

## Ecological site R038XA115AZ Volcanic Upland 12-16" p.z.

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### 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.

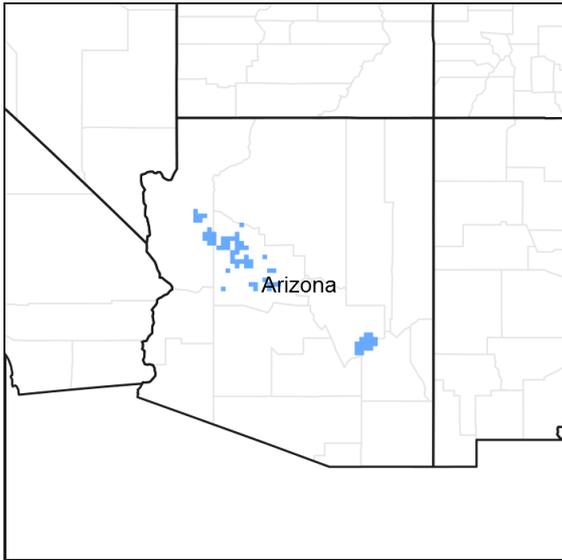


Figure 1. Mapped extent

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 38.1 – Lower Mogollon Transition

Elevations range from 3000 to 4500 feet and precipitation averages 12 to 16 inches per year. Vegetation includes canotia, one-seed juniper, mesquite, catclaw acacia, jojoba, turbinella oak, ratany, shrubby buckwheat, algerita, skunkbush, tobosa, vine mesquite, bottlebrush squirreltail, grama species, curly mesquite, desert needlegrass and New Mexico feathergrass. The soil temperature regime is thermic and the soil moisture regime is ustic aridic. 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

R038XA102AZ	Clayey Upland 12-16" p.z.
R038XA103AZ	Clay Loam Upland 12-16" p.z.
R038XA117AZ	Volcanic Hills 12-16" p.z. Clayey

## Similar sites

R038XB213AZ	Volcanic Upland 16-20" p.z.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Eriogonum wrightii</i> (2) <i>Opuntia spinosior</i>
Herbaceous	(1) <i>Pleuraphis mutica</i> (2) <i>Hilaria belangeri</i>

## Physiographic features

This site occurs in the lower elevations of the Mogollon Transition zone south of the rim in central Arizona. This site occurs in an upland position. It occurs on gently sloping pediments, basalt flows and mesa tops.

Table 2. Representative physiographic features

Landforms	(1) Pediment (2) Lava flow (3) Mesa
Flooding frequency	None
Ponding frequency	None
Elevation	3,200–4,600 ft
Slope	0–15%
Ponding depth	0 in
Aspect	Aspect is not a significant factor

## Climatic features

Precipitation in this common resource area averages 12 to 16 inches. The winter-summer rainfall ratio ranges from about 60-40% in the northwest portion of the Land Resource Unit to about 50-50% in the southeast region. Summer rains fall July through September 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 northern Pacific, and falls as rain or snow in widespread storms of low intensity and long duration. Snowfall ranges from a trace to 10 inches per year and can occur from November through March. At the lower elevations, snow seldom persists longer than a day. May and June are the driest months of the year. Humidity is generally low all year. Average annual air temperatures range from 59 to 70 degrees F., a thermic temperature regime. Daytime temperatures in summer are commonly in the 90's. Freezing temperatures are common from October through April, usually during the night or early morning hours. The actual precipitation, available moisture, and temperature varies depending upon region, elevation, rain shadow effect, and aspect.

Table 3. Representative climatic features

Frost-free period (average)	230 days
Freeze-free period (average)	300 days
Precipitation total (average)	16 in

## Influencing water features

There are no water features associated with this site.

## Soil features

These soils are shallow (10 to 20 inches deep), clayey throughout and well drained. They are formed in alluvium from basalt, andesite and related volcanic tuff and ash. The surface textures are clayloam and clay. These soils have vertic properties and crack and churn with wetting and drying. The effective rooting depth is limited due to hard bedrock at 20 inches or less. Runoff is slow on dry soils due to cracks and holes, but is high on moist soils. The erosion hazard is slight unless heavy traffic causes trailing and compaction. The soils mapped here include: from SSA-627 Mohave County Southern Part MU Graham-54; SSA-637 Yavapai County Western Part MU's Faraway GrL, StVL-FaC & Venezia StVL-VnD, VsC & VtC; SSA-675 San Carlos IR Area MU Eskiminzin-640; SSA-697 Mohave County Central Part MU's Graham-45, Kingtut-72 & Promontory-72.

Table 4. Representative soil features

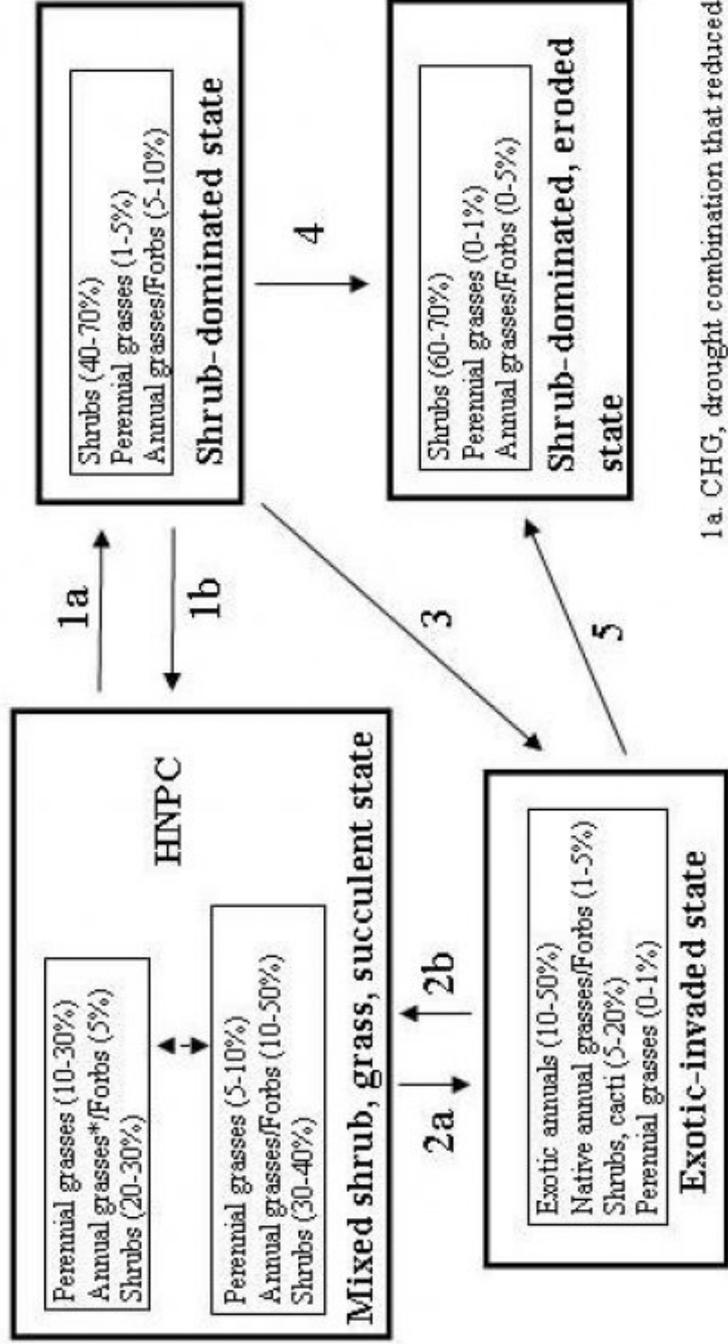
Parent material	(1) Alluvium–basalt
Surface texture	(1) Cobbly clay (2) Gravelly clay loam (3) Clay
Family particle size	(1) Clayey
Drainage class	Well drained to moderately well drained
Permeability class	Moderate to slow
Soil depth	10–20 in
Surface fragment cover ≤3"	5–20%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	1.2–2.4 in
Calcium carbonate equivalent (0-40in)	1–15%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	7–8.2
Subsurface fragment volume ≤3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0–5%

## Ecological dynamics

The historic native plant community is a mixed shrub, succulent, grass community (tobosa dominated) with a diverse flora of native annual grasses and forbs of both the winter and summer season. Periodic wildfires which burned adjacent sites with deep soils, would not carry easily through these areas with shallow soils and poor fuel continuity. In the absence of fire for longer periods shrubs and cacti can exist in the potential plant community. The interactions of drought, grazing and fire can result in loss of tobosa cover. If tobosa canopy cover is reduced to less than 5% and is patchy in distribution; it may not be able to re-colonize large areas. In these situations, annual species, both native and non-native can dominate the plant community. Non-native annuals may, over time, diminish the soil seed-bank of native annual species.

## State and transition model

# MLRA 38.1 (12-16''), Volcanic Upland



1a. CHG, drought combination that reduced tobosa grass cover.

1b. Herbicide followed by possible seeding of tobosa.

2a. Introduction of seed source, CHG, drought combination.

2b. Unknown

3. Introduction of seed source, El Nino type event, catastrophic fire.

4, 5. Accelerated soil erosion may occur where herbaceous patches are absent. Usually heavy traffic from livestock or vehicles, soil compaction, rilling and loss of surface soil.

\* Annual grasses include natives and non-natives

**State 1**  
**Mixed Shrub-Grass State**

**Community 1.1**  
**Historic Native Plant Community**

The historic native plant community is a shrub, succulent, grass community dominated by tobosa grass with lesser amounts of shrubby buckwheat and cacti. A rich flora of native annual forbs and grasses, of both the winter and summer seasons, exist in the plant community. Periodic, naturally occurring wildfires usually left these areas unburned due to lack of fine fuel continuity, shallow soils and rock outcrop.

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

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	170	400	720
Shrub/Vine	100	200	325
Forb	2	20	265
Tree	0	5	25
<b>Total</b>	<b>272</b>	<b>625</b>	<b>1335</b>

**Table 6. Soil surface cover**

Tree basal cover	0-1%
Shrub/vine/liana basal cover	1-2%
Grass/grasslike basal cover	2-5%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	1-5%
Litter	10-40%
Surface fragments >0.25" and <=3"	25-50%
Surface fragments >3"	5-15%
Bedrock	1-10%
Water	0%
Bare ground	5-55%

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

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	1-5%	1-10%	0-5%
>0.5 <= 1	–	5-10%	1-10%	1-10%
>1 <= 2	–	1-5%	15-30%	0-5%
>2 <= 4.5	–	5-10%	0-1%	–
>4.5 <= 13	0-1%	0-5%	–	–
>13 <= 40	0-2%	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Figure 6. Plant community growth curve (percent production by month). AZ3811, 38.1 12-16" p.z. all sites. Growth begins in the spring, most growth occurs in the summer..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	1	7	15	20	22	20	10	5	0	0

## State 2 Shrub Dominated State

### Community 2.1 Shrub Dominated Plant Community

Tobosa canopy cover is reduced due to the interactions of drought, grazing and / or fire. Shrubs, cacti and annual forbs and grasses dominate the plant community. Tobosa canopy cover is less than 5% and patchy in distribution. Tobosa may not be able to re-colonize large areas because of very poor seed production and no seed-bank. Vertic soil properties maintain good, surface, soil tilth and good infiltration rates when soils are dry. Plant production is high, even with the lack of perennial grass cover, due to soil cracking.

## State 3 Exotic Invaded State

### Community 3.1 Exotic Forb and Grass Plant Community

Non-native annual grasses and forbs like; red brome, cheatgrass, tumble mustard, wild oats and filaree, can invade and dominate areas of the site with very low tobosa cover. These species can, over time, reduce the seed-bank of native annual grasses and forbs. Their presence can increase the fire frequency (of man made fires) especially where roads and urban areas are adjacent to areas of the site.

## State 4 Shrub Dominated, Eroded state

### Community 4.1 Shrub Dominated, Eroded Plant Community

Shrubs like; whitethorn acacia, mesquite, wait a bit mimosa and catclaw acacia; and succulents like; prickly pear, cholla and banana yucca increase to dominate the site. Tobosa cannot re-colonize large areas with low canopy cover levels and patchy distribution. Heavy livestock or vehicle traffic causes soil compaction, rilling and loss of soil surface.

## 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>Dominant mid grasses</b>			150–300	
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	150–300	–
2	<b>Cool season grasses</b>			2–20	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	2–20	–
3	<b>Miscellaneous perennial grasses</b>			10–200	
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	10–100	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	1–50	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	10–50	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	1–50	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–50	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–50	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	5–50	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	0–50	–
	tanglehead	HECO10	<i>Heteropogon contortus</i>	0–20	–
	slender grama	BORE2	<i>Bouteloua repens</i>	0–20	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	0–10	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	0–10	–
	Parish's threeawn	ARPUP5	<i>Aristida purpurea</i> var. <i>parishii</i>	0–10	–
	spidergrass	ARTEG	<i>Aristida ternipes</i> var. <i>gentilis</i>	0–10	–
	plains lovegrass	ERIN	<i>Eragrostis intermedia</i>	0–2	–
	green sprangletop	LEDU	<i>Leptochloa dubia</i>	0–2	–
4	<b>Annual grasses</b>			5–200	
	mucronate sprangletop	LEPAB	<i>Leptochloa panicea</i> ssp. <i>brachiata</i>	1–150	–
	little barley	HOPU	<i>Hordeum pusillum</i>	0–100	–
	Mexican panicgrass	PAHI5	<i>Panicum hirticaule</i>	0–50	–
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	0–50	–
	Arizona signalgrass	URAR	<i>Urochloa arizonica</i>	0–25	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0–20	–
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	0–20	–
	Mexican sprangletop	LEFUU	<i>Leptochloa fusca</i> ssp. <i>uninervia</i>	0–10	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–10	–
	witchgrass	PACA6	<i>Panicum capillare</i>	0–10	–
	feather fingergrass	CHVI4	<i>Chloris virgata</i>	0–5	–
	small fescue	VUMI	<i>Vulpia microstachys</i>	0–5	–
	Eastwood fescue	VUMIC	<i>Vulpia microstachys</i> var. <i>ciliata</i>	0–5	–
	sticky sprangletop	LEVI5	<i>Leptochloa viscida</i>	0–5	–
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	0–5	–
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	0–2	–
	delicate muhly	MUFR	<i>Muhlenbergia fragilis</i>	0–2	–

	littleseed muhly	MUMI	<i>Muhlenbergia microsperma</i>	0-2	-
	Bigelow's bluegrass	POBI	<i>Poa bigelovii</i>	0-2	-
	canyon cupgrass	ERLE7	<i>Eriochloa lemmonii</i>	0-2	-
	tufted lovegrass	ERPE	<i>Eragrostis pectinacea</i>	0-2	-
	desert lovegrass	ERPEM	<i>Eragrostis pectinacea</i> var. <i>miserrima</i>	0-2	-
<b>Forb</b>					
5	<b>Perennial forbs</b>			1-15	
	wealeaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	1-10	-
	largeflower onion	ALMA4	<i>Allium macropetalum</i>	0-5	-
	bluedicks	DICA14	<i>Dichelostemma capitatum</i>	1-5	-
	Indian rushpea	HOGL2	<i>Hoffmannseggia glauca</i>	1-2	-
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	0-2	-
	brownplume wirelettuce	STPA4	<i>Stephanomeria pauciflora</i>	0-2	-
	Louisiana vetch	VILUL2	<i>Vicia ludoviciana</i> ssp. <i>ludoviciana</i>	0-2	-
	perennial rockcress	ARPE2	<i>Arabis perennans</i>	0-2	-
	Watson's dutchman's pipe	ARWA	<i>Aristolochia watsonii</i>	0-1	-
	scarlet spiderling	BOCO	<i>Boerhavia coccinea</i>	0-1	-
	Arizona wrightwort	CAAR7	<i>Carlowrightia arizonica</i>	0-1	-
	desert mariposa lily	CAKE	<i>Calochortus kennedyi</i>	0-1	-
	sego lily	CANU3	<i>Calochortus nuttallii</i>	0-1	-
	Indian paintbrush	CAST12	<i>Castilleja</i>	0-1	-
	lipfern	CHEIL	<i>Cheilanthes</i>	0-1	-
	rose heath	CHER2	<i>Chaetopappa ericoides</i>	0-1	-
	dwarf desertpeony	ACNA2	<i>Acourtia nana</i>	0-1	-
	brownfoot	ACWR5	<i>Acourtia wrightii</i>	0-1	-
	trailing windmills	ALIN	<i>Allionia incarnata</i>	0-1	-
	tuber anemone	ANTU	<i>Anemone tuberosa</i>	0-1	-
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0-1	-
	branched noseburn	TRRA5	<i>Tragia ramosa</i>	0-1	-
	longflower tube tongue	JULO3	<i>Justicia longii</i>	0-1	-
	Wright's deervetch	LOWR	<i>Lotus wrightii</i>	0-1	-
	plains blackfoot	MELE2	<i>Melampodium leucanthum</i>	0-1	-
	wishbone-bush	MILAV	<i>Mirabilis laevis</i> var. <i>villosa</i>	0-1	-
	tufted evening primrose	OECA10	<i>Oenothera caespitosa</i>	0-1	-
	cliffbrake	PELLA	<i>Pellaea</i>	0-1	-
	Parry's beardtongue	PEPA24	<i>Penstemon parryi</i>	0-1	-
	slimleaf bean	PHAN3	<i>Phaseolus angustissimus</i>	0-1	-
	orange fameflower	PHAU13	<i>Phemeranthus aurantiacus</i>	0-1	-
	canaigre dock	RUHY	<i>Rumex hymenosepalus</i>	0-1	-
	twinleaf senna	SEBA3	<i>Senna bauhinioides</i>	0-1	-
	Coues' cassia	SECO10	<i>Senna covesii</i>	0-1	-
	New Mexico fanpetals	SINE	<i>Sida neomexicana</i>	0-1	-
	silverleaf nightshade	SOEL	<i>Solanum elaeagnifolium</i>	0-1	-

	whitestem goldenbush	ERDI14	<i>Ericameria discoidea</i>	0–1	–
	beeblossom	GAURA	<i>Gaura</i>	0–1	–
	southwestern mock vervain	GLGO	<i>Glandularia gooddingii</i>	0–1	–
	desert rosemallow	HICO	<i>Hibiscus coulteri</i>	0–1	–
	whitemouth dayflower	COER	<i>Commelina erecta</i>	0–1	–
	Cooley's bundleflower	DECO2	<i>Desmanthus cooleyi</i>	0–1	–
6	<b>Annual forbs</b>			1–250	
	Coulter's spiderling	BOCO2	<i>Boerhavia coulteri</i>	0–25	–
	California poppy	ESCAM	<i>Eschscholzia californica</i> ssp. <i>mexicana</i>	0–25	–
	longleaf false goldeneye	HELOA2	<i>Helioomeris longifolia</i> var. <i>annua</i>	0–25	–
	Arizona popcornflower	PLAR	<i>Plagiobothrys arizonicus</i>	1–25	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	0–15	–
	bristly fiddleneck	AMTE3	<i>Amsinckia tessellata</i>	0–15	–
	sensitive partridge pea	CHNI2	<i>Chamaecrista nictitans</i>	0–10	–
	Coulter's lupine	LUSP2	<i>Lupinus sparsiflorus</i>	0–10	–
	thelypody	THELY	<i>Thelypodium</i>	0–10	–
	woolly tidestromia	TILA2	<i>Tidestromia lanuginosa</i>	0–5	–
	spreading fanpetals	SIAB	<i>Sida abutifolia</i>	0–5	–
	manybristle chinchweed	PEPA2	<i>Pectis papposa</i>	0–5	–
	phacelia	PHACE	<i>Phacelia</i>	0–5	–
	creamcups	PLCA5	<i>Platystemon californicus</i>	0–5	–
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	1–5	–
	slender goldenweed	MAGR10	<i>Machaeranthera gracilis</i>	0–5	–
	tanseyleaf tansyaster	MATA2	<i>Machaeranthera tanacetifolia</i>	0–5	–
	miniature lupine	LUBI	<i>Lupinus bicolor</i>	0–5	–
	pitseed goosefoot	CHBE4	<i>Chenopodium berlandieri</i>	0–5	–
	shaggyfruit pepperweed	LELA	<i>Lepidium lasiocarpum</i>	0–5	–
	Thurber's pepperweed	LETH2	<i>Lepidium thurberi</i>	0–5	–
	foothill deervetch	LOHU2	<i>Lotus humistratus</i>	0–5	–
	coastal bird's-foot trefoil	LOSA	<i>Lotus salsuginosus</i>	0–5	–
	crestrub morning-glory	IPCO2	<i>Ipomoea costellata</i>	0–5	–
	cryptantha	CRYPT	<i>Cryptantha</i>	0–5	–
	Arizona poppy	KAGR	<i>Kallstroemia grandiflora</i>	0–5	–
	New Mexico thistle	CINE	<i>Cirsium neomexicanum</i>	0–5	–
	miner's lettuce	CLPEP	<i>Claytonia perfoliata</i> ssp. <i>perfoliata</i>	0–5	–
	fivewing spiderling	BOIN	<i>Boerhavia intermedia</i>	0–5	–
	fringed redmaids	CACI2	<i>Calandrinia ciliata</i>	0–5	–
	exserted Indian paintbrush	CAEXE	<i>Castilleja exserta</i> ssp. <i>exserta</i>	0–5	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–5	–
	carelessweed	AMPA	<i>Amaranthus palmeri</i>	0–5	–
	hoary bowlesia	BOIN3	<i>Bowlesia incana</i>	0–2	–
	scrambled eggs	COAU2	<i>Corydalis aurea</i>	0–2	–
	wedgeleaf draba	DRCU	<i>Draba cuneifolia</i>	0–2	–

	miniature woollystar	ERDI2	<i>Eriastrum diffusum</i>	0–2	–
	American wild carrot	DAPU3	<i>Daucus pusillus</i>	0–2	–
	sacred thorn-apple	DAWR2	<i>Datura wrightii</i>	0–2	–
	Arizona lupine	LUAR4	<i>Lupinus arizonicus</i>	0–2	–
	Goodding's bladderpod	LEGO2	<i>Lesquerella gooddingii</i>	0–2	–
	hollowleaf annual lupine	LUSU3	<i>Lupinus succulentus</i>	0–2	–
	desert evening primrose	OEPR	<i>Oenothera primiveris</i>	0–2	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0–2	–
	purslane	PORTU	<i>Portulaca</i>	0–2	–
	New Mexico plumeseed	RANE	<i>Rafinesquia neomexicana</i>	0–2	–
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	0–2	–
	sand fringe-pod	THCU	<i>Thysanocarpus curvipes</i>	0–1	–
	sawtooth sage	SASU7	<i>Salvia subincisa</i>	0–1	–
	desert unicorn-plant	PRAL4	<i>Proboscidea althaeifolia</i>	0–1	–
	doubleclaw	PRPA2	<i>Proboscidea parviflora</i>	0–1	–
	Florida pellitory	PAFL3	<i>Parietaria floridana</i>	0–1	–
	green carpetweed	MOVE	<i>Mollugo verticillata</i>	0–1	–
	Fendler's desertydandelion	MAFE	<i>Malacothrix fendleri</i>	0–1	–
	warty caltrop	KAPA	<i>Kallstroemia parviflora</i>	0–1	–
	California goldfields	LACA7	<i>Lasthenia californica</i>	0–1	–
	redstar	IPCO3	<i>Ipomoea coccinea</i>	0–1	–
	ivy-leaf morning-glory	IPHE	<i>Ipomoea hederacea</i>	0–1	–
	sorrel buckwheat	ERPO4	<i>Eriogonum polycladon</i>	0–1	–
	Texas stork's bill	ERTE13	<i>Erodium texanum</i>	0–1	–
	Mexican fireplant	EUHE4	<i>Euphorbia heterophylla</i>	0–1	–
	spurge	EUPHO	<i>Euphorbia</i>	0–1	–
	star gilia	GIST	<i>Gilia stellata</i>	0–1	–
	five eyes	CHAMA8	<i>Chamaesaracha</i>	0–1	–
	annual agoseris	AGHE2	<i>Agoseris heterophylla</i>	0–1	–

#### Shrub/Vine

7	<b>Shrubs</b>			15–75	
	catclaw acacia	ACGR	<i>Acacia greggii</i>	10–35	–
	Sonoran scrub oak	QUTU2	<i>Quercus turbinella</i>	0–10	–
	spiny hackberry	CEEH	<i>Celtis ehrenbergiana</i>	0–5	–
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa</i> var. <i>biuncifera</i>	0–5	–
	blue paloverde	PAFL6	<i>Parkinsonia florida</i>	0–5	–
	western honey mesquite	PRGLT	<i>Prosopis glandulosa</i> var. <i>torreyana</i>	0–5	–
	velvet mesquite	PRVE	<i>Prosopis velutina</i>	0–5	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0–5	–
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	0–5	–
	jojoba	SICH	<i>Simmondsia chinensis</i>	0–5	–
	lotebush	ZIOBC	<i>Ziziphus obtusifolia</i> var. <i>canescens</i>	0–2	–
	Berlandier's wolfberry	LYBE	<i>Lycium berlandieri</i>	0–2	–

	pale desert-thorn	LYPA	<i>Lycium pallidum</i>	0–2	–
	red barberry	MAHA4	<i>Mahonia haematocarpa</i>	0–2	–
	algerita	MATR3	<i>Mahonia trifoliolata</i>	0–2	–
	littleleaf sumac	RHMI3	<i>Rhus microphylla</i>	0–2	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–1	–
	desert sweet	CHMI2	<i>Chamaebatiaria millefolium</i>	0–1	–
	California brickellbush	BRCA3	<i>Brickellia californica</i>	0–1	–
8	<b>Half shrubs</b>			50–150	
	bastardsage	ERWR	<i>Eriogonum wrightii</i>	10–60	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–15	–
	littleleaf ratany	KRER	<i>Krameria erecta</i>	0–10	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–10	–
	fairyduster	CAER	<i>Calliandra eriophylla</i>	0–10	–
	rough menodora	MESC	<i>Menodora scabra</i>	0–5	–
	burweed	ISTE2	<i>Isocoma tenuisecta</i>	0–1	–
	turpentine bush	ERLA12	<i>Ericameria laricifolia</i>	0–1	–
	threadleaf snakeweed	GUMI	<i>Gutierrezia microcephala</i>	0–1	–
	pelotazo	ABIN	<i>Abutilon incanum</i>	0–1	–
	yerba de pasmo	BAPT	<i>Baccharis pteronioides</i>	0–1	–
9	<b>Succulents</b>			25–100	
	walkingstick cactus	CYSP8	<i>Cylindropuntia spinosior</i>	5–50	–
	cactus apple	OPEN3	<i>Opuntia engelmannii</i>	10–50	–
	banana yucca	YUBA	<i>Yucca baccata</i>	1–15	–
	tulip pricklypear	OPPH	<i>Opuntia phaeacantha</i>	1–10	–
	Christmas cactus	CYLE8	<i>Cylindropuntia leptocaulis</i>	0–10	–
	Schott's century plant	AGSC3	<i>Agave schottii</i>	0–5	–
	sacahuista	NOMI	<i>Nolina microcarpa</i>	0–5	–
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	0–2	–
	goldenflower century plant	AGCH2	<i>Agave chrysantha</i>	0–2	–
	dollarjoint pricklypear	OPCH	<i>Opuntia chlorotica</i>	0–2	–
	soaptree yucca	YUEL	<i>Yucca elata</i>	0–1	–
	Palmer's century plant	AGPA3	<i>Agave palmeri</i>	0–1	–
	buck-horn cholla	CYAC8	<i>Cylindropuntia acanthocarpa</i>	0–1	–
	Whipple cholla	CYWH	<i>Cylindropuntia whipplei</i>	0–1	–
	common sotol	DAWH2	<i>Dasylirion wheeleri</i>	0–1	–
	pinkflower hedgehog cactus	ECBO2	<i>Echinocereus bonkerae</i>	0–1	–
	Engelmann's hedgehog cactus	ECEN	<i>Echinocereus engelmannii</i>	0–1	–
	pinkflower hedgehog cactus	ECFA	<i>Echinocereus fasciculatus</i>	0–1	–
	spiny star	ESVI2	<i>Escobaria vivipara</i>	0–1	–
<b>Tree</b>					
10	<b>Trees</b>			0–25	
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	0–20	–
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	0–20	–

	redberry juniper	JUCO11	<i>Juniperus coahuilensis</i>	0–20	–
	alligator juniper	JUDE2	<i>Juniperus deppeana</i>	0–5	–
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	0–5	–
	crucifixion thorn	CAHO3	<i>Canotia holacantha</i>	0–5	–

## Animal community

This site is suitable for grazing year round and is traversed by all classes of livestock. Very stony and cobbly surfaces can hinder livestock movement. The site is susceptible to erosion only in overgrazed areas, old roads, cattle trails and concentration areas like bed grounds, water-lots and salt grounds.

This site has good habitat diversity for a variety of desert and grassland wildlife species.

## Hydrological functions

Due to soil cracking and high gravel, rock covers (producing rough surfaces), this site has high, initial, infiltration rates. It produces runoff when rain falls or snow melts, and the soils are moist.

## Recreational uses

Climate is characterized by warm summers and cold winters. Recreation activities include hunting, hiking, camping, photography, bird watching and backpacking.

## Wood products

There are no significant wood products produced on this site.

## Other products

There is some native harvest of food plants like wild onions, grassnuts, prickly pear and cholla fruits and thistle. Clay for pot making. Malapai rock for building.

## Type locality

Location 1: Graham County, AZ	
Township/Range/Section	T8S R22E S18
General legal description	On Eureka Springs ranch.

## Contributors

Dan Robinett  
Larry D. Ellicott

## 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:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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

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5. **Number of gullies and erosion associated with gullies:**

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

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

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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):**

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

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

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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):**

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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:

Sub-dominant:

Other:

Additional:

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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:**
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17. **Perennial plant reproductive capability:**
-