USDA Natural Resources Conservation Service

Ecological site R038XA126AZ
Limy Slopes 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.

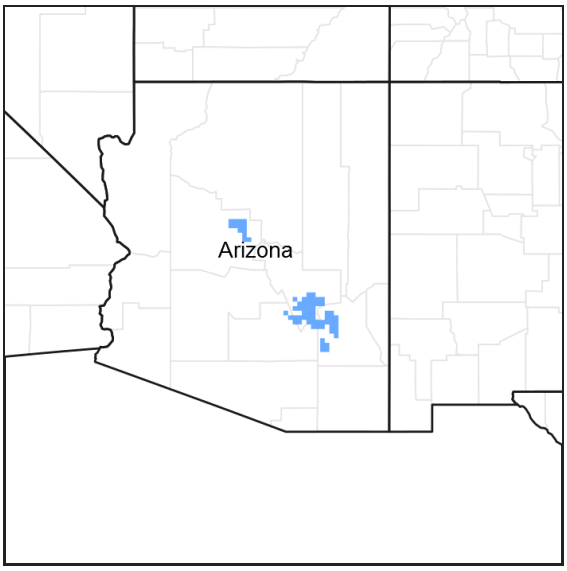


Figure 1. Mapped extent

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.

Classification relationships

Similar to TES Mapping Units # 356, 383 and 460 on the Prescott National Forest.

Associated sites

R038XA105AZ	**Limestone Hills 12-16" p.z.**

R038XA106AZ	**Limy Upland 12-16" p.z.**
R038XA108AZ	**Clayey Slopes 12-16" p.z.**

Similar sites

R041XB207AZ	**Limy Slopes 8-12" p.z.**
R041XC308AZ	**Limy Slopes 12-16" p.z.**
R040XA110AZ	**Limy Slopes 10"-13" p.z.**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *acacia constricta* (2) *calliandra eriophylla*
Herbaceous	(1) *bouteloua eriopoda* (2) *bouteloua curtipendula*

Physiographic features

This site occurs at the lowest elevations of the interior chaparral zone in the Mogollon Transition area. It occurs in an upland position; on steep hill slopes and ridges.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Scarp slope (3) Ridge
Flooding frequency	None
Elevation	3,100–4,600 ft
Slope	15–55%
Aspect	N, E, S

Climatic features

Precipitation in this common resource area averages 12 to 16 inches annually. The winter-summer rainfall ratio ranges from about 60/40% in the northwest part of the area to 50/50% in the southeast part. Summer rains fall July through September; 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 a trace to 10 inches per year and can occur from November through March. Snow seldom persists for more than a day except on north aspects. 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 (thermic temperature regime). Daytime temperatures in the summer are commonly in the high 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 vary, depending on, region, elevation, rain shadow effect and aspect.

Table 3. Representative climatic features

Frost-free period (average)	230 days
Freeze-free period (average)	285 days
Precipitation total (average)	16 in

Influencing water features

There are no water features associated with this site.

Soil features

These soils are moderately deep to deep (30-60 inches) and dark colored in the surface (6-12 inches). They are loamy textured, very calcareous and well drained. They have formed in alluvium and colluvium from limestone and related limy conglomerates. Soil surfaces are well covered by light colored gravels, cobbles and/or stones. The erosion hazard is slight due to gravel, cobble and rock covers.

Soils mapped to date on this site include: from SSA-639 Black Hills-Sedona Area MU's Tombstone-441, 541 & 641, Blancoverde-428 & 528 and Mule family-440; SSA-675 Tombstone-505, 551 & 595, Torriorthents-551.

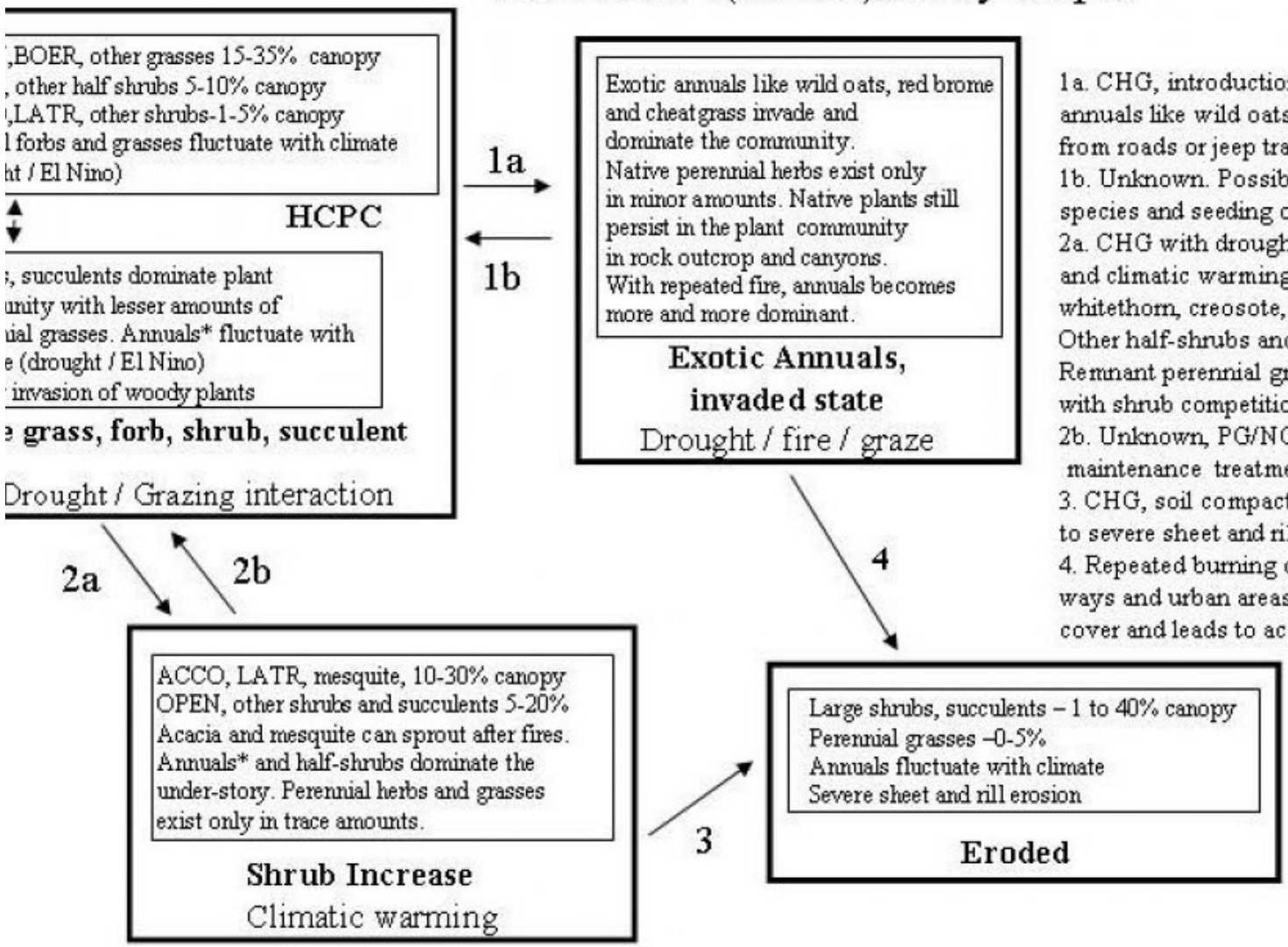
Table 4. Representative soil features

Parent material	(1) Alluvium–limestone (2) Colluvium–conglomerate
Surface texture	(1) Gravelly sandy loam (2) Very gravelly sandy loam (3) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to moderate
Soil depth	30–60 in
Surface fragment cover <=3"	35–60%
Surface fragment cover >3"	1–10%
Available water capacity (0-40in)	2–4 in
Calcium carbonate equivalent (0-40in)	10–35%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	7.8–8.6
Subsurface fragment volume <=3" (Depth not specified)	15–65%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

The historic native plant community is dominated by perennial warm season grasses with a mixture of desert shrubs, half shrubs, succulents and forbs. This includes a flora of native annual grasses and forbs of both the winter and summer seasons. Periodic wildfires occurred at moderate intervals (15 to 30 years) and helped to maintain a balance between grasses and shrubs. The interactions of drought, fire and continuous livestock grazing can, over time, result in the loss of palatable grasses, half shrubs and suffrutescent forbs on this site. The lack of fire for very long periods can lead to increases in large shrubs like creosotebush and whitethorn acacia. In some situations non-native annuals can dominate the site. These species can, over time, diminish the soil seed-bank of native annual species. Non-native annuals can act to increase the fire frequency of areas of the site near roads and urban areas, where the incidence of man-made fires is high.

MLRA 38-1(12-16"), Limy Slopes



1a. CHG, introduction of a seed source of exotic annuals like wild oats, red brome and cheatgrass usually from roads or jeep trails through areas of the site.
1b. Unknown. Possible herbicide treatment of exotics species and seeding of native grasses.
2a. CHG with drought, lack of fire for long periods and climatic warming. Increase by large shrubs like whitethorn, creosote, mesquite, ocotillo, and prickly pear. Other half-shrubs and succulents can increase also. Remnant perennial grasses cannot re-colonize areas with shrub competition.
2b. Unknown, PG/NG with herbicide shrub control. maintenance treatments for shrubs (fire, herbicide).
3. CHG, soil compaction and loss of grass cover leading to severe sheet and rill erosion on steep hill-slopes.
4. Repeated burning due to man made fires from road-ways and urban areas causes removal of shrub and grass cover and leads to accelerated sheet and rill erosion.

*Native annuals dominant, may be patches of some non-natives

CHG – continuous heavy grazing
PG/NG – proper grazing, no grazing
ACCO - whitethorn, KRER, range ratany
LATR, creosotebush, OPEN – prickly pear
BOER, black grama, BOCU – sideoats grama

Figure 4. State and Transition, Limy Slopes 12-16" p.z.

State 1
Native Grass-Shrub State

Community 1.1
Historic Native Plant Community

The historic, native, plant community is dominated by warm season perennial grasses with a mixture of desert shrubs, half-shrubs, suffrutescent forbs and succulents. A rich flora of native annual forbs and grasses, of both the winter and summer seasons, exist in the plant community. Natural fires, which burned at moderate intervals in this region, helped to maintain a balance between perennial grasses and shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	250	500	750
Shrub/Vine	50	150	290
Forb	5	35	190
Tree	0	15	75
Total	**305**	**700**	**1305**

Table 6. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	2-5%
Grass/grasslike basal cover	5-10%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0-5%
Litter	15-60%
Surface fragments >0.25" and <=3"	35-60%
Surface fragments >3"	1-10%
Bedrock	0%
Water	0%
Bare ground	10-40%

Table 7. Canopy structure (% cover)

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

Community 2.1
Exotic Annual Invaded Plant Community

Non-native annual grasses like red brome, mediterranean grass (schismus) and cheatgrass can invade and dominate areas of the site. 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. Repeated fires tend to remove the native shrub, grass and forb canopy.

State 3
Shrub Increased State

Community 3.1
Shrub Increased Plant Community

In the absence of fire for long periods of time and with continuous grazing, shrubs like creosote and whitethorn acacia and succulents like prickly pear and banana yucca can increase to dominate the plant community. Perennial grasses and forbs cannot recover in the face of increased shrub competition.

State 4
Eroded State

Community 4.1
Eroded Plant Community

Shrubs like creosotebush and whitethorn acacia and succulents like prickly pear and banana yucca can increase to dominate the site. Non-native annual forbs and grasses dominate the under-story. In "El Nino" years herbaceous fuels are sufficient for burning and repeat fires are especially common in areas close to residential zones and roads. Extreme rainfall events coupled with the fire, drought and grazing interaction, can lead to rilling of steep slopes. Compaction of soils can occur with heavy trailing from continuous livestock use. Loss of plant cover after repeated fire can lead to accelerated sheet and rill erosion under these circumstances.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant perennial grasses**			235–500	
	black grama	BOER4	*Bouteloua eriopoda*	150–400	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	15–100	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	50–100	–
	slim tridens	TRMU	*Tridens muticus*	10–50	–
	blue threeawn	ARPUN	*Aristida purpurea var. nealleyi*	10–50	–
2	**Cool season grasses**			1–100	
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	0–75	–
	needle and thread	HECO26	*Hesperostipa comata*	0–25	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–15	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0–5	–
	squirreltail	ELEL5	*Elymus elymoides*	0–2	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–2	–
3	**Misc. perennial grasses**			10–100	
	purple threeawn	ARPU9	*Aristida purpurea*	0–25	–
	Hall's panicgrass	PAHA	*Panicum hallii*	1–25	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	5–20	–
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	0–15	–
	spidergrass	ARTE3	*Aristida ternipes*	0–15	–
	red grama	BOTR2	*Bouteloua trifida*	0–15	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	0–15	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–15	–
	nineawn pappusgrass	ENDE	*Enneapogon desvauxii*	1–10	–
	shortleaf woollygrass	ERAV	*Erioneuron avenaceum*	0–5	–
	Arizona cottontop	DICA8	*Digitaria californica*	0–5	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–5	–
	slim tridens	TRMUE	*Tridens muticus var. elongatus*	0–5	–
	big galleta	PLRI3	*Pleuraphis rigida*	0–5	–
	fall witchgrass	DICO6	*Digitaria cognata*	0–2	–
	slender grama	BORE2	*Bouteloua repens*	0–1	–
	tanglehead	HECO10	*Heteropogon contortus*	0–1	–
	curly-mesquite	HIBE	*Hilaria belangeri*	0–1	–
	spidergrass	ARTEG	*Aristida ternipes var. gentilis*	0–1	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–1	–
	tobosagrass	PLMU3	*Pleuraphis mutica*	0–1	–
4	**Annual grasses**			1–50	
	sixweeks threeawn	ARAD	*Aristida adscensionis*	1–10	–
	Mexican panicgrass	PAHI5	*Panicum hirticaule*	0–10	–
	small fescue	VUMI	*Vulpia microstachys*	0–10	–

	Eastwood fescue	VUMIC	*Vulpia microstachys var. ciliata*	0–10	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–10	–
	mucronate sprangeltop	LEPAB	*Leptochloa panicea ssp. brachiata*	0–5	–
	witchgrass	PACA6	*Panicum capillare*	0–5	–
	Arizona signalgrass	URAR	*Urochloa arizonica*	0–5	–
	prairie threeawn	AROL	*Aristida oligantha*	0–5	–
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	0–2	–
	Arizona brome	BRAR4	*Bromus arizonicus*	0–2	–
	feather fingergrass	CHVI4	*Chloris virgata*	0–2	–
	delicate muhly	MUFR	*Muhlenbergia fragilis*	0–2	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	0–2	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	0–1	–
	canyon cupgrass	ERLE7	*Eriochloa lemmonii*	0–1	–
	tufted lovegrass	ERPE	*Eragrostis pectinacea*	0–1	–
	desert lovegrass	ERPEM	*Eragrostis pectinacea var. miserrima*	0–1	–
	little barley	HOPU	*Hordeum pusillum*	0–1	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	0–1	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–1	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–1	–
Forb					
5	**Perennial forbs**			3–40	
	trailing windmills	ALIN	*Allionia incarnata*	1–5	–
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	1–5	–
	hairyseed bahia	BAAB	*Bahia absinthifolia*	0–5	–
	leatherweed	CRPO5	*Croton pottsii*	0–5	–
	paleface	HIDE	*Hibiscus denudatus*	0–5	–
	bluedicks	DICA14	*Dichelostemma capitatum*	0–5	–
	glandleaf milkwort	POMA7	*Polygala macradenia*	0–5	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1–5	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	1–5	–
	wishbone-bush	MILAV	*Mirabilis laevis var. villosa*	0–2	–
	Coues' cassia	SECO10	*Senna covesii*	0–2	–
	rue of the mountains	THTE2	*Thamnosma texana*	0–2	–
	Fendler's bladderpod	LEFE	*Lesquerella fendleri*	0–2	–
	Gila manroot	MAGI	*Marah gilensis*	0–2	–
	Parry's false prairie-clover	MAPA7	*Marina parryi*	0–2	–
	lacy tansyaster	MAPI	*Machaeranthera pinnatifida*	0–2	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	0–2	–
	Mojave spurge	EUSC6	*Euphorbia schizoloba*	0–1	–
	southwestern mock vervain	GLGO	*Glandularia gooddingii*	0–1	–
	desert rosemallow	HICO	*Hibiscus coulteri*	0–1	–
	purplenerve springparsley	CYMU2	*Cymopterus multinervatus*	0–1	–
	Gregg's prairie clover	DAGR2	*Dalea greggii*	0–1	–

	James' prairie clover	DAJA	*Dalea jamesii*	0–1	–
	Cooley's bundleflower	DECO2	*Desmanthus cooleyi*	0–1	–
	desert larkspur	DEPA	*Delphinium parishii*	0–1	–
	tall mountain larkspur	DESC	*Delphinium scaposum*	0–1	–
	plains blackfoot	MELE2	*Melampodium leucanthum*	0–1	–
	slender janusia	JAGR	*Janusia gracilis*	0–1	–
	ragged nettlespurge	JAMA	*Jatropha macrorhiza*	0–1	–
	longflower tube tongue	JULO3	*Justicia longii*	0–1	–
	desert marigold	BAMU	*Baileya multiradiata*	0–1	–
	scarlet spiderling	BOCO	*Boerhavia coccinea*	0–1	–
	climbing wartclub	BOSC	*Boerhavia scandens*	0–1	–
	wavyleaf Indian paintbrush	CAAPM	*Castilleja applegatei ssp. martinii*	0–1	–
	Arizona wrightwort	CAAR7	*Carlowrightia arizonica*	0–1	–
	desert mariposa lily	CAKE	*Calochortus kennedyi*	0–1	–
	sego lily	CANU3	*Calochortus nuttallii*	0–1	–
	tuber anemone	ANTU	*Anemone tuberosa*	0–1	–
	narrowleaf silverbush	ARLA12	*Argythamnia lanceolata*	0–1	–
	white sagebrush	ARLUM2	*Artemisia ludoviciana ssp. mexicana*	0–1	–
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	0–1	–
	perennial rockcress	ARPE2	*Arabis perennans*	0–1	–
	dense ayenia	AYMI	*Ayenia microphylla*	0–1	–
	largeflower onion	ALMA4	*Allium macropetalum*	0–1	–
	dwarf desertpeony	ACNA2	*Acourtia nana*	0–1	–
	brownfoot	ACWR5	*Acourtia wrightii*	0–1	–
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	0–1	–
	branched noseburn	TRRA5	*Tragia ramosa*	0–1	–
	Louisiana vetch	VILUL2	*Vicia ludoviciana ssp. ludoviciana*	0–1	–
	Lemmon's ragwort	SELE8	*Senecio lemmonii*	0–1	–
	New Mexico fanpetals	SINE	*Sida neomexicana*	0–1	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	0–1	–
	desert tobacco	NIOB	*Nicotiana obtusifolia*	0–1	–
	toadflax penstemon	PELI2	*Penstemon linarioides*	0–1	–
	Parry's beardtongue	PEPA24	*Penstemon parryi*	0–1	–
	desert penstemon	PEPS	*Penstemon pseudospectabilis*	0–1	–
	orange fameflower	PHAU13	*Phemeranthus aurantiacus*	0–1	–
	slender poreleaf	POGR5	*Porophyllum gracile*	0–1	–
	canaigre dock	RUHY	*Rumex hymenosepalus*	0–1	–
	twinleaf senna	SEBA3	*Senna bauhinioides*	0–1	–
	fleabane	ERIGE2	*Erigeron*	0–1	–
	turpentinebroom	THMO	*Thamnosma montana*	0–1	–
6	**Annual forbs**			2–150	
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–25	–

	phacelia	PHACE	*Phacelia*	0–20	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–15	–
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	0–15	–
	lyreleaf jewelflower	STCA5	*Streptanthus carinatus*	0–15	–
	thelypody	THELY	*Thelypodium*	0–10	–
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–10	–
	exserted Indian paintbrush	CAEXE	*Castilleja exserta ssp. exserta*	0–10	–
	cryptantha	CRYPT	*Cryptantha*	0–10	–
	pitseed goosefoot	CHBE4	*Chenopodium berlandieri*	0–5	–
	Coulter's spiderling	BOCO2	*Boerhavia coulteri*	0–5	–
	fivewing spiderling	BOIN	*Boerhavia intermedia*	0–5	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–5	–
	chia	SACO6	*Salvia columbariae*	0–5	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–5	–
	woolly plantain	PLPA2	*Plantago patagonica*	0–5	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–5	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	0–5	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–5	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–5	–
	desertparsley	LOMAT	*Lomatium*	0–5	–
	coastal bird's-foot trefoil	LOSA	*Lotus salsuginosus*	0–5	–
	combseed	PECTO	*Pectocarya*	0–5	–
	slender goldenweed	MAGR10	*Machaeranthera gracilis*	0–5	–
	tanseyleaf tansyaster	MATA2	*Machaeranthera tanacetifolia*	0–2	–
	Thurber's pepperweed	LETH2	*Lepidium thurberi*	0–2	–
	wedgeleaf draba	DRCU	*Draba cuneifolia*	0–2	–
	New Mexico thistle	CINE	*Cirsium neomexicanum*	0–2	–
	sorrel buckwheat	ERPO4	*Eriogonum polycladon*	0–2	–
	spurge	EUPHO	*Euphorbia*	0–2	–
	crestrib morning-glory	IPCO2	*Ipomoea costellata*	0–2	–
	purslane	PORTU	*Portulaca*	0–2	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–2	–
	hyssopleaf sandmat	CHHY3	*Chamaesyce hyssopifolia*	0–2	–
	hairy prairie clover	DAMO	*Dalea mollis*	0–2	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–2	–
	sacred thorn-apple	DAWR2	*Datura wrightii*	0–1	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–1	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	0–1	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–1	–
	yellow tackstem	CAPA7	*Calycoseris parryi*	0–1	–
	white tackstem	CAWR	*Calycoseris wrightii*	0–1	–
	milkvetch	ASTRA	*Astragalus*	0–1	–
	annual agoseris	AGHE2	*Agoseris heterophylla*	0–1	–
	carelessweed	AMPA	*Amaranthus palmeri*	0–1	–

	desert unicorn-plant	PRAL4	*Proboscidea althaeifolia*	0–1	–
	doubleclaw	PRPA2	*Proboscidea parviflora*	0–1	–
	New Mexico plumeseed	RANE	*Rafinesquia neomexicana*	0–1	–
	sawtooth sage	SASU7	*Salvia subincisa*	0–1	–
	spreading fanpetals	SIAB	*Sida abutifolia*	0–1	–
	woollyhead neststraw	STMI2	*Stylocline micropoides*	0–1	–
	sand fringepod	THCU	*Thysanocarpus curvipes*	0–1	–
	redstar	IPCO3	*Ipomoea coccinea*	0–1	–
	ivyleaf morning-glory	IPHE	*Ipomoea hederacea*	0–1	–
	Arizona poppy	KAGR	*Kallstroemia grandiflora*	0–1	–
	California goldfields	LACA7	*Lasthenia californica*	0–1	–
	star gilia	GIST	*Gilia stellata*	0–1	–
	longleaf false goldeneye	HELOA2	*Heliomeris longifolia var. annua*	0–1	–
	Texas stork's bill	ERTE13	*Erodium texanum*	0–1	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–1	–
	spreading fleabane	ERDI4	*Erigeron divergens*	0–1	–
	miner's lettuce	CLPEP	*Claytonia perfoliata ssp. perfoliata*	0–1	–
	scrambled eggs	COAU2	*Corydalis aurea*	0–1	–
	Fendler's desertdandelion	MAFE	*Malacothrix fendleri*	0–1	–
	Arizona lupine	LUAR4	*Lupinus arizonicus*	0–1	–
	miniature lupine	LUBI	*Lupinus bicolor*	0–1	–
	whitestem blazingstar	MEAL6	*Mentzelia albicaulis*	0–1	–
	green carpetweed	MOVE	*Mollugo verticillata*	0–1	–
	desert evening primrose	OEPR	*Oenothera primiveris*	0–1	–
	Florida pellitory	PAFL3	*Parietaria floridana*	0–1	–
	manybristle chinchweed	PEPA2	*Pectis papposa*	0–1	–
	Arizona popcornflower	PLAR	*Plagiobothrys arizonicus*	0–1	–
	creamcups	PLCA5	*Platystemon californicus*	0–1	–
Shrub/Vine					
7	**Dominant large shrubs**			30–100	
	whitethorn acacia	ACCO2	*Acacia constricta*	20–75	–
	creosote bush	LATR2	*Larrea tridentata*	1–50	–
	whitethorn acacia	ACCOP9	*Acacia constricta var. paucispina*	0–10	–
8	**Miscellaneous large shrubs**			2–25	
	catclaw acacia	ACGR	*Acacia greggii*	1–5	–
	Sonoran scrub oak	QUTU2	*Quercus turbinella*	0–5	–
	ocotillo	FOSP2	*Fouquieria splendens*	0–2	–
	Wright's beebrush	ALWR	*Aloysia wrightii*	0–2	–
	desert ceanothus	CEGR	*Ceanothus greggii*	0–2	–
	desert sweet	CHMI2	*Chamaebatiaria millefolium*	0–1	–
	Warnock's snakewood	COWA	*Condalia warnockii*	0–1	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–1	–
	snapdragon penstemon	KEANM	*Keckiella antirrhinoides ssp. microphylla*	0–1	–

	crown of thorns	KOSP	*Koeberlinia spinosa*	0–1	–
	water jacket	LYAN	*Lycium andersonii*	0–1	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	0–1	–
	Arizona desert-thorn	LYEX	*Lycium exsertum*	0–1	–
	red barberry	MAHA4	*Mahonia haematocarpa*	0–1	–
	algerita	MATR3	*Mahonia trifoliolata*	0–1	–
	catclaw mimosa	MIACB	*Mimosa aculeaticarpa var. biuncifera*	0–1	–
	redberry buckthorn	RHCR	*Rhamnus crocea*	0–1	–
	littleleaf sumac	RHMI3	*Rhus microphylla*	0–1	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–1	–
	Wright's mock buckthorn	SAWR	*Sageretia wrightii*	0–1	–
	jojoba	SICH	*Simmondsia chinensis*	0–1	–
	Arizona necklacepod	SOAR3	*Sophora arizonica*	0–1	–
	lotebush	ZIOBC	*Ziziphus obtusifolia var. canescens*	0–1	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	0–1	–
9	**Dominant half shrubs**			15–100	
	fairyduster	CAER	*Calliandra eriophylla*	10–50	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–15	–
	rough menodora	MESC	*Menodora scabra*	0–15	–
	desert zinnia	ZIAC	*Zinnia acerosa*	0–15	–
	littleleaf ratany	KRER	*Krameria erecta*	0–10	–
	featherplume	DAFO	*Dalea formosa*	0–10	–
	mariola	PAIN2	*Parthenium incanum*	0–5	–
	longleaf phlox	PHLO2	*Phlox longifolia*	0–5	–
	woody crinklemat	TICA3	*Tiquilia canescens*	0–5	–
	purple sage	SADOM	*Salvia dorrii ssp. mearnsii*	0–1	–
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	0–1	–
	bastardsage	ERWR	*Eriogonum wrightii*	0–1	–
	Coulter's brickellbush	BRCO	*Brickellia coulteri*	0–1	–
10	**Succulents**			2–35	
	cactus apple	OPEN3	*Opuntia engelmannii*	1–15	–
	tulip pricklypear	OPPH	*Opuntia phaeacantha*	0–10	–
	banana yucca	YUBA	*Yucca baccata*	1–10	–
	sacahuista	NOMI	*Nolina microcarpa*	0–10	–
	soaptree yucca	YUEL	*Yucca elata*	0–5	–
	purple pricklypear	OPMA8	*Opuntia macrocentra*	0–5	–
	saguaro	CAGI10	*Carnegiea gigantea*	0–5	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	0–2	–
	common sotol	DAWH2	*Dasylirion wheeleri*	0–2	–
	pinkflower hedgehog cactus	ECBO2	*Echinocereus bonkerae*	0–1	–
	Arizona hedgehog cactus	ECCOA	*Echinocereus coccineus var. arizonicus*	0–1	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–1	–

	cactus				
	redspine fishhook cactus	ECER2	*Echinomastus erectocentrus*	0–1	–
	pinkflower hedgehog cactus	ECFA	*Echinocereus fasciculatus*	0–1	–
	spinystar	ESVI2	*Escobaria vivipara*	0–1	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	0–1	–
	devil's cholla	GRKU	*Grusonia kunzei*	0–1	–
	Graham's nipple cactus	MAGR9	*Mammillaria grahamii*	0–1	–
	walkingstick cactus	CYSP8	*Cylindropuntia spinosior*	0–1	–
	buck-horn cholla	CYAC8	*Cylindropuntia acanthocarpa*	0–1	–
	teddybear cholla	CYBI9	*Cylindropuntia bigelovii*	0–1	–
	jumping cholla	CYFU10	*Cylindropuntia fulgida*	0–1	–
	goldenflower century plant	AGCH2	*Agave chrysantha*	0–1	–
	Parry's agave	AGPA4	*Agave parryi*	0–1	–
	Schott's century plant	AGSC3	*Agave schottii*	0–1	–
11	**Increaser half-shrubs**			2–40	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	2–30	–
	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	0–10	–
	button brittlebush	ENFR	*Encelia frutescens*	0–2	–
	threadleaf snakeweed	GUMI	*Gutierrezia microcephala*	0–1	–
	burroweed	ISTE2	*Isocoma tenuisecta*	0–1	–
	rayless goldenhead	ACSP	*Acamptopappus sphaerocephalus*	0–1	–
Tree					
12	**Trees**			0–75	
	crucifixion thorn	CAHO3	*Canotia holacantha*	0–25	–
	oneseed juniper	JUMO	*Juniperus monosperma*	0–15	–
	Utah juniper	JUOS	*Juniperus osteosperma*	0–15	–
	blue paloverde	PAFL6	*Parkinsonia florida*	0–10	–
	redberry juniper	JUCO11	*Juniperus coahuilensis*	0–10	–
	western honey mesquite	PRGLT	*Prosopis glandulosa var. torreyana*	0–1	–
	velvet mesquite	PRVE	*Prosopis velutina*	0–1	–

Animal community

This site is suitable for grazing year round, and is easily traversed by livestock. Livestock grazing use is concentrated on south slopes and ridge-tops. North aspects are not grazed until southern aspects are over-used. The site is susceptible to erosion in overgrazed areas like bed-grounds, livestock trails and lower slopes adjacent to water.

The site has good habitat diversity for a variety of desert wildlife species. It is home mainly to small mammals and birds and their associated predators. It is a foraging area for larger mammals like deer and javalina. Water developments are very important to both livestock and wildlife on this site.

Hydrological functions

This site has rough surfaces, due to a high cover of gravels and stones, which act to hold water on the site. When the soils are dry, it produces little runoff. It produces significant runoff only when heavy rain falls on snow or moist soils.

Recreational uses

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

Wood products

Very limited fuel-wood for campfires and branding fires.

Other products

There is some harvest of food plants like prickly pear tunas, jojoba nuts and mescal. There is limited harvest of medicinal plants like mormon tea and creosote bush. There is limited harvest of fibers from beargrass, banana yucca and skunkbush sumac.

Type locality

Location 1: Graham County, AZ	
Township/Range/Section	T8S R21E S16
General legal description	Eureka Springs Ranch, 3/4 mile from water trough at end of pipeline. Southern exposure at 4200 feet elevation.

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:**