

# Ecological site R035XA101AZ

## Breaks 10-14" 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.

### MLRA notes

Major Land Resource Area (MLRA): 035X–Colorado Plateau

“PROVISIONAL ecological site concepts developed and described. See Project Plan [insert Project Plan Name] for more details and related milestones.” This ecological site occurs in Land Resource Unit 35.1 - the Colorado Plateau Mixed Grass Plains Elevations range from 5300 to 6500 feet and precipitation averages 10 to 14 inches per year. Vegetation includes *Stipa* species, Indian ricegrass, galleta, and blue grama, fourwing saltbush, winterfat, and cliffrose. The soil temperature regime is mesic and the soil moisture regime is ustic aridic. 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.

### Ecological site concept

“ATTENTION: This ecological site meets the requirements for PROVISIONAL (if not more). A provisional ecological site is established after ecological site concepts are developed and an initial state-and-transition model is drafted. A provisional ecological site typically will include literature reviews, land use history information, legacy data (prior approved range site descriptions, forage suitability groups, woodland suitability groups, etc.), and includes some soils data, and estimates for canopy and/or species composition by weight,. A provisional ecological site provides the conceptual framework of soil-site correlation for the development of the ESD. For more information about this ecological site, please contact your local NRCS office.”

**Table 1. Dominant plant species**

Tree	(1) <i>Juniperus monosperma</i> (2) <i>Juniperus osteosperma</i>
Shrub	(1) <i>Atriplex canescens</i> (2) <i>Krascheninnikovia lanata</i>
Herbaceous	(1) <i>Bouteloua curtipendula</i> (2) <i>Bouteloua gracilis</i>

### Physiographic features

This range site occurs as hills and steep escarpments. Due to the shallow soils and very steep slopes, this site is subject to significant runoff. Bedrock areas may be nearly vertical.

**Table 2. Representative physiographic features**

Landforms	(1) Hill (2) Escarpment
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Flooding frequency	None
Ponding frequency	None
Elevation	1,620 – 1,980 m
Slope	30 – 70 %
Aspect	Aspect is not a significant factor

### Climatic features

50-60% of moisture falls as rain Jul-Sep and is the most effective moisture for plant growth. The remaining moisture comes as snow during the winter.

Mean temperature for the hottest month (Jul) is 72 F; for the coldest month (Jan) is 32 F. Extreme temperatures of 105 F and -28F have been recorded. Long periods with little or no effective moisture are relatively common.

Cool season plants begin 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)	160 days
Freeze-free period (average)	180 days
Precipitation total (average)	330 mm

### Influencing water features

Available soil moisture on this site is from rainfall.

### Soil features

Soils that are grouped together in this site have characteristics of being very shallow to moderately deep to bedrock or other plant root restricting layers. Surface soil texture has a minimum depth of 2-7 inches and range in texture from a fine sandy loam to a stony clay loam. Subsoils may have permeabilities ranging from slow to rapid. Subsurface or substratum layers have textures ranging from gravelly loam to clay and coarse fragments ranging from 20-85% by volume. Erosion hazard is moderate. Soils are neutral to moderately alkaline (pH 7.0-8.2). With good vegetative cover, infiltration rates are increased, stability against erosion is good and plant-soil moisture relationships are good.

Typical taxonomic units include:

SSA-631 Coconino County Central Part MU 065 Winona;

SSA-699 Hualapai/Havasupai MU 054 Winona;

SSA-635 Apache County Central part MU SU Stony Rock Land;

SSA-715 Fort Defiance Area AZ/NM MU's 48, 48 & 50 Kinusta family, 48 Eslendo, 49 & 116 Strych family, 101 Torriorthents, 11 Mathis family and 127 Ustic Torriorthents.

Table 4. Representative soil features

Parent material	(1) Alluvium – limestone (2) Eolian deposits – calcareous sandstone
Surface texture	(1) Fine sandy loam (2) Stony clay loam
Family particle size	(1) Loamy
Drainage class	Excessively drained to well drained
Permeability class	Slow to rapid
Soil depth	10 – 80 cm
Surface fragment cover <=3"	10 – 60 %
Surface fragment cover >3"	0 – 10 %
Available water capacity (0-101.6cm)	2.54 – 6.35 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Sodium adsorption ratio (0-101.6cm)	10
Soil reaction (1:1 water) (0-101.6cm)	7.5 – 10
Subsurface fragment volume <=3" (Depth not specified)	20 – 90 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

## 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 (HCPC) 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.

T1. Continuous heavy grazing, summer droughts

R1. Pest/Brush management

## State and transition model

Figure 3. 35.1 Breaks

## Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Dominant grasses</b>			202-387	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	73-183	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	37-146	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	37-110	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	8-37	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	8-37	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	22-37	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	8-37	–
	spike muhly	MUWR	<i>Muhlenbergia wrightii</i>	8-22	–
2	<b>Needlegrasses</b>			28-62	
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	11-34	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	11-28	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	6-11	–
3	<b>Mid grasses</b>			34-62	
	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	11-28	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	11-22	–
	muttongrass	POFE	<i>Poa fendleriana</i>	6-11	–
	muttongrass	POFEL	<i>Poa fendleriana ssp. longiligula</i>	6-11	–
4	<b>Other grasses</b>			17-45	
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	6-17	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	6-17	–
	mesa dropseed	SPFL2	<i>Sporobolus flexuosus</i>	4-13	–

	threeawn	ARIST	<i>Aristida</i>	6-11	-
	ring muhly	MUTO2	<i>Muhlenbergia torreyi</i>	2-9	-
<b>Forb</b>					
5	<b>All Forbs</b>			34-73	
	Forb, perennial	2FP	<i>Forb, perennial</i>	10-34	-
	globemallow	SPHAE	<i>Sphaeralcea</i>	9-28	-
	Forb, annual	2FA	<i>Forb, annual</i>	8-22	-
	aster	ASTER	<i>Aster</i>	3-11	-
<b>Shrub/Vine</b>					
6	<b>Dominant shrubs</b>			22-90	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	9-39	-
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	8-28	-
	jointfir	EPHED	<i>Ephedra</i>	6-22	-
	buckwheat	ERIOG	<i>Eriogonum</i>	6-22	-
	Bigelow sage	ARBI3	<i>Artemisia bigelovii</i>	6-13	-
7	<b>Misc. shrubs</b>			34-84	
	Apache plume	FAPA	<i>Fallugia paradoxa</i>	11-34	-
	Mexican cliffrose	PUME	<i>Purshia mexicana</i>	11-28	-
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	9-22	-
	Fremont's mahonia	MAFR3	<i>Mahonia fremontii</i>	6-11	-
	desert sweet	CHMI2	<i>Chamaebatiaria millefolium</i>	2-6	-
8	<b>Other shrubs</b>			22-50	
	brickellbush	BRICK	<i>Brickellia</i>	6-11	-
	rabbitbrush	CHRYS9	<i>Chrysothamnus</i>	4-11	-
	woolly groundsel	PACA15	<i>Packera cana</i>	4-11	-
	snakeweed	GUTIE	<i>Gutierrezia</i>	3-9	-
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	2-8	-
	desert-thorn	LYCIU	<i>Lycium</i>	2-6	-
	sacahuista	NOMI	<i>Nolina microcarpa</i>	2-6	-
9	<b>Succulents</b>			6-11	
	pricklypear	OPUNT	<i>Opuntia</i>	4-11	-
	yucca	YUCCA	<i>Yucca</i>	2-6	-
<b>Tree</b>					
10	<b>Trees</b>			67-146	
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	22-73	-
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	22-73	-
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	8-37	-

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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## Animal community

On the less severe slopes this site is suitable for light grazing during any season by all types of livestock. Because soils are shallow and slopes are steep, grazing should be light in order to protect the native plant community and soils. When this range site is grazed yearlong or primarily in the spring, cool season mid grasses that are most readily damaged by grazing decline and less productive species dominate the plant community. Most vegetation is palatable to livestock but may not be available for grazing due to steep slopes. The diversity of topography and vegetative form provides habitat for numerous wildlife species. Because of the rough broken nature of the site, it becomes important to adjacent sites for cover and protection from adverse weather. Wildlife adapted to this site will benefit from

practices that will restore or maintain the native plant community.

### Recreational uses

Land form contains steep side slopes on hills and escarpments. Landscape quality includes an abundance of spring and summer flowering forbs. The aesthetic appeal is excellent due to the mixture of tree forms with shrub and grass understory. Winters are cold; however, relatively mild summers make this site attractive for wildlife observation, hunting, rockhounding and hiking.

### Other products

Personal firewood, pinyon nuts and rock products

### Type locality

Location 1: Coconino County, AZ	
General legal description	Site located each side of Aubrey Cliffs, 8 miles northwest of Seligman.
Location 2: Navajo County, AZ	
UTM zone	N
UTM northing	3838951
UTM easting	581633
General legal description	Site located on ten mile hill, just off of Hwy 77, 7 miles south of Snowflake, AZ.

### Contributors

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### 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.

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Contact for lead author	State Rangeland Management Specialist, NRCS-Arizona State Office, Phoenix, AZ
Date	10/21/2010
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

### Indicators

1. **Number and extent of rills:** Numerous well defined rills on areas with less than 40% rock and gravel. Number and extent of rills increase with slope steepness and length.  

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2. **Presence of water flow patterns:** Many well developed WFP around perennial plants and boulders. Increase flow patterns with a decreased in rock fragment cover.  

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3. **Number and height of erosional pedestals or terracettes:** Numerous well developed pedestals (1 – 3” high) around perennial plants and smaller boulders. Some terracettes form in less steep WFPs.  

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20 to 50% bare ground depending on rock and gravel cover.  

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5. **Number of gullies and erosion associated with gullies:** Gullies can occur in less rocky and deeper soil areas. Many small gullies and gully like formations on toe slopes. There are numerous large drainages on this site that are stable and lined with bedrock.  

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Most herbaceous and fine woody litter will be transported by wind and in water flow pathways, while a small percentage stays in place. Coarse woody litter and duff will accumulate under shrub canopies.  

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil resistance to erosion varies greatly depending on vegetative cover as well the distribution of rock, boulders and/or gravel. In areas of no vegetative cover or rock armoring, the surface erodes readily.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** No A horizon in plant inter spaces, surface is clay to sandy clay. Weak platy structure erodes readily. Color varies greatly depending on parent materials.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is dominated by shrubs with 20 to 40% cover, and then by perennial grasses with 5 to 15% cover, with 5 to 10% cover in trees, and 0 to 1% cover in forbs. Both canopy and basal cover values of grasses and some shrubs decrease during prolonged drought.
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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.
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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: Dominant: Warm season grasses (25-30%) > Cool season grasses (15-25%) = Large shrubs (15-25%)
- Sub-dominant: >Sub-dominant: Half shrubs (5-10%) = Trees (5-10%) > Perennial forbs (3-5%)
- Other: other: Succulents (1-3%) = Annual forbs & grasses (1-5%)
- Additional:
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** In a normal year up to 10 to 15% of grasses and shrubs die off. During and after drought years there can be from 10 to 30% die off of shrubs and grasses. Severe winter droughts affect shrubs, trees and cool season grasses the most. Severe summer droughts affect the warm season grasses the most.
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14. **Average percent litter cover (%) and depth ( in):** Within plant interspaces litter ranges from 10 to 20 % cover with no real depth, while under shrub and tree canopies it ranges from 50 to 100% cover with depths from 1/8 to 1/2 inch thick. 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):** 300-500 lbs/ac in dry years; 500-700 lbs/ac in normal years; 700-900 lbs/ac in 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: Herbaceous species that can invade this site are Russian thistle and annual grasses, such as cheatgrass. Other species that have the potential to invade and increase with time are juniper, broom snakeweed, rabbitbrush, and Mormon tea. are on the site.

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