and Prescribed Grazing can restore the Shortgrass Shrub Savannah State to the Mixed-grass Prairie State.

Conservation practices

Brush Management
Prescribed Grazing
Grazing Land Mechanical Treatment
Range Planting

Restoration pathway R3A
State 3 to 2

Brush Management, Grazing Lands Mechanical Treatment, Range Planting, and Prescribed Grazing can shift the Shortgrass/Shrub Savannah State to the Shortgrass Prairie State.

Conservation practices

Brush Management
Prescribed Grazing
Grazing Land Mechanical Treatment
Range Planting

Restoration pathway R4A
State 4 to 1

Brush Management, Grazing Lands Mechanical Treatment, Range Planting, and Prescribed Grazing can shift the Mixed-grass Shrub Savannah State to the Mixed-grass Prairie State.

Conservation practices

Brush Management
Prescribed Grazing
Grazing Land Mechanical Treatment
Range Planting

Additional community tables

Table 18. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Shortgrass**			588–981	
	blue grama	BOGR2	*Bouteloua gracilis*	588–981	–
2	**Midgrasses**			706–1177	
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	112–560	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	112–560	–

	vine mesquite	PAOB	*Panicum obtusum*	112–560	–
	streambed bristlegrass	SELE6	*Setaria leucopila*	112–560	–
3	**Shortgrass**			84–140	
	tobosagrass	PLMU3	*Pleuraphis mutica*	84–140	–
4	**Shortgrasses**			84–140	
	buffalograss	BODA2	*Bouteloua dactyloides*	28–84	–
	curly-mesquite	HIBE	*Hilaria belangeri*	28–84	–
	burrograss	SCBR2	*Scleropogon brevifolius*	28–56	–
5	**Shortgrasses**			84–140	
	threeawn	ARIST	*Aristida*	28–56	–
	ear muhly	MUAR	*Muhlenbergia arenacea*	28–56	–
	sand muhly	MUAR2	*Muhlenbergia arenicola*	28–56	–
Forb					
6	**Forb**			17–28	
	croton	CROTO	*Croton*	17–28	–
7	**Forbs**			67–112	
	pigweed	AMARA	*Amaranthus*	22–45	–
	prairie broomweed	AMDR	*Amphiachyris dracunculoides*	22–45	–
	white sagebrush	ARLUM2	*Artemisia ludoviciana ssp. mexicana*	22–45	–
	woolly locoweed	ASMOM5	*Astragalus mollissimus var. mollissimus*	22–45	–
	thistle	CIRSI	*Cirsium*	22–45	–
	Cooley's bundleflower	DECO2	*Desmanthus cooleyi*	22–45	–
	polkadots	DYLI	*Dyschoriste linearis*	22–45	–
	Wright's eryngo	ERHE3	*Eryngium heterophyllum*	22–45	–
	buckwheat	ERIOG	*Eriogonum*	22–45	–
	spurge	EUPHO	*Euphorbia*	22–45	–
	dwarf morning-glory	EVOLV	*Evolvulus*	22–45	–
	beeblossom	GAURA	*Gaura*	22–45	–
	Davis Mountain mock vervain	GLBIC	*Glandularia bipinnatifida var. ciliata*	22–45	–
	rushpea	HOFFM	*Hoffmannseggia*	22–45	–
	bitter rubberweed	HYOD	*Hymenoxys odorata*	22–45	–
	hairy caltrop	KAHI	*Kallstroemia hirsutissima*	22–45	–
	bladderpod	LESQU	*Lesquerella*	22–45	–
	lacy tansyaster	MAPI	*Machaeranthera pinnatifida*	22–45	–
	purslane	PORTU	*Portulaca*	22–45	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	22–45	–
	globemallow	SPHAE	*Sphaeralcea*	22–45	–
	fameflower	TALIN2	*Talinum*	22–45	–
	fiveneedle pricklyleaf	THPEP	*Thymophylla pentachaeta var. pentachaeta*	22–45	–
	desert zinnia	ZIAC	*Zinnia acerosa*	22–45	–
Shrub/Vine					
8	**Shrub**			34–56	

	woolly butterflybush	BUMA	*Buddleja marrubiifolia*	34–56	–
9	**Shrubs**			0–6	
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	0–6	–
	western honey mesquite	PRGLT	*Prosopis glandulosa var. torreyana*	0–6	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–6	–
10	**Shrub**			17–28	
	pricklypear	OPUNT	*Opuntia*	17–28	–

Animal community

This site was historically used in the production of domestic livestock and to provide habitat for native wildlife. Small mammals, such as rodents and rabbits utilize the area. Some deer and ground squirrels utilize this site. Larger mammals such as coyotes and fox can frequent the area, as they are dependent upon these rodents. Pronghorn antelope utilize the area heavily for both a food source and hiding cover for fawns.

Reptiles may frequent the area. The edge effect of grasslands provides good hunting areas for insects. The Trans-Pecos region is important to many migratory bird species. The seeds of some grasses and forbs are an important component to the diets of some birds. Grasses and shrubs also provide protective cover for nesting and young birds.

Plant Preferences by Animal Kind:
This rating system provides general guidance as to animal preferences for plant species. It also reveals 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 reflect the ecological status of the plant within the plant community. In order to discuss the value of plant species to particular animals, five plant preference classifications have been determined. Additionally, various parts of plants are discussed.

Preferred Plant - P - Composition of a plant species is greater in the diet of the target animal than found in the area being grazed by this animal.
Desirable Plant - D - Composition of plant species is approximately the same in the diet of the target animal as that found in the area being grazed by this animal.
Undesirable Plant - U - Composition of plant species is lower in the diet of the target animal than is found in the area being grazed by this animal.
Toxic Plant - T - Rare occurrence in the diet of the target animal and, if consumed in any tangible amounts, will result in death or severe illness in the animal.
Non-consumed Plant - N - Plant species that would not be eaten under normal extremes in forage conditions, but if no other forage is available, the target animal will attempt consumption although at greatly reduced rates.
Not documented – X – Plant species utilized, but the degree of utilization unknown.

Hydrological functions

This site lies in a water receiving position. When properly managed it captures and safely retains water. The soils, which comprise this site are well drained with slow to moderately slow permeability. Runoff is negligible on slopes less than one percent, and very low on slopes one to three percent. Providing the vegetation resource is managed properly, water and wind erosion potential is low. When vegetation is removed, these soils can also become crusted, thereby reducing the infiltration. Rill and gully erosion can occur, especially due to the extra water the site receives. Once started this type of erosion is difficult to treat and return to a productive stable environment

These soils are high in organic matter and therefore have the potential to be very productive. These sites can benefit from water spreading for increased native grass range management or pasture and hay production.

Recreational uses

Hunting, hiking, horseback riding and bird watching are the most feasible recreation uses. In some instances, off-

road vehicle users like to use the site for trails and courses, but this use can destroy vegetation cover leading to increased bare ground and increased erosion. This site when managed well is aesthetically pleasing to those enjoy who enjoy wide open places and traditional western prairie views.

Wood products

No merchantable wood products are available.

Other products

When managed properly this site provides forage for livestock and wildlife. The site can also provide cover for wildlife. Rangelands are an important ecosystem in the global carbon cycle. Well managed rangelands sequester more carbon than those that have deteriorated.

Other information

None.

Inventory data references

Two annual production transect was established within the Marfa and Musquiz Soil series, in Presidio County, in September and December 2002. The transects represent a Shortgrass Prairie community. A transect reflecting historical, pre-European settlement conditions has not yet been established. Transect location was recorded using the GPS.

Transect includes the collection of various types of vegetation information:

Herbaceous production from ten 1.92 or ten 9.6 square foot plots
Shrub production from three 0.01 acre plots
Line point intercept cover data
Canopy and basal gap data

Transect data and canopy cover class data is stored in the rangeland management files at the Presidio County Soil Survey office in Marfa, Texas.

Additionally some historical references were also reviewed. This site has been correlated between sites in Brewster, Jeff Davis, and Presidio Counties.

Other references

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Other References:
Griffith, Randy Scott. 1991. *Panicum obtusum*. In: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2003, June). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/ [6/17/03].

National Water and Climate Center, and Natural Resources Conservation Service, United States Department of Agriculture. TAPS Climate Data, Available URL: http://www.wcc.nrcs.usda.gov [Accessed June 20, 2003]

Powell, A.M. 1998. Trees and Shrubs of the Trans-Pecos and Adjacent Areas. University of Texas Press. Austin, TX.

Powell, A.M. 2000. Grasses of the Trans-Pecos and Adjacent Areas. Iron Mountain Press. Marathon, TX

Soil Survey Division, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions [Online WWW]. Available URL: " http://ortho.ftw.nrcs.usda.gov/osd/" [Accessed June 20, 2003]
U.S. Department of Agriculture. Natural Resources Conservation Service. National Soil Information System (NASIS) Release 5.1 [DATABASE]. Fort Collins, Colorado, June 2003

Uchytil, Ronald. 1988. *Pleuraphis mutica*. In: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2003, June). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/ [6/17/03].

USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Warnock, B.H. 1977. Wildflowers of the Davis Mountains and the Marathon Basin, Texas. Sul Ross State University. Alpine, TX

NRCS 417 Clipping Data

Soil Survey Reports of Counties in the MLRA 42, NRCS Field Office Technical Guide, Section II E Range Sites

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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)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

   _____

2. **Presence of water flow patterns:**

   _____

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

   _____

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

   _____

5. **Number of gullies and erosion associated with gullies:**

   _____

6. **Extent of wind scoured, blowouts and/or depositional areas:**

   _____

7. **Amount of litter movement (describe size and distance expected to travel):**

   _____

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

   _____

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

   _____

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

    _____

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

    _____

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:

    Sub-dominant:

    Other:

    Additional:

    _____

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**

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17. **Perennial plant reproductive capability:**
