USDA Natural Resources Conservation Service

Ecological site R036XB007NM
Malpais

Accessed: 05/04/2024

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.

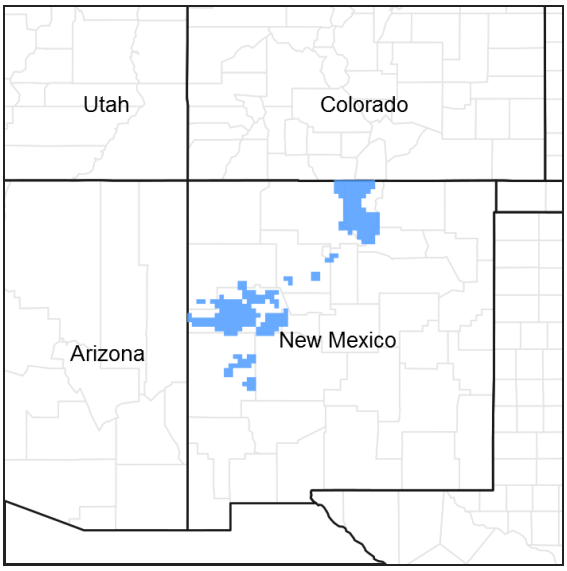

Figure 1. Mapped extent

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.

MLRA notes

Major Land Resource Area (MLRA): 036X–Southwestern Plateaus, Mesas, and Foothills

R036XB007NM – Malpais is an ecological site that is found on nearly level to gently sloping mesas, lava plateaus, lava flows, lava flows on valley floors, and ridges in MLRA 36 (Southwestern Plateaus Mesas and Foothills). The southern portion MLRA 36 is illustrated yellow color on the map where this site occurs. The site concept was established in the Southwestern Plateaus. Mesas, and Foothills – Warm Semiarid Mesas and Plateaus LRU (Land Resource Area). This LRU has 10 to 16 inches of precipitation and has a mesic temperature regime. Lower part of MLRA 36 is dominated by summer precipitation for monsoons, unlike the upper part of MLRA 36 which is almost an equal split.

Classification relationships

NRCS & BLM:
Major Land Resource Area 36, Southwestern Plateaus Mesas and Foothills (United States Department of Agriculture, Natural Resources Conservation Service, 2006).

USFS:
313Bd Chaco Basin High Desert Shrubland and 313Be San Juan Basin North subsections < 313B Navaho Canyonlands Section < 313 Colorado Plateau Semi-Desert (Cleland, et al., 2007).

315Ha Central Rio Grande Intermontane, and 315Hb North Central Rio Grande Intermontane subsections <315H Central Rio Grande Intermontane Section < 315 Southwest Plateau and Plains Dry Steppe and Shrub (Cleland, et al., 2007).

315Ad Chupadera High Plains Grassland subsections <315A Pecos Valley Section < 315 Southwest Plateau and Plains Dry Steppe and Shrub (Cleland, et al., 2007).

331Jb San Luis Hills and 331Jd Southern San Luis Grasslands subsections <331J Northern Rio Grande Basin Section < 331 Great Plains- Palouse Dry Steppe (Cleland, et al., 2007).

M313Bd Manzano Mountains Woodland subsection < Sacramento-Monzano Mountains Section < M313 Arizona-New Mexico Mountains Semi-Desert - Open Woodland - Coniferous Forest - Alpine Meadow

M331Fg Sangre de Cristo Mountains Woodland and M331Fh Sangre de Cristo Mountains Coniferous Forest subsection < M331F Southern Parks and Rocky Mountain Range Section< M331 Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow M331Gk Brazos Uplift and M331Gm Jemez and San Pedro Mountains Coniferous Forest subsections < M331G South Central Highlands Section < M331 Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow

EPA:
21d Foothill Shrublands and 21f Sedimentary Mid-Elevation Forests < 21 Southern Rockies < 6.2 Western Cordillera < 6 Northwestern Forested Mountains (Griffith, 2006).

20c Semiarid Benchlands and Canyonlands < 20 Colorado Plateaus < 10.1 Cold Deserts < 10 North American Deserts (Griffith, 2006).

22m Albuquerque Basin, 22i San Juan/Chaco Tablelands and Mesas, 22h North Central New Mexico Valleys and Mesas, 22f Taos Plateau, and 22g Rio Grande Floodplain, < 22 Arizona/New Mexico Plateau < 10.1 Cold Deserts < 10 North American Deserts (Griffith, 2006).

USGS:
Colorado Plateau Province (Navajo and Datil Section) Southern Rocky Mountains Basin and Range (Mexican Highland and Sacramento Section)

Ecological site concept

The 36XB Malpais ecological site was drafted from the existing R036XB007NM – Malpais range site MLRA 36XB (NRCS, 2003). This site occurs on nearly level to gently sloping mesas, lava plateaus, lava flows, lava flows on valley floors, and ridges. The typical surface soil textures are stony loam, very stony loam, or stony silty clay loam. It has an aridic ustic/ustic arid moisture regime and mesic temperature regime. The effective precipitation ranges from 10 to 16 inches

Associated sites

F036XA001NM	**Pinyon Upland** Pinyon Upland (Formerly South of Gallup 13-16”)- Soils are very shallow to shallow and non-skeletal; soil surface is loam, channery loam or clay loam. Landforms are broad mesas, cuestas, and hills interspersed with numerous deep canyons and dry washes.
R036XA004NM	**Gravelly Slopes** Gravelly Slopes - Slopes are 3-25%; Soils are skeletal and deep. Soil surface textures are gravelly to very gravelly loam or cobbly loam with subsoil that are loams to clay loam. Landforms are rolling hills, divides, and ridges.
R036XB006NM	**Loamy** Loamy - lopes 1-15%; soils are very shallow to shallow and skeletal and not skeletal; soil surface are loam, stony to very stony loam, very cobbly loam, fine sandy loam, very cobbly fine sandy loam, stony silt loam, stony silty clay loam, and cobbly silty clay loam; Parent materials are basalt influences but can have sometimes influence from sandstone and/or shale. Landforms nearly level to gently sloping mesas, lava plateaus, lava flows, lava flows on valley floors, and ridges.

R036XB018NM	**Stony Loam** Stony Loam - Slopes 0-15%; soils are deep to very deep and skeletal and non-skeletal; Surface soil textures are cobbly loam, or loam. Subsoils are loamy. Landforms are nearly level alluvial fans, stream terraces, plateaus, mesas and volcanic cones.

Similar sites

R036XB014NM	**Shallow Loam** Shallow Loam - Slopes 1-25%; soils are very shallow to shallow and non-skeletal; soil surface is sandy loam to loam with a loamy subsoil from basalt and eolian materials. Landform is ridges, hills, interfluves on undulating plateaus, escarpments on cuestas, and escarpments on mesas.
R036XB015NM	**Shallow Savanna** Shallow Savanna - Slopes 1-55%; very shallow to shallow soils and non-skeletal; very cobbly loam, very cobbly sandy loam, loam, cobbly clay loam, and channery clay loam over a clayey subsoil. Bedrock can be sandstone, shale or basalt. Landforms narrow ridges, hills, breaks and mesas of bedrock controlled landscapes.
R036XB013NM	**Shallow Gravelly** Shallow Gravelly - Slopes 3-20%; soils are very shallow to shallow and non-skeletal; soil surface gravelly loam or gravelly fine sandy loam; gravelly sandy loam; subsoil is sandy loams to loams. Landforms located adjacent to narrow ridges, hills, breaks structural benches and mesas of bedrock controlled landscapes.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is located on nearly level to gently sloping mesas, lava plateaus, lava flows, lava flows on valley floors, and ridges. Basalt rock outcrops interspersed with deeper pockets of soil characterize with in this site. Slopes range from 1 to 15 percent. Elevation ranges from 6,400 to 8,000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Lava plateau (2) Mesa (3) Lava flow
Flooding frequency	None
Ponding frequency	None
Elevation	1,951–2,438 m
Slope	1–15%
Aspect	E, S, W

Climatic features

Mean annual precipitation varies from 12 to 14 inches. Deviations of 4 inches or more are quite common. Approximately 60 percent of the precipitation is received during the native plant growth period, April through September. June is the driest month. During July, August, and September, 4 to 5 inches of precipitation influence the presence and production of warm-season plants. Fall and spring moisture is conducive to the growth of cool-season herbaceous plants. Maximum shrub growth also occurs during this time. Summer precipitation is characterized brief, localized thunderstorms. Winter moisture usually occurs as snow or light rain.

Mean monthly temperature varies from 64 degrees F in July to 21 degrees F in January. The maximum is near 100 degrees F. The minimum is near 40 degrees F. The average last killing frost in the spring is around mid-May. The

first killing frost in the fall is late September or early October. The frost-free period is approximately 120 to 140 days, but freezing temperatures have been recorded for every month except July and August. Temperatures are generally conducive to herbaceous plant growth from April through September.

Wind velocities are relatively light most of the year with stronger winds occurring in spring and early summer. These stronger winds, which may exceed 25 miles per hour, increase transpiration rates of plants and rapidly dry the soil surface. Also, small soil particles are often displaced by the stronger winds, which can result in structural damage to native plants, particularly young seedlings.

Climate data was obtained from the WCCR web site using 50% probabilities for freeze-free and frost-free seasons at 28.5 degrees F and 32.5 degrees F, respectively.

Table 3. Representative climatic features

Frost-free period (average)	126 days
Freeze-free period (average)	145 days
Precipitation total (average)	330 mm

Influencing water features

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

Soil features

The soils are very shallow to shallow (5 to 20 inches in depth) with large amounts of exposed bedrock. The surface layers range from loam, stony loam, very stony loam, very cobbly loam, fine sandy loam, very cobbly fine sandy loam, stony silt loam, stony silty clay loam, and cobbly silty clay loam. Surface texture range in clay percent from 15 to 28% clay. Effective rooting depth is 5 to 20 inches, though roots may penetrate fractures in the bedrock. Parent materials are eolian deposits derived from sandstone and shale and/or residuum weathered from basalt; eolian deposits over slope alluvium derived from basalt; eolian deposits derived from sandstone; eolian deposits over alluvium derived from sandstone and shale; and loess over residuum weathered from basalt.

This site is found in NM670, NM672, NM656, and NM692 soil surveys. This ecological site has been correlated to the following soils with the listed particle control sections:

Fine-Loamy:
Antonito

Loamy:
Pescado, Petaca, Prieta

Loamy-Skeletal:
Travelers

Clayey:
Viuda

Clayey-Skeletal:
Prieta

Table 4. Representative soil features

Parent material	(1) Eolian deposits–sandstone and shale (2) Loess–basalt (3) Residuum–basalt

Surface texture	(1) Stony loam (2) Very stony loam (3) Stony silty clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	13–51 cm
Surface fragment cover <=3"	5–25%
Surface fragment cover >3"	0–30%
Available water capacity (0-101.6cm)	2.29–7.37 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–2 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" (Depth not specified)	5–30%
Subsurface fragment volume >3" (Depth not specified)	5–35%

Ecological dynamics

MLRA 36 occurs on the higher elevation portion of the Colorado Plateau. The Colorado Plateau is a physiographic province which exists throughout eastern Utah, western Colorado, western New Mexico and northern Arizona. It is characterized by uplifted plateaus, canyons and eroded features. The Colorado Plateau lies south of the Uintah Mountains, north of the Mogollon transition area, west of the Rocky Mountains, and east of the central Utah highlands. The higher elevation portion of the Colorado Plateau which is represented by MLRA 36 is characterize by broken topography, and lack of perennial water sources. This area has a long history of past prehistoric human use for years. MLRA 36 shows archaeological evidence indicating that pinyon-juniper woodlands where modified by prehistoric humans and not pristine and thus where altered at the time of European settlement (Cartledge & Propper, 1993). This area also included natural influences of herbivory, fire, and climate. This area rarely served as habitat for large herds of native herbivores or large frequent historic fires due to the broken topography. This site is extremely variable and plant community composition will vary with the water fluctuations on this site.

The lower part MLRA 36 developed under climatic conditions that include hot, dry summers with summer rains showers and little to no snow with the mild winter temperatures. This area has climatic fluctuations and prolonged droughts are common occurrences. Between an above average year and a drought year. Forbs are the most dynamic component of this community and can vary up to 4 fold (Passey et.al. 1982). The precipitation and climate of MLRA 36 are conducive to producing Pinyon/juniper, and sagebrush complexes with high productive sites in the bottoms of the canyons. Predominant species on the Colorado Plateau are Wyoming big sagebrush (*Artemisia tridentata* var. wyomingensis), mountain big sagebrush (*A. tridentata* var. vaseyana), and black sagebrush (*A. nova*), basin big sagebrush (*A. tridentata* var. tridentata), Utah juniper (Juniperus utahensis), one-seed juniper (*Juniperus monosperma*), and two-needle pinyon (*Pinus edulis*). One-seed juniper has the capability to discontinue active growth when moisture is limited but can resume growth when moisture availability improves. This growth pattern may represent an important adaptation allowing them to survive on very arid sites.

The ability for an ecological site to carry fire depends primarily on the present fuel load and plant moisture content—sites with small fuel loads will burn more slowly and less intensely than sites with large fuel loads. Fire is an important aspect of grass dominated ecological sites. According to the Fire Effects Modeling done with LANDFIRE

successional modeling for southwest desert grasslands that the fire return interval is 10 to 833 years (USFS, 2012). Fires varied in intensity and frequency depending on the site's productivity. Shrub vegetation is able to reestablish from seed dispersal from the adjacent non burned shrub stands; however the process is relatively slow. When the site is degraded by the presence of invasive annuals, the fire return interval is shortened due to increased fuels. The shortened fire return interval is often sufficient to suppress the native plant community.

Variability in climate, soils, aspect and complex biological processes will cause the plant communities to differ. These factors contributing to annual production variability include wildlife use, drought, and insects. Factors contributing to special variability include soil texture, depth, rock fragments, slope, aspect, and micro-topography. The species lists are representative and not a complete list of all occurring or potentially occurring species on this site. The species lists are not intended to cover the full range of conditions, species and responses of the site. The State & Transition model depicted for this site is based on available research, field observations and interpretations by experts and could change as knowledge increases. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. The following diagram does not necessarily depict all the transitions and states that this site may exhibit, but it does show some of the most common plant communities.

State and transition model

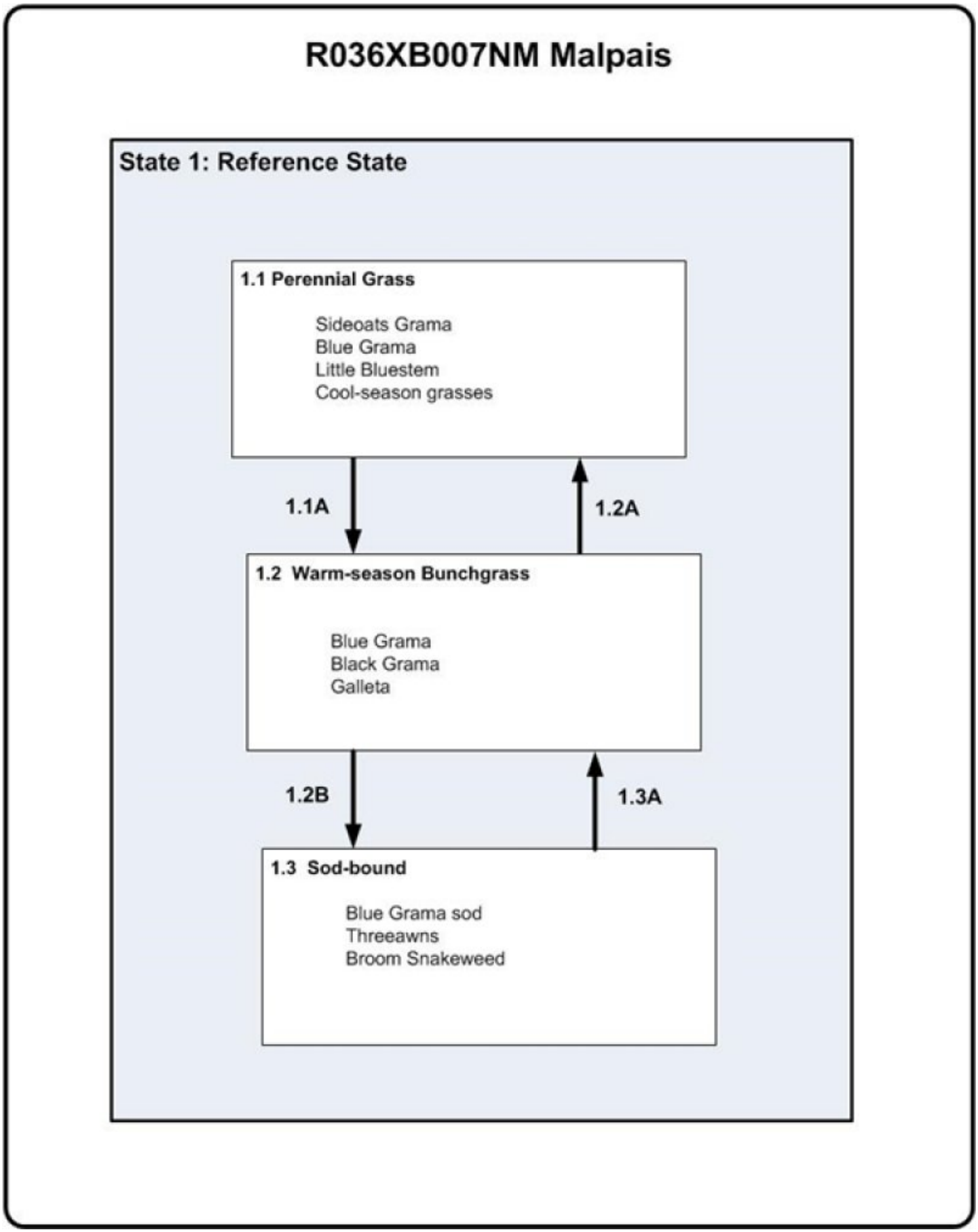
R036XB007NM Malpais
State 1: Reference State
1.1 Perennial Grass
Sideoats Grama
Blue Grama
Little Bluestem
Cool-season grasses
1.1A
1.2A
1.2 Warm-season Bunchgrass
Blue Grama
Black Grama
Galleta
1.2B
1.3A
1.3 Sod-bound
Blue Grama sod
Threeawns
Broom Snakeweed

Figure 6. STM

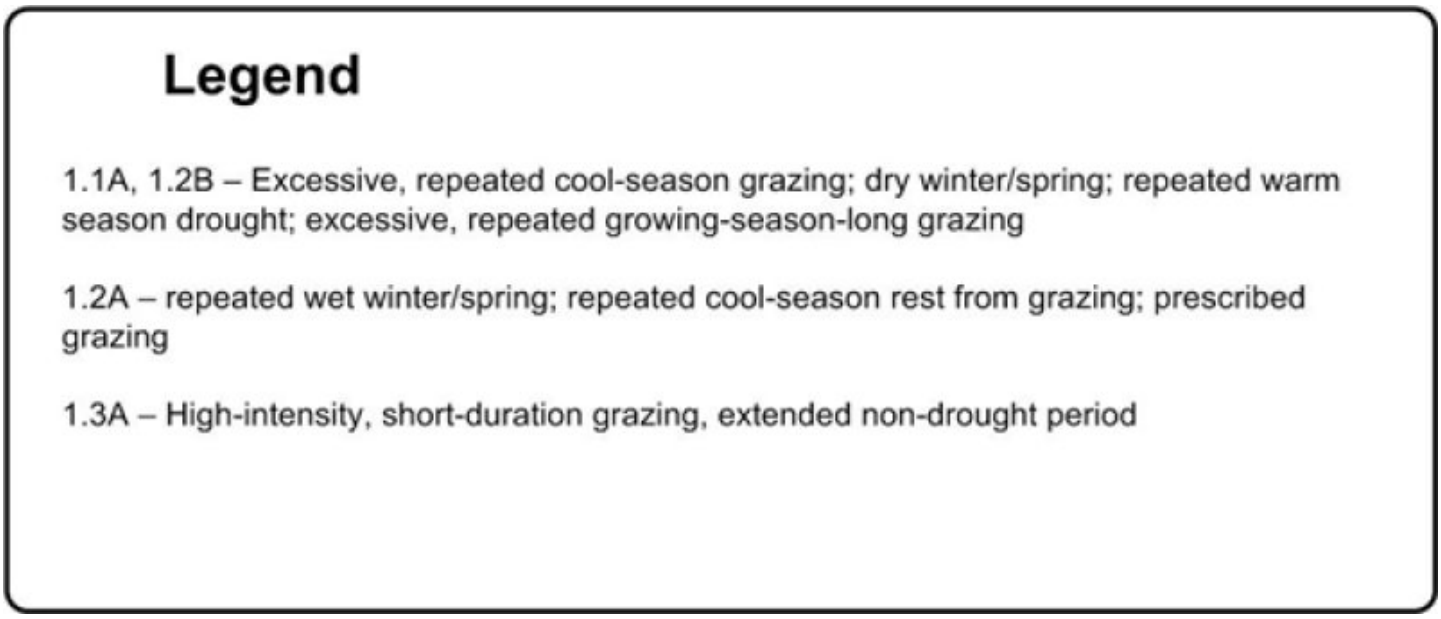

Figure 7. Legend

State 1
Reference State

Grasses found on this site include: blue grama, sideoats grama, western wheatgrass, little bluestem, spike muhly, alkali sacaton, black grama, galleta, and New Mexico feathergrass. Winterfat, four-wing saltbush, and broom snakeweed are common shrubs. A few pinyon and juniper may be found widely scattered across the site. Continuous heavy grazing causes a decrease in sideoats grama, little bluestem, spike muhly, and other cool-season grasses. Where dominated by warm-season grasses, either blue grama, galleta, or black grama may assume dominance depending on individual site characteristics. Blue grama seems to be the most grazing-resistant species, and under continued heavy use, may become sod-bound. Other species that are typically found in this community include threeawn, and broom snakeweed. Grass composition is variable; cover ranges from uniform to patchy with numerous small, bare patches. Shrubs and a few trees may be present on the site with a combined canopy cover averaging 7%. Evidence of erosion such as pedestalling of grasses, rills, and gullies is limited.

Community 1.1
Perennial Grass

Grasses are the dominant component of the reference plant community phase, accounting for 75 to 85% of the total production. Sideoats grama and blue grama is the dominant grass species along with prairie Junegrass and Carex. Other characteristic species are western wheatgrass, little bluestem, spike muhly, alkali sacaton, black grama, galleta, and New Mexico feathergrass. Winterfat, four-wing saltbush, and broom snakeweed are common shrubs. A few pinyon and juniper may be found widely scattered across the site.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	157	269	381
Tree	45	78	112
Forb	22	45	67
Total	**224**	**392**	**560**

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	3-13%
Grass/grasslike basal cover	10-20%

Forb basal cover	1-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	10-20%
Surface fragments >0.25" and <=3"	5-15%
Surface fragments >3"	40-60%
Bedrock	0%
Water	0%
Bare ground	10%

Figure 9. Plant community growth curve (percent production by month). NM0007, R036XB007NM Malpais HCPC. R036XB007NM Malpais HCPC A mixed mid-grass and shrubland with a minor forb component..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	10	10	25	30	12	5	0	0

Community 1.2
Warm-season Bunchgrass

This plant community has a perennial grass and forb plant community with sparse shrub cover. Continuous heavy grazing causes a decrease in sideoats grama, little bluestem, spike muhly, and cool-season grasses. Where dominated by warm-season grasses, either blue grama, galleta, or black grama may assume dominance depending on individual site characteristics.

Community 1.3
Sod-bound

This plant community has a perennial grass and forb plant community. Blue grama becomes the dominant grass. Blue grama seems to be the most grazing-resistant species, and under continued heavy use, may become sod-bound. Other species that are typically found in this community include threeawn, and broom snakeweed. This pathway occurs when favorable events occur and increase in perennial grass establishment and a decrease in shrub cover and diversity.

Pathway 1.1A
Community 1.1 to 1.2

This is the successional pathway between community 1.1 and 1.2. This pathway describes the effects of a long term drought. Dry winters and/or spring will reduce cool season plant growth and recruitment. Repeated drought during warm season growth period will reduce warm season plants growth and recruitment. Repeated, unmanaged continuous season-long grazing during cool-season grass growth and/or excessive, repeated growing-season-long grazing can help to shorten the time this pathway takes.

Pathway 1.2A
Community 1.2 to 1.1

This is the successional pathway between community 1.2 and 1.1. This pathway describes the effects of any combination of infrequent fire activity but regular fire and wet weather periods which will help to maintain or increase the amount herbaceous vegetation. Good livestock management and moderate wildlife grazing/browsing will allow for improved vigor in herbaceous species. Livestock management may include rest or no grazing.

Pathway 1.2B
Community 1.2 to 1.3

This plant community has a perennial grass and forb plant community. Blue grama becomes the dominant grass. Blue grama seems to be the most grazing-resistant species, and under continued heavy use, may become sod-bound. Other species that are typically found in this community include threeawn, and broom snakeweed. This pathway occurs when favorable events occur and increase in perennial grass establishment and a decrease in shrub cover and diversity.

Pathway 1.3A
Community 1.3 to 1.2

This is the successional pathway between community 1.3 and 1.2. Good livestock management and moderate wildlife grazing/browsing will allow for improved vigor in herbaceous species. Livestock management may include rest or no 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				20–39	
	sideoats grama	BOCU	*Bouteloua curtipendula*	20–39	–
2				20–39	
	sideoats grama	BOCU	*Bouteloua curtipendula*	20–39	–
3				20–31	
	squirreltail	ELEL5	*Elymus elymoides*	20–31	–
4				59–78	
	western wheatgrass	PASM	*Pascopyrum smithii*	59–78	–
5				20–40	
	needle and thread	HECO26	*Hesperostipa comata*	20–40	–
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	20–40	–
6				20–28	
	prairie Junegrass	KOMA	*Koeleria macrantha*	20–28	–
	muttongrass	POFE	*Poa fendleriana*	20–28	–
7				0–20	
	little bluestem	SCSC	*Schizachyrium scoparium*	0–20	–
8				39–59	
	James' galleta	PLJA	*Pleuraphis jamesii*	39–59	–
9				0–28	
	black grama	BOER4	*Bouteloua eriopoda*	0–28	–
10				12–20	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	12–20	–
11				20–31	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	20–31	–
Forb					
12				12–20	
	pingue rubberweed	HYRI	*Hymenoxys richardsonii*	12–20	–
	goldenweed	PYRRO	*Pyrrocoma*	12–20	–

13				12–20	
	Forb, annual	2FA	*Forb, annual*	12–20	–
	Forb, perennial	2FP	*Forb, perennial*	12–20	–
Shrub/Vine					
14				39–78	
	big sagebrush	ARTR2	*Artemisia tridentata*	39–78	–
16				20–59	
	fourwing saltbush	ATCA2	*Atriplex canescens*	20–59	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	20–59	–
17				12–39	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	12–39	–
Tree					
15				0–12	
	oneseed juniper	JUMO	*Juniperus monosperma*	0–12	–

Animal community

Habitat for Wildlife:
This site provides habitats which support a resident animal community that is characterized by pronghorn antelope, coyote, white-tailed jackrabbit, rock mouse, rock squirrel, and prairie lark. Raptors will forage over these sites. Antelope and elk will make seasonal use of these sites.

Hydrological functions

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

Hydrologic Interpretations
Soil Series----------Hydrologic Group
Pescado----------D
Petaca----------D
Prieta----------D

Recreational uses

This site has value for nature observation, photography, hiking, and hunting. The canyon and mountain setting enhance its beauty.

Wood products

This site has no significant potential for wood production.

Other products

Grazing:
Approximately 75 percent of the vegetation produced on this site comes from plants producing forage suitable for grazing or browsing. Improper grazing distribution, which leads to a deterioration of the potential plant community, may be a problem on this site due to the amount of rock outcrop. Deterioration of the potential plant community is indicated by a decrease in such species as sideoats grama, western wheatgrass, needlegrass, muttongrass, pinegrass, winterfat, and fourwing saltbush. Species that increase include blue grama, galleta, threeawn, broom snakeweed, and big sagebrush. A planned grazing system with periodic deferment is best to maintain the desirable balance between plant species and to maintain high productivity.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index----------Ac/AUM
100 - 76----------6.9 – 9.2
75 – 51----------8.9 – 13.8
50 – 26----------13.5 – 27.5
25 – 0----------27.5+

Type locality

Location 1: Rio Arriba County, NM
Location 2: Sandoval County, NM
Location 3: San Juan County, NM

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--Site Development and Testing Plan--:

Future work to validate and further refine the information in this Provisional Ecological Site Description is necessary. This will include field activities to collect low-, medium-, and high-intensity sampling, soil correlations, and analysis of that data.

Additional information and data is required to refine the Plant Production and Annual Production tables for this ecological site. The extent of MLRA 36 must be further investigated.

Field testing of the information contained in this Provisional ESD is required. As this ESD is moved to the Approved ESD level, reviews from the technical team, quality control, quality assurance, and peers will be conducted.

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:

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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:**
