

## **Ecological site R039XA138AZ Clay Loam Upland 17-22 p.z.**

Last updated: 9/05/2019  
 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.

### **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.

### **Associated sites**

F039XA134AZ	<b>Limestone Upland 17-22" p.z. (PIPO)</b>
F039XA135AZ	<b>Basalt Hills 17-22" p.z. (PIPO, QUGA)</b>
R039XA129AZ	<b>Clay Bottom 17-22"</b>

**Table 1. Dominant plant species**

Tree	(1) <i>Pinus ponderosa</i>
Shrub	(1) <i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>glabrata</i>
Herbaceous	(1) <i>Muhlenbergia montana</i> (2) <i>Festuca arizonica</i>

### **Physiographic features**

This site occurs on plateaus, hills and fan remnants. The soils are moderately deep (20-40") to deep (40-60") and noneffervescent throughout. The site does not benefit significantly from run-on moisture from adjacent sites.

**Table 2. Representative physiographic features**

Landforms	(1) Plateau (2) Hill (3) Mesa
Elevation	1,829–2,438 m
Slope	0–15%

Aspect	Aspect is not a significant factor
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### 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)	559 mm

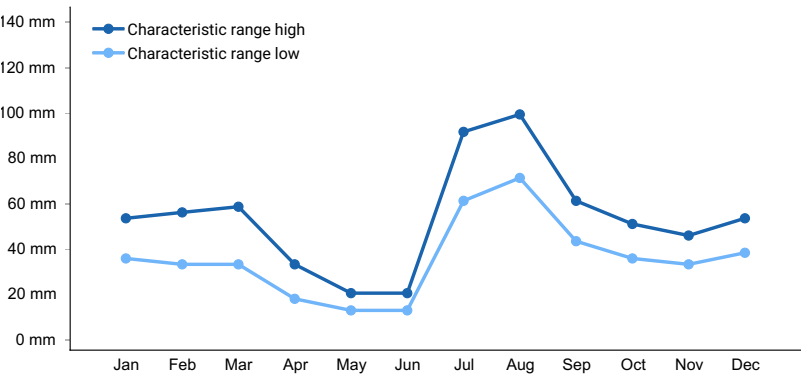


Figure 1. Monthly precipitation range

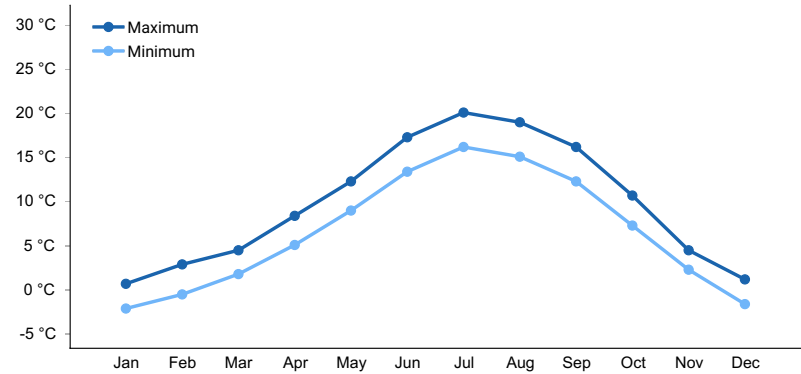


Figure 2. Monthly average minimum and maximum temperature

### Influencing water features

There are no water features associated with this site.

### Soil features

The soils characterizing this site are moderately deep (20-40") to deep (40-60") and noneffervescent throughout. The surface soil textures include Gravelly, cobbly or very stoney loam and is generally about 7 to 11 inches deep. The subsurface textures include gravelly clay loam, very gravelly clay and cobbly loam and have slow permability. The site can absorb most or all of the moisture the climate supplies. With good vegetative cover the infiltration rate is slow. Coarse fragments average from 15 to 55 percent of the soil volume. Typical taxonomic units include: SSA 695 Navajo Depot - MU's 4-Fallsam family and Smolan family, 5-Gavlin family, 7-Ligai family, 10 & 11-Nibley family and 15-Kellypoint family.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Cobbly loam (3) Very stony loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to slow
Soil depth	51–152 cm
Surface fragment cover >3"	15–55%
Available water capacity (0-101.6cm)	0.18–0.53 cm
Calcium carbonate equivalent (0-101.6cm)	0–1%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	6.6–7.8
Subsurface fragment volume >3" (Depth not specified)	15–55%

## Ecological dynamics

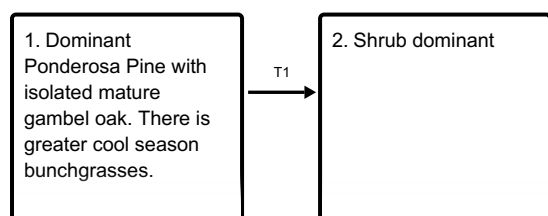
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The historical climax plant community represents the natural potential plant communities found on relict or 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

1.1. Historic Climax  
Plant Community

**State 1**  
**Dominant Ponderosa Pine with isolated mature gambel oak. There is greater cool season bunchgrasses.**

Ponderosa Pine dominant with isolated mature gambel oak and rabbitbrush.

**Community 1.1**  
**Historic Climax Plant Community**

The plant community of this ecological site is a grassland with a mix of cool and warm season grasses and forbs. The plant community of this site does not readily convert to a woodland, even in the absence of periodic fire.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	547	601	656
Forb	36	49	73
Shrub/Vine	22	29	36
Tree	—	8	15
Total	605	687	780

Table 6. Ground cover

Tree foliar cover	0-1%
Shrub/vine/liana foliar cover	1-2%
Grass/grasslike foliar cover	30-35%
Forb foliar cover	1-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	40-50%
Surface fragments >0.25" and <=3"	5-10%
Surface fragments >3"	2-4%
Bedrock	0%
Water	0%
Bare ground	20-30%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	—	—	1-5%
>0.15 <= 0.3	—	—	—	—
>0.3 <= 0.6	—	1-2%	30-35%	—
>0.6 <= 1.4	—	—	—	—
>1.4 <= 4	—	—	—	—
>4 <= 12	—	—	—	—
>12 <= 24	0-1%	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

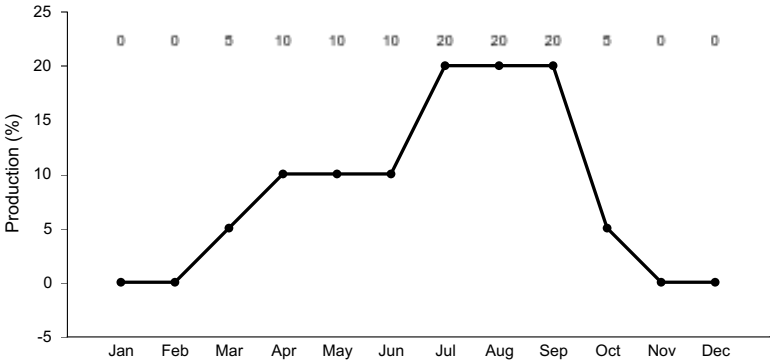


Figure 4. Plant community growth curve (percent production by month). AZ3911, 39.1 17-22" p.z. all sites. Growth begins in the spring, most growth occurs during the summer rainy season..

## State 2

### Shrub dominant

Shrub dominant with immature gambel oak and rabbitbrush. There are less cool-season bunchgrasses.

## Transition T1

### State 1 to 2

Severe, crown burning fire taking out the ponderosa pine. The ecological processes to restore the site to reference are unknown.

## Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Tree					
0				7–22	
	ponderosa pine	PIPO	<i>Pinus ponderosa</i>	7–22	—
Shrub/Vine					
0				11–45	
	rubber rabbitbrush	ERNAG	<i>Ericameria nauseosa ssp. nauseosa var. glabrata</i>	7–22	—
	pingue rubberweed	HYRI	<i>Hymenoxys richardsonii</i>	7–22	—
Grass/Grasslike					
0				20-24	

0				33-54	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	36-73	-
	muhly	MUHLE	<i>Muhlenbergia</i>	0-7	-
	deergrass	MURI2	<i>Muhlenbergia rigens</i>	0-7	-
1				504-572	
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	256-327	-
	Arizona fescue	FEAR2	<i>Festuca arizonica</i>	182-256	-
	pine dropseed	BLTR	<i>Blepharoneuron tricholepis</i>	36-73	-
	spike muhly	MUWR	<i>Muhlenbergia wrightii</i>	29-44	-
	Ross' sedge	CARO5	<i>Carex rossii</i>	7-22	-
	squirreltail	ELELE	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	0-7	-
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0-7	-
	muttongrass	POFE	<i>Poa fendleriana</i>	0-7	-
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0-7	-
	black dropseed	SPIN5	<i>Sporobolus interruptus</i>	0-7	-
	nodding brome	BRAN	<i>Bromus anomalus</i>	0-7	-
<b>Forb</b>					
2				34-95	
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	29-44	-
	pussytoes	ANTEN	<i>Antennaria</i>	7-15	-
	aster	ASTER	<i>Aster</i>	0-7	-
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0-7	-
	iris	IRIS	<i>Iris</i>	0-7	-
	flax	LINUM	<i>Linum</i>	0-7	-
	lupine	LUPIN	<i>Lupinus</i>	0-7	-
	beardtongue	PENST	<i>Penstemon</i>	0-7	-
	cinquefoil	POTEN	<i>Potentilla</i>	0-7	-
	ragwort	SENEC	<i>Senecio</i>	0-7	-
3				17-62	
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	7-15	-
	sandwort	ARENA	<i>Arenaria</i>	7-15	-
	redroot buckwheat	ERRA3	<i>Eriogonum racemosum</i>	7-15	-
	spurge	EUPHO	<i>Euphorbia</i>	0-7	-
	mustard	BRASS2	<i>Brassica</i>	0-7	-
	thistle	CIRSI	<i>Cirsium</i>	0-7	-
	weakleaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	0-7	-

## 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. This site offers a fair diversity in the vegetative complex for wildlife. In higher condition classes the site is most suitable to grassland wildlife species. As retrogression occurs the woody species increase and wildlife species utilizing the site may change.

## Recreational uses

This site has a variety of summer flowers. It has excellent aesthetic appeal because of the open grassland appearance.

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: Coconino County, AZ	
Township/Range/Section	T21N R5E S10
General legal description	Bellemont, AZ Quad, SE1/4, SW1/4, Section 10, T21N, R5E, Coconino County, 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:

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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):

- 
5. **Number of gullies and erosion associated with gullies:**
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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):**
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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:
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17. **Perennial plant reproductive capability:**
-