

Ecological site R035XB219AZ

Sandy Loam Upland

6-10" p.z.

Accessed: 06/20/2026

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

“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 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

“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	Not specified
Shrub	(1) <i>Atriplex canescens</i> (2) <i>Ephedra cutleri</i>
Herbaceous	(1) <i>Bouteloua eriopoda</i> (2) <i>Achnatherum hymenoides</i>

Physiographic features

This site occurs in an upland position. It neither benefits significantly from run-in of moisture nor does it suffer from excessive loss of moisture from runoff, unless denuded of its vegetative cover. It is on gently sloping to rolling plains and slopes are mainly less than 12 percent.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Plain
-----------	------------------------------

Flooding frequency	None to very rare
Elevation	1,370 – 1,770 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

Climatic features

Area has a very dry and windy climate that is hot in the summer and cold in the winter. Average annual precipitation is from 6 to 10 inches. 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 falls from December through February, but rarely lasts more than a few days. The driest period is from late May to early July. Summer rains occur from July through September during brief intense local thunderstorms. The rain is sporadic in intensity and location. Windy conditions are common year round with the strongest most frequently in 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

Soil features

The soils in this ecological site are deep and have no plant root restricting layer.

The surface horizon texture is sandy loam to loamy sand about 4 to 10 inches thick.

The subsurface horizons have textures ranging from sandy clay loam to loamy sand. There may be thin strata of finer or coarser material.

The permeability ranges from moderate to rapid and can absorb and hold all of the moisture the climate supplies.

Typical taxonomic units include:

SSA 633 Navajo County Central - MU's 5 Kinan, 20, 21, 46 & 60 Grieta;

SSA-707 Little Colorado River Area MU's 33 Moffat, 30, 33 & 51 Monue;

SSA 711 Navajo Mountain Area - MU's 30 & 51 Monue, 62 Nakai;

SSA 713 Chinle Area - MU's 31 & 32 Monue, 32 Nakai, 46 Marcou;

SSA 714 Hopi - MU's 22, 23 & 33 Nakai, 15 Kinan, 5 Doak, 5, 20, 23 & 32 Monue;

SSA 715 Fort Defiance Area AZ/NM MU's 38 & 106 Grieta family, 56 & 58 Marcou family 62,63,64,65,67,92,107 & 111 Monue, 66 Monue

family, 67 Nakai, 70 Norkiki family, 91,93 & 108 Shiprock family, 106 Grieta family, & 111 Sogzie;

SSA 717 Shiprock NM - MU's 120 & 240 Nageezi, 173 & 205 Shiprock, 506 Blackston, 502 Sogzie;

SSA 689 Glen Canyon Area UT MU's 42 Nepalto, 16 Myton & 36 Seeg.

SSA 619 Chaco Canyon Area NM - MU's 04, 010 Yelives;

SSA 692 McKinley County Area NM - 235 Yelives

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone
Surface texture	(1) Sandy loam (2) Loamy sand
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to rapid
Soil depth	100 – 150 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	10.16 – 17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 7.9
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %

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

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 of 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.

The State and Transition model shows the most common occurring plant communities likely to be encountered on this ecological site. This model may not show every possible plant community, but only those that are most prevalent and observed through field inventory. As more data is collected and research is available, these plant communities may be revised, removed, and even added to reflect the ecological dynamics of this site.

State and transition model

Figure 3. State and Transition Model - R035XB219AZ

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
0				160-364	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	73-183	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	37-73	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	0-37	–
	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	15-37	–
1				256-364	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	110-219	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	73-183	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	0-37	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0-37	–
2				73-146	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	37-110	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	8-37	–
3				37-110	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	37-73	–
	mesa dropseed	SPFL2	<i>Sporobolus flexuosus</i>	8-37	–

	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	8-37	-
4				22-37	
	threeawn	ARIST	<i>Aristida</i>	8-15	-
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	8-15	-
	ring muhly	MUTO2	<i>Muhlenbergia torreyi</i>	8-15	-
	burrograss	SCBR2	<i>Scleropogon brevifolius</i>	8-15	-
Forb					
5				22-37	
	bluebowls	GIAC4	<i>Giliastrum acerorum</i>	8-15	-
	Indian rushpea	HOGL2	<i>Hoffmannseggia glauca</i>	8-15	-
	Forb, perennial	2FP	<i>Forb, perennial</i>	0-15	-
	globemallow	SPHAE	<i>Sphaeralcea</i>	8-15	-
	Rocky Mountain zinnia	ZIGR	<i>Zinnia grandiflora</i>	8-15	-
	shaggy dwarf morning-glory	EVNU	<i>Evolvulus nuttallianus</i>	0-8	-
	flatspine stickseed	LAOC3	<i>Lappula occidentalis</i>	0-8	-
	shortstem lupine	LUBR2	<i>Lupinus brevicaulis</i>	0-8	-
	whitestem blazingstar	MEAL6	<i>Mentzelia albicaulis</i>	0-8	-
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0-8	-
	Forb, annual	2FA	<i>Forb, annual</i>	0-8	-
Shrub/Vine					
6				73-146	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	29-73	-
	jointfir	EPHED	<i>Ephedra</i>	22-37	-
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	22-37	-
7				22-37	
	Bigelow sage	ARBI3	<i>Artemisia bigelovii</i>	8-15	-
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	8-15	-
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	8-15	-
	buckwheat	ERIOG	<i>Eriogonum</i>	8-15	-
8				8-37	
	rabbitbrush	CHRY9	<i>Chrysothamnus</i>	8-15	-
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	8-15	-
	pale desert-thorn	LYPA	<i>Lycium pallidum</i>	8-15	-
	pricklypear	OPUNT	<i>Opuntia</i>	8-15	-
	yucca	YUCCA	<i>Yucca</i>	8-15	-
9				8-15	
	stretchberry	FOPUP	<i>Forestiera pubescens var. pubescens</i>	8-15	-
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	8-15	-

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 2.3 plant community composition

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

Table 10. Community 3.1 plant community composition

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

Table 11. Community 4.1 plant community composition

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

Animal community

This site is suitable for yearlong grazing by either cows and calves or stocker cattle and is easily traversed by all classes of livestock. Prescribed Grazing systems adapt very well to use on this site. Soils on this site are susceptible to erosion, particularly on overgrazed areas, roads, cattle trails and concentration areas. This site offers some food and cover for selected species of wildlife. In higher condition classes the site is most suitable to grassland wildlife species. As retrogression occurs, food species decrease and cover forms increase.

Recreational uses

Site is typically low, gently rolling plains and fans. 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: Coconino County, AZ	
General legal description	South slope of Tucker Mesa, Turquoise Ranch, 7 miles northwest of Winslow, AZ.
Location 2: Navajo County, AZ	
Township/Range/Section	T19N R22E S31

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

Holbrook ESD Office
 K. Gishi
 Larry D. Ellicott
 Peter Lefebvre

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)	Ken Gishi, Dan Carroll, Dean Schlichting
Contact for lead author	State Rangeland Management Specialist, NRCS-Arizona State Office
Date	07/01/2008
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:** Very few expected. Some indistinct short water flow patterns may occur on soils with steeper slopes. These soils have moderate to rapid permeability and moderate runoff.

3. **Number and height of erosional pedestals or terracettes:** None, but some mounding (about 1-2 inches) around long-lived perennial grasses and large shrubs is common.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground averages about 30 to 50 percent.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** Uncommon, Some deposition may occur when site is adjacent to Sandy Uplands and/or Sandy washes. There should be no wind scoured areas or blowouts.

7. **Amount of litter movement (describe size and distance expected to travel):** Majority of herbaceous and fine woody litter will be transported by wind with a smaller percentage moving in water flow pathways. Coarse woody litter will remain under shrub canopies.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**
Surface textures are loamy fine sand, fine sandy loam and sandy loam with thickness ranging from 3-10 inches. Soil aggregate stability ratings should average 3-4 under plant canopies and 2-3 in the interspaces. A thin crust (biological or physical) may occur on this site and can provide some surface protection.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is weakly granular. Surface textures are loamy fine sand, fine sandy loam and sandy loam with thickness ranging from 3-10 inches. Surface color can be variable depending of parent material.

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 mixed of short and midgrasses with a small percentage of scattered shrubs and forbs. The plant community by weight consists of about 80% grasses, 15% shrubs, 5% forbs. Basal cover range from 10-20% (Grasses,80-90% >> Shrubs,5-10% > forbs,1-5%). Due to the slope, soil texture and plant community composition, this site is moderately effective at storing precipitation.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Most of the soils are not easily compacted, due to granular structure. Some of the soils may have a thin platy structure.

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: warm season colonizing grasses > cool season bunch grasses >

Sub-dominant: warm season bunch grasses > shrubs

Other: forbs > cacti and other succulents

Additional:

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 survival in all but the most severe droughts. Severe winter droughts affect shrubs most. Severe summer droughts affect grasses the most

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):**
Average annual production on this site is expected to be 575 to 675 lbs/ac in a year of average 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: Broom snakeweed, Mormon tea, and burro grass are native to the site, but have the potential to increase and dominate after heavy grazing. Cheatgrass and red brome are exotic annual grasses that have the potential to invade and dominate, with or without disturbance. Russian thistle and redstem storks bill are exotic forbs that have the potential to invade and dominate the site after heavy grazing and/or disturbance, especially if the site is near farm fields or disturbed lands.

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.
