

# Ecological site R039XA103AZ

## Clayey Upland 17-22" p.z.

Last updated: 9/05/2019  
Accessed: 05/18/2024

### 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.

### 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) <i>Pinus ponderosa</i> (2) <i>Quercus gambelii</i>
Shrub	(1) <i>Gutierrezia sarothrae</i> (2) <i>Tetradymia canescens</i>
Herbaceous	(1) <i>Poa compressa</i> (2) <i>Poa fendleriana</i>

### Physiographic features

This site occurs in an upland position as mesa tops, plateaus and side slopes. It neither benefits from run-in moisture nor does it suffer from excessive runoff, unless denuded of its vegetative cover.

Table 2. Representative physiographic features

Landforms	(1) Mesa (2) Plateau
Elevation	1,981–2,316 m
Slope	0–30%
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)	559 mm

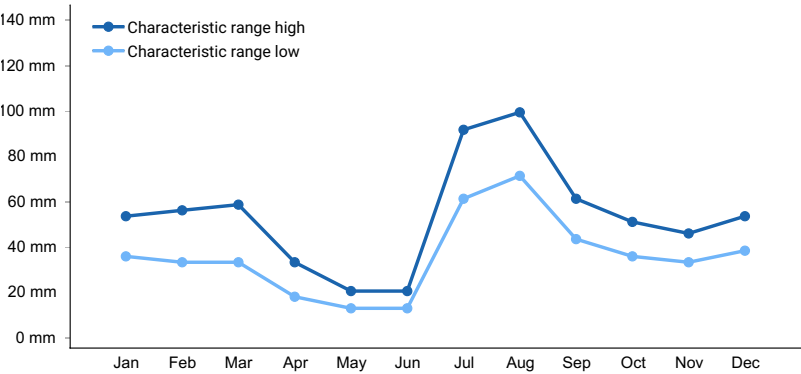


Figure 1. Monthly precipitation range

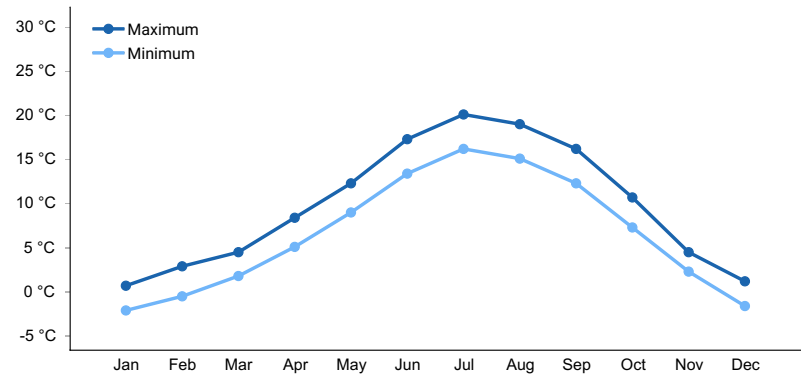


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

Soils on this site are moderately deep (20-40") and deep (40-60"). They formed in material weathered from basic igneous rock (basalt). The surface textures include silt loam to gravelly clay loam two to three inches thick. Subsurface textures include stony clay to clay. Hazard of water erosion is moderate. The content of soluble salts is low.

Typical taxonomic unit includes: from SSA-683 MU's 7B, 8B, 9D, 10D & 11E-Brolliar AND SSA-693 MU's 2, 2A, 2B & 12 Brolliar.

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Gravelly clay loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained
Permeability class	Slow to very slow
Soil depth	51–152 cm
Surface fragment cover <=3"	0–10%

Soil reaction (1:1 water) (0-101.6cm)	6.4–7
Subsurface fragment volume <=3" (Depth not specified)	10–20%

## Ecological dynamics

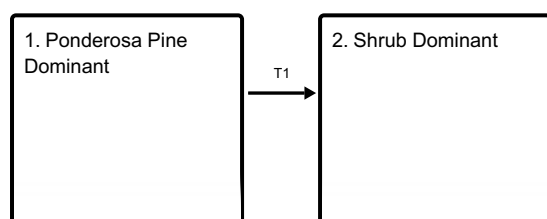
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The historical climax plant community represents the natural potential plant communities found on relict or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

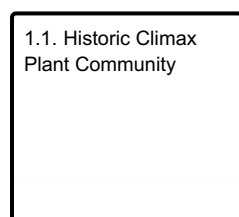
NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity Index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine 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

### Ponderosa Pine Dominant

Ponderosa Pine Dominant with Isolated, mature gambel oak and cool season bunch grasses

## Community 1.1

### Historic Climax Plant Community

This site has a plant community made up primarily of mid and short grasses with a small percentage of forbs, shrubs and trees. In the potential plant community there is a mixture of both cool and warm season grasses. Plants most likely to invade or increase on this site after disturbance are cholla, toadflax, broom snakeweed and pingue. Continuous grazing during the winter and spring periods will decrease the cool season grasses, which are replaced

by warm season, lower forage value grasses and shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	897	953	1009
Forb	56	84	112
Shrub/Vine	22	34	45
Tree	16	20	24
<b>Total</b>	<b>991</b>	<b>1091</b>	<b>1190</b>

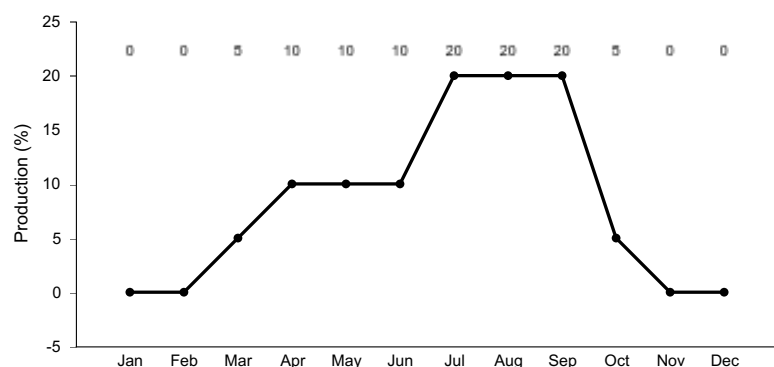


Figure 4. Plant community growth curve (percent production by month). AZ3911, 39.1 17-22" p.z. all sites. Growth begins in the spring, most growth occurs during the summer rainy season..

## State 2 Shrub Dominant

Immature gambel oak plus other shrubs with small amounts of cool season bunchgrasses

## Transition T1 State 1 to 2

Severe fire causing a decrease in trees and an increase in basal sprouting shrubs. Restoration processes back to state one are not understood.

## Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Tree</b>					
0				0–39	
<b>Shrub/Vine</b>					
0				22–45	
<b>Grass/Grasslike</b>					
0				897–1009	
<b>Forb</b>					
0				56–112	

## Animal community

This site is suitable for grazing by all classes of livestock and is primarily used as a late spring and early fall seasonal range. Some areas in the site may have very stony surfaces which impede livestock movement.

Developed water is limited on the site. Prescribed grazing should be applied with deferrment in late spring or early summer to maintain the high percentage of cool season grasses.

This site has relatively poor habitat diversity in the native plant community. As retrogression occurs trees increase on the site reducing the diversity. This site is adapted to grassland wildlife species but the edges adjacent to timber are used by many species.

## Recreational uses

This site has a variety of summer flowers and the open grassland which normally adjoins a timber edge makes it aesthetically pleasing.

Summers are cool and pleasant but winters are harsh and cold.

Main activities are hunting, camping, photography and wildlife observation.

## Type locality

Location 1: Coconino County, AZ	
Township/Range/Section	T21N R7E S14
General legal description	On Switzer Mesa in Flagstaff, AZ city limits.

## 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:**

---

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:**

---