USDA Natural Resources
Conservation Service

Ecological site F035XA121AZ
Shallow Loam 10-14" p.z. Cobbly (JUOS)

Accessed: 05/11/2025

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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 035X–Colorado Plateau

AZ CRA 35.1 - Colorado Plateau Mixed Grass Plains

Elevations range from 5100 to 6000 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.

Table 1. Dominant plant species

Tree	(1) *Juniperus osteosperma*
Shrub	(1) *Purshia stansburiana*
Herbaceous	(1) *Bouteloua gracilis*

Physiographic features

Site occurs on footslopes and summits of low hills. Depth is from very shallow to shallow. Surface textures from extremely cobble loam to very gravelly loam. Subsurface textures from very cobbly loam to very cobbly clay loam. pH from 7.4 to 8.4 and hazard of erosion is slight from water and wind.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mesa (3) Plateau
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	None to rare
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None
Elevation	5,200–5,500 ft
Slope	1–12%
Aspect	Aspect is not a significant factor

Climatic features

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

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

Table 3. Representative climatic features

Frost-free period (average)	160 days
Freeze-free period (average)	180 days
Precipitation total (average)	13 in

Influencing water features

Soil features

Soils are very shallow to shallow. Surface textures are Extremely cobbly loam to very gravelly loam. Subsurface textures from very cobbly loam to very cobbly clay loam. pH from 7.4 to 8.4 with Limestone bedrock at 17 to 28 inches and lime content at 40% plus.

Typical taxonomic units include:

SSA-699 Hualapai/Havasupai Area MU's 53 Curhollow and Winona.

Table 4. Representative soil features

Parent material	(1) Residuum–limestone
Surface texture	(1) Extremely cobbly loam (2) Very cobbly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate

Soil depth	5–20 in
Surface fragment cover <=3"	5–15%
Surface fragment cover >3"	10–20%
Available water capacity (0-40in)	1–2 in
Calcium carbonate equivalent (0-40in)	15–35%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	2–15%
Subsurface fragment volume >3" (Depth not specified)	5–10%

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 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.

State and transition model

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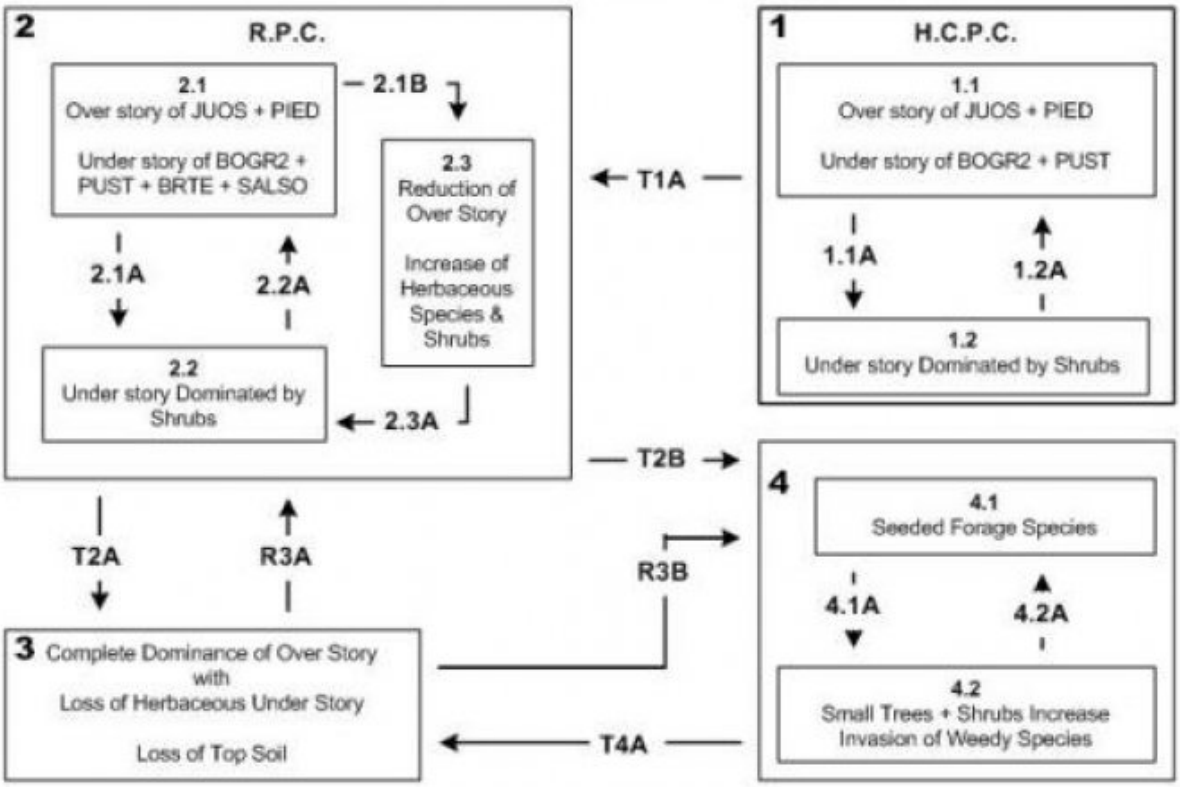

1. H.C.P.C.

1.1 The Historic Climax Plant Community is composed mainly of a woodland community with an over story of Utah juniper (JUOS) and Colorado pinyon (PIED). The under story species include blue grama (BOGR2), black grama (BOER4), globe mallow (SPHAE), Stansbury cliffrose (PUST), and prickly pear (OPPH).

1.1A Extended drought results in a reduction of the herbaceous plant community.

1.2 The H.C.P.C. will respond to the extended dry climatic variations by reducing the herbaceous component and increasing the shrub components.

1.2A Having good moisture years along with a natural fire regime will help maintain the H.C.P.C.

T1A Extended periods of low precipitation will increase the over story and the shrubs while reducing the ability of the understory to compete for scarce moisture resources. The reduction of native understory plants will increase the less desirable species and open up the plant community to the invasion of non-native noxious species.

2. R.P.C.

2.1 The Reference Plant Community is a similar woodland community to the H.C.P.C. with an over story of Utah juniper (JUOS) and Colorado pinyon (PIED). The under story species include blue grama (BOGR2), black grama (BOER4), globe mallow (SPHAE), Stansbury cliffrose (PUST), and prickly pear (OPPH) and includes the exotic annuals cheat grass (BRTE) & Russian thistle (SALSO) which have established a niche where they will persist.

2.1A Continuous extreme herbivory or extended drought results in a reduction of the herbaceous plant community and allows the invasion of exotic annuals.

2.2 R.P.C. will respond to the heavy grazing or extended dry climatic variations by reducing the herbaceous component and increasing the shrub components.

2.2A Installation of a Prescribed Grazing System and/or good moisture years along with natural fire or prescribed burning help maintain the forage base.

2.1B Use of Brush Management to remove most large over story species and increase the production of herbaceous species improves forage for use by large ungulates.

2.3 Reduction of the tree and large shrub over story will allow the herbaceous species to become the dominants in the plant community.

2.3A Continuous grazing by large ungulates or extended drought results in a reduction of the herbaceous plant community & allows the over story species to increase.

T2A Extended periods of continuous extreme herbivory and/or low precipitation will increase the over story and the shrubs and reduce the ability of the understory to compete for scarce resources. The reduction of native understory plants will increase the less desirable species and open up the plant community to non-native noxious species. Eventually leading to a total dominance of the over story and a loss of top soil.

T2B Use Brush Management to remove the over story & use Range Planting of adapted non-native forage species for grazing.

3. The establishment of noxious weeds and loss of top soil limits options for recovery.

R3A Control of the weedy species, selective removal of trees and shrubs and installation of a Prescribed Grazing System.

R3B Use Brush Management to remove the over story, do control of the weedy species & use Range Planting to establish adapted non-native forage species for grazing.

4. Plant community composed of mainly herbaceous species with a few trees and large shrubs. Installation of a Prescribed Grazing system will help to maintain the vigor of the grasses and forbs.

4.1 Plant community consists of planted adapted non-native forage species.

4.1A Extended drought/continuous herbivory will reduce the herbaceous component and the trees and shrubs will begin to recover.

4.2 Plant community showing signs of tree and large shrub recovery plus an invasion of weedy species.

4.2A Prescribed Burning and control of weeds along with Prescribed Grazing.

T4A Extended periods of continuous extreme herbivory and/or low precipitation will increase the over story and the shrubs while reducing the ability of the understory to compete for scarce moisture resources. Eventually leading to a total dominance of the over story and a loss of top soil.

State 1
Historic Natural Plant Community

Community 1.1
Historic Natural Plant Community

Woodland community with an overstory of Utah juniper and Colorado pinyon. Understory species include blue grama, black grama, needleandthread, globemallow, astragalus, Stansbury cliffrose, and running prickly pear.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	110	145	180
Shrub/Vine	60	80	100
Forb	30	40	50
Tree	15	20	25
Total	**215**	**285**	**355**

Table 6. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	–
>0.5 <= 1	–	–	0-40%	–
>1 <= 2	–	2-10%	–	0-5%
>2 <= 4.5	0-5%	–	0-20%	–
>4.5 <= 13	–	5-20%	–	–
>13 <= 40	25-35%	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Tree					
0				12–16	
	Utah juniper	JUOS	*Juniperus osteosperma*	12–16	–
	twoneedle pinyon	PIED	*Pinus edulis*	12–16	–
Shrub/Vine					
0				30–50	
	Mexican cliffrose	PUME	*Purshia mexicana*	20–40	–
	banana yucca	YUBA	*Yucca baccata*	16–20	–
	Fremont's mahonia	MAFR3	*Mahonia fremontii*	16–20	–
	tulip pricklypear	OPPH	*Opuntia phaeacantha*	16–20	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	12–16	–
	mormon tea	EPVI	*Ephedra viridis*	12–16	–
	spiny greasebush	GLSPS	*Glossopetalon spinescens var. spinescens*	12–16	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	12–16	–
Grass/Grasslike					
0				150–250	
	blue grama	BOGR2	*Bouteloua gracilis*	100–140	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	16–20	–
	black grama	BOER4	*Bouteloua eriopoda*	16–20	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	16–20	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	12–16	–
	Grass-like, perennial	2GLP	*Grass-like, perennial*	12–16	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	12–16	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	12–16	–
Forb					
0				10–20	
	milkvetch	ASTRA	*Astragalus*	5–8	–
	globemallow	SPHAE	*Sphaeralcea*	5–8	–
	Forb, perennial	2FP	*Forb, perennial*	4–6	–

Animal community

This site is suitable for grazing during any period of the year by cows and calves, stocker cattle, sheep and horses. Prescribed grazing systems can benefit this site by allowing rest periods for the cool season species.

The potential plant community provides a variety of food and cover plants for wildlife. When the vegetation complex retrogresses then unpalatable shrub species increase and the site becomes less usable as a foraging area for some species. Grazing practices that encourage cool season grass species are beneficial to antelope, cottontails and rodents. Shrubs that provide both food and cover should be maintained.

Wildlife factors of Food, Cover, Topography are good but water is scarce in natural springs and potholes.

Recreational uses

Site is located on gently sloping plains and mesa tops which lend themselves to activities such as horseback riding, wildlife observation and hunting.

This site has a variety of spring and summer flowers which are particularly noticeable after good moisture periods. It has good aesthetic appeal when not severely disturbed.

Winters are cold, however, relatively mild spring, fall and summer months are attractive to recreationists.

Wood products

Site Index = 35 - 40
Fuelwood (Cords/Ac) = 4 - 6
Fence Posts (7 foot) /Ac = 15 - 20
Christmas Trees/Ac = 5 - 10
CMAI* per year = 3sq ft/ac
Productivity Class = 1
*CMAI is the "Culmination of Mean Annual Increment" or highest average growth rate of the stand in the units specified.

Other information

Woodland Uses and Management Interpretations

Equipment & Operability Considerations -
Suitable Equipment for:
Harvesting: All kinds
Site Prep: All kinds
Tree Planting: Best to do by hand(shallow soil)
Precommercial Thinning: All kinds
Equipment Limitation:
Slope: None
Unsurfaced Roads: None
Stoniness/rock outcrop: Slight
Water table/flooding: None
Erosion Potential is slight for all uses.
Soil Management:
Compaction potential: Good
Rutting potential: Rutting may occur when wet
Revegetation potential:
Poor - due to shallow, droughty soil

Type locality

Location 1: Mohave County, AZ	
Township/Range/Section	T25N R10W S9
General legal description	Nelson Quad - 4 miles northeast of Peach Springs, north of Highway 66 on the Hualapai Indian Reservation, 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)	
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:**