USDA Natural Resources
Conservation Service

Ecological site R035XG707AZ
Clay Loam Upland 14-18" p.z.

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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.

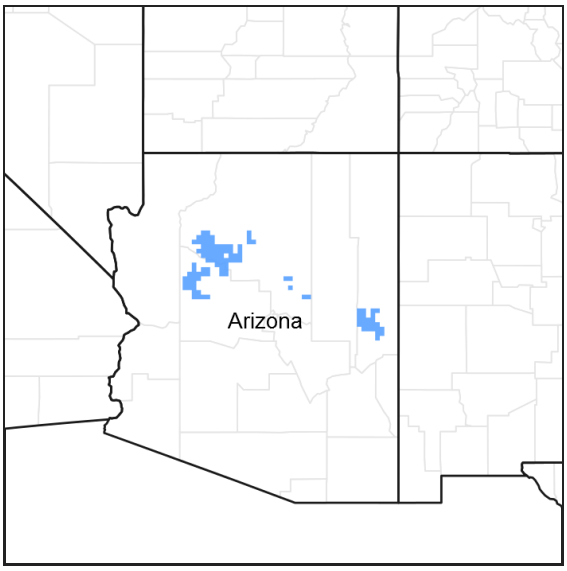

Figure 1. Mapped extent

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): 035X–Colorado Plateau

AZ CRA 35.7 – Colorado Plateau Woodland – Grassland

Elevations range from 5000 to 7000 feet and precipitation averages 14 to 18 inches per year. Vegetation includes one-seed juniper, Colorado pinyon, Stansbury cliffrose, Apache plume, four-wing saltbush, green Mormon tea, needle and thread, sideoats grama, blue grama, black grama, galleta, bottlebrush squirreltail, and muttongrass. The soil temperature regime is mesic and the soil moisture regime is aridic 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) *Juniperus monosperma* (2) *Pinus edulis*
Shrub	(1) *Krascheninnikovia lanata*
Herbaceous	(1) *Bouteloua gracilis* (2) *Pascopyrum smithii*

Physiographic features

This site occurs in an upland position on gently sloping to steep mesas and hills, cinder cones, and plains. It neither benefits significantly from run-in moisture from adjacent areas nor does it suffer from excessive loss from run-off unless denuded of its vegetative cover. It occurs on all exposures. Soils are formed on basalt, volcanic debris and cinders.

Table 2. Representative physiographic features

Landforms	(1) Mesa (2) Hill (3) Plain
Flooding frequency	None
Ponding frequency	None
Elevation	1,676–2,134 m
Slope	0–30%
Aspect	Aspect is not a significant factor

Climatic features

This area receives 14-18" precipitation yearly. About 50% falls during Jul-Sep and is the most effective, dependable moisture. The remainder falls Nov-Feb as snow or light rain. High velocity winds during the winter and spring are common.

Mean temperatures for the hottest month (Jul)are 69F; coldest month (Jan) are 30F. Extreme temperatures of 100F and -30F have been recorded. Long periods of little or no effective moisture occur frequently.

Cool season plants start growth in early spring and mature early summer. Warm season plants take advantage of summer rains and are growing and nutritious Jul-Sep.

Table 3. Representative climatic features

Frost-free period (average)	170 days
Freeze-free period (average)	170 days
Precipitation total (average)	457 mm

Influencing water features

Soil features

Ate someSoils are moderately deep to deep. Surface texture ranges from loam to silty clay loam. Subsoil texture ranges from cobbly clay to gravelly clay loam. Cinders and time-cemented hardpan occur at depths of 20-40" in some soils. Small amounts of lime are present in the lower profile. pH ranges from 7.0-8.2.

Coarse fragments of gravel, cobble or stones range from 15-35% in the profile. This site is well drained. Soils can absorb most of the moisture supplied by the climate.

SSA-631 Coconino Central Area MU's 41 & 42 Showlow Gr fsl and 47 & 49 Thunderbird;
SSA-635 Apache County Central Part MU's TbC & TDB Thunderbird;
SSA-637 Yavapai County Western part MU's CdC & StB Thunderbird.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Very slow to slow
Soil depth	51–152 cm
Available water capacity (0-101.6cm)	7.01–25.35 cm
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–25%
Subsurface fragment volume >3" (Depth not specified)	0–70%

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 ben 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

The State and Transition Model and Accompanying Narrative Descriptions are Still To Be Developed for this Ecological Site. For More Information Contact The Arizona NRCS State Rangeland Management Specialist.

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

This range site has a mixed plant community made up of junipers and pinyon pine and an understory of mid and short grasses, shrubs and a relatively small percentage of forbs. In the original plant community, there was a mixture of both cool and warm season grasses. Plant species most likely to invade or increase on this site when it deteriorates are broom snakeweed, annuals, cacti, rabbitbrush and groundsel. Continuous grazing during the winter and spring periods will decrease cool season grasses which are replaced by 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	656	–	908
Forb	50	–	151
Tree	50	–	151
Shrub/Vine	50	–	101
Total	**806**	**–**	**1311**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				101–353	
	western wheatgrass	PASM	*Pascopyrum smithii*	101–353	–
2				0–20	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	0–20	–
3				50–151	
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	50–151	–
4				0–40	
5				0–10	
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	0–10	–
6				0–101	
	muttongrass	POFE	*Poa fendleriana*	0–101	–
7				0–50	
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–50	–
8				50–151	
	sideoats grama	BOCU	*Bouteloua curtipendula*	50–151	–
9				0–40	
	black grama	BOER4	*Bouteloua eriopoda*	0–40	–
10				0–10	
	vine mesquite	PAOB	*Panicum obtusum*	0–10	–
11				0–50	
	spike muhly	MUWR	*Muhlenbergia wrightii*	0–50	–
12				0–50	
	common wolfstail	LYPH	*Lycurus phleoides*	0–50	–
13				202–404	
	blue grama	BOGR2	*Bouteloua gracilis*	202–404	–
14				0–30	
	threeawn	ARIST	*Aristida*	0–30	–
15				0–10	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–10	–
16				0–20	
	ring muhly	MUTO2	*Muhlenbergia torreyi*	0–20	–
17				50–151	
	James' galleta	PLJA	*Pleuraphis jamesii*	50–151	–
Forb					
18				50–151	
	Forb, annual	2FA	*Forb, annual*	50–151	–
	Forb, perennial	2FP	*Forb, perennial*	50–151	–
	buckwheat	ERIOG	*Eriogonum*	50–151	–
	globemallow	SPHAE	*Sphaeralcea*	50–151	–
Shrub/Vine					

Shrub/Vine					
19				20–50	
	winterfat	KRLA2	*Krascheninnikovia lanata*	20–50	–
20				0–20	
	jointfir	EPHED	*Ephedra*	0–20	–
21				10–20	
	fourwing saltbush	ATCA2	*Atriplex canescens*	10–20	–
22				0–10	
	Mexican cliffrose	PUME	*Purshia mexicana*	0–10	–
23				0–10	
	woolly groundsel	PACA15	*Packera cana*	0–10	–
24				0–50	
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	0–50	–
25				0–50	
	Greene's rabbitbrush	CHGR6	*Chrysothamnus greenei*	0–50	–
26				0–10	
	narrowleaf yucca	YUAN2	*Yucca angustissima*	0–10	–
27				10–50	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	10–50	–
28				0–50	
	spineless horsebrush	TECA2	*Tetradymia canescens*	0–50	–
29				0–20	
	pricklypear	OPUNT	*Opuntia*	0–20	–
30				0–10	
	Fremont's mahonia	MAFR3	*Mahonia fremontii*	0–10	–
31				0–10	
	skunkbush sumac	RHTR	*Rhus trilobata*	0–10	–
32				50–151	
	Utah juniper	JUOS	*Juniperus osteosperma*	50–151	–
34				0–30	
	alligator juniper	JUDE2	*Juniperus deppeana*	0–30	–
35				50–101	
	twoneedle pinyon	PIED	*Pinus edulis*	50–101	–
Tree					
33				50–151	
	oneseed juniper	JUMO	*Juniperus monosperma*	50–151	–

Animal community

This site is favorable for livestock grazing during most grazing periods except when snow cover restricts availability of forage. Planned grazing systems adapt well when this site is included in a ranching operation.

This site has fair to good diversity in the plant community. It provides important year-long food and cover for wildlife. Brush management practices should maximize edge effect, allow pockets near water and utilize corridors to and from water.

Recreational uses

This site occurs as rolling hills, meandering ridges and gradual slopes and is characterized by grasslands interspersed with trees. It has warm summers and cold winters with high winds common during the spring and summer. Recreational activities include hunting, hiking and horseback riding.

Other information

T&E Species: Golden eagles and/or prairie falcons may use this site for hunting.

Type locality

Location 1: Coconino County, AZ	
Township/Range/Section	T22 N. R2 E. S3
Location 2: Coconino County, AZ	
Township/Range/Section	T22 N. R2 E. S6
Location 3: Navajo County, AZ	
Township/Range/Section	T9 N. R29 E. S31
General legal description	Showlow Airport
Location 4: Navajo County, AZ	
Township/Range/Section	T15 N. R14 E. S16
General legal description	Top of Chevlon Butte.

Contributors

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Unknown

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)	Karlyn Huling
Contact for lead author	NRCS Flagstaff Area Office
Date	05/15/2006
Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** A few minor rills may form due to fine sandy loam and clay loam surface textures, slow permeability, and medium to rapid runoff, especially on steeper slopes.

2. **Presence of water flow patterns:** Some water flow patterns may form due to slow permeability and medium to rapid runoff, especially on steeper slopes.

3. **Number and height of erosional pedestals or terracettes:** A few pedestals and terracettes may form, but they should be very short.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** This site has an average available water capacity of 5 inches, so it has a moderate to high potential for the production of plant cover. Drought may cause an increase in bare ground.

5. **Number of gullies and erosion associated with gullies:** None.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous and fine woody litter will be transported in water flow pathways. Coarse woody litter will remain under shrub and tree canopies.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil surface textures are fine sandy loam and clay loam. Most surface horizons have gravels, cobbles, or stones. When well vegetated or covered with rock armor, these soils have a high resistance to both water and wind erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is mostly granular (moderate to strong, very fine to fine), but some areas have a platy structure (weak to strong, thin to medium). Surface thickness is 2-3 inches. Color is variable depending upon parent materials.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is characterized by a relatively uniform distribution of mostly grasses with some shrubs and a few forbs. Some of the areas may have up to 25% canopy cover of trees. Both canopy and basal cover values (especially canopy cover) decrease during prolonged drought. This type of plant community is moderately to highly effective at capturing and storing precipitation.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Due to fine sandy loam and clay loam surface textures, these soils may be easily compacted, but only within the top 3 inches. Many soils are protected from compaction by rock fragments. Some of the soils have a naturally platy surface structure.

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: None

    Sub-dominant: warm season bunchgrasses >> cool season colonizing grasses = cool season bunchgrasses > forbs > trees = warm season colonizing grasses > shrubs > cacti = Agave family

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All plant functional groups are adapted to survival in all years except during the most severe droughts. Severe winter drought affects trees and shrubs most. Severe summer drought affects grasses the most.

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14. **Average percent litter cover (%) and depth (in):** Mostly herbaceous litter with some woody litter. Litter amounts increase during the first few years of drought, then decrease in later years.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 700-800 lbs/ac dry years; 800-1100 lbs/ac median years; 1100-1300 lbs/ac wet years.

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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:** Broom snakeweed, Greene rabbitbrush, Ericameria (rubber rabbitbrush), and Opuntia (pricklypear cactus) are all native to the site but have the ability to increase and dominate after heavy grazing. Utah, oneseed, and alligator juniper are also native to the site but also have the ability to increase and dominate after heavy grazing and/or fire exclusion.

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17. **Perennial plant reproductive capability:** All plants native to the site are adapted to the climate and are capable of producing seeds, stolons, and rhizomes in msot years except during the most severe droughts.
