

# Ecological site R035XC329AZ Loamy Upland 10-14" p.z. Gravelly

Last updated: 5/19/2025  
Accessed: 05/21/2025

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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 35.3 – Colorado Plateau Sagebrush – Grasslands

Elevations range from 4500 to 6000 feet and precipitation averages 10 to 14 inches. Vegetation includes Wyoming big sagebrush, Utah juniper, Colorado pinyon - cliffrose, Mormon tea, fourwing saltbush, blackbrush Indian ricegrass, needle and thread, western wheatgrass Galleta, black grama, blue grama, and sand dropseed. 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.

**Table 1. Dominant plant species**

Tree	(1) <i>Juniperus osteosperma</i>
Shrub	(1) <i>Artemisia tridentata ssp. wyomingensis</i> (2) <i>Gutierrezia sarothrae</i>
Herbaceous	(1) <i>Hesperostipa comata ssp. comata</i> (2) <i>Achnatherum hymenoides</i>

## Physiographic features

This site occurs on treads and toeslopes of fan terraces.

**Table 2. Representative physiographic features**

Landforms	(1) Fan (2) Terrace
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	None to rare
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	None to rare
Elevation	1,707–2,195 m
Slope	2–15%
Aspect	Aspect is not a significant factor

## Climatic features

Winter summer moisture ratios range from 70:30 to 60:40. 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

December through February. Accumulations above 12 inches are not common but can occur. Snow usually lasts for 3-4 days, but can persist much longer. Summer daytime temperatures are commonly 95 - 100 F and on occasion exceed 105 F. Winter air temperatures can regularly go below 10 F and have been recorded below - 20 F.

**Table 3. Representative climatic features**

Frost-free period (average)	168 days
Freeze-free period (average)	193 days
Precipitation total (average)	356 mm

## Influencing water features

### Soil features

Soils are very deep. Surface textures are gravelly fine sandy loam and very channery fine sandy loam. Subsoil textures are fine sandy loam, gravelly sandy clay loam, very cobbly sandy loam and very gravelly sandy clay loam. Parent material is alluvium derived from sandstone, basalt and quartz diorite. Available water capacity is low. Water erosion hazard is slight; wind erosion hazard is slight-to-severe. Soils are non-to-very slightly saline and non-to-slightly sodic. pH range is 7.4-9.0. Soil moisture regime is ustic aridic. Soil temperature regime is mesic.

SSA 717 Shiprock Area AZ/NM MU's 319 Lavellga and 310 Millett.

**Table 4. Representative soil features**

Parent material	(1) Alluvium–basalt
Surface texture	(1) Gravelly fine sandy loam (2) Very channery fine sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	152 cm
Surface fragment cover ≤3"	10–30%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	6.35–12.7 cm
Calcium carbonate equivalent (0-101.6cm)	15–30%

Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	5–13
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	5–20%
Subsurface fragment volume >3" (Depth not specified)	0–5%

## Ecological dynamics

The dominant aspect of this site is grassland with minor amounts of shrubs. Trees (Utah juniper) are scattered across the landscape. Major grasses are needleandthread, New Mexico feathergrass, Indian ricegrass and galleta. Wyoming big sagebrush and broom snakeweed are the major shrubs.

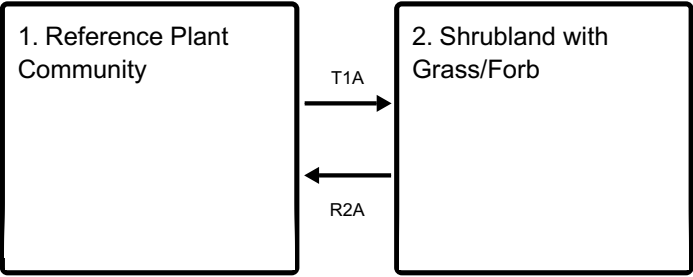
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The Historical Climax Plant Community represents the natural potential plant communities found on relict or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

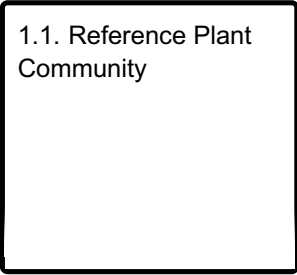
NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine 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

## Ecosystem states



## State 1 submodel, plant communities



## State 1 Reference Plant Community

This state represents the most ecologically stable conditions in terms of resistance to erosion. Moreover, this state has the highest potential for productivity and plant diversity.

## Community 1.1 Reference Plant Community

This site has a plant community made up primarily of mid and short grasses with a relatively small percentage of forbs and shrubs. In the original plant community there is a predominance of cool season grasses with shrubs, half shrubs, and warm season grasses.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	336	471	661
Tree	34	45	56
Shrub/Vine	34	45	56
Forb	11	11	22
Total	415	572	795

Table 6. Ground cover

Tree foliar cover	0-2%
Shrub/vine/liana foliar cover	0-2%
Grass/grasslike foliar cover	10-20%
Forb foliar cover	0-1%
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	—	—	—	0-1%
>0.15 <= 0.3	—	—	5-10%	—
>0.3 <= 0.6	—	0-1%	10-20%	—
>0.6 <= 1.4	—	—	—	—
>1.4 <= 4	0-1%	—	—	—
>4 <= 12	—	—	—	—
>12 <= 24	—	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

**Figure 5. Plant community growth curve (percent production by month). AZ3501, 35.3 10-14" p.z. needle and thread. Growth starts in spring and extends into summer, plants may be green in the fall..**

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

**Figure 6. Plant community growth curve (percent production by month). AZ3503, 35.3 10-14" p.z. galleta. Growth begins in spring, most growth occurs during summer and early fall rainy season. Plants will green up again in the fall..**

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

**Figure 7. Plant community growth curve (percent production by month).**  
**AZ3504, 35.3 10-14" p.z. bottlebrush squirreltail. Growth occurs in late winter, spring, and fall. Plants often remain green through the winter..**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	35	25	10	0	0	5	5	0	0

**Figure 8. Plant community growth curve (percent production by month).**  
**AZ3505, 35.3 10-14" p.z. Indian ricegrass. Growth begins in spring, with semi-dormancy occurring during July through August. Plants will green up again in the fall..**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	10	20	25	20	5	5	10	5	0	0

**Figure 9. Plant community growth curve (percent production by month).**  
**AZ3508, 35.3 10-14" p.z. Wyoming big sagebrush. Most growth occurs in spring and early summer. 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	20	10	10	10	0	0

**Figure 10. Plant community growth curve (percent production by month).**  
**AZ3531, 35.3 10-14" p.z. all sites. Growth begins in the spring and continues through the summer..**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	17	18	10	19	20	10	1	1	0

## State 2

### Shrubland with Grass/Forb

This state is characterized by an increase overstory Wyoming big sagebrush and broom snakeweed with an understory comprised primarily mostly of galleta, blue grama, and forbs.

#### Dominant plant species

- Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*), shrub
- broom snakeweed (*Gutierrezia sarothrae*), shrub
- James' galleta (*Pleuraphis jamesii*), grass
- blue grama (*Bouteloua gracilis*), grass

## Transition T1A

### State 1 to 2

Season-long grazing providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization. This grazing regime is coupled with fire suppression and the introduction of non-native annual forbs and grasses

## Restoration pathway R2A

### State 2 to 1

#### Conservation practices

Brush Management
Prescribed Burning

## Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Tree</b>					
0				22–56	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	72–119	–
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	28–56	–
<b>Shrub/Vine</b>					
0				22–56	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	48–72	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	48–72	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	48–72	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	6–28	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	6–28	–
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	6–28	–
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	0–11	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–11	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–11	–



	Grass/Grasslike	Forb	Shrub	Tree	Other
0					
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	84–140	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	56–84	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	56–84	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	56–84	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	28–56	–
	squirreldail	ELELE	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	28–56	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	24–48	–
	squirreldail	ELELE	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	24–48	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	6–28	–
<b>Forb</b>					
0				0–22	
	Forb, perennial	2FP	<i>Forb, perennial</i>	6–17	–
	Forb, annual	2FA	<i>Forb, annual</i>	6–11	–
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	1–2	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	1–2	–

## Animal community

Site is favorable for grazing throughout most of the year except when snow cover restricts availability of forage. With continuous grazing use during winter and spring, the relatively scarce cool season mid grasses are replaced by galleta, snakeweed and lower value annuals. 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. When vegetative retrogression occurs, unpalatable shrubby species increase and some wildlife species may be benefit.

Wildlife species found on the site include lizards, ground squirrel, cottontail rabbit, snakes, blacktail jackrabbit and mule deer.

## Recreational uses

Site is typically fans and low stream terraces. It produces high desert grasslands which can be very picturesque.

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

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

## Type locality

Location 1: Apache County, AZ	
Township/Range/Section	T38N R31E S6
General legal description	Horse Mesa quad - 1.5 mi S of Oak Spring, Navajo Indian Reservation, Arizona

## Contributors

HSH  
Larry D. Ellicott  
Steve Barker

## Approval

Kendra Moseley, 5/19/2025

## 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	05/21/2025
Approved by	Kendra Moseley

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):**

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**5. Number of gullies and erosion associated with gullies:**

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**6. Extent of wind scoured, blowouts and/or depositional areas:**

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**7. Amount of litter movement (describe size and distance expected to travel):**

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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):**

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**9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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**10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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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):**

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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:

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:**

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