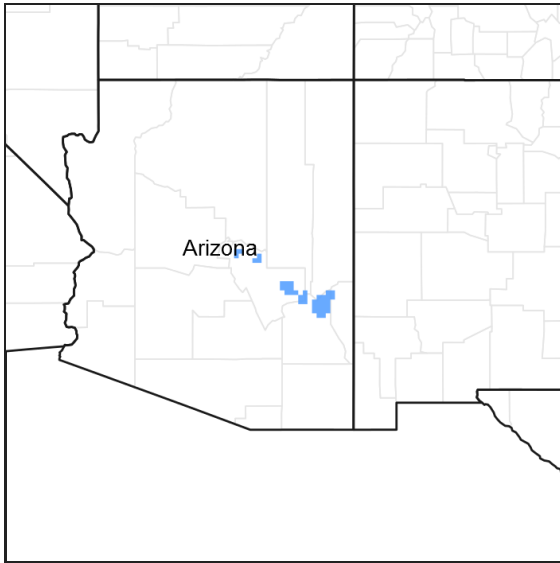


# **Ecological site R038XC303AZ Clay Loam Upland 20-24" p.z.**

Accessed: 02/17/2025

## 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): 038X–Mogollon Transition South

AZ 38.3 – Upper Mogollon Transition

Elevations range from 5100-7000 feet and precipitation averages 20 to 27 inches per year. Vegetation includes Gambel oak, Arizona white oak, Emory oak, pinyon, alligator juniper, one seed juniper, Arizona cypress, ponderosa pine, shrubby buckwheat, sacahuista, skunkbush sumac, Wright silktassle, blue grama, sideoats grama, muttongrass, western wheatgrass, and bottlebrush squirreltail. The soil temperature regime is mesic and the soil moisture regime is typic ustic. This unit occurs within the Transition Zone Physiographic Province and is characterized by canyons and structural troughs or valleys. Igneous, metamorphic and sedimentary rock classes occur on rough mountainous terrain in association with less extensive sediment filled valleys exhibiting little integrated drainage.

## Associated sites

F038XC315AZ	<b>Ponderosa Pine - Gray Oak Forest 20-25" p.z. (PIPO, QUGR3)</b> At the upper elevations larger ponderosa pine occurs in the drainages of this site. Smaller stunted ponderosa pine intermingle with alligator juniper in upland positions.
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R038XC302AZ	<b>Clayey Upland 20-24</b> The Clayey upland site occurs intermingled with this site. Clayey upland has a high percentage of western wheatgrass and vine mesquite in the plant community.
R038XC316AZ	<b>Clayey Slopes 20-24"</b> The Loamy slopes site occurs on skeletal soils and soils that are shallow to primarily quartzite bedrock. The loamy slopes site has a significant over story of gray and Emory oak, manzanita, beargrass and other Arizona chaparral species.

### Similar sites

R038XC302AZ	<b>Clayey Upland 20-24</b> The clayey upland site can experience juniper encroachment similar to the clayloam upland site. Western wheatgrass is a significant grass of the clayey upland plant community. As the herbaceous component of the clayey upland site degrades annual goldeneye becomes a dominant annual on the site and can usually be a good key to differentiate the two sites in the absence of western wheatgrass.
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

### Physiographic features

This site occurs in the upper elevations of the Mogollon Transition zone south of the Mogollon Rim in central Arizona.

This site is primarily in an upland position but also occurs on hill slopes up to 15%. It neither benefits significantly from run-in moisture nor suffers from excess runoff.

**Table 2. Representative physiographic features**

Landforms	(1) Alluvial fan (2) Plain
Elevation	5,100–6,400 ft
Slope	2–15%
Ponding depth	0 in
Aspect	N, E, S

### Climatic features

Precipitation in this common resource area averages approximately 20 to 24 inches annually. Precipitation is lower and temperatures are cooler in the eastern part of the MLRA. The winter-summer rainfall ratio ranges from about 60/40% in the western part of the area to 45/55% in the eastern part. Summer rains fall July through September; and are from high-intensity convective thunderstorms. This moisture originates primarily from the Gulf of Mexico, but can come from the remnants of Pacific hurricanes in September. Winter moisture is frontal, originates in the north Pacific, and falls as rain or snow in widespread storms of low intensity and long duration. Snowfall ranges from 10 to 18 inches per year and can occur from November through April. May and June are the driest months of the year. Humidity is generally low all year.

Average annual air temperatures range from 50 to 57 degrees F (mesic temperature regime). Daytime temps in the summer are commonly in the mid 80's in the eastern portion of the MLRA and the low to mid 90's in the western portion. Freezing temperatures are common from October through April. The actual precipitation, available moisture and temperature varies, depending on, region, elevation, rain shadow effect and aspect.

**Table 3. Representative climatic features**

Frost-free period (average)	167 days
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Freeze-free period (average)	188 days
Precipitation total (average)	24 in

## Influencing water features

There are no water features associated with this site.

## Soil features

This site occurs near the highest elevations of the interior chaparral zone in the Mogollon Transition area. This site primarily occurs in an upland position. It occurs in small amount on low slope hills and ridge-tops.

These soils are deep, clayey throughout, and well drained. They are formed in alluvium from basalt, andesite, related volcanic tuffs and ash, and quartzite. The surface textures range from heavy loam, clayloam, to light clay. The effective rooting depth is 30 to 60 inches, plus. Runoff is slow on dry lightly vertic soils due to cracks and holes, but is moderate to high on moist soils. The erosion hazard is slight unless heavy traffic causes trailing and compaction.

Soil series mapped include: from SSA-675 San Carlos IR Area MU's Anezul-3 & 48, Dedal-3, Sponiker-35 & 78.

**Table 4. Representative soil features**

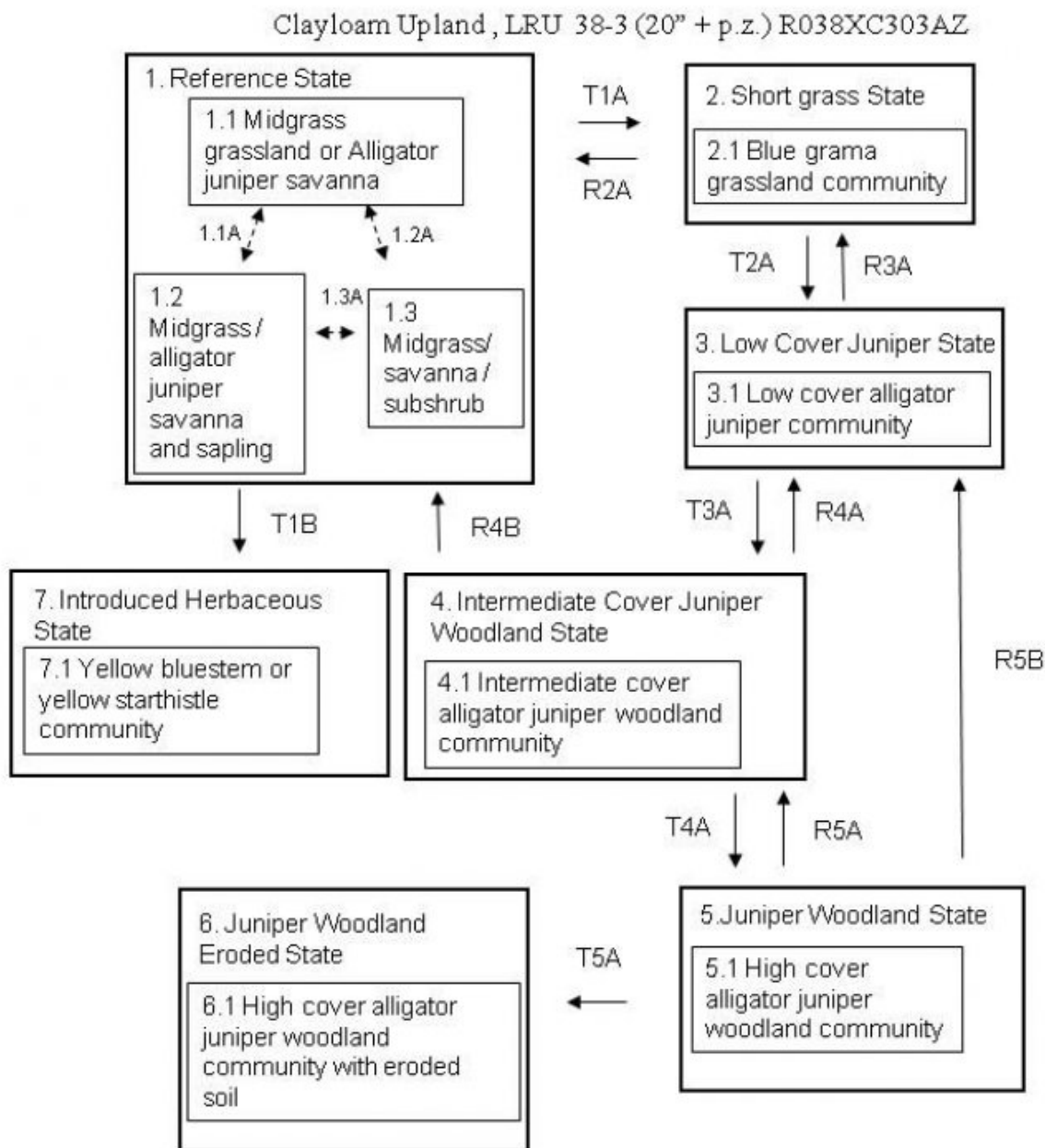
Parent material	(1) Alluvium–basalt
Surface texture	(1) Gravelly clay loam (2) Clay
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderately slow to slow
Soil depth	60 in
Surface fragment cover <=3"	0–35%
Surface fragment cover >3"	0–15%
Available water capacity (0-40in)	5.9–10.5 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	6.6–8
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–15%

## Ecological dynamics

The historic native plant community includes grasslands and Alligator juniper savannas. In areas with higher slopes southern exposures have a grassland aspect, northern exposures develop a mixed tree savanna. The plant community includes a flora of native annual grasses and forbs of both the winter and summer seasons. Periodic wildfires occurred at moderate intervals and helped maintain open grasslands and a balance between herbaceous

plants and trees in savannas. In the absence of fire for longer periods trees can become dominant. The interactions of drought, fire and continuous livestock grazing can, over time, result in the loss of palatable perennial grasses.

## State and transition model



### State 1

#### Reference State

Sideoats grama is the dominant grass species and occurs as a grassland or savanna where alligator juniper is the tree species. Large diameter alligator juniper trees (24-48" Diameter at Root Collar) range from 1 to 5 per acre.

#### Community 1.1

#### Midgrass Alligator Juniper Savanna



**Figure 4. 1.1 Midgrass alligator juniper savanna**

The reference plant community is grassland or a savanna dominated by sideoats grama. Blue grama is a large component of the community in the eastern portion of the CRA and a mixture of hairy and blue grama are large components in the western portion of the CRA. Prairie junegrass, muttongrass and bottlebrush squirreltail are a trace group of cool season grasses in the plant community and can diminish to lower levels after severe winter - spring drought. Alligator juniper is the principal tree species. A flora of native annual forbs and grasses, of both the winter and summer seasons, exist in the plant community. Periodic, naturally occurring, wildfires were important in maintaining the reference plant community.

**Table 5. Annual production by plant type**

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1100	1400	1789
Tree	0	30	60
Shrub/Vine	5	25	50
Forb	5	20	40
<b>Total</b>	<b>1110</b>	<b>1475</b>	<b>1939</b>

**Table 6. Soil surface cover**

Tree basal cover	0-1%
Shrub/vine/liana basal cover	0-1%
Grass/grasslike basal cover	15-20%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	50-85%
Surface fragments >0.25" and <=3"	0-35%
Surface fragments >3"	0-15%
Bedrock	0%
Water	0%
Bare ground	0%

**Table 7. Canopy structure (% cover)**

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	5-10%	0-3%
>0.5 <= 1	–	0-5%	20-30%	0-5%
>1 <= 2	–	–	40-50%	0-1%
>2 <= 4.5	0-10%	–	5-10%	–
>4.5 <= 13	–	–	–	–
>13 <= 40	0-5%	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Figure 6. Plant community growth curve (percent production by month). AZ3813, 38.3 20-24"p.z. all sites. Growth begins in the spring and continues into the summer and fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	10	15	15	20	10	5	5	0

## Community 1.2 Midgrass / alligator juniper savanna and sapling Community



Figure 7. 1.2 High juniper saplings

Alligator juniper savanna with 1 to 5 larger diameter (24-48" Diameter at Root Collar) trees per acre and 25-75 saplings per acre. Young juniper in this phase of the plant community have germinated and grown to approximately 3 feet tall. The fire management officer on Clifton Ranger District in the east portion of this Common Resource Area (CRA) reports prescribed fire is effective at killing saplings less than 2-3 feet tall. Fire is also effective at killing trees that have been cut and allowed to resprout before burning. Most trees that have resprouted are killed with a second fire if a first fire has not been effective. Fire has been most effective at killing both young trees and trees that have been cut and allowed to resprout when fire is applied in the fall or winter. The Clifton RD reports 70-80% kill of alligator juniper using these methods.

## Community 1.3 Midgrass savanna / sub shrub community

Sideoats grama is the dominant grass species. Populations of 200-300 snakeweed plants per acre are observed at substantial distances from livestock water. It has been observed that these populations can be a naturally occurring feature of the reference plant community and not a result of unmanaged livestock grazing. Snakeweed can naturally increase during climatic conditions favorable to its establishment and is easily killed by wildfire and drought, making this a periodic episode of the reference plant community. This increase in snakeweed has no

observed negative affects to herbaceous production in terms of the plant community being able to support fires. Drought or naturally occurring wildfires reduce snakeweeds densities to 0-20 plants per acre.

### Pathway 1.1A Community 1.1 to 1.2



Midgrass Alligator Juniper Savanna



Midgrass / alligator juniper savanna and sapling Community

Favorable weather for juniper seeds to establish and absence of fire allowing seedlings to grow to sapling size. Naturally occurring wildfire or prescribed fire before junipers become resistant to fire eliminates the saplings.

### Pathway 1.2A Community 1.1 to 1.3

Favorable weather patterns favor establishment of snakeweed seed, plants survive and grow to mature plants. Naturally occurring wildfire, prescribed fire, or severe winter/spring drought severely reduces or eliminates snakeweed plants.

### Pathway 1.1A Community 1.2 to 1.1



Midgrass / alligator juniper savanna and sapling Community



Midgrass Alligator Juniper Savanna

Natural or prescribed fire kills saplings less than 3 feet tall, restoring grassland or savanna aspect.

#### Conservation practices

Prescribed Burning

### Pathway 1.2A Community 1.3 to 1.1

Drought and/or natural or prescribed fires kill snakeweed plants which restores the grassland or savanna aspect

#### Conservation practices

Prescribed Burning

### State 2 Short grass State

Sideoats grama is replaced by blue and or hairy grama.

### Community 2.1 Blue grama grassland community



**Figure 8. 2.1 Blue grama grassland**

Continuous heavy herbivory from elk or livestock reduce the vigor of the dominant grass, sideoats grama. Blue grama being more tolerant of heavy herbivory replaces sideoats grama as the dominant grass and with very heavy herbivory becomes a sod grass versus a bunchgrass.

### **State 3**

#### **Low cover juniper State**

Alligator juniper tree canopies are 10 foot in diameter and approximately 20-25 feet apart.

#### **Community 3.1**

##### **Low cover alligator juniper Community**



**Figure 9. 3.1 Low Juniper Cover**

Alligator juniper has increased in canopy cover where trees averaging 10 foot canopy diameter are approximately 20-25 feet apart. Good herbaceous production occurs in the interspaces of the trees but practitioners are unlikely to apply fire in the hottest seasons with this level of tree canopy due to tree canopy fires and extreme fire behavior. Tree shredding has been applied on a limited basis in similar communities in the east central portion of the MLRA. The herbaceous response 2-3 years after shredding was capable of carrying a broadcast fire. This was based on the Clifton Ranger District fire management officer's suggestion that 800 lbs per acre of herbaceous fuel was the minimum requirement in their fire program.

### **State 4**

#### **Intermediate cover juniper State**

Tree canopies are 15-20 feet in diameter and 10-15 feet apart.

#### **Community 4.1**



## Intermediate cover alligator juniper woodland Community



Figure 10. 4.1 Intermediate Juniper Cover

Juniper tree canopies are 15-20 foot in diameter and 10-15 feet apart. Grass production with sideoats grama as the dominant can still occur in the interspaces of trees and is still vigorous, reproductive, and capable of producing seed. In the east central portion of the MLRA lightning caused fires have burned similar communities with 100% canopy kill but no studies have been conducted for effectiveness of the total kill of juniper on these sites.

### State 5

#### Juniper Woodland State

Juniper dominates the site.

### Community 5.1

#### High cover alligator juniper woodland Community



Figure 11. 5.1 High Juniper Cover

Nearly all understory herbaceous species are lost. Cool season grasses are found under the canopies of juniper trees. Soil rill erosion is still minimal.

### State 6

#### Juniper woodland, eroded State

High juniper cover, actively eroding soils.

### Community 6.1

#### High cover alligator juniper woodland Community with eroded soils



Figure 12. 6.1 High juniper cover, Eroding soils

High canopy cover of juniper. Herbaceous species are restricted to trace amounts of cool season species found under canopies of trees. Rill erosion is severe.

### **Transition T1A**

#### **State 1 to 2**

Continuous heavy herbivory reducing vigor of sideoats grama. Blue or hairy grama become dominant grasses.

### **Transition T1B**

#### **State 1 to 6**

Exact mechanism is unknown and this transition likely occurs as a result of reduced vigor and ground cover of desirable perennial grass plants and subsequent establishment of the introduced species.

### **Restoration pathway R2A**

#### **State 2 to 1**

Unknown. Species other than blue grama only establish where livestock pipelines have been ripped into the soil or other disturbances have reduced the competitive nature of blue grama in east central Arizona and west central New Mexico grasslands. Contour ripping and range seeding may assist in this restoration.

### **Conservation practices**

Grazing Land Mechanical Treatment
Range Planting

### **Transition T2A**

#### **State 2 to 3**

Fire suppression, continuous herbivory reducing fire fine fuel loads, junipers establishing and maturing into 10-15 foot tall trees. Potentially induced by changes in precipitation patterns favoring germination and establishment of cool season species.

### **Restoration pathway R3A**

#### **State 3 to 2**

Proper grazing use of remaining fine fuels. Lightning caused wildfire, mechanical removal of juniper trees followed by lightning or prescribed fire. Juniper mortality due to drought, principally at lower elevations of the site.

### **Conservation practices**

Brush Management
Prescribed Burning
Prescribed Grazing

**Transition T3A**  
**State 3 to 4**

Continued fire suppression. Extreme herbivory of remnant fine fuels. Additional juniper trees establish and or existing trees increase in size.

**Restoration pathway R4B**  
**State 4 to 1**

Unknown. Lightning or other extreme summer fire kills majority of juniper. Seeding after fire if herbaceous species are absent and very clayey subsoils are not exposed. Mechanical removal of juniper, reseeding, and lightning or prescribed fire once herbaceous fine fuels have recovered to support fire. If root is not removed by mechanical means maintenance fires should be applied as described for Community Phase 1.2 as this species will resprout. Alternative would be stump application of herbicide after cutting trees to control resprouting and prescribed fire to burn tree skeletons.

**Transition T4A**  
**State 4 to 5**

Continued fire suppression. Extreme herbivory of fine fuels.

**Restoration pathway R5B**  
**State 5 to 3**

Unknown. Lightning or other extreme summer fire kills greater amounts of juniper. Seeding after fire if very clayey subsoils are not exposed. Most junipers will resprout. Mechanical removal of larger junipers, reseeding, and lightning or prescribed fire once herbaceous fine fuels have recovered to support fire. Stump application of herbicide after cutting trees is needed to control sprouting if maintenance fire is not planned.

**Conservation practices**

Brush Management
Prescribed Burning
Range Planting
Prescribed Grazing

**Restoration pathway R5A**  
**State 5 to 4**

Unknown. Low intensity fire kills lesser amounts of juniper. Seeding after fire if very clayey subsoils are not exposed. Most junipers will resprout. Mechanical removal of larger junipers, reseeding, and lightning or prescribed fire once herbaceous fine fuels have recovered to support fire. Stump application of herbicide after cutting trees is needed to control sprouting if maintenance fire is not planned.

**Conservation practices**

Brush Management
Prescribed Burning
Grazing Land Mechanical Treatment
Range Planting

## Transition T5A State 5 to 6

Continued fire suppression. Rill erosion leading to very deep rills on the site.

### Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Mid Grasses</b>			700–1209	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	700–1200	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	0–5	–
	plains lovegrass	ERIN	<i>Eragrostis intermedia</i>	0–1	–
	green sprangletop	LEDU	<i>Leptochloa dubia</i>	0–1	–
	bullgrass	MUEM	<i>Muhlenbergia emersleyi</i>	0–1	–
2	<b>Cool season grasses</b>			5–40	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	3–20	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	1–10	–
	muttongrass	POFE	<i>Poa fendleriana</i>	1–10	–
3	<b>Misc. perennial grasses</b>			0–10	
	Arizona threeawn	ARAR6	<i>Aristida arizonica</i>	1–10	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	0–5	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	0–5	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	0–1	–
	hairy woollygrass	ERPI5	<i>Erioneuron pilosum</i>	0–1	–
	spike muhly	MUWR	<i>Muhlenbergia wrightii</i>	0–1	–
	bulb panicgrass	PABU	<i>Panicum bulbosum</i>	0–1	–
	Pringle's speargrass	PIPR2	<i>Piptochaetium pringlei</i>	0–1	–
	Texas bluestem	SCCI2	<i>Schizachyrium cirratum</i>	0–1	–
4	<b>Annual grasses</b>			5–30	
	little barley	HOPU	<i>Hordeum pusillum</i>	0–30	–
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	0–10	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0–10	–
	small fescue	VUMI	<i>Vulpia microstachys</i>	0–5	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–5	–
	delicate muhly	MUFR	<i>Muhlenbergia fragilis</i>	0–2	–
	littleseed muhly	MUMI	<i>Muhlenbergia microsperma</i>	0–2	–
5	<b>Short grasses</b>			300–500	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	200–350	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	10–300	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	10–25	–
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	0–10	–

Forb					
6	<b>Perennial forbs</b>			5–20	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–3	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0–1	–
	perennial rockcress	ARPE2	<i>Arabis perennans</i>	0–1	–
	wholeleaf Indian paintbrush	CAIN14	<i>Castilleja integra</i>	0–1	–
	sego lily	CANU3	<i>Calochortus nuttallii</i>	0–1	–
	whitemargin sandmat	CHAL11	<i>Chamaesyce albomarginata</i>	0–1	–
	rose heath	CHER2	<i>Chaetopappa ericoides</i>	0–1	–
	whiteflower prairie clover	DAAL	<i>Dalea albiflora</i>	0–1	–
	Torrey's craglily	ECFL	<i>Echeandia flavescens</i>	0–1	–
	trailing fleabane	ERFL	<i>Erigeron flagellaris</i>	0–1	–
	silver dwarf morning-glory	EVSE	<i>Evolvulus sericeus</i>	0–1	–
	shortsepal lewisia	LEBR	<i>Lewisia brachycalyx</i>	0–1	–
	Lewis flax	LILE3	<i>Linum lewisii</i>	0–1	–
	New Mexico yellow flax	LINE	<i>Linum neomexicanum</i>	0–1	–
	monkeyflower	MIMUL	<i>Mimulus</i>	0–1	–
	New Mexico groundsel	PANE7	<i>Packera neomexicana</i>	0–1	–
	orange fameflower	PHAU13	<i>Phemeranthus aurantiacus</i>	0–1	–
	Fendler's groundcherry	PHHEF	<i>Physalis hederifolia</i> var. <i>fendleri</i>	0–1	–
	slimflower scurfpea	PSTE5	<i>Psoralidium tenuiflorum</i>	0–1	–
	Arizona spikemoss	SEAR2	<i>Selaginella arizonica</i>	0–1	–
	Fendler's globemallow	SPFE	<i>Sphaeralcea fendleri</i>	0–1	–
	Rusby's globemallow	SPRU2	<i>Sphaeralcea rusbyi</i>	0–1	–
	stemless Townsend daisy	TOEX2	<i>Townsendia exscapa</i>	0–1	–
	toadflax penstemon	PELI2	<i>Penstemon linarioides</i>	0	–
	Cooley's bundleflower	DECO2	<i>Desmanthus cooleyi</i>	0	–
7	<b>Annual forbs</b>			5–20	
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0–5	–
	Arizona popcornflower	PLAR	<i>Plagiobothrys arizonicus</i>	0–2	–
	Wright's bird's beak	COWR2	<i>Cordylanthus wrightii</i>	0–2	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	0–2	–
	slender goldenweed	MAGR10	<i>Machaeranthera gracilis</i>	0–2	–
	mesa tansyaster	MATA	<i>Machaeranthera tagetina</i>	0–1	–
	slender phlox	MIGRG4	<i>Microsteris gracilis</i> var. <i>gracilis</i>	0–1	–
	Lindley's silverpuffs	MILI5	<i>Microseris lindleyi</i>	0–1	–
	wedgeleaf draba	DRCU	<i>Draba cuneifolia</i>	0–1	–
	harlequinbush	GAHEG	<i>Gaura hexandra</i> ssp. <i>gracilis</i>	0–1	–
	longleaf false goldeneye	HELOA2	<i>Heliomeris longifolia</i> var. <i>annua</i>	0–1	–
	crestrub morning-glory	IPCO2	<i>Ipomoea costellata</i>	0–1	–
	intermediate pepperweed	LEVIM	<i>Lepidium virginicum</i> var. <i>medium</i>	0–1	–
	New Mexico copperleaf	ACNE	<i>Acalypha neomexicana</i>	0–1	–

	annual agoseris	AGHE2	<i>Agoseris heterophylla</i>	0–1	–
	western rockjasmine	ANOC2	<i>Androsace occidentalis</i>	0–1	–
	smallflowered milkvetch	ASNU4	<i>Astragalus nuttallianus</i>	0–1	–
	blunt tansymustard	DEOB	<i>Descurainia obtusa</i>	0–1	–
	redseed plantain	PLRH	<i>Plantago rhodosperma</i>	0–1	–
	Douglas' knotweed	PODO4	<i>Polygonum douglasii</i>	0–1	–
	little hogweed	POOL	<i>Portulaca oleracea</i>	0–1	–
	sawtooth sage	SASU7	<i>Salvia subincisa</i>	0–1	–
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	0–1	–
	stemless Townsend daisy	TOEX2	<i>Townsendia exscapa</i>	0–1	–
	clasping Venus' looking-glass	TRPE4	<i>Triodanis perfoliata</i>	0–1	–
<b>Tree</b>					
8	<b>Trees</b>			0–60	
	alligator juniper	JUDE2	<i>Juniperus deppeana</i>	0–60	–
	alligator juniper	JUDE2	<i>Juniperus deppeana</i>	0	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			0–5	
	hollyleaf redberry	RHIL	<i>Rhamnus ilicifolia</i>	0–2	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–2	–
	yerba de pasmo	BAPT	<i>Baccharis pteronioides</i>	0–1	–
	Wright's silktassel	GAWR3	<i>Garrya wrightii</i>	0–1	–
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa var. biuncifera</i>	0–1	–
10	<b>Sub shrubs</b>			0–50	
	bastardsage	ERWR	<i>Eriogonum wrightii</i>	0–50	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–15	–
11	<b>Cacti</b>			0–2	
	Parry's agave	AGPA4	<i>Agave parryi</i>	0–2	–
	walkingstick cactus	CYSP8	<i>Cylindropuntia spinosior</i>	0–1	–
	pinkflower hedgehog cactus	ECFE	<i>Echinocereus fendleri</i>	0–1	–
	spiny star	ESVIV	<i>Escobaria vivipara var. vivipara</i>	0–1	–
	cactus apple	OPEN3	<i>Opuntia engelmannii</i>	0–1	–
	twistspine pricklypear	OPMA2	<i>Opuntia macrorhiza</i>	0–1	–
	tulip pricklypear	OPPH	<i>Opuntia phaeacantha</i>	0–1	–

## Animal community

This site is a significant habitat for pronghorn antelope. Elk utilize this site to a good degree in the evening coming out of shrub dominated browse sites at elevations below this site and ponderosa pine forests above this site.

This site is suitable for livestock grazing year round. There are limited areas of very cobbly surfaces that receive little livestock use. This site is susceptible to erosion in areas with very high livestock utilization like bed grounds, livestock trails, and areas adjacent to water.

## Hydrological functions

This site has high basal cover of perennial bunch grasses that maintain short water flow paths and relatively high infiltration. As this site is used by wildlife and livestock at higher degrees blue grama becomes the dominant species at most locations. If blue grama is maintained as a vigorous bunchgrass it provides a good level of infiltration on the site. As the vigor of blue grama further decreases at high levels of wildlife and livestock utilization and becomes a sod grass runoff can become significant but the grass can still provide a fair degree of soil protection and pedestalling is not very extensive. At severe levels of wildlife and livestock utilization where the basal cover of blue grama is reduced soil erosion can become significant and pedestalling of grass plants becomes significant. The interaction between juniper competition and severe wildlife and livestock utilization can reduce the cover of herbaceous plants to the point where severe rill formation begins to occur.

## Recreational uses

Hunting, camping, horseback riding, backpacking, rock hounding, photography.

## Wood products

In the reference community there is limited harvest of fuel wood, fence posts and stays from pinyon and juniper. Substantial quantities of juniper are available on this site where it has been allowed to progress to woodland. Volume of wood can be calculated from David Chojnacky's 1988 publication: Juniper, pinyon, oak and mesquite volume equations for Arizona.

## Other products

Western Apache use approximately 700 species of plants in the region. This site provides an important source of plants and animals for traditional uses in the reference state. As the site degrades to woodland the number of species of plants and animals used for traditional purposes declines significantly.

## Inventory data references

Production data were obtained by dry weight rank/comparative yield method for herbaceous and sub shrub species. Production data for trees and shrubs were obtained from ocular estimates on a per acre basis and the use of AZ NRCS Range Technical Note #52 due to the low densities of these species.

## Type locality

Location 1: Gila County, AZ	
General legal description	South of Salt River Canyon above Seneca Lake.

## 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)	Dave Womack, Emilio Carrillo, Scott Stratton, Dan Robinett
Contact for lead author	USDA NRCS Tucson Area Office
Date	03/15/2011

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

## Indicators

1. **Number and extent of rills:** None present on the site. Perennial grass basal area is 15-20%, dominated by bunchgrasses less than 12" apart, promote infiltration, and break up water flow reducing its energy and ability to produce rills on the site.  

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2. **Presence of water flow patterns:** Water flow paths are less than 12 inches in length before encountering plant bases. Perennial grass basal area is 15-20%, dominated by bunchgrasses less than 12" apart and breaks up water flow paths.  

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3. **Number and height of erosional pedestals or terracettes:** None present on the site. Very high density of plants reduces potential for soil erosion and pedestal formation. Plant community is dominated by bunchgrasses that are not conducive to terracette formation.  

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 2-10%.  

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5. **Number of gullies and erosion associated with gullies:** None present on the site. See #2 above.  

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None present on the site. High density and canopy of perennial grass not conducive to wind erosion.  

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter travels less than 12 inches in water flow paths before being trapped by plant bases.  

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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 stability values range from 4-6.  

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is granular with weak to moderate rupture resistance. Surfaces range from 3 to 4 inches thick and have colors ranging from 7.5YR 4/3 to 10YR dry and 7.5YR 3/3 to 10YR 2/2 moist.  

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Midgrasses >> short grasses > cool season grasses = annual forbs & grasses = trees & shrubs > perennial forbs. High density and 15-20% basal area of perennial grasses is very conducive to slowing down water leaving 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 present on the site. Argillic horizon is 2-4 inches deep and when dry has moderate to strong structure that can be mistaken for a compaction layer.

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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: Midgrasses >> short grasses

Sub-dominant: cool season grass = annual forbs & grasses = trees & shrubs

Other:

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very low plant mortality; approximately 1-2% of short grasses are dead.

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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):** 1100 lbs/ac below average year, 1500 lbs/ac average year, 1950 lbs/ac above average year

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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:** Alligator juniper, yellow bluestem, yellow star thistle.

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17. **Perennial plant reproductive capability:** Not affected after several years of drought in the region

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