

# Ecological site R035XB236AZ

## Colluvial Slopes

### 6-10" p.z.

### Warm

Last updated: 5/20/2025

Accessed: 06/22/2026

#### 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

This ecological site occurs in Common Resource Area 35.2 - the Colorado Plateau Shrub – Grasslands Elevations range from 3800-5800 feet and precipitation averages 6 to 10 inches per year. Vegetation includes shadscale, fourwing saltbush, Mormon tea, blackbrush, Indian ricegrass, galleta, blue grama, and black grama. The soil temperature regime is mesic and the soil moisture regime is typic 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

This ecological site occurs as colluvial sideslopes of hills, escarpments and cliffs. Slopes generally range from 15 to 65 percent. Soils on this site are well-drained and moderately deep to deep. There may be small pockets of shallow soils. Surface textures range from extremely gravelly loam to fine sand to extremely gravelly fine sandy loam. Subsurface textures are gravelly fine sandy loam to very fine sandy loam.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Coleogyne ramosissima</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i> (2) <i>Pleuraphis jamesii</i>

#### Physiographic features

This ecological site occurs as colluvial sideslopes of hills, escarpments and cliffs. Slopes generally range from 15 to 65 percent. This site occurs in an upland position. It neither benefits significantly from run-in moisture nor does it suffer from excessive loss of moisture from runoff, unless denuded of its vegetative cover.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Escarpment (3) Valley side
Flooding frequency	None
Ponding frequency	None
Elevation	1,770 m
Slope	20 – 70 %
Aspect	W

### Climatic features

The 35.2 Colorado Plateau Cold Desert Shrub - Grassland common resource area has a very dry and windy climate that is hot in the summer and cold in the winter. The annual precipitation averages between 6 and 10 inches. The soil moisture regime is typical aridic and the soil temperature regime is mesic. A slight majority of the precipitation arrives during the late fall, winter, and early spring. This winter season moisture originates in the Pacific Ocean and arrives as rain, or sometimes snow, during widespread frontal storms of generally low intensity. The majority of the snow (average range of 1 to 17 inches) falls from December through February, but rarely lasts more than a few days. A seasonal drought occurs from late May through early July. Summer rains occur from July through September during brief intense local thunderstorms. The rain is sporadic in intensity and location. The moisture originates from the Gulf of Mexico in the early summer and the Gulf of California in the late summer/early fall. Windy conditions are common year round, but the winds are strongest and most frequent during the spring.

Table 3 Representative climatic features

Frost-free period (average)	180 days
Freeze-free period (average)	210 days
Precipitation total (average)	250 mm

### Influencing water features

The soil moisture on this ecological site comes from precipitation. The site does not benefit significantly from run-on moisture. The loamy surface texture of the soil allows the site to capture the majority of precipitation but the steep slopes will produce runoff during the more intense storms.

### Soil features

Soils on this site are moderately deep to deep on slopes and may have small pockets of shallow soils. Surface textures range from extremely gravelly loam to fine sand to extremely gravelly fine sandy loam. Subsurface textures are gravelly fine sandy loam to very fine sandy loam.

These soils formed in colluvium, alluvium and residuum from sandstone, siltstone and conglomerate materials from recapture and

westwater canyon members of the Morrison formation. The moisture regime is typic aridic and the temperature regime is mesic.

Soil survey map unit components correlated to this ecological site include:

SSA 707 Little Colorado River Area MU 37 Nepalto;  
 SSA 717 Shiprock NM MU 516 Kaito

**Table 4. Representative soil features**

Parent material	(1) Colluvium – sandstone and siltstone (2) Alluvium – conglomerate
Surface texture	(1) Extremely gravelly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	100 – 150 cm
Surface fragment cover <=3"	40 – 50 %
Surface fragment cover >3"	0 – 20 %
Available water capacity (0-101.6cm)	12.7 – 17.78 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 10

Subsurface fragment volume <=3" (Depth not specified)	10 – 20 %
Subsurface fragment volume >3" (Depth not specified)	10 %

## Ecological dynamics

An ecological site is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Spatial boundaries of the communities; however, can be recognized by characteristic patterns of species composition, association, and community structure. The historic climax plant community for this ecological site has been described by sampling relict or relatively undisturbed sites and/or reviewing historic records. The historic climax plant community is the plant community that evolved over time with the soil forming process and long term changes in climatic conditions of the area. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site.

Natural disturbances, such as drought, fire, grazing of native fauna, and insects, are inherent in the development and maintenance of these plant communities. The effects of these disturbances are part of the range of characteristics of the ecological site. Fluctuations in plant community structure and function caused by the effects of natural disturbances help establish the boundaries and characteristics of an ecological site. They are accounted for as part of the range of characteristics of the ecological site. Recognizable plant community phases are identified in the reference state of the ecological site. Some sites may have a small range of variation, while others have a large range. Some plant community phases may exist for long periods of time, while others may only occur for a couple of years after a disturbance.

Deterioration of the plant community, hydrology, or soil site stability on an ecological site can result in crossing a threshold or potentially irreversible boundary to another state, or equilibrium. This can occur as a result of the loss of soil surface through erosion, the loss of the stability of the site due to disturbances that cause active erosion on the site, increases in the amounts and/or patterns or runoff from rainstorms, changes in availability of surface and subsurface water, significant changes in plant structural and functional types, or the introduction of non-native species. When these thresholds are crossed, the potential of the ecological site to return to the historic climax plant community can be lost, or restoration will require significant inputs . There may be multiple states possible for an ecological site, determined by the type and or severity of disturbance.

The known states and transition pathways for this ecological site are described in the state and transition model. Within each state, there may be one or more known plant community phases. These community phases describe the different plant community that can be recognized and mapped across this ecological site. The state and transition model is intended to help land users recognize the current plant community on the ecological site, and the management options for improving the plant community to the desired plant community.

Plant production information in this site description is standardized to the annual production on an air-dry weight basis in near normal rainfall years.

## State and transition model

Figure 3. STM - R035XB236AZ

## 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>Grasses</b>			45-129	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	28-50	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	17-34	–
	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	0-17	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0-17	–
	Grass, annual	2GA	<i>Grass, annual</i>	0-6	–

	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	0-6	-
	saline wildrye	LESAS	<i>Leymus salinus ssp. salinus</i>	0-6	-
<b>Forb</b>					
2	<b>Forbs</b>			6-17	
	Forb, annual	2FA	<i>Forb, annual</i>	1-11	-
	Forb, perennial	2FP	<i>Forb, perennial</i>	1-11	-
<b>Shrub/Vine</b>					
3	<b>Shrubs</b>			146-359	
	blackbrush	CORA	<i>Coleogyne ramosissima</i>	140-196	-
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	17-39	-
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0-22	-
	Torrey's jointfir	EPTO	<i>Ephedra torreyana</i>	6-22	-
	Bigelow sage	ARBI3	<i>Artemisia bigelovii</i>	0-17	-
	Cutler's jointfir	EPCU	<i>Ephedra cutleri</i>	0-11	-
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0-11	-
	roundleaf buffaloberry	SHRO	<i>Shepherdia rotundifolia</i>	0-6	-
	narrowleaf yucca	YUAN2	<i>Yucca angustissima</i>	0-6	-
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0-6	-
	Greene's rabbitbrush	CHGR6	<i>Chrysothamnus greenei</i>	0-6	-
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0-6	-

Table 6. Community 2.1 plant community composition

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

This site is only favorable for grazing throughout most of the year by stockers and sheep except when snow cover restricts availability of forage. Prescribed grazing systems can benefit this site by allowing rest periods for the cool season species. Wildlife diversity on this site is quite limited due to steepness of topography and vegetative form and lack of water. This site does provide a significant forage substrate for adapted small species.

## Recreational uses

Site is located on steeply sloping fans and hills which lend themselves to activities such as photography, wildlife observation and hiking. Winters are cold, however relatively mild spring, fall and summer months are attractive to recreationists.

## Type locality

Location 1: Navajo County, AZ	
Township/Range/Section	T41N R27E S29
General legal description	Toh Atin Mesa West Quad; 5 miles west southwest of Red Mesa School, Section 29, T41N, R27E, Navajo Indian Reservation, AZ.

## Other references

Updates and revisions for this ESD were conducted as part of a 2007-2012 Interagency Technical Assistance Agreement between the Bureau of Indian Affairs–Navajo Region and the NRCS-Arizona.

## Contributors

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## Approval

Kendra Moseley, 5/20/2025

## 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)	Kenneth Gishi
Contact for lead author	State Rangeland Management Specialist - NRCS State Office - Phoenix, AZ
Date	08/27/2012
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

- 1. Number and extent of rills:** Few and not likely due to the extensive surface cover of rock fragment armor and the large amount of rock fragments in the profile.  

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- 2. Presence of water flow patterns:** Few water flow patterns expected and may not be apparent due to significant rock fragment on the surface. Should be short to moderate in length and discontinuous.  

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- 3. Number and height of erosional pedestals or terracettes:** A few might be found on the steepest slopes. Most pedestals and terracettes are associated with litter and debris and not erosion. This site is armored by a high amount of rock cover.  

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**  
Bare ground ranges from 10-30 percent.

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

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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):** Some fine litter will be transported in water flow pathways, but most coarse and woody litter will remain under or near shrub canopies due to high rock cover.

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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):**  
Expect ratings of 1-2 in interspaces, 3-4 under shrub canopies.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure typically is platy (weak to moderate, thin to thick) or granular (moderate, fine to coarse). Soil surface textures range from loamy fine sand to fine sandy loam. All surface horizons are very gravelly to extremely gravelly with some cobbles and stones. Soil will have significant rock cover, up to 70 percent cover (gravels, cobbles, stones, and boulders). When well vegetated with rock cover, these soils have moderate resistance to water erosion and a high resistance to wind erosion. Soil color are typically reddish brown, but can vary depending on parent material.

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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 characterized by a low shrub canopy with scattered grasses and few forbs. The canopy cover ranges from 15-30 percent (70-80% shrubs, 20-30% grasses, and 1-5% forbs). The high amount of rock cover along with shrub and herbaceous plant cover aid in reducing splash erosion and rain drop impact. The rock cover helps to reduce or slow runoff and promote infiltration. This site is only slightly effective at capturing and storing moisture.

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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. These soils are not easily compacted due to the extensive cover of rock fragments and high volume of rock fragments in the surface horizons.

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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:** Shrubs (blackbrush, shadscale, Bigelow sagebrush) >>

**Sub-dominant:** Cool season grasses > Warm season grasses >

**Other:** Perennial forbs > Annual forbs >= Succulents > Annual grasses

**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 survive in all years except for the most severe droughts. Severe winter droughts affect the shrubs the most. Severe summer droughts affect the grasses the most.

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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):**

Average annual production on this site is expected to be 250 to 350 lbs/ac. in a year of average annual precipitation.

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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: Blackbrush is native to the site, but has the potential to increase and dominate the site. Cheatgrass, red brome and Russian thistle are non-native annuals that can invade on the site regardless of disturbance or management.**

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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 in most years except for the most severe droughts.**

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