USDA Natural Resources
Conservation Service

Ecological site DX035X03F003
Pinyon Juniper - Breaks/Hills 12 to 15 inches

Accessed: 05/14/2025

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.

Table 1. Dominant plant species

Tree	(1) *Pinus edulis* (2) *Juniperus monosperma*
Shrub	(1) *Artemisia frigida*
Herbaceous	(1) *Bouteloua curtipendula* (2) *Bouteloua gracilis*

Legacy ID

F035XG003NM

Physiographic features

This map unit is on sideslopes of basalt- capped mesas, ridges on elevated plains, and sideslopes of steep, dissected canyons. The units are chararcterized by surface-exposed bedrock and rock outcrops. Areas can be long, narrow, and/or large, but irregular in shape. This map unit has variable exposure and distinct vegetative characteristics between cool-moist and warm-dry aspects, with variable tree densities and plant composition. Slopes range from 10 to over 45%, sometimes steeper along base of escarpments and dissected canyons. Elevation varies within the map unit distribution.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) V-shaped valley (3) Escarpment
Elevation	1,981–2,499 m
Slope	10–45%
Aspect	N, S

Climatic features

Representative weather station used is from Quemado, NM, Catron County, within 40 mile proximity to sites sampled. The weather station is within the climatic division NM-04, Southwestern Mountains. According to Catron County Soil Survey, this map unit is within a precipitation zone of 12-15 inch average annual precipitation. Average annual air temperature is 47 to 54 degrees (F). Due to elevation and latitude, this landscape is prone to winter and summer moisture with summer moisture exceeding winter. Summer precip is typically derived from convective showers with winter derived from snow and rain mixed storm events. Frost free days
are based on >/=32.5 degrees (F); freeze free days based on >/= 30 degrees (F).

Table 3. Representative climatic features

Frost-free period (average)	130 days
Freeze-free period (average)	214 days
Precipitation total (average)	381 mm

Influencing water features

None, except downslope runoff and slope retention of snow-pack on North slopes.
This unit is not influenced by wetlands or free-flowing streams or seeps.

Soil features

Representative sites are located on Aridic Argiustolls. This site also occurs on the Majada, Guy, Faraway, and Motoqua soil series and on Ustic Torriorthents. Rock outcrops are prevalent and surface coarse fragments are common. Surface textures are fine to coarse sandy loams. The soils can be shallow to deep, well-drained and formed in alluvium, colluvium, or residuum derived from volcanic material. This site's variable slope and aspect are conducive to retaining snowpack and soil moisture and susceptible to evaporation.

This ecological site is associated with map units (MUs) 385, 471, and 487 in the Catron County soil survey.

Table 4. Representative soil features

Surface texture	(1) Very cobbly loamy sand (2) Very stony clay (3) Bouldery loamy coarse sand
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to very rapid
Soil depth	13–152 cm
Surface fragment cover <=3"	5%
Surface fragment cover >3"	20–70%

Calcium carbonate equivalent (0-101.6cm)	1–35%
Subsurface fragment volume <=3" (Depth not specified)	5–10%
Subsurface fragment volume >3" (Depth not specified)	5–85%

Ecological dynamics

The Historical Climax Plant Community (HCPC) is relative to the location on the landscape influenced by aspect, slope, and accessibility to animals (ungulates), density of surface rock, and depth of soil to sustain herbaceous production for fire occurrences. There is a distinct difference in plant community structure based on aspect and its response to impacts that will influence succession. For this ESD, the distinctions are defined in terms of those landscapes that have primarily a north- or south-facing aspect.

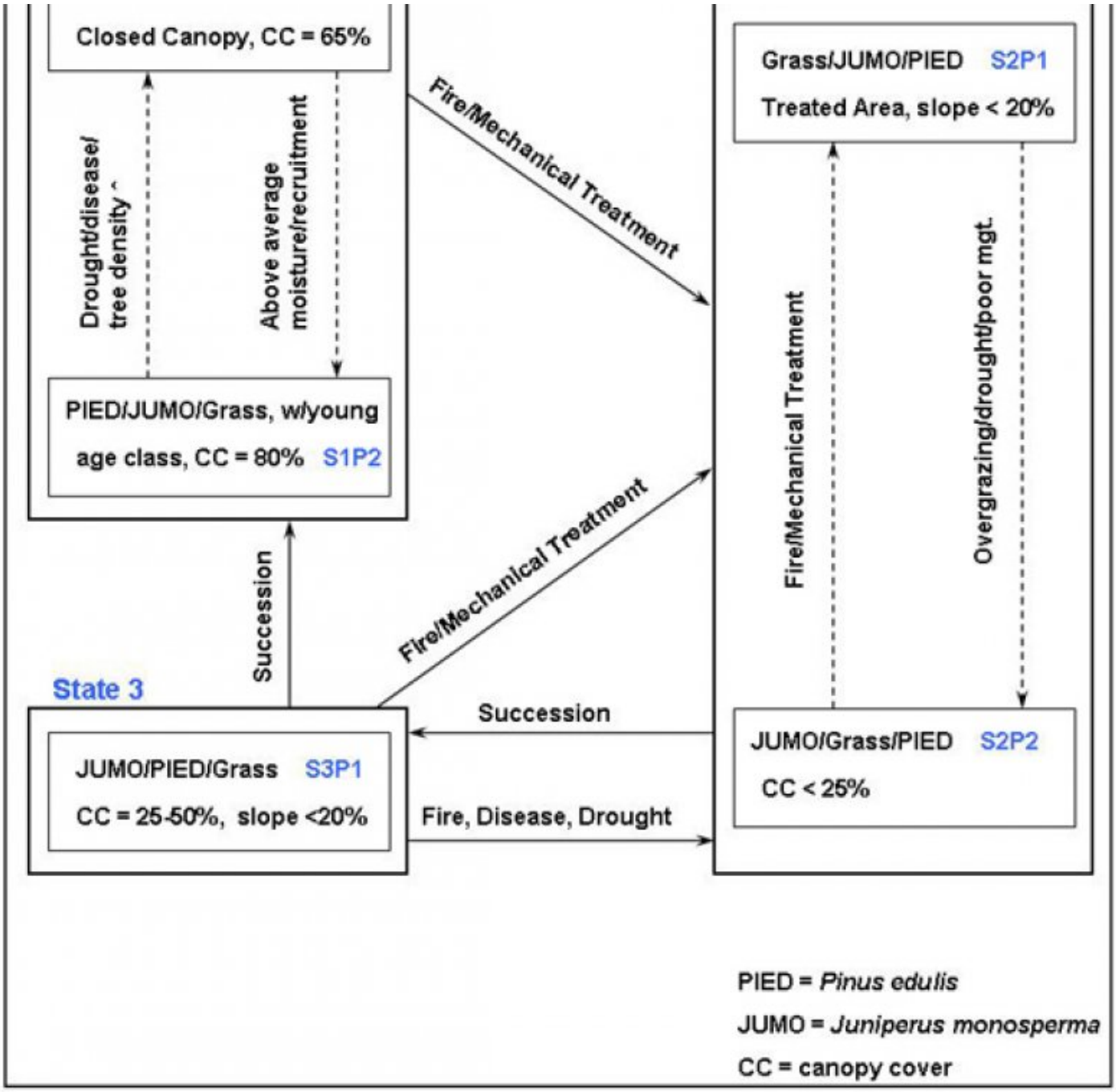
North-facing slopes have a climax community dominated by twoneedle pinyon (hereafter called pinyon) with montane-type herbaceous species in the understory plant community such as muttongrass, prairie junegrass, Stipa spp., and Carex spp. Factors that influence plant structure would be drought and livestock and, to a lesser degree, fire due to the northerly exposure. Fire may occur but is limited in size (<50 acres, typically 1 to 10 acres) and patchy with a catastrophic event being isolated. Early successional communities consist of grasses and shrubs, converting to oneseed juniper/Rocky Mountain juniper and eventually to pinyon/oneseed juniper.

Drought and rock outcrop influence fuel loading, and fuels are generally discontinuous which is not conducive to large fires. Livestock grazing influences herbaceous cover and fire susceptibility. Reduced fine fuels leads to pinyon/juniper density increases. High tree density will lead to pinyon mortality and susceptibility to disease infestations. South-facing slopes are generally dominated by oneseed juniper with codominant pinyon. This site tends to be more arid. Factors that influence plant succession are drought, fire, grazing, and rock outcrops. Herbaceous cover tends to be greater in areas less accessible to livestock and with higher density of rock outcrops. Plant diversity and production is greater in such areas. Southerly exposure limits soil moisture, and along with shallow soils, tends to inhibit pinyon growth. Drought would not only limit herbaceous growth, it would also contribute to tree mortality resulting from insect (Ips beetle, scale insects) and disease (dwarf mistletoe) infestations. Fires are likely to be more frequent on south-facing slopes but due to fragmented landscapes (rock outcrops), they would be small and patchy.

This landscape is not conducive to large or catastrophic fires (crown fires) due to open stands, except under the most extreme conditions of high tree density patches, interlocking crowns, ladder fuels, low moisture, high temperatures, and high winds. Such an occurrence may occur in isolated areas and limited in size by the surface rock. Higher tree densities could be seen in soil inclusions within the Majada and Guy soil series. Grazeable areas are less steep and have less rock outcropping. These areas could receive substantial grazing pressure due to the presence of palatable grasses such as sideoats grama, New Mexico muhly, and Stipa spp. Heavy grazing and associated effects on fine fuel loadings would lead to an increase in oneseed juniper. Site index (based on tree diameter in relation to basal area) for these sites is typically “3” on south slopes and “2” or “3” on north slopes, depending on steepness and density of rock outcrops. Minimal regeneration is expected, generally consistent with tree mortality.

The Historic Plant Community would consist of old growth trees dominating the site, comprising 50 to 60% of the stand, Mid-age trees would comprise 25-35%, and young age classes(seedlings/saplings) comprise 15-25% of the stand. The young age class could be virtually nonexistent in some isolated areas. Mature trees would be long-lived, large diameter, with few, if any, dead trees present.

State and transition model


Closed Canopy, CC = 65%
Drought/disease/ tree density ^
Above average moisture/recruitment
PIED/JUMO/Grass, w/young age class, CC = 80% S1P2
Succession
State 3
JUMO/PIED/Grass S3P1
CC = 25-50%, slope <20%
Fire/Mechanical Treatment
Fire/Mechanical Treatment
Grass/JUMO/PIED S2P1
Treated Area, slope < 20%
Fire/Mechanical Treatment
Overgrazing/drought/poor mgt.
Succession
JUMO/Grass/PIED S2P2
CC < 25%
Fire, Disease, Drought
PIED = Pinus edulis
JUMO = Juniperus monosperma
CC = canopy cover

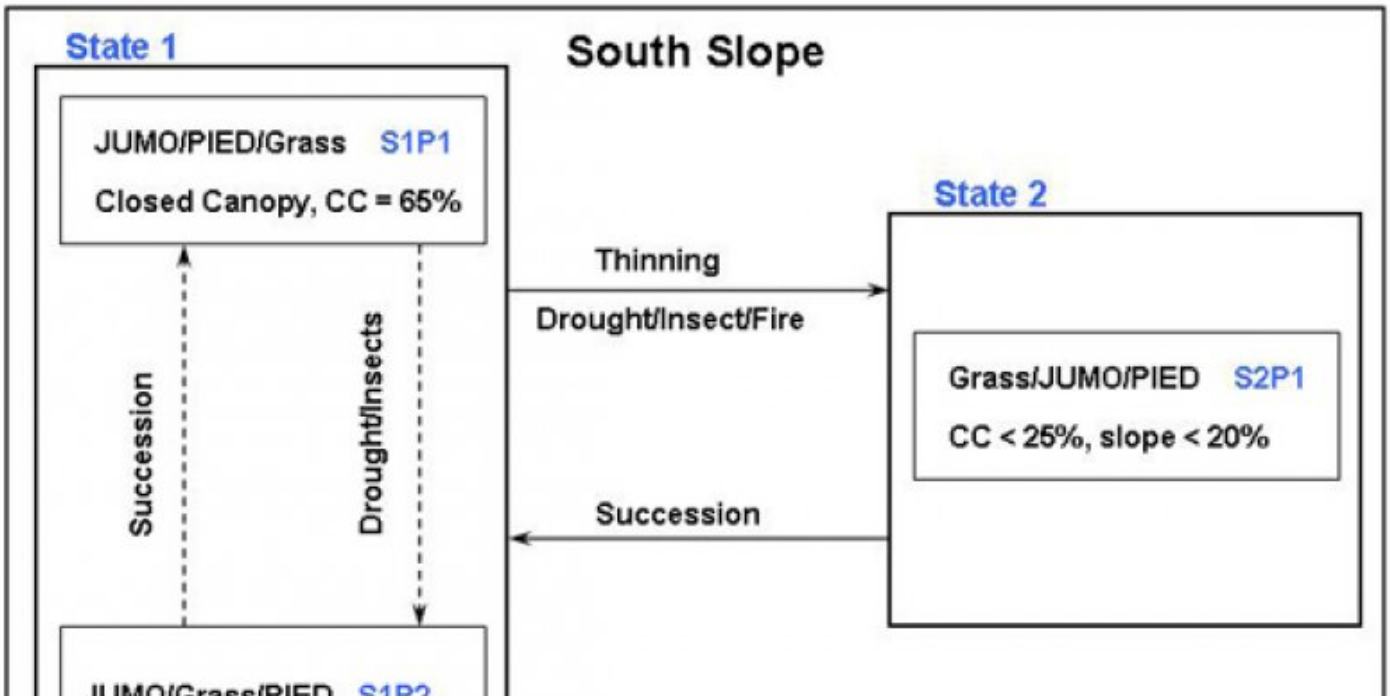

State 1
South Slope
JUMO/PIED/Grass S1P1
Closed Canopy, CC = 65%
Succession
Drought/Insects
State 2
Thinning
Drought/Insect/Fire
Grass/JUMO/PIED S2P1
CC < 25%, slope < 20%
Succession

Figure 4. State-and-Transition Model

State 1
HCPC State 1 Plant Community 1 (South Slope)

Community 1.1
HCPC State 1 Plant Community 1 (South Slope)

South Slope S1 = This is the state at which the plant community is represented by the HCPC with normal successional processes occurring. These processes include minor shifts as result of small scale, isolated fire occurrence, incidental age mortality, and disease infestations induced by drought. Stand recruitment is generally in sync with mortality. South Slope S1P1 = This plant community may express itself due to the aridity of the site, the woodland stand may become more open following extreme drought periods resulting in pinyon mortality. South Slope S1P2 = Drought-induced pinyon mortality (along with insect and disease infestations) would allow for a oneseed juniper/grass community to dominate. Succession would eventually allow pinyon to become codominant. South Slope S2P1 = This plant community would result from a transition through some form of land treatment, generally on slopes under 20% using mechanical or herbicidal means to reduce total canopy cover to less than 15%. A mixed-grass stand would exist comprised of warm- and cool-season species under proper grazing management or predominantly warm-season grass stands (blue grama and three awn species) under improper grazing management. Trees would occupy the landscape as seedlings/saplings, with oneseed juniper dominating the composition. Interpretive Plant Community: Three sites were evaluated with 3 plots measured in each site to develop this ESD. Most of the sites contained an age structure comprised of middle aged pinyon/juniper trees with a small representation of overmature trees. Very little regeneration was present, indicating that tree replacement and mortality occur very slowly. The information below represents the plant structure for a north slope, pinyon/juniper plant community. South slopes may have a lower tree cover and slightly higher herbaceous cover.

Forest overstory. South slopes contain slightly more juniper than pinyon. The mid-aged class dominates the stand structure with old growth being less prevalent. Very few seedlings/saplings are present. Few fire-scarred trees are evident, indicating little to no wildfire activity. Canopy closure varies, but in general, more herbaceous production is found on south slopes than north, typically in rockier areas where livestock have minimal access or less desire to traverse the landscape. North slopes contain less herbaceous cover due to greater canopy and litter cover under pinyon and juniper trees. Cool season species are notably more obvious on north slopes and receive grazing pressure from both livestock and wildlife (elk, deer). South/southeast aspects have canopy cover ranging from 20 to 50%, with north/northwest aspects having canopy cover ranging from 15 to 80%.

State 2
HCPC State 1 Plant Community 1 (North Slope)

Community 2.1
HCPC State 1 Plant Community 1 (North Slope)

North Slope S1P1 = This is the state at which the plant community is represented at the HCPC with normal successional processes occurring. These processes include minor shifts as result of small isolated fires, incidental mortality, and drought-induced disease. Stand recruitment is generally in sync with mortality. North Slope S1P2 = This plant community occurs as result of favorable moisture years with rapid overstory growth and tree regeneration resulting in an uneven-aged stand. Herbaceous cover decreases as canopy cover increases. This community would revert back to the original state through drought-induced mortality (along with insect and disease infestations) and possible fire occurrence. North Slope S2P1 = This community results from prescribed mechanical or herbicidal treatment which would significantly reduce the overstory and produce a grassland/savannah. Succession would allow the plant community to revert back to woodland, progressing first to a oneseed juniper/grass/pinyon

community (S2P2). These areas are generally rolling and less steep with less surface rock. This site can be dominated by blue grama, although the savannah site could support both cool- and warm-season species if livestock grazing is managed properly using proper use levels and deferment/rest. North Slope S2P2 = This plant community would evolve from S2P1 where oneseed juniper density increases and influences the plant composition through canopy and root system expansion.. This plant community could be moved back to S2P1 through additional land treatments. North Slope S3P1 = This plant community would evolve through normal succession where S2P2 would shift to a more woodland dominated site, although still in an open savannah oneseed juniper/pinyon/grass community. Mature trees may become obvious throughout the site, but would generally be dominated by mid-aged class trees. The landscape would appear dominated by oneseed juniper with subdominant pinyon with a grass/scattered shrub understory. This plant community could progress toward State 1 or revert back to State 2 through additional land treatments. The fire, drought, and disease mortality in pinyon would influence the successional pathway to S3P1.

Forest overstory. North slopes are dominated by pinyon and south slopes are dominated by oneseed juniper. Not all grass species will be found on both exposures. The HCPC would be at near maximum crown canopy of about 65%. Higher densities may occur but would likely be prone to mortality induced by drought and subsequent insect and disease infestations. Despite high canopy cover, cool-season species would dominate the understory on north slopes whereas warm-season species dominate the south slopes if grazing impact was minimal or nonexistent.

Herbaceous cover would be lower in the potential natural community under grazing impact and high canopy cover. In the HCPC, sufficient fine fuels would accumulate, allowing the potential for more frequent, small-scale natural fires. Fire would occur more often on south slopes than north facing slopes. Potential for stand replacement fires may exist on north slopes but not at any large scale.

Fire potential would still be dictated by the high density of exposed bedrock and boulders impeding the rate of spread and heat intensity. Natural fire would likely take a “jackpot” or small pocket blow-out approach, rather than a running fire. In a static state, old-growth trees would dominate the stands being tall with wide diameters. Young age classes will be minimal and generally static with natural mortality of old trees. In a dynamic state, mid-aged trees would dominate the age structure with greater representation of younger age classes. Early seral stages would contain few to no old trees with a dominant young age class, possibly very low in density. The landscape would be characteristic of a juniper savannah with a substantial increase in herbaceous cover. This would likely occur on less steep and less rocky slopes where land treatments are more readily applicable.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Tree	1058	1117	1176
Grass/Grasslike	460	687	913
Shrub/Vine	6	9	11
Forb	–	–	–
Total	**1524**	**1813**	**2100**

Table 6. Ground cover

Tree foliar cover	20-25%
Shrub/vine/liana foliar cover	5%
Grass/grasslike foliar cover	18-22%
Forb foliar cover	2-5%
Non-vascular plants	0%
Biological crusts	1-2%
Litter	20-30%
Surface fragments >0.25" and <=3"	5-8%
Surface fragments >3"	39-25%

Bedrock	0%
Water	0%
Bare ground	11-5%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	–	18-20%	2-5%
>0.3 <= 0.6	–	–	–	–
>0.6 <= 1.4	–	5-8%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	5-10%	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

State 3
State 1 Plant Community 2 (North Slope)

Community 3.1
State 1 Plant Community 2 (North Slope)

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Tree	1187	1254	1320
Grass/Grasslike	185	398	499
Shrub/Vine	6	11	17
Forb	–	–	–
Total	**1378**	**1663**	**1836**

State 4
State 3 Plant Community 1 (North Slope)

Community 4.1
State 3 Plant Community 1 (North Slope)

Table 9. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Tree	1129	1390	1650
Grass/Grasslike	241	467	671
Shrub/Vine	6	15	22
Forb	–	–	–
Total	**1376**	**1872**	**2343**

Additional community tables

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**warm-season increasers**			73–179	
	blue grama	BOGR2	*Bouteloua gracilis*	56–140	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	11–22	–
	threeawn	ARIST	*Aristida*	6–17	–
2	**warm-season decreasers**			112–191	
	New Mexico muhly	MUPA2	*Muhlenbergia pauciflora*	84–140	–
	common wolfstail	LYPH	*Lycurus phleoides*	17–28	–
	bulb panicgrass	PABU	*Panicum bulbosum*	11–22	–
3	**cool-season increaser**			11–22	
	squirreltail	ELEL5	*Elymus elymoides*	11–22	–
4	**cool-season decreasers**			140–280	
	prairie Junegrass	KOMA	*Koeleria macrantha*	84–140	–
	muttongrass	POFE	*Poa fendleriana*	56–140	–
5	**late cool-season decreaser**			112–224	
	sideoats grama	BOCU	*Bouteloua curtipendula*	112–224	–
6	**grasslike increaser**			11–17	
	sedge	CAREX	*Carex*	11–17	–
Shrub/Vine					
7	**half-shrub increaser**			6–11	
	prairie sagewort	ARFR4	*Artemisia frigida*	6–11	–
Tree					
8	**coniferous trees**			1058–1176	
	twoneedle pinyon	PIED	*Pinus edulis*	779–865	–
	oneseed juniper	JUMO	*Juniperus monosperma*	279–310	–

Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**warm-season increasers**			45–146	
	blue grama	BOGR2	*Bouteloua gracilis*	34–106	–
	threeawn	ARIST	*Aristida*	6–22	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	6–17	–
2	**warm-season decreasers**			50–112	
	New Mexico muhly	MUPA2	*Muhlenbergia pauciflora*	45–84	–
	common wolfstail	LYPH	*Lycurus phleoides*	6–17	–
	bulb panicgrass	PABU	*Panicum bulbosum*	0–11	–
3	**cool-season increaser**			0–6	
	squirreltail	ELEL5	*Elymus elymoides*	0–6	–
4	**cool-season decreasers**			22–39	
	prairie Junegrass	KOMA	*Koeleria macrantha*	22–34	–
	muttongrass	POFE	*Poa fendleriana*	0–6	–
5	**late cool-season decreaser**			84–191	
	sideoats grama	BOCU	*Bouteloua curtipendula*	84–191	–
6	**grasslike increaser**			0–6	
	sedge	CAREX	*Carex*	0–6	–
Shrub/Vine					
7	**half-shrub increaser**			6–17	
	prairie sagewort	ARFR4	*Artemisia frigida*	6–17	–
Tree					
8	**coniferous trees**			1187–1320	
	twoneedle pinyon	PIED	*Pinus edulis*	874–972	–
	oneseed juniper	JUMO	*Juniperus monosperma*	313–349	–

Table 12. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**warm-season increasers**			62–195	
	blue grama	BOGR2	*Bouteloua gracilis*	45–139	–
	threeawn	ARIST	*Aristida*	6–34	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	11–22	–
2	**warm-season decreasers**			62–151	
	New Mexico muhly	MUPA2	*Muhlenbergia pauciflora*	56–112	–
	common wolfstail	LYPH	*Lycurus phleoides*	6–22	–
	bulb panicgrass	PABU	*Panicum bulbosum*	0–17	–
3	**cool-season increaser**			0–11	
	squirreltail	ELEL5	*Elymus elymoides*	0–11	–
4	**cool-season decreasers**			28–56	
	prairie Junegrass	KOMA	*Koeleria macrantha*	28–45	–
	muttongrass	POFE	*Poa fendleriana*	0–11	–
5	**late cool-season decreaser**			112–252	
	sideoats grama	BOCU	*Bouteloua curtipendula*	112–252	–
6	**grasslike increaser**			0–6	
	sedge	CAREX	*Carex*	0–6	–
Shrub/Vine					
7	**half-shrub increaser**			6–22	
	prairie sagewort	ARFR4	*Artemisia frigida*	6–22	–
Tree					
8	**coniferous trees**			860–956	
	twoneedle pinyon	PIED	*Pinus edulis*	633–704	–
	oneseed juniper	JUMO	*Juniperus monosperma*	226–252	–

Animal community

These areas may be grazed by livestock. Slopes of less than 10% may be suitable for grazing although they may not have high amounts of forage production with an overstory canopy. Slopes that have been treated to remove or reduce overstory canopy may provide substantially more forage, although these stands are likely to revert to a woodland plant community through succession (grassland/juniper, juniper/grassland, juniper/pinyon, pinyon/juniper). Steeper slopes, though grazed by livestock due to the proximity of water, should not be allocated for grazing or considered in grazing capacity estimates due to susceptibility of soil erosion, density of canopy, and likelihood of increasing grazing pressure on more desirable areas if steep slopes are not fully utilized by livestock.Wildlife such as deer and elk utilize these areas for forage, escape cover, and thermal cover. It has been observed that cool season species are most utilized by wildlife during fall, winter, and early spring. Competition between livestock and wildlife can occur on these areas.

Hydrological functions

The coarse fragments on the surface and in soil profile allow for rapid runoff. Although due to steep slopes, coarse fragments contribute to soil stability and preclude some soil erosion. The soil texture (sandy loam) allows water to percolate through the soil profile. No springs or free-flowing discharges originate from this site. Runoff may contribute to downstream water table recharge. South slopes tend to be drier and retain less soil moisture, and for shorter periods of time, than north slopes. North slopes accumulate and retain snow for longer periods of time allowing for greater percolation and greater retained soil moisture for extended periods of time during fall, winter, and spring.

Recreational uses

This map unit is not conducive to any conventional recreation opportunities. It does posess scenic value, thermal cover for wildlife (wildlife viewing), and hunting opportunities. Landscape is steep and rocky and only accessible on foot or by horseback.

Wood products

No commercial wood fiber is produced from these sites. They produce very little volume for wood posts, although stays can be removed from these sites. Fuelwood value is low to moderate, but due to the steep terrain and surface rock, the land is best left undisturbed to retain soil integrity and prevent soil loss from human or livestock impact.

Other products

No other products are produced from these sites.

Other information

Grazing occurs on these sites on an occasional basis due to the proximity of drinking water, but it is advisable not to include these lands in determining base stocking capacity due to the ruggedness of the landscape which deters grazing use and the impact of grazing on shallow and highly erodible soils.

Other references

Other map units comparable to MU385 are MU487 and MU471.

MU 487- South slopes dominated by oneseed juniper with a blue grama-dominant understory containing lesser amounts of threeawns and needlegrass, slopes 30-50%, bare ground 50-60%, vegetation cover <20%. North/west slopes are dominated by pinyon with codominant oneseed juniper. Vegetation characteristics are similar to MU385, rock outcrops not as common, mostly stoney to cobbly. In some locations, such as dikes, rock outcrops may be represented as vertical bluffs. Uneven-aged stands prevalent, with old pinyon 10-30%, midaged 60-70%, young 10%, with very little seedling/saplings. Certain stands appear stable, few fire scars or mortality. Avg. DRC for pinyon is 12-16 inches old age class trees, midaged 6-10 inches. Estimated forage production is 50-150 lbs/ac.

MU 471 -- South slopes dominated by oneseed juniper, pinyon codominant, understory primarily blue grama. North slopes have slope of about 30%, rock outcrops on ridges, surface rock mostly stony to very cobbly. Surface moss found in certain locales on north slopes (not likely on south slopes). Alligator juniper and ponderosa pine may occur within the mapping unit at 5% of composition. Understory vegetation consists of blue grama as dominant with pine dropseed (10-20 lbs/ac) and mountain muhly (15-25 lbs/ac) and at times these species become very common. Also found in association with north slope vegetation are buckwheat (5-10 lbs/ac) and mountain mahogany, both are commonly hedged by livestock or wildlife. Pinyon may be stunted due to shallow soils with old oneseed juniper trees being very common.

Contributors

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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:

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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:**
