

# Ecological site R035XC324AZ Clayey Slopes 10-14" p.z. Bouldery

Last updated: 5/19/2025

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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.

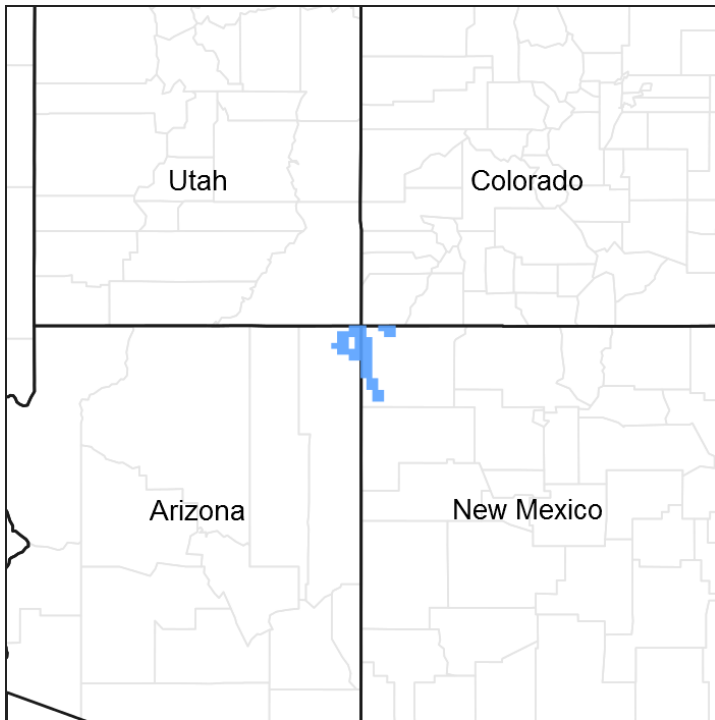


Figure 1. Mapped extent

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>Atriplex confertifolia</i> (2) <i>Artemisia bigelovii</i>
Herbaceous	(1) <i>Leymus salinus</i> (2) <i>Pleuraphis jamesii</i>

## Physiographic features

This site occurs on hillslopes and on escarpments of mesas. Slopes range from 15 to 70 percent.

**Table 2. Representative physiographic features**

Landforms	(1) Hill (2) Mesa (3) Escarpment
Flooding frequency	None
Ponding frequency	None
Elevation	5,000–6,600 ft
Slope	15–70%
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)	14 in

## Influencing water features

This is an upland site, and is not associated with water features or wetlands. During heavy rain events, this site may receive run-on moisture from landforms above and contribute runoff to landforms below.

## Soil features

Soils are very shallow to moderately deep. Surface textures are extremely gravelly clay loam, gravelly sandy clay loam, very gravelly sandy clay loam and very channery fine sandy loam. Subsoil textures are silty clay loam, silty clay, clay loam and loam. Parent materials are colluvium, residuum derived from shale, sandstone and siltstone. Geologic formation is Morrison. Water erosion potential is moderate to severe. Wind erosion potential is slight to severe. pH is 7.8 - 9.0. Soil moisture regime is Ustic Aridic. Soil temperature regime is Mesic. Soils are non-to-slightly saling and slightly sodic.

Typical taxonomic units on this site include:

SSA-717 Shiprock Area AZ/NM MU's 307 Bodot and 311 Eslendo.

**Table 4. Representative soil features**

Parent material	(1) Colluvium–sandstone and siltstone (2) Residuum–shale
Surface texture	(1) Extremely gravelly clay loam (2) Very gravelly sandy clay loam (3) Gravelly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderately slow
Soil depth	10–40 in

Surface fragment cover <=3"	0–15%
Available water capacity (0-40in)	2.5–5 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	5–13
Soil reaction (1:1 water) (0-40in)	7.8–9

## Ecological dynamics

The dominant aspect of this site is grassland with low growing shrubs. Major grasses are Salina wildrye, galleta, and Indian ricegrass. Shrubs include Bigelow sagebrush, shadscale and black sagebrush. Wyoming big sagebrush occurs at higher elevations.

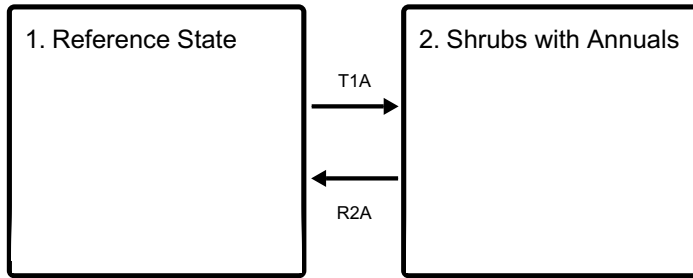
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The Historical Climax Plant Community represents the natural potential plant communities found on relict or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

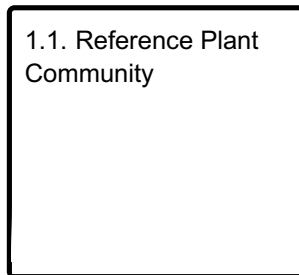
NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine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

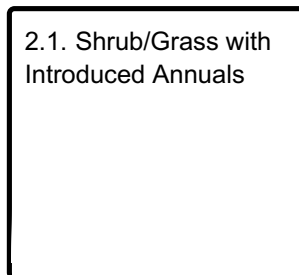
## Ecosystem states



## State 1 submodel, plant communities



## State 2 submodel, plant communities



## State 1 Reference State

The dominant aspect of the this site is a grassland with low growing shrubs. Major grasses are salina wildrye, galleta, Indian ricegrass, Shrubs include Bigelow sagebrush, shadscale, and black sagebrush. Wyoming big sagebrush occurs at the higher elevations of the site. State 1 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 and shrubs with a relatively small percentage of forbs and trees. In the original plant community there is a predominance of cool season grasses with shrubs, half shrubs, and warm season grasses, however, the aspect is dominated by half shrubs. Plant species most likely to invade or increase on this site when it deteriorates are broom snakeweed, galleta, annuals forbs and grasses . Continuous grazing during the winter and spring periods will decrease

the cool season grasses, which are replaced by warm season, lower forage value grasses and half shrubs.

**Table 5. Annual production by plant type**

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	190	260	320
Shrub/Vine	90	120	150
Forb	10	10	10
Tree	0	3	5
<b>Total</b>	<b>290</b>	<b>393</b>	<b>485</b>

**Table 6. Ground cover**

Tree foliar cover	0-1%
Shrub/vine/liana foliar cover	0-2%
Grass/grasslike foliar cover	5-10%
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 (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	0-1%
>0.5 <= 1	–	0-2%	5-10%	–
>1 <= 2	–	–	–	–
>2 <= 4.5	–	–	–	–
>4.5 <= 13	0-1%	–	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

**Figure 5. 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 6. 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 7. Plant community growth curve (percent production by month). AZ3509, 35.3 10-14" p.z. shadscale saltbush. Growth begins in spring and extends through the summer. Seed set occurs in summer to early fall..**

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

**Figure 8. Plant community growth curve (percent production by month). AZ3510, 35.3 10-14" p.z. saline wildrye. Growth begins in spring and extends through summer. Seed set occurs in late summer..**

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

**Figure 9. 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

**Figure 10. Plant community growth curve (percent production by month). AZ3534, 35.3 10-14" p.z. Bigelow sagebrush. Growth occurs mostly in spring and summer. Seed set occurs in later summer to fall..**

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

## **State 2**

### **Shrubs with Annuals**

The plant community in this state is a shrubland comprise of half shrub and shrubs with some perennial grasses and non native annual plant species. Cool season grasses are still present but in reduced amounts with increased amounts of warm season perennial grasses. Introduced annual grasses and forbs are present and common to the site. At the higher elevations there may an increase of sagebrush species along with other shrub species, including roundleaf buffalo berry.

### **Community 2.1**

#### **Shrub/Grass with Introduced Annuals**

This plant community is shrub dominated by species such as broom snakeweed, shadscale saltbush, and sagebrush species. Perennial grasses, such as cool season grasses are still present but at reduced amounts. Galleta and other warm season grasses have increased. Introduced annual grasses and forbs, including cheatgrass, and Russian thistle are common. At higher elevations larger shrubs, including Wyoming big sagebrush can also increase on this site.

### **Transition T1A**

#### **State 1 to 2**

Prolonged drought, continuous heavy grazing, surface disturbance, introduction of non-native annuals. Improper grazing management along with drought can reduce perennial grass species and promote shrub dominance. Increased surface disturbance allows for the germination and establishment of introduced annuals.

### **Restoration pathway R2A**

#### **State 2 to 1**

If possible; restoration might be a combination of practices including brush management, herbaceous weed treatment, range planting, and prescribed grazing management.

**Context dependence.** The sites steep slopes, high surface rock content, and salinity content may limit the effectiveness and extent of restoration practices and applicability.

## Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Tree</b>					
0				0–4	
	saline wildrye	LESAS	<i>Leymus salinus ssp. salinus</i>	52–78	–
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	0–4	–
<b>Shrub/Vine</b>					
0				100–140	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	20–40	–
	Bigelow sage	ARBI3	<i>Artemisia bigelovii</i>	20–40	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	26–39	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	4–20	–
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	0–20	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	4–20	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	4–20	–
	Torrey's jointfir	EPTO	<i>Ephedra torreyana</i>	0–4	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	0–4	–
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	0–4	–
<b>Grass/Grasslike</b>					
0				240–280	
	saline wildrye	LESAS	<i>Leymus salinus ssp. salinus</i>	80–120	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	40–60	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	20–40	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	13–26	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	4–20	–
	muttongrass	POFE	<i>Poa fendleriana</i>	4–20	–
	black greasewood	BOEB4	<i>Bouteloua eriopoda</i>	0–10	–

	black grama	BOER4	<i>Bouteloua eriopoda</i>	0-12	-
	squirreltail	ELELE	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	0-8	-
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	0-8	-
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0-8	-
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	0-4	-
<b>Forb</b>					
0				0-20	
	muttongrass	POFE	<i>Poa fendleriana</i>	3-13	-
	Forb, perennial	2FP	<i>Forb, perennial</i>	4-12	-
	phlox	PHLOX	<i>Phlox</i>	0-4	-
	Forb, annual	2FA	<i>Forb, annual</i>	0-4	-

## Animal community

This site is suitable for grazing during any period of the year by stocker cattle and sheep. Prescribed grazing systems can benefit this site by allowing rest periods for the cool season species. Steep slopes and boulder scattered surface may cause distribution problems.

The potential plant community provides a variety of food and cover plants for wildlife. When the vegetation complex retrogresses then unpalatable shrub species increase and the site becomes less usable as a foraging area for some species. Grazing practices that encourage cool season grass species are beneficial to antelope, cottontails and rodents. Shrubs that provide both food and cover should be maintained.

Wildlife includes mule deer, cottontail rabbit, lizards, mourning dove, blacktail jackrabbit and snakes.

## Recreational uses

Site is located on steeply sloping hills and backslopes of escarpments which lend themselves to activities such as horseback riding, hiking, wildlife observation and hunting.

This site has a variety of spring and summer flowers which are particularly noticeable after good moisture periods. It has good aesthetic appeal when not severely disturbed.

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

## Type locality

Location 1: Apache County, AZ	
Township/Range/Section	T41N R30E S24
General legal description	Teec Nos Pos Quad - Southwest quarter of Section 24, T41N, R30E, 1.2 mi N of Teec Nos Pos, Navajo Indian Reservation, Arizona

## 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.

Author(s)/participant(s)	
Contact for lead author	
Date	03/13/2026
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):**
- 

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:**
-