

Ecological site R035XH814AZ
Sandstone Upland 17-25" p.z. Cobbly

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.



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): 035X–Colorado Plateau

AZ CRA 35.8 - Colorado Plateau Ponderosa Pine Forests

Elevations range from 6800 to 8500 feet and precipitation averages 17 to 25 inches per year. Vegetation includes ponderosa pine, white fir, aspen, pinyon, juniper, Gambel oak, big sagebrush, ceanothus, blue elderberry, muttongrass, upland sedge, and big wildrye, mountain muhly, Arizona fescue, pine dropseed, and blue grama. The soil temperature regime ranges from mesic to frigid and the soil moisture regime is typic 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 edulis</i> (2) <i>Pinus ponderosa</i>
Shrub	(1) <i>Artemisia nova</i> (2) <i>Quercus gambelii</i>

Herbaceous	(1) <i>Poa fendleriana</i> (2) <i>Elymus elymoides</i> ssp. <i>elymoides</i>
------------	---

Physiographic features

These sites are on footslopes and shoulders of domes of mountain summits. Slopes range from 15 to 35 percent. This site is of small extent on the Carrizo Mountains portion of the Colorado Plateau province in northeast Arizona.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Dome
Flooding frequency	None to very rare
Ponding frequency	None to rare
Elevation	2,591–2,865 m
Slope	15–35%
Aspect	Aspect is not a significant factor

Climatic features

Winter-Summer moisture ratios are typically 70:30 on the west side of this CRA and shift to 60:40 on the east side. Late spring is usually the driest period and early fall moisture can be sporadic. Summer rains fall from June through September; moisture originates in the Gulf of Mexico and creates convective, usually brief, intense thunderstorms. Cool season moisture from October through May tends to be frontal; it originates in the Pacific and the Gulf of California and falls in widespread storms with longer duration and lower intensity. Precipitation generally comes as snow from October into April. Snowpack can persist for 3-4 months, although it may disappear in exposed areas during prolonged dry weather. Summer daytime temperatures are typically 80-90 F but can exceed 95 F. Winter temperatures around 0 F are common and can reach -25 F.

Table 3. Representative climatic features

Frost-free period (average)	100 days
Freeze-free period (average)	130 days
Precipitation total (average)	635 mm

Influencing water features

Soil features

Soils are shallow, extremely cobbly very fine sandy loam. Subsoil textures are very cobbly very fine sandy loam to very cobbly fine sandy loam. Parent materials are residuum, alluvium and eolian materials derived from sandstone, siltstone and quartz diorite. Geologic formation is materials from tertiary diorite plus sandstone. Available water capacity is very low. Water erosion hazard is severe; wind erosion is slight. Soils are non-saline, non-sodic. pH range is 6.1-7.3. Soil moisture regime is typic ustic; temperature regime is frigid. Sandstone bedrock is at 14". Landform and position is footslopes and shoulders on domes of mountain summits.

Soil taxonomic unit is:

SSA-717 Shiprock Area: MU 618 Zibetod.

Table 4. Representative soil features

Surface texture	(1) Extremely cobbly very fine sandy loam (2) Very cobbly very fine sandy loam
-----------------	---

Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately rapid to rapid
Soil depth	25–51 cm
Surface fragment cover <=3"	5–15%
Surface fragment cover >3"	10–40%
Available water capacity (0-101.6cm)	0–6.35 cm
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	5–20%
Subsurface fragment volume >3" (Depth not specified)	15–35%

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 fire, grazing, 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 amount shown for each group. Divide the resulting total by the total normal year production shown in the plant community description. If the 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



State 1

Historic Climax Plant Community

Community 1.1

Historic Climax Plant Community

This site is a shrub-grass plant community with forbs and scattered groves of Gambel Oak, Colorado Pinyon or Ponderosa pine. Muttongrass, Arizona fescue and bottlebrush squirreltail are the major grasses; training fleabane is the major forb, and black sagebrush is the major shrub. With severe disturbance, black sagebrush, trailing fleabane and pingue will increase; cheatgrass and annual forbs will invade.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	359	381	404
Shrub/Vine	179	224	269
Forb	135	157	179
Tree	90	112	135
Total	763	874	987

Table 6. Ground cover

Tree foliar cover	5-10%
-------------------	-------

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

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	—	0-2%	0-5%
>0.15 <= 0.3	—	0-5%	5-10%	0-1%
>0.3 <= 0.6	—	5-15%	5-10%	—
>0.6 <= 1.4	—	—	—	—
>1.4 <= 4	5-10%	0-5%	—	—
>4 <= 12	0-5%	—	—	—
>12 <= 24	—	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

Figure 5. Plant community growth curve (percent production by month).
AZ3581, 35.8 17-25" 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	0	4	10	24	21	23	13	5	0	0

Figure 6. Plant community growth curve (percent production by month).
AZ3901, 35.8 17-25" p.z. muttongrass. Growth begins in the spring and extends through the summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	30	20	20	10	5	0	0

Figure 7. Plant community growth curve (percent production by month).
AZ3902, 35.8 17-25" p.z. Arizona fescue. Growth begins in the late spring and extends through the summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	5	20	30	30	10	5	0	0

Figure 8. Plant community growth curve (percent production by month).
AZ3904, 35.8 17-25" p.z. black sagebrush. Most growth occurs in the spring. Stem elongation and seed set occur in the fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	15	30	10	10	20	10	0	0

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				78–112	
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	9–45	–
	ponderosa pine	PIPO	<i>Pinus ponderosa</i>	9–45	–
Shrub/Vine					
0				179–291	
	black sagebrush	ARNO4	<i>Artemisia nova</i>	179–224	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	9–45	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	9–45	–
	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	19–38	–
	Arizona fescue	FEAR2	<i>Festuca arizonica</i>	19–38	–
Grass/Grasslike					
0				359–404	
	muttongrass	POFE	<i>Poa fendleriana</i>	90–135	–
	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	45–90	–
	Arizona fescue	FEAR2	<i>Festuca arizonica</i>	45–90	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–45	–
	White Mountain sedge	CAGE	<i>Carex geophila</i>	9–45	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–27	–
	White Mountain sedge	CAGE	<i>Carex geophila</i>	4–19	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–18	–
Forb					
0				135–179	
	trailing fleabane	ERFL	<i>Erigeron flagellaris</i>	45–90	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	9–45	–
	pingue rubberweed	HYRI	<i>Hymenoxys richardsonii</i>	9–45	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–45	–
	ragwort	SENEC	<i>Senecio</i>	9–27	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–11	–

Animal community

Site is favorable for grazing throughout most of the year except when snow cover restricts availability of forage. Planned grazing systems adapt well to use on this site.

The potential plant community produced by this site provides food for those species of wildlife that utilize grass as a major portion of their diet. Wildlife species on this site include mule deer, coyote, rabbits, snakes, rock chucks, rodents and lizards.

Recreational uses

Winters are cold, however, relatively mild summer months are attractive to recreationists.

Activities include hunting, cross-country riding, photography, hiking, rock collecting, and wildlife observation.

Wood products

The Gambel oak, Pinyon and Ponderosa pines provide firewood from the dead and down trees.

Type locality

Location 1: Apache County, AZ	
Township/Range/Section	T39N R30E S7
General legal description	Pastora Peak Quad, on top of Carrizo Mountains, about 9.5 miles southwest of Teec Nos Pos, Navajo Indian Reservation

Contributors

HSH
Larry D. Ellicott
Steve Barker

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:**
