Ecological site R035XB206AZ
Sandy Upland
6-10" p.z.
Warm

Accessed: 05/03/2026

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.

Associated sites

R035XB217AZ	**Sandy Upland 6-10" p.z.** Deep, non-calcareous, sandy sites on plains, fans, and stabilized dunes
R035XB219AZ	**Sandy Loam Upland 6-10" p.z.** Deep, coarse-loamy sites on rolling plains and uplands with slopes mainly less than 12 percent
R035XB235AZ	**Sandy Loam Upland 6-10" p.z. Warm** Deep, calcareous soils on summits and risers of fan terraces and structural benches of plateaus with loamy subsurface textures

Similar sites

R035XB217AZ	**Sandy Upland 6-10" p.z.** Deep, non-calcareous, sandy sites on plains, fans, and stabilized dunes

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima* (2) *Ephedra cutleri*

Herbaceous	(1) *Achnatherum hymenoides*

Physiographic features

This site occurs on stabilized dunes and sand sheets in dune fields. Sand sheets may occur in interdunes, on relatively flat plateaus, or on stream terraces. Slopes typically range from 1 to 15%. Elevations range from 3800 to 5800 feet.

Table 2. Representative physiographic features

Landforms	(1) Sand sheet (2) Dune (3) Interdune
Flooding frequency	None
Ponding frequency	None
Elevation	1,160 – 1,770 m
Slope	0 – 20 %
Aspect	Aspect is not a significant factor

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 typic 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

There are no water features associated with this site.

Soil features

Soils on this site are moderately deep to very deep. Surface textures are sandy and range from course sand to loamy very fine sand. Subsurface textures are loamy fine sand, fine sand, loamy sand and sand. They are formed in alluvium and eolian from sandstone and siltstone from Navajo sandstone and Jurassic age formations. The upper surface horizons may be slightly effervescent to non-effervescent. Below the surface horizon, the soil generally effervesces slightly to violently.

Typical Taxonomic Units include:

Little Colorado River Area (AZ707) Soil Map Units - 34-Sheppard;
Navajo Mountain Area (AZ711) - Soil Map Unit's - 1-Aneth; 19, 31, 49, 52, 50, 53, 58, 63-Sheppard; 53-Sheppard, gypsic substratum.

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone and siltstone
Surface texture	(1) Coarse sand (2) Sand (3) Loamy very fine sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Rapid
Soil depth	100 – 180 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	3.81 – 10.67 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 8.6

Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

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. State and Transition Model - R035XB206AZ

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	**Cool season perennial grasses**			56-101	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	39-78	–
	squirreltail	ELEL5	*Elymus elymoides*	4-20	–
	needle and thread	HECO26	*Hesperostipa comata*	4-20	–
	purple threeawn	ARPU9	*Aristida purpurea*	0-12	–
2	**Warm season perennial grasses**			39-78	

	James' galleta	PLJA	*Pleuraphis jamesii*	4-39	–
	spike dropseed	SPCO4	*Sporobolus contractus*	0-20	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0-20	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	0-20	–
	black grama	BOER4	*Bouteloua eriopoda*	4-20	–
	blue grama	BOGR2	*Bouteloua gracilis*	4-20	–
	sandhill muhly	MUPU2	*Muhlenbergia pungens*	0-8	–
	Grass, perennial	2GP	*Grass, perennial*	0-8	–
3	**Annual grasses**			0-11	
	sixweeks grama	BOBA2	*Bouteloua barbata*	0-8	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0-8	–
Forb					
4	**Forbs**			12-50	
	fineleaf hymenopappus	HYFIL	*Hymenopappus filifolius var. lugens*	0-8	–
	tansyaster	MACHA	*Machaeranthera*	0-8	–
	Forb, annual	2FA	*Forb, annual*	0-8	–
	rose heath	CHER2	*Chaetopappa ericoides*	0-8	–
	Wright's bird's beak	COWR2	*Cordylanthus wrightii*	0-8	–
	globemallow	SPHAE	*Sphaeralcea*	0-8	–
	winged buckwheat	ERAL4	*Eriogonum alatum*	0-4	–
	flatcrown buckwheat	ERDED4	*Eriogonum deflexum var. deflexum*	0-4	–
	buckwheat	ERIOG	*Eriogonum*	0-4	–
	ragweed	AMBRO	*Ambrosia*	0-4	–
	Eastwood's sandwort	AREA	*Arenaria eastwoodiae*	0-4	–
	milkvetch	ASTRA	*Astragalus*	0-4	–
	crownleaf evening primrose	OECO2	*Oenothera coronopifolia*	0-4	–
	New Mexico groundsel	PANEN	*Packera neomexicana var. neomexicana*	0-4	–
	phlox	PHLOX	*Phlox*	0-4	–
	purslane	PORTU	*Portulaca*	0-4	–
	spurge	EUPHO	*Euphorbia*	0-3	–
Shrub/Vine					
5	**Dominate Shrub**			118-157	
	blackbrush	CORA	*Coleogyne ramosissima*	118-157	–
6	**Subshrubs**			17-45	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	6-22	–
	southern goldenbush	ISPL	*Isocoma pluriflora*	0-11	–
	gilia beardtongue	PEAM	*Penstemon ambiguus*	0-11	–
	threadleaf ragwort	SEFLF	*Senecio flaccidus var. flaccidus*	0-11	–
	Riddell's ragwort	SERI2	*Senecio riddellii*	0-11	–
7	**Yucca and agave-like**			1-11	
	narrowleaf yucca	YUAN2	*Yucca angustissima*	1-11	–
8	**Cacti**			0-6	
	pricklypear	OPUNT	*Opuntia*	0-6	–
10	**Other Large Shrubs**			39-62	
	Cutler's jointfir	EPCU	*Ephedra cutleri*	20-39	–
	sand sagebrush	ARFI2	*Artemisia filifolia*	4-20	–

	fourwing saltbush	ATCA2	*Atriplex canescens*	4-20	–
	sand buckwheat	ERLE9	*Eriogonum leptocladon*	0-8	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0-4	–
	Apache plume	FAPA	*Fallugia paradoxa*	0-4	–
	common dunebroom	PAFI4	*Parryella filifolia*	0-4	–
	Greene's rabbitbrush	CHGR6	*Chrysothamnus greenei*	0-4	–

Table 6. Community 1.2 plant community composition

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

Table 7. Community 2.1 plant community composition

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

Table 8. Community 2.2 plant community composition

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

Table 9. Community 3.1 plant community composition

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

Animal community

This site is used for grazing by cattle, horses, sheep, and goats.

Hydrological functions

There are no hydrologic features associated with this site.

Wood products

There is no potential for the production of wood products on this site.

Inventory data references

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Type locality

Location 1: Coconino County, AZ	
Latitude	36° 10′ 15″
Longitude	111° 7′ 45″

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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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-Arizona State Office, Phoenix, AZ
Date	02/25/2010
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** **None**

2. **Presence of water flow patterns:** **None expected due to rapid permeability and very low runoff characteristics of soils.**

3. **Number and height of erosional pedestals or terracettes:** **No pedestal and terracettes, some mounding around long-lived perennial shrubs and grasses**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** **Bare ground ranges from 40-70% and can vary considerably due to the droughty nature of the site. Bare ground may be higher where this site intergrades with active sand dunes.**

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** No appreciable movement of woody litter, some fine herbaceous litter movement expected by wind

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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):** Soils associated with this site develop a thin crust (physical or biological crust) resistant to erosion. Expected values of 2-3

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The surface of soils associated with this site are single grained; loose. Most surface textures are fine sands, but include sand and loamy fine sands.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The site is characterized by a mix of shrub canopy (60%), scattered grasses (35%) and forbs (5%). A good mix of perennial bunchgrasses provide the best infiltration on the site.

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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: Shrubs

    Sub-dominant: Cool–season perennial grasses >= warm–season grasses > half-shrubs

    Other: Annual forbs > perennial forbs >= 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):** In normal years mortality is very low for all functional groups. Less than 10% canopy decline in shrubs and perennial grasses. Summer droughts affect warm-season grasses the most and winter droughts affect shrubs and cool-season 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):** In normal rainfall years about 350 lbs/ac is expected.

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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: Cheat grass and/or red brome, Russian thistle and other introduced annual forbs

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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/or rhizomes except during the most severe droughts.
