Ecological site DX035X01I113
Loamy Upland
10-14" 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

This ecological site occurs in Common Resource Area 35.1 - the Colorado Plateau Mixed Grass Plains Elevations range from 4800 to 6300 feet and precipitation averages 10 to 14 inches per year. Vegetation includes Stipa species, Indian ricegrass, galleta, and blue grama, fourwing saltbush, winterfat, and cliffrose. 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.

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) *Krascheninnikovia lanata* (2) *Atriplex canescens*
Herbaceous	(1) *Bouteloua eriopoda* (2) *Bouteloua gracilis*

Legacy ID

R035XA113AZ

Physiographic features

This ecological site occurs in an upland position as gently rolling plains, fans and terraces. Slopes generally range from 0% to 15% with occasional steeper slopes up to 30%.

This site neither benefits significantly from run-in nor experiences excessive loss of moisture from runoff.

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Fan (3) Terrace
Flooding frequency	None
Elevation	1,460 – 1,920 m
Slope	0 – 20 %
Aspect	Aspect is not a significant factor

Climatic features

50-60% of moisture falls as rain from July through September and is the most effective moisture for plant growth. The remaining moisture comes as snow during the winter.

Mean temperature for the hottest month (July) is 72 F; for the coldest month (January) is 32 F. Extreme temperatures of 105 F and -28F have been recorded. Long periods with little or no effective moisture are relatively common.

Cool season plants begin growth in early spring and mature by early summer. Warm season plants take advantage of summer rains and actively grow from July through September.

Table 3 Representative climatic features

Frost-free period (average)	160 days
Freeze-free period (average)	180 days
Precipitation total (average)	330 mm

Influencing water features

This site neither benefits significantly from run-in moisture nor experiences excessive loss of moisture from runoff.

Soil features

Soils grouped in this site are moderately deep or deeper to any plant root restricting layers. The surface horizons have textures of very fine sandy loam to sandy clay loam with various amounts of gravel on the surface. The surface layers are about 2 to 8 inches thick. The subsurface horizons have textures ranging from clay to loam with coarse fragments ranging from 0 to 40% by volume. The substratum, which occurs at depths of 15 to 36 or more inches, ranges from clay loam to very gravelly sand and in some soils has a strong accumulation of lime. The soil reaction is neutral to moderately alkaline (pH 6.6 to 8.4). Soluble salt accumulations are low.

Typical taxonomic units include:
Coconino County Central (AZ631) Soil Map Units-2-Aut grL, 3-Aut,4-Aut, 31-Poley grL, 32- Poley, 33-Poley, 35-Quivera grvL, 46-Tenorio grvSL;
Navajo County Central (AZ633) Soil Map Units -5-Barx, 6-Barx, 47-Poley, 62-Sheeza, 71-Ustollic haplargids;
Apache County Central (AZ635) Soil Map Units-Cob-Clovis, CoB-Clovis, CoC-Clovis, CsB-Clovis, CsC-Clovis, JoB-Jocity, HUB-Hubert, HUC2-Hubert, HEB-Hereford, HEB-Hereford, HeB-Hereford, HeC- Hereford, HfB-Hereford, HhB-Hereford heavy varient, HrC-Hereford

heavy varient, MGD-Millett;
Yavapai County Western (AZ637)Soil Map Units- PlB-Poley, Po-Poley, Pp-Poley;
Mohave County Central (AZ697)Soil Map Units-115-Quagwa;
Hualapai/Havasupai (AZ699) Soil Map Units- 37-Quagwa, 32-Barx, 34-Poley;
Little Colorado River Area (AZ707) Soil Map Units - 2-Aut, 63-Tuweep;
Navajo Mountain Area (AZ711) Soil Map Units - 27-Gish (moderately deep), 64-Ustic Haplocambids, 65-Ustic haplargids;
Chinle Area (AZ713) Soil Map Units- 39-Gish;
Fort Defiance (AZ715) Soil Map Units - 35 Flaco and 80-Penistaja family.

Table 4. Representative soil features

Parent material	(1) Pyroclastic flow – basalt (2) Alluvium – limestone
Surface texture	(1) Very fine sandy loam (2) Sandy clay loam (3) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to slow
Soil depth	100 – 150 cm
Surface fragment cover <=3"	0 – 30 %
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	19.56 – 20.07 cm
Calcium carbonate equivalent (0-101.6cm)	10 – 40 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified

Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 40 %
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 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 - R035XA113AZ

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant grasses**			336-504	
	black grama	BOER4	*Bouteloua eriopoda*	95-135	–
	blue grama	BOGR2	*Bouteloua gracilis*	101-123	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	34-90	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	34-67	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	34-67	–
	James' galleta	PLJA	*Pleuraphis jamesii*	34-67	–
	muttongrass	POFE	*Poa fendleriana*	6-34	–

	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	6-34	–
	western wheatgrass	PASM	*Pascopyrum smithii*	6-34	–
2	**Other grasses**			34-73	
	Grass, perennial	2GP	*Grass, perennial*	0-11	–
	threeawn	ARIST	*Aristida*	6-11	–
	common wolfstail	LYPH	*Lycurus phleoides*	6-11	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	6-11	–
	ring muhly	MUTO2	*Muhlenbergia torreyi*	6-11	–
	spike dropseed	SPCO4	*Sporobolus contractus*	6-11	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	6-11	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	6-11	–
Forb					
3	**All forbs**			8-39	
	Forb, perennial	2FP	*Forb, perennial*	4-22	–
	Forb, annual	2FA	*Forb, annual*	3-17	–
Shrub/Vine					
4	**Dominant shrubs**			39-73	
	fourwing saltbush	ATCA2	*Atriplex canescens*	22-45	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	17-28	–
5	**Other shrubs**			6-34	
	rough menodora	MESC	*Menodora scabra*	6-17	–
	jointfir	EPHED	*Ephedra*	2-11	–
	buckwheat	ERIOG	*Eriogonum*	2-11	–
6	**Misc. shrubs**			0-22	
	sand sagebrush	ARFI2	*Artemisia filifolia*	0-6	–
	prairie sagewort	ARFR4	*Artemisia frigida*	0-6	–
	Greene's rabbitbrush	CHGR6	*Chrysothamnus greenei*	0-6	–
	rubber rabbitbrush	ERNAG	*Ericameria nauseosa ssp. nauseosa var. glabrata*	0-6	–
	snakeweed	GUTIE	*Gutierrezia*	0-6	–
	New Mexico groundsel	PANE7	*Packera neomexicana*	0-6	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	0-6	–
7	**Succulents**			6-34	
	buckhorn cholla	CYACA2	*Cylindropuntia acanthocarpa var. acanthocarpa*	3-11	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	3-11	–
	yucca	YUCCA	*Yucca*	3-11	–
Tree					
8	**Trees**			6-39	
	juniper	JUNIP	*Juniperus*	6-22	–
	Fremont's mahonia	MAFR3	*Mahonia fremontii*	3-17	–

Table 6. Community 1.2 plant community composition

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

Table 7. Community 1.3 plant community composition

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

Table 8. Community 2.1 plant community composition

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

Table 9. Community 2.2 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 3.2 plant community composition

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

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 rabbitbrush, snakeweed and lower value forbs and grasses. 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 benefit.

Recreational uses

This site is located on undulating plains and foot slopes with a variety of spring and summer flowering shrubs and forbs following good moisture. The grassland aspect has good appeal. Winters are cold, however relatively mild summers make the site attractive to many recreational activities.

Type locality

Location 1: Yavapai County, AZ	
Township/Range/Section	T23N R6W S32

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.

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Date	03/13/2006
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** **No rills expected. A few minor rills may form on slopes greater that 5% due to moderate permeability and moderate runoff.**

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2. **Presence of water flow patterns:** **Water flow patterns are infrequent, short (1 to 2 meters), and poorly developed with less than 10% coverage. They may become more common on steeper slopes due to slow to moderate permeability and medium runoff characteristics of the soils.**

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3. **Number and height of erosional pedestals or terracettes:** **Pedestals less than 1" may be common and often associated with water flow patterns. Terracettes are infrequent, but they should be short. Both may be more developed and common during a drought, due to moderate wind erosion hazard of the soils. Moderate wind erosion hazard occurs on the soils with a coarse-loamy surface textures. Pedestals and terracettes may be more common, especially on steeper slopes, but they should be short.**

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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 30-50%. Drought may cause an increase in bare ground.**

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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:** **No blowouts are present on this site. Some small mounding around long-lived perennial plant bases common, especially during droughts, due to low to moderate wind erosion hazard of the soil.**

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7. **Amount of litter movement (describe size and distance expected to travel):** **Most herbaceous and fine woody litter will be transported by wind and in short water flow pathways, while a small percentage stays in place. Coarse woody litter and duff will**

accumulate under shrub and tree canopies.

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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): Soil aggregate stability ratings should average 4-5 (range 3 to 6) under plant canopies and 2-3 (range 1 to 3)in the interspaces. There is usually less than 5% cover of rock fragments on the surface. When well vegetated, soils have a moderate resistance to water erosion and moderate to high resistance to wind erosion**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Soil structure is mostly granular (weak to moderate, very fine and fine) with some platy (weak, thin and medium) and sub angular blocky (weak, fine to medium). Surface thickness typically ranges from 2-8 inches, but is mostly 2-4 inches. Color is typically reddish brown to 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 relatively even distribution of mostly grasses with some shrubs and a few forbs. This type of plant community is moderately effective at capturing and storing precipitation thus reducing runoff. Cover averages 30-40% (25 to 30% grasses, 5-10% shrubs, 2-5% forbs). Basal plant cover averages 10-20% (15% grasses, 2% shrubs, 1% forbs). Both cover values decrease during a prolonged drought.**

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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): The occurrence of compaction layers should be rare to none. Soils with sandy clay loam and clay loam textures, can be easily compacted when wet, if there are no rock fragments in surface horizons. Some surface horizons are naturally platy.**

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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: >40%: None

    Sub-dominant: 11-40%: warm season bunchgrasses > warm season colonizing grasses > shrubs > cool season bunchgrasses >

    Other: Minor (3-10%): forbs = cacti = trees(trace)

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): In a normal year up to 10% of grasses and shrubs die off. During and after drought years there can be from 10 to 15% die off of shrubs and grasses. Severe winter droughts affect shrubs, trees and cool season grasses the most. Severe summer droughts affect the warm season grasses the most.**

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14. **Average percent litter cover (%) and depth (in): Average percent litter cover ranges from 20-40% and depth 1/8”inch. Within plant interspaces litter ranges from 5 to 20% cover ,while under shrub and tree canopies litter can range up to 50% cover with depths from 1/8 to 1/4 inch thick.**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** **Total production ranges from; 300-375 pounds per acre (dry weight) in drought years; 572-725 pounds per acre in average years; 725-800 pounds per acre in wet years.**

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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:** **Mormon tea (EPVI), Broom snakeweed (GUSA2), Greene''s rabbitbrush (CHGR6), Prickly pear (OPPO), Whipple cholla cactus (CYWH) and false buffalo grass (MUSQ) are all native to the site, but have the ability to increase and dominate the area after unmanaged grazing. Oneseed juniper (JUMO) is native to the site, but has the ability to increase and dominate the site after unmanaged grazing and/or fire exclusion. Russian thistle (SATR12) is an exotic forb that has the ability to increase and dominate the site after heavy grazing and/or ground disturbance.**

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17. **Perennial plant reproductive capability:** **All plants native to this site are adapted to the climate and are producing seeds, stolons and rhizomes in all but the most severe droughts.**
