

## Ecological site F039XA133AZ Basalt Upland 17-22" p.z. (PIPO)

Last updated: 9/05/2019  
Accessed: 04/26/2024

### 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.

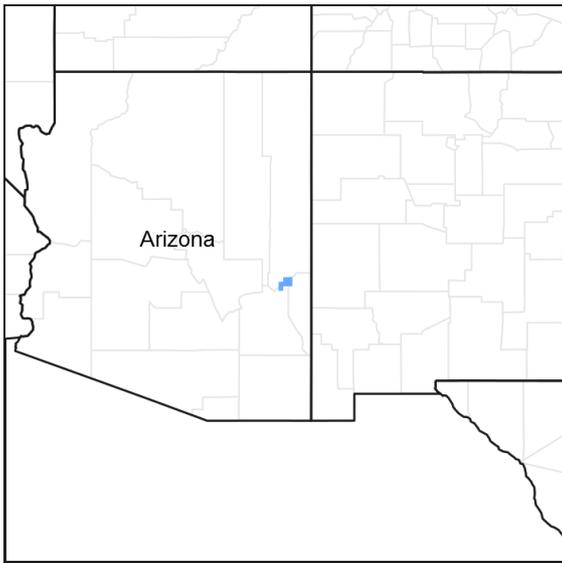


Figure 1. Mapped extent

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.

### 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>                                      |
| Shrub      | (1) <i>Quercus gambelii</i>                                     |
| Herbaceous | (1) <i>Festuca arizonica</i><br>(2) <i>Muhlenbergia montana</i> |

## Physiographic features

This site occurs on basalt plateaus, mesas and hills. The soils are non-effervescent and are shallow to basalt bedrock. The site does not benefit from run-on moisture from adjacent areas.

**Table 2. Representative physiographic features**

|           |                                     |
|-----------|-------------------------------------|
| Landforms | (1) Plateau<br>(2) Mesa<br>(3) Hill |
| Elevation | 6,000–8,000 ft                      |
| Slope     | 0–8%                                |
| 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 mapped on this site are shallow to basalt bedrock. The surface soil texture ranges from stony loam to very cobbly loam. The surface soil has a minimum depth of 2 to 3 inches. Subsurface soil textures range from cobbly clay loam to very cobbly clay. The soil cannot absorb and hold all the moisture the climate supplies. The shrink-swell potential is moderate. Course fragments average from 15 to 35 percent.

Typical taxonomic units mapped on this site include: from SSA-675 San Carlos IR area MU 18-Bushvalley; SSA-683 MU 12E-Cabezon; SSA-695 Kaibab NF area MU's 1-Cavezon very stony loam & 15-Thimble very cobbly loam.

**Table 4. Representative soil features**

|                                      |   |
|--------------------------------------|---|
| Parent material                      | (1) Residuum–basalt                         |
| Surface texture                      | (1) Very stony loam<br>(2) Very cobbly loam |
| Family particle size                 | (1) Loamy                                   |
| Drainage class                       | Well drained                                |
| Permeability class                   | Slow to moderately slow                     |
| Soil depth                           | 15–20 in                                    |
| Surface fragment cover ≤3"           | 0–50%                                       |
| Surface fragment cover >3"           | 0–15%                                       |
| Available water capacity<br>(0-40in) | 0.07–0.17 in                                |
| Electrical conductivity<br>(0-40in)  | 0–2 mmhos/cm                                |

|  |         |
|--|---------|
| Soil reaction (1:1 water)<br>(0-40in)                    | 7.4–7.8 |
| Subsurface fragment volume <=3"<br>(Depth not specified) | 15–50%  |
| Subsurface fragment volume >3"<br>(Depth not specified)  | 0–21%   |

## Ecological dynamics

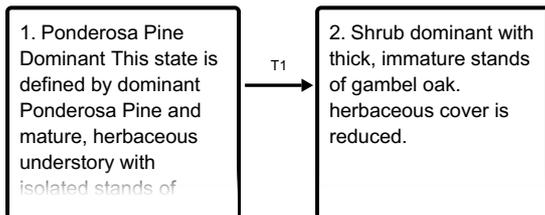
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The historical climax plant community represents the natural potential plant communities found on relict or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

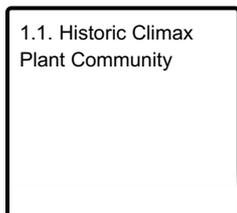
NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity Index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine 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** This state is defined by dominant Ponderosa Pine and mature, herbaceous understory with isolated stands of gambel oak.

### Community 1.1

#### Historic Climax Plant Community

This site is a ponderosa pine forest with an understory of grasses, forbs and shrubs. Gambel oak occurs in both

tree and shrub form. Without periodic fires the density of ponderosa pine increases and understory plant occurrence and production decrease. The understory grass plant community is a mix of cool and warm season perennial grasses. A few annual grasses, both cool and warm season, also occur. Perennial and annual forbs make up a relatively small part of the understory plant community.

Table 5. Annual production by plant type

| Plant Type      | Low (Lb/Acre) | Representative Value (Lb/Acre) | High (Lb/Acre) |
|-----------------|---------------|--------------------------------|----------------|
| Grass/Grasslike | 288           | 333                            | 378            |
| Tree            | 36            | 65                             | 94             |
| Forb            | 22            | 34                             | 45             |
| Shrub/Vine      | 4             | 11                             | 18             |
| <b>Total</b>    | <b>350</b>    | <b>443</b>                     | <b>535</b>     |

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 with thick, immature stands of gambel oak. herbaceous cover is reduced.

## Transition T1

### State 1 to 2

The trigger event is an extreme crown-burning fire. This kills the ponderosa pine and causes a thick stand of gambel oak. As of now it is uncertain what ecological processes will restore this site back to reference.

## Additional community tables

Table 6. Community 1.1 plant community composition

| Group                  | Common Name                | Symbol | Scientific Name                              | Annual Production (Lb/Acre) | Foliar Cover (%) |
|------------------------|----------------------------|--------|--|-----------------------------|------------------|
| <b>Grass/Grasslike</b> |                            |        |  |                             |                  |
| 1                      | <b>Cool Season grasses</b> |        |  | 275–350                     |                  |
|                        | mountain muhly             | MUMO   | <i>Muhlenbergia montana</i>                  | 112–180                     | –                |
|                        | Arizona fescue             | FEAR2  | <i>Festuca arizonica</i>                     | 22–68                       | –                |
|                        | Ross' sedge                | CARO5  | <i>Carex rossii</i>                          | 27–45                       | –                |
|                        | squirreltail               | ELELE  | <i>Elymus elymoides ssp. elymoides</i>       | 22–45                       | –                |
|                        | muttongrass                | POFE   | <i>Poa fendleriana</i>                       | 4–22                        | –                |
|                        | black dropseed             | SPIN5  | <i>Sporobolus interruptus</i>                | 9–18                        | –                |
|                        | pine dropseed              | BLTR   | <i>Blepharoneuron tricholepis</i>            | 9–18                        | –                |
|                        | Fendler's threeawn         | ARPUF  | <i>Aristida purpurea var. fendleriana</i>    | 4–14                        | –                |
|                        | spike muhly                | MUWR   | <i>Muhlenbergia wrightii</i>                 | 0–9                         | –                |
|                        | slender wheatgrass         | ELTRT  | <i>Elymus trachycaulus ssp. trachycaulus</i> | 0–4                         | –                |
|                        | prairie Junegrass          | KOMA   | <i>Koeleria macrantha</i>                    | 0–4                         | –                |
| 2                      | <b>Warm Season Grasses</b> |        |  | 14–28                       |                  |
|                        | blue grama                 | BOGR2  | <i>Bouteloua gracilis</i>                    | 14–22                       | –                |
|                        | little bluestem            | SCSC   | <i>Schizachyrium scoparium</i>               | 0–4                         | –                |

|                   |                       |        |  |       |   |
|-------------------|-----------------------|--------|--|-------|---|
| 3                 | <b>Annual Grasses</b> |        |  | 4-9   |   |
|                   | Grass, annual         | 2GA    | <i>Grass, annual</i>                                   | 4-9   | - |
| <b>Forb</b>       |                       |        |  |       |   |
| 4                 | <b>Forbs</b>          |        |  | 22-45 |   |
|                   | western yarrow        | ACMIO  | <i>Achillea millefolium var. occidentalis</i>          | 4-9   | - |
|                   | aster                 | ASTER  | <i>Aster</i>   | 4-9   | - |
|                   | thistle               | CIRSI  | <i>Cirsium</i>   | 4-9   | - |
|                   | cinquefoil            | POTEN  | <i>Potentilla</i>                                      | 4-9   | - |
|                   | ragwort               | SENEC  | <i>Senecio</i>   | 0-4   | - |
|                   | Fendler's meadow-rue  | THFE   | <i>Thalictrum fendleri</i>                             | 0-4   | - |
|                   | vetch                 | VICIA  | <i>Vicia</i>   | 0-4   | - |
|                   | redroot buckwheat     | ERRA3  | <i>Eriogonum racemosum</i>                             | 0-4   | - |
|                   | geranium              | GERAN  | <i>Geranium</i>  | 0-4   | - |
|                   | iris                  | IRIS   | <i>Iris</i>  | 0-4   | - |
|                   | trefoil               | LOTUS  | <i>Lotus</i>   | 0-4   | - |
|                   | lupine                | LUPIN  | <i>Lupinus</i>   | 0-4   | - |
|                   | milkvetch             | ASTRA  | <i>Astragalus</i>                                      | 0-4   | - |
| <b>Shrub/Vine</b> |                       |        |  |       |   |
| 5                 | <b>Shrubs</b>         |        |  | 4-18  |   |
|                   | pingue rubberweed     | HYRI   | <i>Hymenoxys richardsonii</i>                          | 0-9   | - |
|                   | Fendler's ceanothus   | CEFE   | <i>Ceanothus fendleri</i>                              | 0-4   | - |
|                   | rubber rabbitbrush    | ERNAN5 | <i>Ericameria nauseosa ssp. nauseosa var. nauseosa</i> | 0-4   | - |
|                   | broom snakeweed       | GUSA2  | <i>Gutierrezia sarothrae</i>                           | 0-4   | - |
| 6                 | <b>Succulents</b>     |        |  | 0-4   |   |
|                   | pricklypear           | OPUNT  | <i>Opuntia</i>   | 0-4   | - |
| <b>Tree</b>       |                       |        |  |       |   |
| 7                 | <b>Trees</b>          |        |  | 36-94 |   |
|                   | Gambel oak            | QUGA   | <i>Quercus gambelii</i>                                | 22-45 | - |
|                   | ponderosa pine        | PIPO   | <i>Pinus ponderosa</i>                                 | 18-27 | - |
|                   | alligator juniper     | JUDE2  | <i>Juniperus deppeana</i>                              | 4-22  | - |

## Animal community

Suitability for grazing by livestock is good before canopy exceeds 50%. Cattle, sheep, goats and horses can use this site in summer and early fall. Management considerations include use of Prescribed Grazing, water developments and reseeding grass following harvest operations for forage and to reduce erosion, grazing should not damage young trees.

Site factors affecting wildlife:

Water: Frequently found in scattered natural wetlands and springs.

Cover: good for most species.

Food: Good potential except where grazing is unmanaged.

Other: Snowfall causes shifts in wildlife populations.

## Recreational uses

Winters are cold and summers are quite warm. Spring and fall are the dry seasons and are typically cool and windy.

Recreational activities most likely to occur are hunting, cross-country riding, photography and wildlife observation.

## Wood products

In development.

## Type locality

|                               |  |
|-------------------------------|--|
| Location 1: Graham County, AZ |  |
| Township/Range/Section        | T3N R27E S19   |
| General legal description     | 2,150 feet north and 2,160 feet east of the southwest corner of Section 19, Township 3 N, Range 27 E |

## Contributors

Karlynn Huling  
Larry D. Ellicott

## 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:**
- 
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):**

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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:**

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