USDA Natural Resources Conservation Service

Ecological site R070CY109NM
Loamy

Last updated: 10/21/2024
Accessed: 05/12/2025

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.

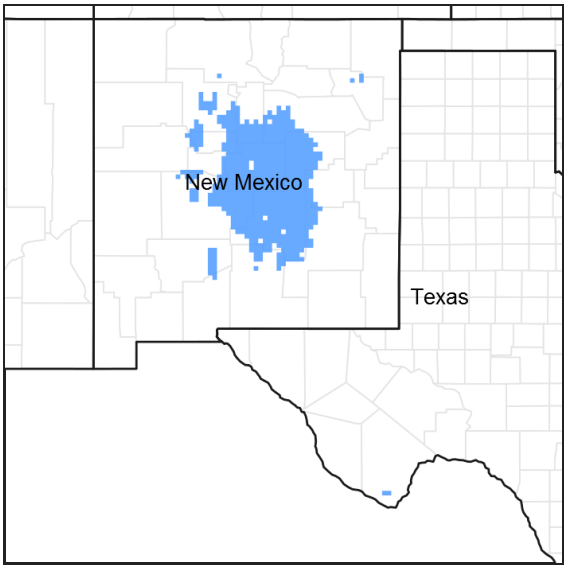


Figure 1. Mapped extent

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.

MLRA notes

Major Land Resource Area (MLRA): 042C–Central New Mexico Highlands

Major Land Resource Area (MLRA) 42C is a high elevation portion of central New Mexico that is the convergence of four major physiographic provinces: Basin and Range, Southern Rocky Mountains, Great Plains, and Colorado Plateau. As such, it contains parts or characteristics of each, though tectonically, as a region, it is the easternmost extent of the Basin and Range Province and, more specifically, a structural expression of the Rio Grande Rift. It consists mostly of rangeland with some forested areas associated with numerous disconnected mountain ranges such as the Guadalupe, Sacramento, and Manzano Mountains. Other major physiographic features include the Galisteo Basin or the enclosed Estancia Basin, the structural Chupadera and Glorieta Mesas, and the piedmonts of the Buchanan and Guadalupe Mesas.

LRU notes

This site does not yet have an LRU designation

Ecological site concept

This site encompasses a wide variety of landscapes, landforms and soil materials, but the overriding features are a gently-sloping, somewhat loamy soil with good water-holding capacity and no overriding soil features such as

carbonates or salts, rock fragments, sandy or clayey textures, or influence of bedrock. This site occurs on level to somewhat sloping landscapes such as piedmont slopes, plateaus, mesas, bajadas, or plains. Slopes average 5 percent or less, although they may range as high as 15 percent. Aspect varies but is not significant. Elevation ranges from 5,000 to 7,000 feet. Soils are moderately deep to very deep, fine sandy loam to silty clay loam, and are typically in alluvium or slope alluvium overlain by some amount of eolian or loess deposits. Some portion of the components correlated to this site could and should be split out into separate ecological site concepts.
Vegetation includes western wheatgrass, blue grama, galleta, bottlebrush squirreltail, sideoats grama, little bluestem, vine mesquite, black grama, dropseeds, alkali sacaton, Drumond milk vetch, locoweed, wild buckwheat, scarlet globemallow, fourwing, winterfat, ephedra, common wolfberry, and Apachie plume.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

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

The properties of this site will exist within the ranges of the following soil series, but are not necessarily characterized by their full range.
The Clovis soils are on fan terraces, piedmont slopes, and plains. Slopes range from 0 to 20 percent. The soils formed in medium and moderately fine textured mixed sediments from quartzite, gneiss, schist, sandstone, and limestone. Elevations range from 4,500 to 7,200 feet.
Darvey soils are on hills, fan terraces and valley fills. Slope is 0 to 5 percent. The soils formed in alluvium derived from calcareous sandstone and shale and limestone. The elevation is 4,500 to 6,500 feet.
Witt soils are on fan terraces, piedmonts, bajadas and mesas. Slope ranges from 0 to 12 percent. They formed in silty calcareous sediments derived from mixed parent materials including quartzite, gneiss, sandstone, shale, limestone, eolian material, and Triassic and Jurassic redbed sediments. Elevation ranges from 5,200 to 7,000 feet.
Hagerman soils are on hills, piedmonts, fans, ridgetops and mesas. The most common slopes are 0 to 8 percent but some range to 20 percent. elevation ranges from 5,500 to 7,500 feet
The La Fonda soils are on fan remnants and piedmont slopes. Slopes range from 0 to 15 percent. They formed in medium and moderately fine textured calcareous sediments derived principally from "redbed" formations of Jurassic, Triassic, Permian and Pennsylvanian age. These formation are mostly shales and fine grained sandstones. The sediments are readily susceptible to water erosion and areas of La Fonda soils are often cut by arroyos. elevation ranges from 4,200 to 7,000 feet.
The Tapia soils are on summits of interfluves of undulating plains, plains of ancient alluvium, valley side slopes, and mesa tops. Slope ranges from 0 to 15 percent. The soils formed in calcareous medium to moderately fine textured material derived from mixed igneous and sedimentary rocks over gravelly very limy deposits. Elevations range from 5,400 to 7,200 feet.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Fan piedmont
Runoff class	Negligible to high
Flooding frequency	None
Ponding frequency	None
Elevation	1,524–2,134 m
Slope	0–15%
Water table depth	152 cm

Aspect	Aspect is not a significant factor

Climatic features

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

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

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

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

4. Both temperature and precipitation favor warm-season perennial species. However, about 40 percent of the annual precipitation falls at a time favorable to cool-season plant growth. The soils of this site can store water from winter and early spring moisture for use by cool-season species. This allows the cool-season species to occupy an important component of this site. Strong winds from the west and southwest that blow from February to June can rapidly dry the soil profile during a critical period for cool-season plant growth.

Clovis - The climate is semiarid continental. Typically, the mean annual temperature is about 49 to 57 degrees F. The mean annual precipitation is typically 10 to 14 inches, but has ranged to 16 inches in some areas. Frost-free period is 140 to 185 days. In Arizona, the mean annual temperature drops to 48 degrees and the frost-free period is 120 to 165 days.
Darvey - The mean annual precipitation is 10 to 13 inches, but has ranged to 17 inches in the past. The mean annual soil temperature ranges from 48 to 59 degrees F. The frost-free period is about 150 to 190 days.
Witt - The mean annual precipitation ranges from 10 to 14 inches. Mean annual temperature ranges from 45 to 54 degrees F. The frost-free period ranges from 120 to 160 days.
Hagerman - Mean annual precipitation ranges from 10 to 13 inches, and mean annual temperature ranges from 46 to 54 degrees F. The average summer temperature is 67 degrees F. Most of the precipitation falls during the period from July through September. Frost-free period is 120 to 170 days
La Fonda - The climate is semiarid and continental. Mean annual precipitation ranges from 10 to 13 inches, but does range to 16 inches in some areas with a pronounced summer maximum characterized by frequent heavy thunderstorms of short duration. Mean annual air temperature ranges from 50 to 58 degrees F. The frost-free period ranges from 120 to 180 days
Tapia - The average annual precipitation ranges from about 10 to 16 inches and the mean annual soil temperature ranges from 48 to 52 degrees F. The precipitation pattern is characterized by a marked summer maximum resulting from thunderstorms. The frost-free season ranges from 120 to 170 days.

Table 3. Representative climatic features

Frost-free period (average)	145 days
Freeze-free period (average)	
Precipitation total (average)	381 mm

Influencing water features

This is an upland site, and is not associated with water features or wetlands. During heavy rain events, this site may receive run-on moisture from landforms above and contribute runoff to landforms below.

Soil features

1. The soils of this site are well drained, moderately deep to deep. The surface texture varies from fine sandy loam

to silty clay loam and clay loam. Soil permeability is moderate to moderately slow. Available water-holding capacity is moderately high to high. As vegetative cover decreases, the intake rate and water-holding capacity also decreases. If the soil is not adequately covered, wind and water erosion can be severe.

2. Characteristic soil series:
Ancho CL
Chupadero FSL
Tapia L
Hagerman FSL, SCL
Jarita SiL
La Fonda L, FSL
Pena L
Rance SiL
Redun L
Silver L
Alicia L
Carnero L
Clovis L, FSL
Darvey L
Wilcoxson L
Witt SiCL, CL, L, SiL
Penistaja L, SCL
Dioxice L
Scholle L
Threadgill SiL
The following are the most commonly used series in map unit components that are correlated to this ecosite.

The Clovis series consists of very deep, well drained, moderately permeable soils that formed in medium and moderately fine textured sediments from quartzite gneiss, schist, sandstone, and limestone. The Clovis soils are on fan terraces, piedmont slopes, and plains. Slopes are 0 to 20 percent. The mean annual precipitation is about 11 inches. The mean annual temperature is about 53 degrees F. Well drained. Permeability is moderate or moderately slow. Runoff is negligible on slopes less than 1 percent, very low on 1 to 3 percent slopes, low on 3 to 5 percent slopes and medium on 5 to 20 percent slopes.
The Darvey series consists of very deep, well drained, moderately permeable soils that formed in alluvium from calcareous sandstone, shale and limestone. These soils are on hills, fan terraces, and valley fill. Slope ranges from 0 to 5 percent. Mean annual precipitation is about 12 inches and mean annual air temperature is about 55 degrees F. Well drained; slow runoff; moderate permeability
The Witt series consists of very deep, well drained, moderately or moderately slowly permeable soils that formed in eolian material and alluvium derived from sedimentary materials on fan terraces, piedmonts, bajadas and mesas. Slope ranges 0 to 12 percent. The mean annual precipitation is about 11 inches and the mean annual temperature is 50 degrees F. Well drained. Permeability is moderately slow. Runoff is low on slopes less than 1 percent, medium on 1 to 5 percent slopes and high on 5 to 15 percent slopes.
The Hagerman series consists of moderately deep, well drained, moderately permeable soils that formed in alluvium and eolian material derived from sandstone and shale on hills, piedmont fans, mesas and ridgetops. Slope ranges from 0 to 20 percent. Mean annual precipitation is about 12 inches and mean annual air temperature is about 50 degrees F.
Well drained. Permeability of the soil is moderate over a very slowly permeable bedrock. Runoff is negligible on slopes less than 1 percent, low on 1 to 3 percent slopes, medium on 3 to 5 percent slopes, high on 5 to 8 percent slopes, and very high on slopes greater than 8 percent.
The La Fonda series consists of very deep, well drained, moderately permeable soils that formed in medium and moderately fine textured calcareous sediments derived from sandstone and shale. La Fonda soils are on fan remnants and piedmont slopes. Slope ranges from 0 to 15 percent. Mean annual precipitation is about 12 inches and mean annual air temperature is about 55 degrees F. Well drained. Permeability is moderate. Runoff is negligible on slopes less than 1 percent, very low on 1 to 3 percent slopes, low on 3 to 5 percent slopes, and medium on 5 to 15 percent slopes
The Tapia series consists of very deep, well drained, moderately permeable soils that formed in alluvium and eolian material derived from mixed sources. These soils are on piedmont fans and mesas and on interfluves of undulating plains. Permeability is moderate. Slope ranges from 0 to 15 percent. Average annual precipitation is about 16

inches and the average annual air temperature is about 52 degrees F. Well drained. Permeability is moderate. Runoff is negligible on slopes less than 1 percent slopes, low on 1 to 5 percent slopes and medium on 5 to 15 percent slopes

Table 4. Representative soil features

Surface texture	(1) Loam (2) Fine sandy loam (3) Silt loam
Drainage class	Well drained
Permeability class	Moderate to moderately slow
Soil depth	127–508 cm

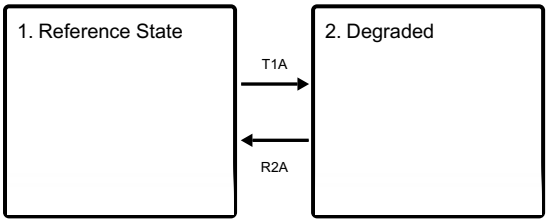
Ecological dynamics

POTENTIAL NATURAL PLANT COMMUNITY

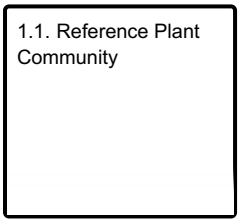
1. The potential plant community of this site is a mixed grassland of warm- and cool-season, mid- and short perennial grasses. Woody species occupy a minor, but more important, part of this plant community. Forbs are a minor component of this site. However, during years of abundant spring and fall moisture, a large variety of forbs occur throughout this site.
Vegetation includes western wheatgrass, blue grama, galleta, bottlebrush squirreltail, sideoats grama, little bluestem, vine mesquite, black grama, dropseeds, alkali sacaton, Drumond milk vetch, locoweed, wild buckwheat, scarlet globemallow, fourwing, winterfat, ephedra, common wolfberry, and Apachie plume.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
Reference State

The potential plant community of this site is a mixed grassland of warm- and cool-season, mid- and short perennial grasses (western wheatgrass, bottlebrush squirreltail, sideoats grama, little bluestem, vine-mesquite, black grama, fourwing saltbush, and winterfat). Woody species occupy a minor, but more important, part of this plant community. Forbs are a minor component of this site. However, during years of abundant spring and fall moisture, a large variety of forbs occur throughout this site.

Resilience management. This site is poorly suited to continuous yearlong grazing or grazing continuously during the growing season.

Community 1.1

Reference Plant Community

POTENTIAL NATURAL PLANT COMMUNITY 1. The potential plant community of this site is a mixed grassland of warm- and cool-season, mid- and short perennial grasses. Woody species occupy a minor, but more important, part of this plant community. Forbs are a minor component of this site. However, during years of abundant spring and fall moisture, a large variety of forbs occur throughout this site. 2. Composition of the Potential Plant Community Approximate percentage of total annual herbage production. Grasses and Grasslike - 80-90% western wheatgrass 15-20 blue grama 15-20 bottlebrush squirreltail 5-7 sideoats grama) little bluestem) 10-15 vine-mesquite 5-10 black grama 5-7 sand dropseed) spike dropseed) 5-8 alkali sacaton 3-5 threeawn spp. 2-5 Hall's panicum) switchgrass) 5-10 plains lovegrass) other grasses 5-10 Woody 5-10% fourwing saltbush) winterfat) 5-7 ephedra) pale wolfberry) Apache plume) 3-5 broom snakeweed) rubber rabbitbrush) 3-5 other shrubs 1-5 Forbs 5-10% Drummond milkvetch) redstemmed milkvetch) T-2 locoweed spp. T-2 wild buckwheat T-2 globemallow T-2 threadleaf groundsel T-2 other forbs T-2 Other grasses that could appear on this site include wolftail, cane bluestem, silver bluestem, prairie junegrass, pinyon ricegrass, Indian ricegrass, New Mexico feathergrass, needleandthread, green needlegrass, mesa dropseed, spike muhly, Metcalfe muhly, curlyleaf muhly, buffalograss, burrograss, ring muhly, mat muhly, sandhill muhly, red muhly, poa spp., and carex spp. Other shrubs include skunkbush sumac, littleleaf sumac, sacahuista, yucca spp., Bigelow sagebrush, fringed sagewort, cholla, pricklypear, pinyon, juniper, and algerita. Other forbs include Rocky Mountain beeplant, marigold yarrow, ragweed, wooly Indian-wheat, whorled milkweed, tansymustard, fiddleneck, and Indian paintbrush.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	398	852	1300
Shrub/Vine	22	78	135
Forb	22	78	135
Total	**442**	**1008**	**1570**

State 2
Degraded

This state is characterized by sod-bound blue grama. Other common plants in this phase are broom snakeweed, tree cholla, and oneseed juniper. While full plant lists have not been compiled for this state, this is a much less productive plant community than the reference. Under continuous yearlong grazing or grazing continuously during the growing season, species such as western wheatgrass, bottlebrush squirreltail, sideoats grama, little bluestem, vine-mesquite, black grama, fourwing saltbush, and winterfat will decrease in composition.

Characteristics and indicators. Legacy Statement: "Typical site deterioration is characterized by low-vigor sod-like blue grama which will eventually become 80 to 95 percent of the plant community. This condition cuts the productivity of this site to almost nothing*. Further deterioration is typified by an increase in bare ground and an invasion of woody species such as juniper and pinyon, along with an increase in ring and mat muhly and broom snakeweed." *Clearly, "almost nothing" could use clarification. Future ESD work should seek to quantify this decrease in productivity. In sod-bound form with severely truncated root systems, blue grama often has very low productivity in proportion to its canopy cover.

Transition T1A
State 1 to 2

This transition occurs in response to continuous heavy grazing--either year-round or throughout the growing season.

Restoration pathway R2A
State 2 to 1

This restoration pathway occurs in response to resting and/or properly managed rotational grazing.

Conservation practices

Grazing Management Plan - Applied

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grass/Grasslike**			392–852	
	blue grama	BOGR2	*Bouteloua gracilis*	67–314	–
	western wheatgrass	PASM	*Pascopyrum smithii*	67–314	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–235	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–235	–
	Hall's panicgrass	PAHA	*Panicum hallii*	0–157	–
	vine mesquite	PAOB	*Panicum obtusum*	22–157	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	0–157	–
	switchgrass	PAVI2	*Panicum virgatum*	0–157	–
	spike dropseed	SPCO4	*Sporobolus contractus*	0–126	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–126	–
	black grama	BOER4	*Bouteloua eriopoda*	22–110	–
	squirreltail	ELEL5	*Elymus elymoides*	22–110	–
	alkali sacaton	SPAI	*Sporobolus airoides*	13–78	–
	threeawn	ARIST	*Aristida*	9–78	–
Shrub/Vine					
2	**Woody Plants**			22–135	
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–110	–
	jointfir	EPHED	*Ephedra*	0–110	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–110	–
	pale desert-thorn	LYPA	*Lycium pallidum*	0–78	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–78	–
	Apache plume	FAPA	*Fallugia paradoxa*	0–78	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–78	–
Forb					
3	**Forbs**			22–135	
	Drummond's milkvetch	ASDR3	*Astragalus drummondii*	0–31	–
	Emory's milkvetch	ASEM2	*Astragalus emoryanus*	0–31	–
	milkvetch	ASTRA	*Astragalus*	0–31	–
	buckwheat	ERIOG	*Eriogonum*	0–31	–
	threadleaf ragwort	SEFL3	*Senecio flaccidus*	0–31	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–31	–

Contributors

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Approval

Kendra Moseley, 10/21/2024

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	05/12/2025
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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

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

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

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

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

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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

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

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

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:**

17. **Perennial plant reproductive capability:**