USDA Natural Resources
Conservation Service

Ecological site R039XA105AZ
Shallow Loamy 17-22" p.z.

Last updated: 9/05/2019
Accessed: 05/10/2025

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): 039X–Mogollon Transition North

AZ 39.1 Mogollon Plateau Coniferous Forests

Elevations range from 7000 to 12,500 feet and precipitation averages 20 to 35 inches per year. Vegetation includes ponderosa pine, Gambel oak, Arizona walnut, sycamore, Douglas fir, blue spruce, Arizona fescue, sheep fescue, mountain muhly, muttongrass, junegrass, pine dropseed, and dryland sedges. The soil temperature regime ranges from mesic to frigid and the soil moisture regime ranges from typic ustic to udic ustic. This unit occurs within the Colorado Plateau Physiographic Province and is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin.

Table 1. Dominant plant species

Tree	(1) *Pinus ponderosa* (2) *Pinus edulis*
Shrub	(1) *Ceanothus fendleri* (2) *Rosa woodsii*

Herbaceous	(1) *Muhlenbergia montana* (2) *Bouteloua gracilis*

Physiographic features

This site occurs in an upland position on open rocky slopes and ridgetops. It neither benefits from run-in moisture nor suffers excessively from run-off.

Table 2. Representative physiographic features

Landforms	(1) Ridge
Elevation	6,500–8,000 ft
Slope	5–40%
Aspect	Aspect is not a significant factor

Climatic features

About 40% of the moisture in this Common Resource Area (CRA), or Land Resource Unit (LRU) comes as rain from June to September. The remainder comes from October to May as snow or light rain. Extreme temperatures of 97 and -37 degrees Fahrenheit have been recorded. Some moisture is usually received every month.

Table 3. Representative climatic features

Frost-free period (average)	168 days
Freeze-free period (average)	120 days
Precipitation total (average)	22 in

Influencing water features

Soil features

The soils on this site are very shallow (5-10") and shallow (10-20"), they formed in alluvium derived mainly from hard tuff. Surface textures include fine sandy loam, cobbly sandy loam, cobbly loam, sandy loam or loam and are about five inches thick. Subsurface textures include loam, sandy clay loam or clay loam with over 50 percent rock fragments. Plant-soil moisture relationships are poor and the content of soluble salts is low.
Typical taxonomic units include: SSA 635 Apache County central part - MU's BsE and BuC Bushvalley loam and cobbly sandy loam (warm phase).

Table 4. Representative soil features

Parent material	(1) Alluvium–welded tuff
Surface texture	(1) Fine sandy loam (2) Cobbly sandy loam (3) Cobbly loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderately slow
Soil depth	5–20 in
Surface fragment cover <=3"	45–80%
Soil reaction (1:1 water) (0-40in)	6.5–7

Subsurface fragment volume <=3" (Depth not specified)	50–60%

Ecological dynamics

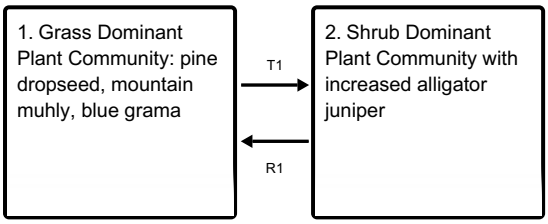
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The historical climax plant community represents the natural potential plant communities found on relict or relatively undisturbed sites. Other plant communities described here represent plant communities that are known to occur when the site is disturbed by factors such as grazing, fire, or drought.

Production data provided in this site description is standardized to air-dry weight at the end of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

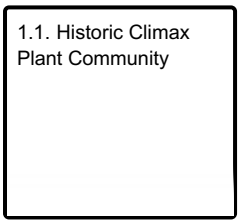
NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity Index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine Similarity Index, compare the production (air-dry weight) of each species to that shown in the plant community description. For each species, count no more than the maximum amount shown for the species, and for each group, count no more than the maximum shown for the group. Divide the resulting total by the total normal year production shown in the plant community description. If rainfall has been significantly above or below normal, use the total production shown for above or below normal years. If field data is not collected at the end of the summer growing season, then the field data must be corrected to the end of the year production before comparing it to the site description. The growth curve can be used as a guide for estimating production at the end of the summer growing season.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
Grass Dominant Plant Community: pine dropseed, mountain muhly, blue grama

Grass Dominant Community. This ecological site is dominated by warm-season grasses such as pine dropseed, mountain muhly, and blue grama. There are some scattered ponderosa pine along with pinyon and juniper.

Community 1.1
Historic Climax Plant Community

This site has a plant community made up primarily of mid grasses with lesser amounts of forbs, shrubs and trees. In the potential plant community there is a mixture of both cool and warm season grasses. Plant species most likely to increase as retrogression occurs on the site, are Arizona fescue, bottlebrush squirreltail and alligator juniper. Kentucky bluegrass invades the site as deterioration occurs.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	750	800	850
Tree	120	150	180
Forb	50	75	100
Shrub/Vine	10	30	50
Total	**930**	**1055**	**1180**

Figure 5. Plant community growth curve (percent production by month). AZ3911, 39.1 17-22" p.z. all sites. Growth begins in the spring, most growth occurs during the summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	10	10	20	20	20	5	0	0

State 2
Shrub Dominant Plant Community with increased alligator juniper

Transition T1
State 1 to 2

Continuous, season-long herbivory which decreases the growth and colonization of some plant species.

Restoration pathway R1
State 2 to 1

Prescribed grazing where decreaser species such as pine dropseed and mountain muhly may colonize, establish healthy root systems, and hold the soil in place.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Tree					
0				100–200	
	ponderosa pine	PIPO	*Pinus ponderosa*	0–50	–
	twoneedle pinyon	PIED	*Pinus edulis*	10–30	–
	alligator juniper	JUDE2	*Juniperus deppeana*	20–30	–
	Utah juniper	JUOS	*Juniperus osteosperma*	10–20	–
	oneseed juniper	JUMO	*Juniperus monosperma*	5–10	–
Shrub/Vine					
0				10–50	
	Fendler's ceanothus	CEFE	*Ceanothus fendleri*	10–50	–
	Woods' rose	ROWOW	*Rosa woodsii var. woodsii*	10–50	–
Grass/Grasslike					
0				750–850	
	mountain muhly	MUMO	*Muhlenbergia montana*	150–250	–
	blue grama	BOGR2	*Bouteloua gracilis*	50–150	–
	sedge	CAREX	*Carex*	0–100	–
	pine dropseed	BLTR	*Blepharoneuron tricholepis*	50–100	–
	Arizona fescue	FEAR2	*Festuca arizonica*	20–80	–
	Idaho fescue	FEID	*Festuca idahoensis*	20–80	–
	Canada bluegrass	POCO	*Poa compressa*	25–75	–
	muttongrass	POFE	*Poa fendleriana*	25–75	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	30–50	–
	spike muhly	MUWR	*Muhlenbergia wrightii*	0–30	–
	sheep fescue	FEOV	*Festuca ovina*	10–20	–
	threeawn	ARIST	*Aristida*	0–20	–
Forb					
0				50–100	
	globemallow	SPHAE	*Sphaeralcea*	5–10	–
	Forb, annual	2FA	*Forb, annual*	5–10	–
	geranium	GERAN	*Geranium*	5–10	–
	sunflower	HELIA3	*Helianthus*	5–10	–
	pea	LATHY	*Lathyrus*	5–10	–
	lupine	LUPIN	*Lupinus*	5–10	–
	cinquefoil	POTEN	*Potentilla*	3–8	–
	scarlet gilia	IPAGF	*Ipomopsis aggregata ssp. formosissima*	3–8	–
	yarrow	ACHIL	*Achillea*	3–8	–
	milkvetch	ASTRA	*Astragalus*	3–8	–
	Indian paintbrush	CASTI2	*Castilleja*	3–8	–

Animal community

This site is well suited for all classes of livestock. It is used primarily for late spring, summer and early fall grazing.

Prescribed Grazing systems are essential to maintain the plant community balance on the site. Steeper slopes occurring within the site will require special management practices to encourage utilization.
This site has relatively poor habitat diversity in the native plant community. It is primarily adapted to grassland wildlife species except at the edge of timber where it is utilized by many species. Large game animals are migratory onto the site primarily for summer use.

Recreational uses

This site has a variety of summer flowers. It has excellent aesthetic appeal because of the open grassland appearance, which is adjacent to a distinct timber edge..
Summers are cool and pleasant but winters are harsh and cold.
Hunting, camping, hiking, cross country skiing, photography and wildlife observation are favorite activities.

Type locality

Location 1: Apache County, AZ	
Township/Range/Section	T5N R30E S2
General legal description	About 1/4 mile North West of Alpine, AZ.

Contributors

Larry D. Ellicott
Steve Barker

Approval

Scott Woodall, 9/05/2019

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:**

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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):**

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:**