

Ecological site DX035X02B611

Clay Loam Upland

13-17" p.z.

Gravelly (PIED, JUOS)

Accessed: 05/05/2026

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

AZ CRA 35.6 - Colorado Plateau Pinyon-Juniper-Sagebrush Elevations range from 5500 to 7000 feet and precipitation averages 13 to 17 inches per year. Vegetation includes pinyon, juniper, big sagebrush, cliffrose, Mormon tea, muttongrass, prairie junegrass, squirreltail, western wheatgrass, and blue grama. The soil temperature regime is mesic and the soil moisture regime is aridic ustic. 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>Pinus edulis</i> (2) <i>Juniperus osteosperma</i>
Shrub	(1) <i>Artemisia tridentata ssp. wyomingensis</i> (2) <i>Purshia stansburiana</i>
Herbaceous	(1) <i>Poa fendleriana</i> (2) <i>Bouteloua gracilis</i>

Legacy ID

F035XF611AZ

Physiographic features

This ecological site is located on summits, footslopes, shoulders and fan terraces of hills, mesas and plateaus. The soil is shallow to deep to any plant root restricting layer. The soil surface is gravelly to extremely gravelly loams and fine sandy loams. Slope of the ecological site ranges from 1 to 20 percent.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mesa (3) Plateau
-----------	-------------------------------------

Flooding frequency	None
Ponding frequency	None
Elevation	1,740 – 2,010 m
Slope	0 – 20 %
Aspect	Aspect is not a significant factor

Climatic features

The climate of this land resource unit is semiarid with warm summers and cool winters. The mean annual precipitation ranges from 13 – 17 inches, but it is very erratic, often varying substantially from year to year. The majority of the precipitation comes from October through April. This precipitation comes as gentle rain or snow from frontal storms coming out of the Pacific Ocean. Snow is common from November through February. Generally no more than a few inches of snow accumulates, melting within a few days, but may last a week or more. The remaining precipitation comes from July through September as spotty, unreliable and sometimes violent thunderstorms. The moisture for this precipitation originates in the Gulf of Mexico (and the Pacific Ocean in the fall) and flows into the area on the north end of the Mexican monsoon. Late May through late June is generally a dry period. The mean annual air temperature ranges from 47 to 49 degrees Fahrenheit (F). The frost-free period (air temperature > 32 degrees F) ranges from 113 to 144 days (@ 50 percent probability). Strong winds are common, especially in the spring.

Table 3 Representative climatic features

Frost-free period (average)	140 days
Freeze-free period (average)	160 days
Precipitation total (average)	430 mm

Influencing water features

Soil features

Soils are shallow to deep with surface textures of gravelly fine sandy loam, extremely gravelly loam, very gravelly loam, loam, cobbly silty clay loam, silty clay loam, very cobbly clay loam, and very cobbly silty clay loam. Subsoil textures are loam, clay loam, clay, gravelly clay, silty clay, gravelly clay loam, gravelly loam, very gravelly clay loam, very gravelly loam, stony clay and very cobbly clay. Parent materials are alluvium, colluvium and residuum from limestone, basalt and sandstone.

Typical taxonomic units include:

SSA-623 Shivwits Area MU's 21 Disterheff, 21 & 95 Natank, 69 Thunderbird, 72 Springerville, 69 & 70 Showlow, 72 Delenbaw;
 SSA-625 Mohave county NE part MU's 57,58,59 & 60 Showlow;
 SSA-699 Hualapai/Havasupai Area MU's 11 Disterheff, 27 Natank, 48 Toqui, 50 Tovar;
 SSA-701 Grand Canyon Area MU's 4 Aridic haplustalfs, 8 Bilburc GrVL, 9 & 170 Bilburc, 9 Binsin, 22 Houserock family, 23 Toqui family, 35 Disterheff, 55 Kellypoint, 94, 125, 131 & 175 Toqui, 124 Toqui GrL.

Table 4. Representative soil features

Parent material	(1) Alluvium – limestone and sandstone (2) Colluvium – basalt
Surface texture	(1) Gravelly fine sandy loam (2) Extremely gravelly loam (3) Cobbly silty clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Slow to moderately slow
Soil depth	30 – 150 cm
Surface fragment cover <=3"	0 – 90 %
Surface fragment cover >3"	0 – 40 %
Available water capacity (0-101.6cm)	6.35 – 25.4 cm
Calcium carbonate equivalent (0-101.6cm)	20 – 50 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.1 – 8.4

Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

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 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

Additional community tables

Table 5. Community 1.1 plant community composition

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

Table 6. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height M	Canopy Cover (%)	Diameter Cm	Basal Area (square M/hectare)
Tree							
Utah juniper	JUOS	<i>Juniperus osteosperma</i>	Native	0.3-4.9	20-35	5.1-33	–
twoneedle pinyon	PIED	<i>Pinus edulis</i>	Native	1.2-8.2	20-35	7.6-35.6	–

Table 7. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (m)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
blue grama	BOGR2	<i>Bouteloua gracilis</i>	Native	0-0.3	5-8
squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	Native	0-0.6	3-8
Fendler's threeawn	ARPUF	<i>Aristida purpurea var. fendleriana</i>	Native	0-0.4	2-5
muttongrass	POFE	<i>Poa fendleriana</i>	Native	0-0.5	2-4
prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	Native	0-0.5	1-3
Shrub/Subshrub					
broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	Native	0.1-0.2	5-10
Siler's penstemon	PELIS	<i>Penstemon linarioides ssp. sileri</i>	Native	0.1-0.6	2-10

Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	Native	0.3-1.2	5-10
Fremont's mahonia	MAFR3	<i>Mahonia fremontii</i>	Native	0.3-2.1	4-9
pointleaf manzanita	ARPU5	<i>Arctostaphylos pungens</i>	Native	0.3-1.8	4-8
Gambel oak	QUGA	<i>Quercus gambelii</i>	Native	0.3-5.5	2-7
mormon tea	EPVI	<i>Ephedra viridis</i>	Native	0.1-0.9	2-5
Stansbury cliffrose	PUST	<i>Purshia stansburiana</i>	Native	0.6-2.1	1-5
Whipple cholla	CYWH	<i>Cylindropuntia whipplei</i>	Native	0.1-0.9	1-5
New Mexico locust	RONE	<i>Robinia neomexicana</i>	Native	0.3-2.4	1-4
skunkbush sumac	RHTR	<i>Rhus trilobata</i>	Native	0.2-1.2	1-3
sulphur-flower buckwheat	ERUM	<i>Eriogonum umbellatum</i>	Native	0-0.2	1-3
Sonoran scrub oak	QUTU2	<i>Quercus turbinella</i>	Native	0.3-1.8	1-3
banana yucca	YUBA	<i>Yucca baccata</i>	Native	0-0.5	1-2
Tree					
twoneedle pinyon	PIED	<i>Pinus edulis</i>	Native	1.2-7.6	10-30
Utah juniper	JUOS	<i>Juniperus osteosperma</i>	Native	0.6-4	10-25

Animal community

Trees are thick making the site only fairly suitable for grazing by cattle, sheep and horses in the summer and fall. Management considerations include grazing systems, proper grazing use and snow covering forage. Springs are found on this site. Elk and deer use the site for winter cover. Food is adequate for native wildlife species. Competition with livestock can be a problem.

Recreational uses

Recreational activities include hiking, hunting, wildlife observations and potography. Landscape has good aesthetic appeal.

Type locality

Location 1: Coconino County, AZ	
Township/Range/Section	T29 N. R7 W. S12
General legal description	National Tank quad. - 4 miles SW of National Tank; Sec. 12, T. 29 N., R. 7 W.; Hualapai Indian Reservation, Arizona.

Contributors

Harmon Hodgkinson
Harmon S. Hodgkinson
Larry D. Ellicott
Stephen Cassady
Steve Barker

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	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

2. Presence of water flow patterns:

3. Number and height of erosional pedestals or terracettes:

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

5. Number of gullies and erosion associated with gullies:

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

7. Amount of litter movement (describe size and distance expected to travel):

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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:

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:**
