USDA Natural Resources
Conservation Service

Ecological site F039XA111AZ
Loamy Upland 17-22" p.z. (PIPO)

Last updated: 9/05/2019
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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.

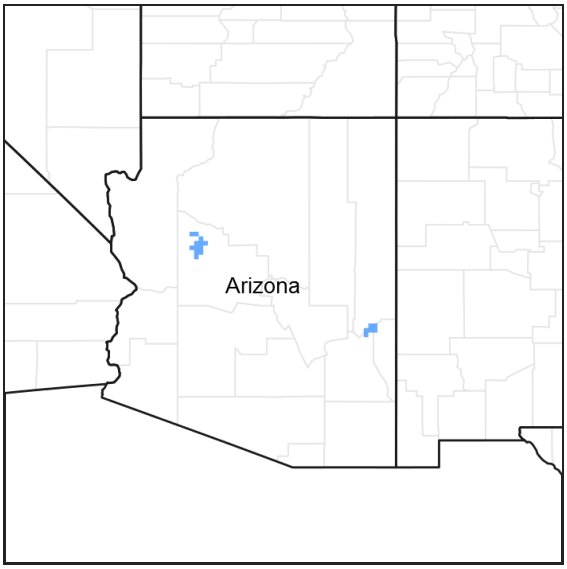


Figure 1. Mapped extent

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) *Quercus gambelii*
Shrub	Not specified

Herbaceous	(1) *Blepharoneuron tricholepis* (2) *Muhlenbergia montana*

Physiographic features

This site occurs on the summits of fan remnants. The soils are deep and non-effervescent throughout. The site does not benefit significantly from run-on-moistue from adjacent sites. Slopes range from 0 to 3 percent. This site occurs on all aspects.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant
Flooding frequency	None
Ponding frequency	None
Elevation	6,000–8,000 ft
Slope	0–3%
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 characterizing this site are deep to limestone bedrock. The surface soil is about 11 inches deep and is covered by a layer of pine needles and other organic accumulation. The subsoil and underlying layers have a slow permeability. This site can absorb most of the moisture the climate supplies. With good vegetative cover the infiltration rate is slow. Course fragments average less than 5 percent of the total soil volume.

Soils correlated to this site include: from SSA-695 MU's 16-Tuttle family loam; SSA-637 MU's HgB & HgD-Hogg, LIC & LID-Lonti; SSA-675 MU 950-Cambern.

Table 4. Representative soil features

Surface texture	(1) Loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained
Permeability class	Slow
Soil depth	54–60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%

Available water capacity (0-40in)	6.5–11 in
Calcium carbonate equivalent (0-40in)	0–1%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	7.4–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

In the abscence of fire the density of trees and shrubs increases. Both the occurrence and production of grasses and forbes in the understory decreases.

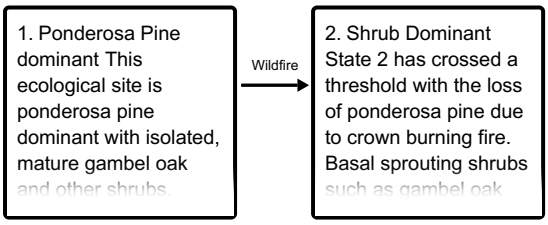
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The historical climax plant community represents the natural potential plant communities found on relict or 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
Ponderosa Pine dominant This ecological site is ponderosa pine dominant with isolated, mature gambel oak and other shrubs. Grass cover is also significant.

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Community 1.1
Historic Climax Plant Community

The plant community of this ecological site is a ponderosa pine forest with an understory of grasses, forbs and shrubs. Gambel oak occurs in both tree and shrub form.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	225	240	255
Forb	30	40	45
Shrub/Vine	3	10	15
Tree	3	10	15
Total	**261**	**300**	**330**

State 2
Shrub Dominant State 2 has crossed a threshold with the loss of ponderosa pine due to crown burning fire. Basal sprouting shrubs such as gambel oak have greatly increased.

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Transition Wildfire
State 1 to 2

Severe, crown burning fire. At this point the ecological drivers to return the site to reference conditions are unknown.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				30–45	
	pine dropseed	BLTR	*Blepharoneuron tricholepis*	30–45	–
2				30–45	
	mountain muhly	MUMO	*Muhlenbergia montana*	30–45	–
3				15–30	
	Arizona fescue	FEAR2	*Festuca arizonica*	15–30	–
4				0–3	
	spike muhly	MUWR	*Muhlenbergia wrightii*	0–3	–
5				3–6	
	prairie Junegrass	KOMA	*Koeleria macrantha*	3–6	–
6				0–15	
	Canada bluegrass	POCO	*Poa compressa*	0–15	–
7				0–15	
	slender wheatgrass	ELTRT	*Elymus trachycaulus ssp. trachycaulus*	0–15	–
8				0–3	
	muttongrass	POFE	*Poa fendleriana*	0–3	–
9				15–45	
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	15–45	–
10				9–12	
	blue grama	BOGR2	*Bouteloua gracilis*	9–12	–
11				0–3	
	muhly	MUHLE	*Muhlenbergia*	0–3	–
12				0–45	
	Ross' sedge	CARO5	*Carex rossii*	0–45	–

Contributors

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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:

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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):**

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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:**
