USDA Natural Resources
Conservation Service

Ecological site DX035X03A006
Basalt Hills and Mesas 16-35 inches

Accessed: 05/20/2024

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.

Classification relationships

The following existing ESDs developed for WP2, MLRA 36, were evaluated in the development of this ESD. Both overstory and understory characteristics were assessed and compared as the data was collected and interpreted. The existing ESDs are: Savannah (R036XB127NM); Hills (R036XB124NM); Gravelly (R036XB114NM); Juniper woodland (F036XB002NM); and Pinyon/Juniper woodland (F036XB001NM).

The Savannah ESD occurs at a lower elevation though it has both pinyon and juniper in the stands with occasional ponderosa pine at higher elevations. The juniper species is not clearly defined in that ESD, but it’s assumed to be dominated by oneseed juniper.

The canopy cover is less than described in this ESD. The Hills ESD is also of lower elevation and tends to favor junipers as dominant over pinyon, with grasslands intermixed; again not comparable to this ESD. The Juniper and Pinyon-Juniper woodland ESDs are from the Zuni reservations, both reflecting drier site conditions and favoring pinyon and oneseed juniper which do not correspond to the vegetative structure and composition described in this ESD.

The historical climax plant community structure (composition and density) was derived from data interpretation and not from adaptation of existing ESDs. The NRCS plants database was consulted to determine the likelihood of a species occurring on the soil series evaluated for this ESD.

The lower elevation limit of the Alegros soil series is associated with the “Gravelly” site (R036XB114NM), which

supports a grassland plant community. The upper elevations of the Alegros soils found in the locations associated with this ESD support a woodland plant community; therefore the R036XB114NM ESD is not comparable to this ESD.

Table 1. Dominant plant species

Tree	(1) *Pinus edulis* (2) *Juniperus monosperma*
Shrub	(1) *Quercus grisea*
Herbaceous	Not specified

Legacy ID

F035XG006NM

Physiographic features

This ecological site occurs on basalt hills, mesa tops, and alluvial plateaus. The aspect is variable. Elevation ranges from 7400 to 8400 feet. The slope ranges from 1 to 15% in most areas, occasionally reaching 35%. Overall, the terrain appears to be rolling hills and gentle sloping terrain from mesas or hills.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mesa (3) Plateau
Elevation	2,256–2,560 m
Slope	3–15%
Aspect	Aspect is not a significant factor

Climatic features

According to the Catron County Soil Survey, the Smilo-Adman complex occurs in a 16-20 inch average annual precipitation zone. The Alegros soil series occurs in a 15-18 inch average annual precipitation zone. Summer moisture is usually from convective showers with winter moisture falling as snow or rain.

Average annual temperature for the Smilo-Adman complex is 40 to 46 ºF. The Catron County Soil Survey indicates that frost-free days (>/=32.5 ºF) range from 80-120 days and freeze free days (>/= 30 ºF) range from 123 to 153 days for the Smilo-Adman complex.

The Pie Town, New Mexico, climate station is the most representative of this ecological site. The tabular climate summary for this ESD was generated by the Climate Summarizer (http://www.nm.nrcs.usda.gov/technical/handbooks/nrph/Climate_Summarizer.xls) using data from the following climate station:

296812 PIETOWN 19 NE, NM (Period of record = 1988 to 2006)

Table 3. Representative climatic features

Frost-free period (average)	169 days
Freeze-free period (average)	193 days
Precipitation total (average)	381 mm

Influencing water features

None, except for downslope runoff and north slope snow-pack retention.

These areas are not influenced by wetlands or free-flowing streams or seeps.

Soil features

The representative soil is the Smilo soil series, which is a fine, mixed, superactive, frigid Aridic Argiustoll. The Adman soil series is a clayey, mixed, superactive, frigid aridic Lithic Argiustoll that also supports this ecological site and occurs in association with the Smilo series.

The Alegros soil series is a clayey over sandy or sandy-skeletal, smectitic, mesic Typic Haplustalf that also supports this ecological site. It is associated with inclusions of the Coni soil series. The Coni series is a loamy, mixed, superactive, frigid Lithic Argiustoll found on ridges and hilltops.

The Smilo-Adman complex is located on basalt hills comprised of 55% Smilo stony loam and 25% Adman stony loam. Included are small amounts of Coni soils and a deep clayey soil in more gently sloping areas, totaling 20% of the soil complex. The Coni soil is intermixed with the Smilo-Adman complex and difficult to differentiate from surface appearance. It tends to support similar vegetation, and for simplicity purposes, it is considered inclusive to the representative soils and is part of this ESD.

The Smilo soil series is moderately deep and well drained and derived from basalt parent material. Basalt is generally at a depth of 30 inches. The Adman soil series is shallow and well drained, also formed from basalt parent material. Basalt is at a depth of 19 inches. The Coni soil series is shallow, well drained, and formed in residuum derived from tuff, and a typical pedon is very gravelly sandy loam.

The Smilo-Adman complex is characterized by stony loam soils. The Alegros soil series is a deep, well drained cobbly loam to extremely cobbly loam formed in alluvium from basaltic or andesitic lava.

The Smilo-Adman complex contains substantial surface rock (stone and cobble), and in some cases it appears as weathered surface bedrock. These soils occur on variable aspects.

The Alegros soil series has a soil texture of cobbly loam to extremely cobbly loam. These soils are found on mesa tops and alluvial plateaus. Soil inclusions comprise 20% of the area and they are characterized as either: (1) lacking a calcium carbonate accumulation, (2) having a dark colored surface layer more than 7 inches thick, or (3) containing bedrock at a depth of 20-40 inches. These soils have a clayey horizon over sandy or gravelly loamy sand.

This ecological site is associated with the following map units (MUs) in the Catron County, Northern Part, Soil Survey.

MU 671, Smilo and Adman series;

MU 710, Alegros and Alegros variant series.

Table 4. Representative soil features

Surface texture	(1) Stony loam (2) Cobbly loam (3) Extremely cobbly loam
Drainage class	Well drained
Permeability class	Moderately slow to rapid
Soil depth	76–127 cm
Surface fragment cover <=3"	15–35%
Surface fragment cover >3"	15–30%
Available water capacity (0-101.6cm)	0.28–0.38 cm

Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	5.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	5–35%
Subsurface fragment volume >3" (Depth not specified)	10–30%

Ecological dynamics

The predominant vegetation is twoneedle pinyon (herein, referred to as pinyon) in both density and canopy cover. Alligator and oneseed junipers are codominant with pinyon on northerly and southerly aspects, respectively. Ponderosa pine and Rocky Mountain juniper vary in occurrence but generally are found on steeper slopes with northerly aspects. Gambel oak occurs in association with ponderosa pine in some locales, especially in areas near the Alegros Mountain slopes. Gray oak can also be found in association with alligator juniper and pinyon, regardless of aspect.

Three states are described in this ESD. This ESD is developed for the soil series addressed in the “Representative Soil Features” section of this document. Though the Alegros series has been addressed in another ESD, further information regarding its relationship to this ESD is described at the end of this document. These ecological sites support a woodland plant community situated on the edge of a transition between woodland and forest. This may be attributed to variations in elevation and climatic regimes. (See Figures 1 through 4).

These sites have a gentle slope that allows livestock grazing to occur. The principal driver among the states is grazing and its collateral effect on fire frequency and soil integrity. Drought/diseases, high precipitation events, and soil degradation also contribute to shifts in plant community structure. Only one state is known to exist at the present time, identified as State #2 in this ESD. The Historical Climax Plant Community (HCPC) and Potential Natural Community (PNC) stand structures are estimated based on interpretations of field data collected at multiple sample sites. Land treatments, in addition to livestock grazing intensity, aids in moving the plant communities among the different states as well. Overstory removal by fuelwood harvesting or incidental small-size crown fires creates a grassland-dominated plant community in each of the states.

In the HCPC state, fire, drought, moisture, and disease interact individually or collectively to change the character of the woodlands, shifting from one plant community to another within the state. Livestock grazing is not considered a part of the Historical Climax Plant Community but other natural processes such as fire, drought, disease, high precipitation events, and wildlife impacts are. Fuelwooding is considered as an impact in the HCPC state as a socially driven activity for heating fuel or religious purposes.

Fires were likely creeping understory events with an occasional wind-driven crowning fire resulting in a thinning or pruning effect on various age class trees. It’s likely that oneseed and alligator junipers are in constant competition for dominance depending on the severity and frequency of fire events. The lack of recurring fire favors survival of regenerating oneseed juniper, since that species is less fire-tolerant than alligator juniper. The age structure for alligator juniper in the Deteriorated Plant Community is represented by very old large-diameter trees. Alligator juniper in the young age class (> 3 inches and < 6 inches diameter at root collar) is minimal in the deteriorated state, further suggesting the influence of fire on species dominance.

Trees are grouped into the following age classes: old trees = 13+ inches diameter at root collar (drc); mid-age trees = 6 to 12.99 inches drc; young trees = 3 to 5.99 inches drc; seedling and saplings = < 3 inches drc.

Description of the State-and-Transition Model:
State 2, Plant Community 5 is the only recorded plant community in this model, due to extensive alterations of the vegetative components upon the soils addressed in this ESD. The other plant communities in this model are estimated. For the estimated plant communities, composition and production of plant species and other related numerical values are reconstructed from either similar plant communities or historical accounts and based on ecological principles, historical records, or anecdotal evidence. Photographs herein may depict plant communities of similar structure and function to those described but with minor differences in species composition.

State and transition model

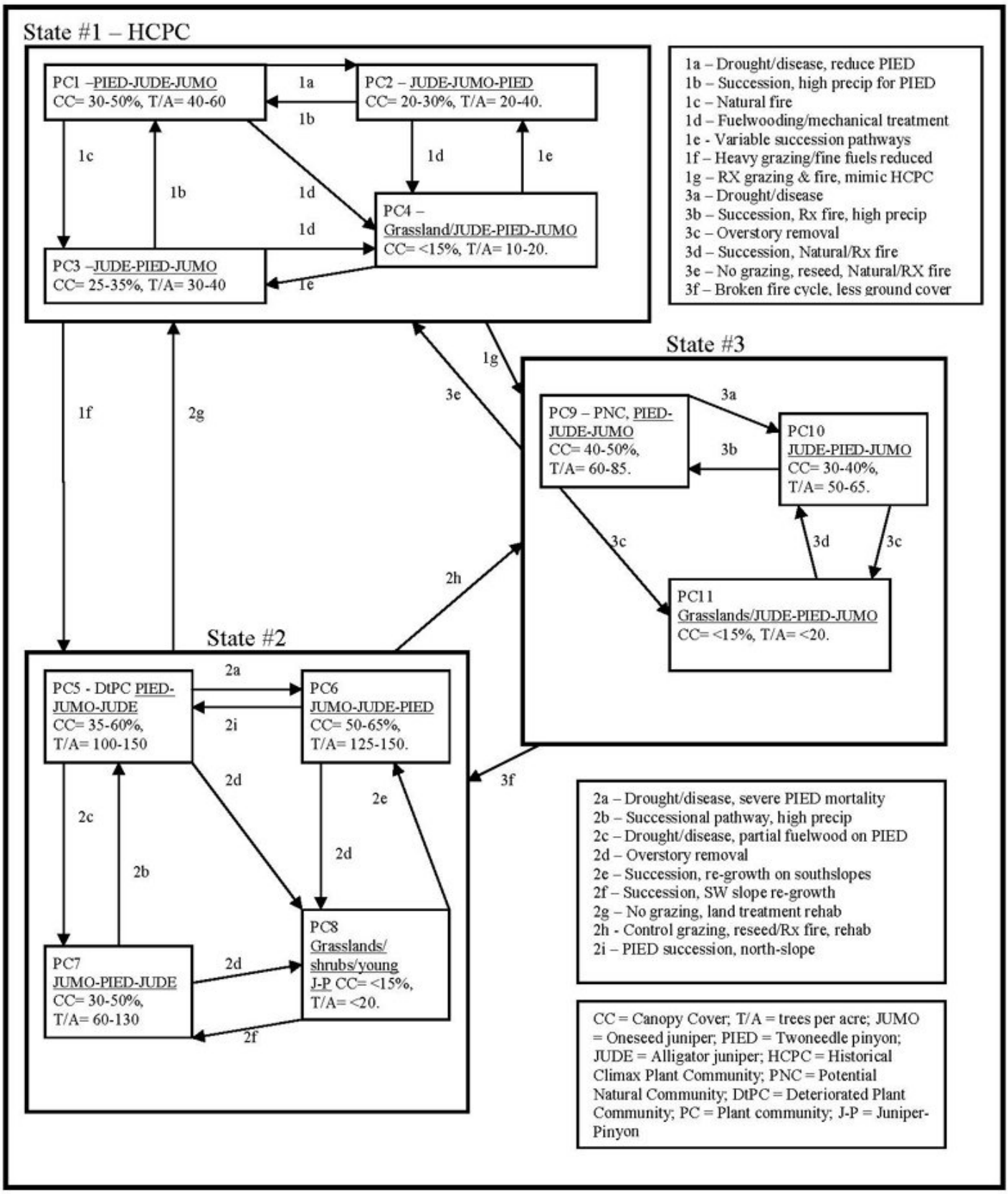

Figure 4. MLRA 39

State 1
Historic Climax Plant Community

Community 1.1

Historic Climax Plant Community

State #1, Historical Climax Plant Community (HCPC): This state reflects the pre-European conditions. Natural fires are a component of this state and generally occur with relatively moderate to high frequency, possibly averaging 25 to 40 years, and more frequently if fine fuels and climatic conditions allow for naturally ignited fires to expand. Crown fires are not expected to occur in this state due to the open nature of the stand of trees. No domestic livestock grazing is considered as part of this state. Understory vegetation is generally comprised of a mix of cool- and warm-season herbaceous vegetation, as well as a greater density and diversity of shrub species than in other states. The HCPC is dominated by old trees which comprise 75 to 90% of the stand, and mid-age trees comprise 15-20% or less. Trees less than 6 inches drc comprise 0-10% of the stand and may be virtually nonexistent in some isolated areas due to recurring low-intensity natural fires. Mature trees are long-lived and of large diameter, with few, if any, dead trees present, except for drought- and disease-affected trees. Plant Community 1 (PC1): This is the climax plant community, self-sustaining through periodic natural fires with minimal susceptibility to insect damage or disease. This plant community is more commonly found on northerly aspects, dominated by pinyon with codominant or subdominant alligator juniper. Oneseed juniper is subdominant and held in check by frequent fires. Plant Community 2 (PC2) may result from significant pinyon mortality caused by severe drought, disease, and/or insects. This would allow alligator and oneseed junipers to surpass pinyon in density on north slopes. A juniper-dominated plant community is more commonly found on south slopes. Fire and drought would maintain a savannah plant community. Plant Community 3 (PC3) reflects an alligator juniper-dominated site where natural fire decreases the pinyon density, and likely decreases oneseed juniper density as well. Time, along with favorable moisture conditions, would allow pinyon to surpass alligator juniper and eventually lead to PC1. Alligator juniper provides a sheltered microclimate that aids in pinyon seedling establishment. Plant Community 4 (PC4) results from an overstory removal of all trees through a fuelwood harvest or mechanical means. Natural succession would move PC4 through either PC2 or PC3, eventually progressing to PC1 on north slopes. On south slopes, the PC4 plant community could revert back to and remain in PC2 or PC3. In the HCPC, tree density ranges between 40-50 trees/acre for the Alegros soil series and 50-60 trees/acre for the Smilo-Adman complex. Tree spacing is about 30-40 feet for pinyon and oneseed juniper and 50-60 feet for alligator juniper. Canopy cover ranges from 30-50%. The canopy cover could vary among plant communities but is generally expected to be higher on north slopes and more open on south slopes. The herbaceous component is comprised of a mixture of warm- and cool-season plants, such as sideoats grama, spike muhly, little bluestem, plains lovegrass, prairie junegrass, muttongrass, mountain muhly, littleseed ricegrass, sedges, and western wheatgrass. Gray oak is also found in the stands as a minor component in the overstory. Mountain mahogany and skunkbush sumac are found in the plant communities but in low quantities and in a healthy state.

Forest understory. HCPC, Plant Community 1 understory production assumes 40% overstory canopy cover.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	377	437	492
Shrub/Vine	17	34	35
Forb	22	22	28
Tree	–	–	–
Total	**416**	**493**	**555**

Table 6. Soil surface cover

Tree basal cover	2%
Shrub/vine/liana basal cover	1%
Grass/grasslike basal cover	30%
Forb basal cover	2%
Non-vascular plants	1%
Biological crusts	0%
Litter	30%

Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	15%
Bedrock	0%
Water	0%
Bare ground	20%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	–	–	–
>0.3 <= 0.6	–	–	–	–
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	30-50%	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

State 2
State 3

Community 2.1
State 3

State #3: State #1 will transition to State #3 as a result of grazing (controlled and well managed), with modifications to the fire cycle. State #3 is comparable to State #1 although tree densities are higher in State #3, all age classes are represented, natural fire intervals become extended in terms of years (unless prescribed fire is used), herbaceous cover may vary more from State #1 (less composition and density), and shifts between tree species may be more pronounced. Plant Community #9 (PC9) is the Potential Natural Community (PNC) dominated by pinyon and co-dominant with alligator juniper. This plant community is sustained through periodic fires, both natural and prescribed. Controlled grazing allows for fine fuels to accumulate and carry a fire through the plant community. In some instances, oneseed juniper may be co-dominant with alligator juniper on south slopes if fires become less frequent. Plant Community #10 (PC10) is a result of drought and disease reducing pinyon densities. The resulting plant community is dominated by alligator juniper (with a subdominant component of oneseed juniper and pinyon) and maintained by a frequent fire cycle. Plant Community #11 (PC11) results from overstory removal through fuelwood harvest or mechanical means. A shorter fire frequency would suppress oneseed juniper and allow alligator juniper to dominate the stands. Pinyon and oneseed juniper will increase in density over time, sequentially progressing toward PC10 and PC9. The stand structure for State #3 is comparable to HCPC, although tree densities are less than 100 trees per acre for all species combined. Tree density ranges from 60-75 trees/acre for the Alegros soil series and 70-85 trees/acre for the Smilo-Adman complex depending on the fire cycle. Tree density can be reduced with prescribed fire and mechanical land treatments such as mowing/mulching. Through land treatments, tree spacing and canopy cover may mimic HCPC levels. The herbaceous component is comprised of a mixture of warm- and cool-season plants, such as sideoats grama, spike muhly, little bluestem, plains lovegrass, prairie junegrass, muttongrass, mountain muhly, littleseed ricegrass, sedges, and western wheatgrass. Densities may vary depending on season of use by livestock and the extent of rest/deferment provided for plants to recover after grazing. Gray oak, hairy mountain mahogany, and skunkbush sumac occur in varying density and are represented by multiple age-classes and growth forms.

State 3
Early Seral (State 1, Plant Community 4)

Community 3.1
Early Seral (State 1, Plant Community 4)

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	499	577	656
Shrub/Vine	39	62	84
Forb	11	13	17
Total	**549**	**652**	**757**

State 4
Deteriorated Plant Community DtPC (State 2, PC5)

Community 4.1
Deteriorated Plant Community DtPC (State 2, PC5)

State #2: This state has evolved as a result of long-term heavy grazing which has reduced the fine fuels necessary to maintain a natural fire regime. This state is represented by a deteriorated plant community typically occurring as Plant Community 5 (PC5), and is dominated by pinyon, codominant oneseed juniper, and subdominant alligator juniper. Natural fires (ground or crown) are essentially nonexistent. Tree densities are variable with higher densities occurring in small patches on the landscape. In PC5 a monoculture of blue grama exists along with invasive perennials or annuals. Very few shrub species are present, and usually found in decadent forms, as a result of grazing. Natural fire is not a component of the State #2 plant communities due to insufficient fine fuels or ladder fuels. Incidental fires may occur from individual tree lightning strikes and only burn in very small patches. State #2, typically has a site index class rating of “3” (0 to 50 basal area) prevailing, with lesser amounts of site index class 2 (51 to 100 basal area), and very few occurrences of site index class 1 (101 to 150 basal area) based on Howell’s site index method. The State #2 characteristics are: a) tree densities are moderate to high, b) pinyon dominates most stands in frequency and canopy cover, c) landscapes are comprised of an uneven-aged stand of trees, d) pinyon seedling/sapling density exceeds that of junipers, e) herbaceous cover exhibits minimal plant diversity, density, and production, f) herbaceous cover is insufficient to protect the soil from wind and water erosion, and g) many communities contain dwarf mistletoe infestations and varying levels of pinyon mortality. Overall in State #2, pinyon averages 67% of composition by frequency and 56% by canopy cover. Oneseed juniper is the dominant juniper species in frequency (17%) and canopy cover (24%). Alligator juniper dominates the old age-class, followed by oneseed juniper and then pinyon. Oneseed juniper and pinyon dominate the younger age-classes, indicating a potential for a future generation of a pinyon- and oneseed juniper-dominated stands. In general, pinyon is shorter-lived than the junipers with a mean age of 278 years (Swetnam and Brown, 1992). Pinyon trees are susceptible to adverse conditions (climate, disease infestations, soil productivity, and fire) that lead to mortality in the species at various ages, contributing to a shift in tree dominance. Conversely, alligator and oneseed junipers are long-lived and appear to be the mainstay in many of these woodland/savannah plant communities. Incidental fires (single tree or small crown fires) caused by lightning strikes on individual trees may occur if fuel accumulations are sufficient at the base of the tree, such as from a packrat midden. Small area (patch-size) burns may occur if sufficient ground- and ladder-fuels are present, and if there are interlocking tree crowns along with extreme fire weather conditions (low humidity, high temperature, high wind velocity, and very low live-fuel moisture). These types of fires are typically rare and not likely to exceed 10 acres in size, due to the discontinuous fuel component and the variable stand densities. Plant Community 6 (PC6) results as drought and disease reduces pinyon density in PC5. High mortality of pinyon would result in a plant community dominated by oneseed juniper on either north or south slopes. On north slopes, this plant community represents the developmental stage for the site to progress back to PC5. On some south slopes, this plant community may become static and persist. Plant Community 7 (PC7) would be a progressive plant community, whereas PC8 would shift over time to a plant community having pinyon as a codominant with oneseed juniper. PC7 is also a sequential plant community in the development from PC8 (Open grassland/shrub community) to PC5. This plant community can also be found on southerly aspects depending on the extent of pinyon mortality and pre-disturbance tree densities. Plant Community 8 (PC8) would result from overstory removal of trees and result in an open grassland/shrub plant community with very little pinyon and juniper regeneration. Return to the HCPC would require tree regeneration through elimination of grazing and extensive land

treatments such as thinning, reseeding, or fall burns. Tree density ranges from 60-150 trees/acre and is generally dominated by pinyon with oneseed juniper secondary in dominance. Tree spacing averages about 15-25 feet for all species and age-classes combined. Canopy cover ranges from 35-65%. The canopy cover may be higher on north slopes than south slopes. The herbaceous component is dominated by blue grama with minor occurrences of spike muhly, squirreltail, prairie junegrass, littleseed ricegrass, and Fendler threeawn. Basal cover and forage production are very low. The shrub component is dominated by rubber rabbitbrush or spineless horsebrush with substantial densities of broom snakeweed. Desirable shrubs such as hairy mountain mahogany and gray oak are heavily browsed and decadent from overuse.

Table 9. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	102	130	157
Shrub/Vine	3	15	25
Forb	2	9	17
Total	**107**	**154**	**199**

State 5
State #2, Plant Community 7 - image only

Community 5.1
State #2, Plant Community 7 - image only

State 6
State #2, Plant Community 6 - image only

Community 6.1
State #2, Plant Community 6 - image only

State 7
State #2, Plant Community 5 - image only

Community 7.1
State #2, Plant Community 5 - image only

Additional community tables

Table 10. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**warm-season increasers**			118–157	
	blue grama	BOGR2	*Bouteloua gracilis*	112–140	–
	common wolfstail	LYPH	*Lycurus phleoides*	3–7	–
	pine dropseed	BLTR	*Blepharoneuron tricholepis*	2–4	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–2	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–2	–
	ring muhly	MUTO2	*Muhlenbergia torreyi*	0–1	–
2	**warm-season decreasers**			67–84	
	spike muhly	MUWR	*Muhlenbergia wrightii*	28–34	–
	mountain muhly	MUMO	*Muhlenbergia montana*	17–22	–

	bullgrass	MUEM	*Muhlenbergia emersleyi*	11	–
	little bluestem	SCSC	*Schizachyrium scoparium*	8–11	–
	big bluestem	ANGE	*Andropogon gerardii*	3–6	–
3	**cool-season increasers**			22–34	
	sedge	CAREX	*Carex*	11–17	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	11–17	–
4	**cool-season decreasers**			101–123	
	prairie Junegrass	KOMA	*Koeleria macrantha*	34–45	–
	muttongrass	POFE	*Poa fendleriana*	17–22	–
	western wheatgrass	PASM	*Pascopyrum smithii*	17	–
5	**late cool-season decreasers**			90–118	
	sideoats grama	BOCU	*Bouteloua curtipendula*	84–112	–
	green sprangletop	LEDU	*Leptochloa dubia*	6	–
Forb					
6	**warm-season forbs**			1–6	
	James' buckwheat	ERJA	*Eriogonum jamesii*	1–3	–
	globemallow	SPHAE	*Sphaeralcea*	0–1	–
	Carruth's sagewort	ARCA14	*Artemisia carruthii*	0–1	–
Shrub/Vine					
7	**broom snakeweed (half-shrub increaser)**			0–3	
	sideoats grama	BOCU	*Bouteloua curtipendula*	84–112	–
	green sprangletop	LEDU	*Leptochloa dubia*	6	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–3	–
8	**prairie sagewort (half-shrub increaser)**			0–1	
	prairie sagewort	ARFR4	*Artemisia frigida*	0–1	–
9	**cool-season shrubs**			28–39	
	hairy mountain mahogany	CEMOP	*Cercocarpus montanus var. paucidentatus*	17	–
	gray oak	QUGR3	*Quercus grisea*	6–11	–
	skunkbush sumac	RHTR	*Rhus trilobata*	6–11	–
10	**succulent shrubs**			0–1	
	little bluestem	SCSC	*Schizachyrium scoparium*	8–11	–
	big bluestem	ANGE	*Andropogon gerardii*	3–6	–
	pricklypear	OPUNT	*Opuntia*	0–1	–
	yucca	YUCCA	*Yucca*	0–1	–
11	**shrub increasers**			1–3	
	Sonoran scrub oak	QUTU2	*Quercus turbinella*	1–2	–
	currant	RIBES	*Ribes*	0–1	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	–	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	–	–
	desert-thorn	LYCIU	*Lycium*	–	–

Table 11. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)

Table 12. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**warm-season increasers**			168–207	
	blue grama	BOGR2	*Bouteloua gracilis*	140–168	–
	common wolfstail	LYPH	*Lycurus phleoides*	17–22	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	3–7	–
	pine dropseed	BLTR	*Blepharoneuron tricholepis*	6	–
	ring muhly	MUTO2	*Muhlenbergia torreyi*	1–2	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	1–2	–
2	**warm-season decreasers**			90–129	
	spike muhly	MUWR	*Muhlenbergia wrightii*	45–56	–
	mountain muhly	MUMO	*Muhlenbergia montana*	17–22	–
	little bluestem	SCSC	*Schizachyrium scoparium*	11–17	–
	big bluestem	ANGE	*Andropogon gerardii*	11–17	–
	bullgrass	MUEM	*Muhlenbergia emersleyi*	6–17	–
3	**cool-season increasers**			34–45	
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	28–34	–
	sedge	CAREX	*Carex*	6–11	–
4	**cool-season decreasers**			34–45	
	prairie Junegrass	KOMA	*Koeleria macrantha*	11–17	–
	muttongrass	POFE	*Poa fendleriana*	6	–
	western wheatgrass	PASM	*Pascopyrum smithii*	6	–
5	**late cool-season decreasers**			174–230	
	sideoats grama	BOCU	*Bouteloua curtipendula*	168–224	–
	green sprangletop	LEDU	*Leptochloa dubia*	6	–
Forb					
6	**warm-season forbs**			11–17	
	James' buckwheat	ERJA	*Eriogonum jamesii*	6–8	–
	globemallow	SPHAE	*Sphaeralcea*	3–4	–
	Carruth's sagewort	ARCA14	*Artemisia carruthii*	2–4	–
Shrub/Vine					
7	**broom snakeweed (half-shrub increaser)**			0–6	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–6	–
8	**prairie sagewort (half-shrub increaser)**			2–6	
	prairie sagewort	ARFR4	*Artemisia frigida*	2–6	–
9	**cool-season shrubs**			28–56	
	hairy mountain mahogany	CEMOP	*Cercocarpus montanus var. paucidentatus*	11–28	–
	skunkbush sumac	RHTR	*Rhus trilobata*	11–17	–
	gray oak	QUGR3	*Quercus grisea*	6–11	–
10	**succulent shrubs**			2–4	
	pricklypear	OPUNT	*Opuntia*	1–2	–

	yucca	YUCCA	*Yucca*	1–2	–
11	**shrub increasers**			7–12	
	Sonoran scrub oak	QUTU2	*Quercus turbinella*	3–6	–
	currant	RIBES	*Ribes*	1–2	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	1–2	–
	desert-thorn	LYCIU	*Lycium*	1	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	0–1	–

Table 13. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**warm-season increasers**			92–112	
	blue grama	BOGR2	*Bouteloua gracilis*	90–101	–
	common wolfstail	LYPH	*Lycurus phleoides*	1–3	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	1–3	–
	pine dropseed	BLTR	*Blepharoneuron tricholepis*	0–2	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–1	–
	ring muhly	MUTO2	*Muhlenbergia torreyi*	0–1	–
2	**warm-season decreasers**			1–10	
	spike muhly	MUWR	*Muhlenbergia wrightii*	1–3	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–3	–
	big bluestem	ANGE	*Andropogon gerardii*	0–1	–
	bullgrass	MUEM	*Muhlenbergia emersleyi*	0–1	–
	mountain muhly	MUMO	*Muhlenbergia montana*	0–1	–
3	**cool-season increasers**			2–17	
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	1–11	–
	sedge	CAREX	*Carex*	1–6	–
4	**cool-season decreasers**			1–6	
	prairie Junegrass	KOMA	*Koeleria macrantha*	1–2	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–1	–
	muttongrass	POFE	*Poa fendleriana*	0–1	–
5	**late cool-season decreasers**			6–12	
	sideoats grama	BOCU	*Bouteloua curtipendula*	6–11	–
	green sprangletop	LEDU	*Leptochloa dubia*	0–1	–
Forb					
6	**warm-season forbs**			2–17	
	James' buckwheat	ERJA	*Eriogonum jamesii*	1–8	–
	globemallow	SPHAE	*Sphaeralcea*	1–4	–
	Carruth's sagewort	ARCA14	*Artemisia carruthii*	0–4	–
Shrub/Vine					
7	**broom snakeweed (half-shrub increaser)**			1–6	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	1–6	–
8	**prairie sagewort (half-shrub increaser)**			0–2	
	prairie sagewort	ARFR4	*Artemisia frigida*	0–2	–

	prairie sagewort	ARFR4	*Artemisia frigida*	0–2	
9	**cool-season shrubs**			1–6	
	gray oak	QUGR3	*Quercus grisea*	1–2	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–2	–
	hairy mountain mahogany	CEMOP	*Cercocarpus montanus var. paucidentatus*	0–1	–
10	**succulent shrubs**			0–2	
	pricklypear	OPUNT	*Opuntia*	0–1	–
	yucca	YUCCA	*Yucca*	0–1	–
11	**shrub increasers**			1–9	
	Sonoran scrub oak	QUTU2	*Quercus turbinella*	1–4	–
	currant	RIBES	*Ribes*	0–1	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	0–1	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–1	–
	desert-thorn	LYCIU	*Lycium*	0–1	–

Animal community

This ecological site is grazed by livestock. Slopes are gentle enough to allow livestock unlimited access over most of the terrain. There are no naturally occurring water sources (springs or streams) in any of the soils. Livestock use depends on the development of man-made watering facilities (wells or stock tanks) and herding techniques to distribute livestock. Livestock have been in various parts of this area for over a century. The effect of grazing on the land and vegetation is evident.

The intensity of grazing and livestock management along with the fire regime will determine how much the plant community changes (overstory and understory) and which state may exists on these sites.

Wildlife such as deer, elk, turkey, and javelina utilize these areas for forage, escape cover, and thermal cover. The cool-season species are most utilized by wildlife during fall, winter, and early spring. Competition for forage between livestock and wildlife can occur, especially for cool-season grasses and shrubs.

Hydrological functions

The course fragments (gravel, cobble, and stone) comprise a substantial part of the ground cover that protects and binds the soil. The soil contains fine sandy or gravelly loam which is subjected to sheet erosion; although not as severe as could possibly occur considering the beneficial effects of the rock content. In State #2, ground cover is minimal; consequently much of the moisture is lost in run-off. If the plant community had a greater diversity of herbaceous plants, much of the moisture could be retained or run-off reduced to allow greater infiltration and support a greater amount of plant diversity. In State #2, soil loss and water run-off is more prevalent than in States 1 and 3, and it likely results in soil deposition on adjoining sites.

Recreational uses

This ecological site is conducive to recreation such as camping and firewood gathering. The woodland/savannah plant communities also provide thermal and nesting cover for wildlife and may provide hunting opportunities at certain times of the year. Most soils are not on steep terrain but can be isolated by steep terrain or distance from an established road. Very little vehicle use occurs on these units; most access is by foot or on horseback. Scenic values are not that high, and changing the vegetative patterns across the landscape would not change the scenic rating significantly except that it may induce more wildlife activity and thusly, wildlife viewing. This site seldom occurs near a road, limiting the potential for pinyon nut gathering.

Wood products

States #1, #2, and #3 produce different levels of wood fiber volume. HCPC produces less fiber than the other two

states. State #2 produces the most fiber. The limited access to this site does not make it conducive to personal or commercial fuelwood collection.

Stand density reductions would likely require other forms of brush disposal, such as chipping, lop and scatter/burn (if sufficient ground fuels are present), or piling and burning.

The fuelwood production is estimated to be about 1.3 cords of wood per acre per year on a sustainable basis, assuming a 150-year rotation cycle, and harvesting only the old age-class trees in the stand. If a greater amount of juniper fuelwood is desired, the rotation cycle would need to be extended out to 300-500 years. Wood posts and stays could also be derived from the woodland/savannah stands but the volume and quality may vary significantly, as height, density, and age class of trees vary by plant community. Few of the oneseed junipers are straight enough for posts, but are generally good enough for stays. In addition, not all alligator juniper trees are straight. Many trees are twisted and curved and inadequate for posts. The very old alligator juniper trees would have to be split to create posts since the first 8 to 12 feet exhibit a very large diameter trunk, too large for a single post.

Other products

None.

Other information

Historical and current grazing practices have significantly altered the plant composition of this ecological site. Restoration efforts will entail a long-term recovery process to restore the native plant structures of States #1 or #3. Reseeding will be an integral part of the recovery process.

Inventory data references

USDA Natural Resources Conservation Service soil survey and a Pinyon/Juniper technical reference, dated September 1997 were used in the location, identification, inventory, and data summary for this ESD. The references are listed in the literature citation of this document. Standard NRCS forms were used to collect data and a field form was created to document frequency, species, and age structure of fire-scarred trees within and adjacent to the study plots for interpretation of the plant community fire history.

Data Source - BLM NMSO
Number of records - 21
Sampling Period - Fall 2005, Winter/Spring 2006
Sampling Location - Catron County, NM.

Other references

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Contributors

Michael Carpinelli
Noe Gonzalez

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:**

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

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

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

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

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

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

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

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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:**
