USDA Natural Resources
Conservation Service

Ecological site R042CY125TX
Loamy

Accessed: 05/20/2025

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

F042CY020TX	**Limestone Mountain (North Aspect) 20-26" PZ** Limestone Mountain (North Aspect) is on steep north facing slopes mostly above 2,286 m in elevation. Soils are mostly shallow to limestone bedrock and clayey. The reference plant community is a mixed conifer forest.
F042CY021TX	**Limestone Mountain (South Aspect) 20-26" PZ** The Limestone Mountain (South Aspect) occurs on mountain slopes and ridgetops, at elevations generally above 2,286 m. Aspects are predominantly south facing or neutral. Soils are mostly shallow to limestone bedrock, gravelly, and loamy. The reference plant community is a ponderosa pine savanna.
R070CY102NM	**Shallow Limestone** Shallow Limestone occurs on limestone hills with 10 to 50 percent slope gradient. Soils are shallow to limestone bedrock. HCPC is mixed prairie grassland with scattered forbs, shrubs, and trees.
R070CY115NM	**Breaks** Breaks are escarpments with slopes ranging 40-95 percent gradient. Soils are shallow to bedrock. HCPC is a mountain shrubland with few scattered trees.
R042CY745TX	**Limestone Canyon Bottomland** Limestone Canyon is a flood plain, stream terrace, arroyo, or basin floor with very gravelly or cobbly soils. HCPC is mainly riparian woodlands but vegetation is variable due to different soil conditions.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex canescens* (2) *Ephedra*
Herbaceous	(1) *Pascopyrum smithii* (2) *Bouteloua gracilis*

Physiographic features

This site occurs on level to strongly sloping piedmont slopes or plains. Slopes average 5 percent or less, although they may range as high as 15 percent. Aspect varies but is not significant. Elevation ranges from 5,000 to 7,000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Plain (3) Drainageway
Flooding frequency	None
Ponding frequency	None
Elevation	1,524–2,134 m
Slope	0–3%
Aspect	Aspect is not a significant factor

Climatic features

The climate of the area is "semi-arid continental."

The average annual precipitation ranges from 13 to 16 inches. Variations of 5 inches, more or less, are not uncommon. Seventy-five percent of the precipitation falls from April to October. Most of the summer precipitation comes in the form of high intensity-short duration thunderstorms.

Temperatures are characterized by distinct seasonal changes and large annual and diurnal temperature changes. The average annual temperature is about 50 degrees F with extremes of -29 degrees F in the winter and 103 degrees F in the summer.

The average frost-free season is 130 to 160 days. The last killing frost falling in early May and the first killing frost in early October.

Both temperature and precipitation favor warm-season perennial species. However, about 40 percent of the annual precipitation falls at a time favorable to cool-season plant growth.

The soils of this site can store water from winter and early spring moisture for use by cool-season species. This allows the cool-season species to occupy an important component of this site. Strong wind from the west and southwest that blow from February to June can rapidly dry the soil profile during a critical period for cool-season plant growth.

Climate data was obtained from http://www.wrcc.sage.dri.edu/summary/climsmnm.html web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

Table 3. Representative climatic features

Frost-free period (average)	173 days
Freeze-free period (average)	187 days
Precipitation total (average)	406 mm

Influencing water features

This site is not influenced by water from a wetland or a stream.

Soil features

The soils of this site are well drained, moderately deep to deep. The surface texture varies form fine sandy loam to silty clay loam and clay loam. Soil permeability is moderate to moderately slow. Available water-holding capacity is moderately high to high. As vegetative cover decreases, the intake rate and water-holding capacity also decreases. If the soil is not adequately covered, wind and water erosion can be severe.

Table 4. Representative soil features

Parent material	(1) Alluvium–limestone (2) Alluvium–sandstone (3) Alluvium–shale
Surface texture	(1) Silt loam (2) Cobbly sandy clay loam (3) Clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Very slow to moderately slow
Soil depth	20–183 cm
Surface fragment cover <=3"	15–35%

Available water capacity (0-101.6cm)	5.08–20.32 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–4
Soil reaction (1:1 water) (0-101.6cm)	6.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	15–35%
Subsurface fragment volume >3" (Depth not specified)	15–35%

Ecological dynamics

The potential plant community of this site is a mixed grassland of warm and cool-season, mid and short perennial grasses. Woody species occupy a minor, but important part of this plant community. Few scattered oneseed junipers and pinyon pine may occur within some portions of the site's geographic range (documented at Guadalupe Mountains National Park [GUMO]). Forbs are a minor component of this site. However, during years of abundant spring and fall moisture, a large variety of forbs occur throughout this site.

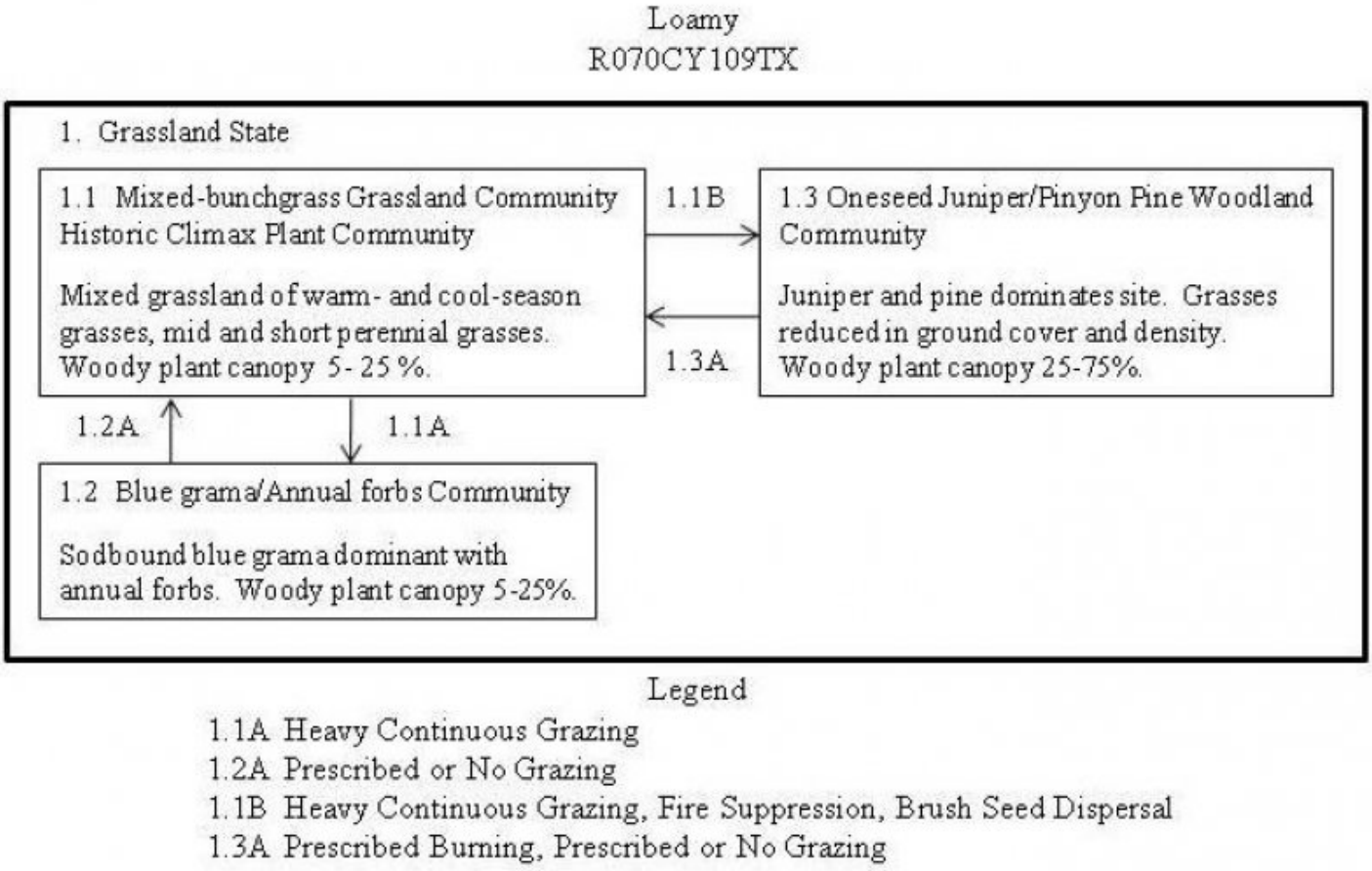
Fire plays an important role natural disturbance within this site. Lack of fire may not necessarily allow trees to encroach on this site throughout the site's range. An available seed source and suitable conditions (possibly areas of lower soil moisture) are necessary. In areas where encroachment has occurred, fire can successfully return the community to more open grassland. There is no evidence a state change where there is a complete loss of grass cover or where a fire threshold has been crossed, perhaps due to the site's resiliency and/or climate. All communities seem to occur in one state.

Finestem needlegrass is documented to occur only within the southern most portion of the site's range (at Guadalupe Mountains National Park). It is considered to be unpalatable to livestock and wildlife and it also seems to act as an increaser since it can be the dominant grass in historically disturbed sites (old homesteads and corrals). It will not dominate all historically disturbed areas. Possible reasons for its dominance in certain disturbed areas are the presence of finer textured soils and higher available soil moisture. Blue grama, wolftail, and western wheatgrass can be found associated but in very low percentages. The finestem needlegrass community does warrant further investigation. This community was not included in the state and transition model.

Some erosion occurring in disturbed areas has been documented to occur. Loss of

herbaceous cover can trigger the formation of rill and possibly gullies on this site.

State and transition model



State 1
Grassland State

Mixed-bunchgrass Grassland Community (1.1) is considered to be the reference plant community. The community is dominated by a diverse mix of bunch, stoloniferous, and rhizomatous grasses. Common grasses include blue grama, vine mesquite, cane bluestem, sacaton, and in some locations finestem needlegrass. Blue grama/Annual forbs Community (1.2) is composed of palatable grasses such as western wheatgrass and vine mesquite have been reduced. Blue grama has transitioned to a sod-bound turfgrass and dominated the grass component. Many annual and perennial forbs have increased. Oneseed Juniper/Pinyon Pine Woodland Community (1.3) is thought to have occurred due to past disturbances or they if the community was a part of the natural variability of the site.

Community 1.1
Mixed-bunchgrass Grassland Community

Figure 4. 1.1 Mixed-bunchgrass Grassland Community

The potential plant community of this site is a mixed grassland of warm and cool-season, bunch, stoloniferous, and rhizomatous perennial grasses. Woody species occupy a minor, but more important, part of this plant community. Forbs are a minor component of this site. However, during years of abundant spring and fall moisture, a large variety of forbs occur throughout this site. Common grasses include blue grama, vine mesquite, cane bluestem, sacaton, and in some locations finestem needlegrass. Prescribed grazing or periodic fire will provide the necessary disturbances needed to maintain the ecological integrity.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	785	1121	1681
Shrub/Vine	112	224	336
Forb	56	84	112
Tree	–	–	–
Total	**953**	**1429**	**2129**

Table 6. Ground cover

Tree foliar cover	0-2%
Shrub/vine/liana foliar cover	2-5%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%

Litter	8-10%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	45-55%

Figure 6. Plant community growth curve (percent production by month). NM4309, R070CY109NM Loamy HCPC. R070CY109NM Loamy HCPC Mixed warm/cool-season short/mid perennial grasses with a minor shrub and forb component. .

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	7	10	15	25	25	8	5	0	0

Community 1.2
Blue grama/Annual Forbs Community

Figure 7. 1.2 Blue grama/Annual Forbs Community

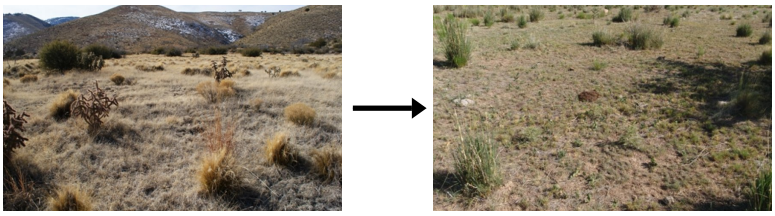
This plant community is the result of heavy continuous grazing. Palatable grasses such as western wheatgrass and vine mesquite have been reduced. Blue grama has transitioned to a sod-bound turfgrass and dominated the grass component. Many annual and perennial forbs have increased. Prescribed grazing or no grazing will help the community return to the reference community.

Community 1.3
Oneseed Juniper/Pinyon Pine Woodland Community

Figure 8. 1.3 Juniper/Pine Woodland Community

In some areas where possibly there is lower soil moisture, different soil texture, and/or there is an available seed source, a oneseed juniper-pinyon pine community exists. It is unclear if they exist due to past disturbance or they are a part of the natural variability of the site. High densities of oneseed juniper did occur near an old stock tank at GUMO, indicating encroachment due to past disturbances. Prescribed fire can be used to reopen the woodland community into a more open grassland. No evidence a state change where there is a complete loss of grass cover or where a fire threshold has been crossed, perhaps due to the site's resiliency and/or climate.

Pathway 1.1A
Community 1.1 to 1.2



Mixed-bunchgrass Grassland Community

Blue grama/Annual Forbs Community

With Heavy Continuous Grazing, the Mixed-bunchgrass Grassland Community will shift to the Blue grama/Annual forbs Community.

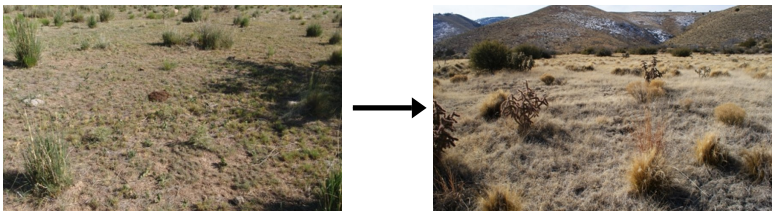
Pathway 1.1B
Community 1.1 to 1.3

Mixed-bunchgrass Grassland Community

Oneseed Juniper/Pinyon Pine Woodland Community

With Heavy Continuous Grazing, Fire Suppression, and Brush Seed Dispersal, the Mixed-bunchgrass Grassland Community will shift to the Oneseed Juniper/Pinyon Pine Woodland Community.

Pathway 1.2A
Community 1.2 to 1.1



Blue grama/Annual Forbs Community

Mixed-bunchgrass Grassland Community

With Prescribed or No Grazing, the Blue grama/Annual Forbs Community can be reverted to the Mixed-bunchgrass Grassland Community.

Conservation practices

Prescribed Burning
Prescribed Grazing

Pathway 1.3A
Community 1.3 to 1.1

Oneseed Juniper/Pinyon Pine Woodland Community

Mixed-bunchgrass Grassland Community

With Prescribed Burning and Prescribed or No Grazing conservation practices, the Oneseed Juniper/Pinyon Pine Woodland Common can revert back to the Mixed-bunchgrass Grassland Community.

Conservation practices

Prescribed Burning

Prescribed Grazing

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Warm-season shortgrass**			196–420	
	blue grama	BOGR2	*Bouteloua gracilis*	196–420	–
2	**Warm-season grasses**			118–252	
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	56–168	–
	spike dropseed	SPCO4	*Sporobolus contractus*	22–84	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	22–84	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	11–56	–
3	**Warm-season grasses**			112–235	
	alkali sacaton	SPAI	*Sporobolus airoides*	56–224	–
	big sacaton	SPWR2	*Sporobolus wrightii*	56–224	–
4	**Warm-season stoloniferous**			118–252	
	black grama	BOER4	*Bouteloua eriopoda*	39–95	–
	vine mesquite	PAOB	*Panicum obtusum*	39–95	–
	James' galleta	PLJA	*Pleuraphis jamesii*	39–95	–
5	**Warm-season mid/shortgrasses**			118–252	
	threeawn	ARIST	*Aristida*	39–95	–
	common wolfstail	LYPH	*Lycurus phleoides*	39–95	–
	Hall's panicgrass	PAHA	*Panicum hallii*	39–95	–
	streambed bristlegrass	SELE6	*Setaria leucopila*	39–95	–
6	**Cool-season grasses**			118–252	
	squirreltail	ELEL5	*Elymus elymoides*	39–95	–
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	39–95	–
	finestem needlegrass	NATE3	*Nassella tenuissima*	39–95	–
	western wheatgrass	PASM	*Pascopyrum smithii*	39–95	–

7	**Perennial Grasses**			11–28	
	Grass, perennial	2GP	*Grass, perennial*	11–28	–
Forb					
8	**Perennial Forbs**			56–112	
	spike dropseed	SPCO4	*Sporobolus contractus*	54–85	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	54–85	–
	Forb, perennial	2FP	*Forb, perennial*	6–22	–
	Drummond's milkvetch	ASDR3	*Astragalus drummondii*	3–8	–
	buckwheat	ERIOG	*Eriogonum*	3–8	–
	white milkwort	POAL4	*Polygala alba*	3–8	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	3–8	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	3–8	–
	vetch	VICIA	*Vicia*	3–8	–
9	**Annual Forbs**			0–11	
	alkali sacaton	SPAI	*Sporobolus airoides*	33–54	–
	Forb, annual	2FA	*Forb, annual*	0–11	–
	bladderpod	LESQU	*Lesquerella*	0–3	–
Shrub/Vine					
10	**Shrubs**			56–168	
	fourwing saltbush	ATCA2	*Atriplex canescens*	11–56	–
	algerita	MATR3	*Mahonia trifoliolata*	11–56	–
	threeawn	ARIST	*Aristida*	21–54	–
	jointfir	EPHED	*Ephedra*	11–39	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	6–34	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	11–28	–
11	**Fibrous/Succulents**			45–112	
	plains lovegrass	ERIN	*Eragrostis intermedia*	54–106	–
	Hall's panicgrass	PAHA	*Panicum hallii*	54–106	–
	switchgrass	PAVI2	*Panicum virgatum*	54–106	–
	pricklypear	OPUNT	*Opuntia*	11–45	–
	soaptree yucca	YUEL	*Yucca elata*	11–34	–
	tree cholla	CYIMI	*Cylindropuntia imbricata var. imbricata*	11–34	–
12	**Trees**			11–56	

	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	54–106	–
	oneseed juniper	JUMO	*Juniperus monosperma*	11–45	–
	twoneedle pinyon	PIED	*Pinus edulis*	0–11	–

Animal community

This site produces a habitat which supports a resident animal community characterized by pronghorn antelope, blacktailed jackrabbit, badger, Gunnison's prairie dog, banner-tailed kangaroo rat, Botta's pocket gopher, burrowing owl, mourning dove, chipping sparrow, sparrow hawk, meadow lark, western spadefoot toad, leopard lizard, short-horned lizard, prairie rattlesnake, coyote, common raven, and prairie falcon hunt over this site.

Plant Preference by Animal Kind:
These preferences are somewhat general in nature as the preferences for plants is dependent upon grazing experience, time of year, availability of choices, and total forage supply.

Legend: P=Preferred D=Desirable U=Undesirable N=Not Consumed T=Toxic X=Used, but not degree of utilization unknown
Preferred – Percentage of plant in animal diet is greater than it occurs on the land
Desirable – Percentage of plant in animal diet is similar to the percentage composition on the land
Undesirable – Percentage of plant in animal diet is less than it occurs on the land
Not Consumed – Plant would not be eaten under normal conditions. Only consumed when other forages not available.
Toxic – Rare occurrence in diet and, if consumed in any tangible amounts results in death or severe illness in animal

Hydrological functions

The runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil groups.

Hydrologic Interpretations
Soil Series----------Hydrologic Group
Ancho----------B
Alicia----------B
Calabasas----------B
Carnero----------C
Cerrillos----------B
Chupadero----------C
Clovis----------B
Darvey----------B

Deacon----------B
Dioxice----------B
Hagerman----------C
Hightower----------C
Jarita----------C
Kim----------B
La Fonda----------B
Nogal----------C
Pastura----------B
Pena----------B
Penistaja----------B
Purcella----------B
Quintana----------B
Rance----------C
Rednun----------C
Remunda----------C
Ribera----------C
Rock Outcrop----------B
Scholle----------B
Sharps----------C
Silver----------C
Tapia----------C
Teco----------B
Threadgill----------B
Wilcoxson----------C
Witt----------B

Recreational uses

This site offers fair to good potential for hiking, backpacking, and horseback riding. Due to the lack of water and shade, it has limited potential for camping, and picnicking. Hunting for antelope, small game, and birds is good. Trapping for fur-bearing animals is fair. The natural beauty of this site is enhanced during years of abundant early spring and fall moisture by a wide variety of wildflowers that bloom throughout the landscape.

Wood products

There is no potential for wood products on this site. However, in areas where juniper and pinyon have invaded or have increased and are established, it is possible to harvest a limited amount of fencing material and fuelwood.

Other products

Grazing:
This site is suited for grazing by all kinds and classes of livestock during all times of the

year. However, it is poorly suited to continuous yearlong grazing or grazing continuously during the growing season. Under such use, species such as western wheatgrass, bottlebrush squirreltail, sideoats grama, little bluestem, vine-mesquite, black grama, fourwing saltbush, and winterfat will decrease in composition. Typical site deterioration is characterized by low-vigor sod-like blue grama which will eventually become 80 to 95 percent of the plant community. This condition cuts the productivity of this site to almost nothing. Further deterioration is typified by an increase in bare ground, and an invasion of woody species such as juniper and pinyon, along with an increase in ring and may muhly and broom snakeweed. Predator control should be considered when using this site for calving or when running sheep or goats.

Other information

None.

Inventory data references

Inventory Data was collected at various New Mexico counties including Chaves, DeBaca, Guadalupe, Lincoln, San Miguel, Santa Fe, and Torrance. Data was also collected at the Guadalupe Mountains National Park.

Other references

Data collection for this site was done in conjunction with the progressive soil surveys within the Pecos-Canadian Plains and Valleys 70 Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: Chaves, De Baca, Guadalupe, Lincoln, San Miguel, Santa Fe, and Torrance.

Characteristic Soils Are:
Alicia, Ancho, Bernal, Calabasas, Carnero Cerrillos, Chupadera, Clovis, Darvey, Deacon Dioxice, Hagerman, Hightower, Jarita, Kim La Fonda, Lazarus, Nogal, Pastura, Pena, Penistaja Purcella, Quintana, Rance, Rednun, Remunda Ribera, Rock Outcrop, Scholle, Sharps, Silver Tapia, Teco, Threadgill, Wilcoxson, and Witt.

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):

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

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

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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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:**
