

Ecological site R041XA126AZ **Clayey Upland 16-20" 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.

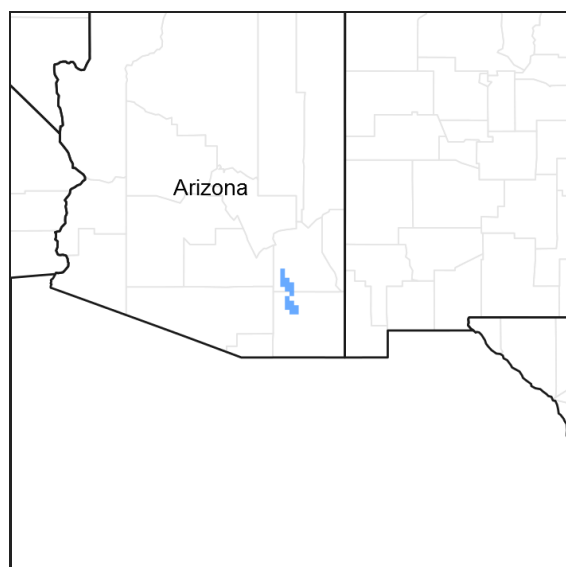


Figure 1. Mapped extent

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): 041X–Madrean Archipelago

AZ 41.1 – Mexican Oak-Pine Forest and Oak Savannah

Elevations range from 4500 to 10,700 feet and precipitation ranges from 16 to 30 inches. Vegetation includes Emory oak, Mexican blue oak, Arizona white oak, one-seed juniper, alligator juniper, sacahuista, California bricklebrush, skunkbush sumac, Arizona rosewood, wait-a-bit mimosa, sideoats grama, blue grama, purple grama, wooly bunchgrass, plains lovegrass, squirreltail, and pinyon ricegrass. The soil temperature regime ranges from thermic to mesic and the soil moisture regime ranges from aridic ustic to typic ustic. This unit occurs within the Basin and Range Physiographic Province and is characterized by numerous mountain ranges that rise abruptly from broad, plain-like valleys and basins. Igneous and metamorphic rock classes dominate the mountain ranges and sediments filling the basins represent combinations of fluvial, lacustrine, colluvial and alluvial deposits.

Associated sites

R041XA108AZ	Loamy Upland 16-20" p.z.
R041XA109AZ	Clay Loam Upland 16-20" p.z.
R041XA111AZ	Volcanic Hills 16-20" p.z.

R041XA114AZ	Loamy Bottom 16-20" p.z.
R041XA115AZ	Loamy Swale 16-20" p.z.

Similar sites

R041XC304AZ	Clayey Upland 12-16" p.z.
R038XB202AZ	Clayey Upland 16-20" p.z.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>pleuraphis mutica</i> (2) <i>panicum obtusum</i>

Physiographic features

This site occurs in the upper elevations of the Madrean Basin and Range Province in southeastern Arizona. It occurs on fan terraces, basalt flows and valley plains.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Terrace (3) Plain
Flooding frequency	None
Ponding frequency	None
Elevation	1,433–1,676 m
Slope	1–15%
Aspect	Aspect is not a significant factor

Climatic features

Precipitation in this zone of the common resource area ranges from 16-20 inches per year with elevations from 4700-5500 feet. Approximately 40% of this moisture comes as gentle rain or snow during the winter-spring (Oct-Apr) season; originates in the north Pacific and Gulf of California and comes as frontal storms with long duration and low intensity. The remaining 60% falls in the summer season (May-Sep); originates in the Gulf of Mexico and are convective, usually brief, intense thunderstorms. Snow is common Dec.-March, averaging 5-15 inches per year, but rarely lasts more than a week. May and June are the driest months. Humidity is low.

Temperatures are mild. Freezing temperatures are common at night from Oct.-May, but daytime temperatures are almost always over 40 F. Below 0 F temperatures can occur Dec.-Feb. Daytime summer highs rarely exceed 95 F.

Species like plains lovegrass, bottlebrush squirreltail and shrubby buckwheat begin growth in late March to April. Warm season grasses begin growth in July or August with receipt of the first summer rains.

Table 3. Representative climatic features

Frost-free period (average)	200 days
Freeze-free period (average)	
Precipitation total (average)	508 mm

Influencing water features

There are no water features associated with this site.

Soil features

These are deep soils that have formed in clayey alluvium. Surfaces are silty clayloam to clay and sticky when wet. Dense clay horizons occur at or near the surface. These horizons consist of smectitic clay materials and exhibit severe soil cracking and churning. Soil surfaces are dark colored. Plant-soil moisture relationships are good.

Soils mapped on this site include: SSA-666 Cochise county Northwest part MU 21 Phantom (Cazador).

Table 4. Representative soil features

Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Slow to very slow
Soil depth	76–152 cm
Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0–5%
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

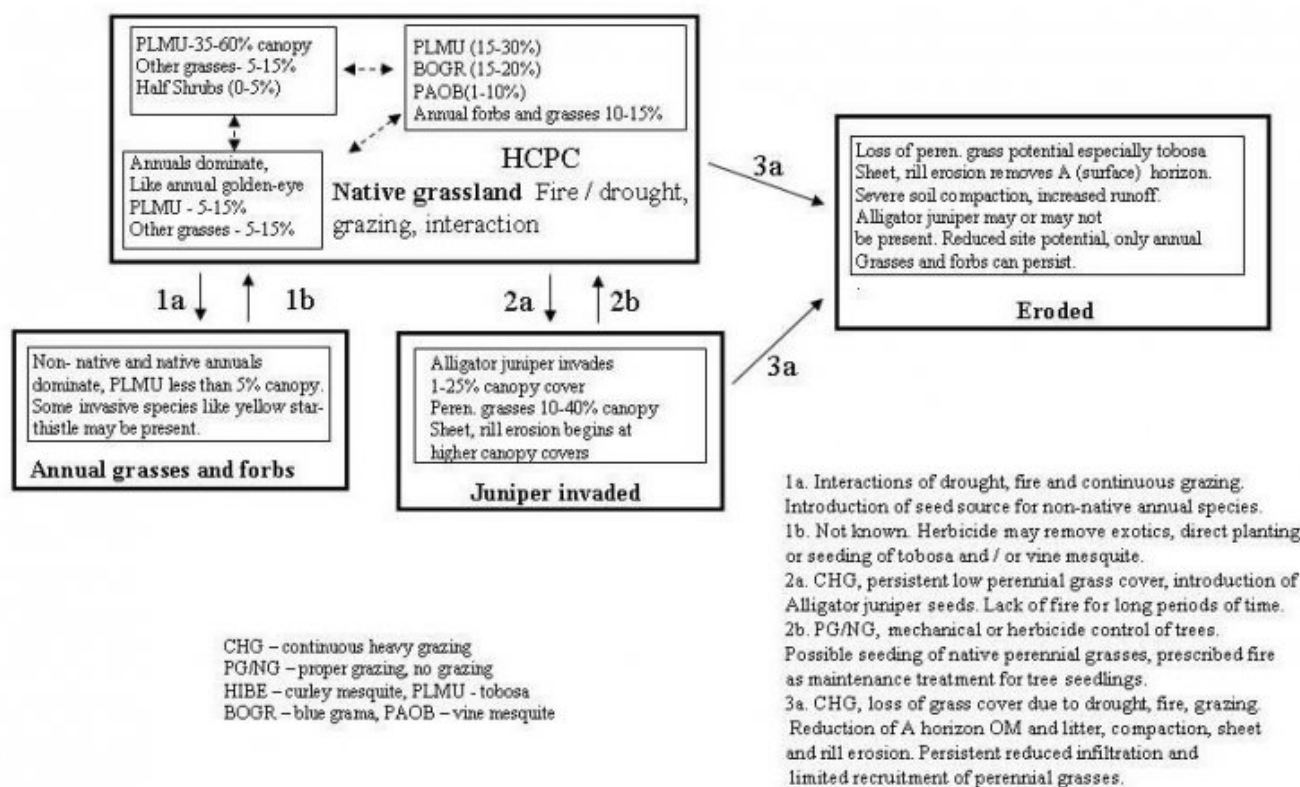
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The Historical Climax Plant Community represents the natural potential plant communities found on relict or relatively undisturbed sites. Other plant communities described here represent plant communities that are known to occur when the site is disturbed by factors such as fire, grazing, or drought.

Production data provided in this site description is standardized to air dry weight at the end of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine Similarity index, compare the production (air dry weight) of each species to that shown in the plant community description. For each species, count no more than the maximum amount shown for the species, and for each group, count no more than the maximum amount shown for each group. Divide the resulting total by the total normal year production shown in the plant community description. If the rainfall has been significantly above or below normal, use the total production shown for above or below normal years. If field data is not collected at the end of the summer growing season, then the field data must be corrected to the end of the year production before comparing it to the site description. The growth curve can be used as a guide for estimating production at the end of the summer growing season.

State and transition model

MLRA 41-1, Clayey Upland 16-20 " pz.



State 1 Native Grassland

Community 1.1 Historic Climax Plant Community

The historic native state includes the native plant communities that occur on the site, including the historic climax plant community. This state includes other plant communities that naturally occupy the site following drought, fire, flooding, herbivores, and other natural disturbances. The historic climax plant community represents the natural climax community that eventually reoccupies the site with proper management. The potential plant community on this site is dominated by warm season perennial grasses. The major perennial species are tobosa and vine mesquite with lesser amounts of species like curly mesquite, blue grama and sideoats grama. Perennial and annual forbs, as well as a few species of low shrubs and succulents, are represented in the plant community. The aspect is grassland. Species like bottlebrush squirreltail and shrubby buckwheat begin growth in April. Warm season grasses begin growth in July or August, with the receipt of the first summer rains.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	628	1289	1681
Forb	7	45	146
Shrub/Vine	1	11	50
Tree	—	—	6
Total	636	1345	1883

Figure 5. Plant community growth curve (percent production by month). AZ4111, 41.1 16-30. Growth begins in the spring, semi-dormancy occurs during the June drought, most growth occurs during the summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	0	15	45	20	5	0	0

State 2
Annual forb and grass

Community 2.1
Annual forb and grass



Figure 6. Clayey Upland 16-20" pz., annuals

This state occurs where the cover of native perennial grasses like tobosa and vine mesquite has been removed due the interactions of drought, fire and continuous grazing. Native and non-native annual forbs and grasses dominate the plant community. Production is high due to soil cracking which breaks up soil compaction and results in high, initial, infiltration rates. Non-native annual species include filaree, wild oats, tumbleweed, kochia, yellow starthistle and tumble mustard. When tobosa has been reduced to less than 5% canopy cover on the site it may not be able to come back due to lack of seed in the soil seed-bank.

State 3
Juniper invaded

Community 3.1
Juniper invaded

This state occurs where Alligator juniper has invaded and increased to dominate the site in the absence of fire for long periods and in the presence of a seed source. The site will become unstable at higher levels of juniper canopy (over 25%).

State 4
Eroded state

Community 4.1
Eroded state

This state occurs where severe impacts by equipment or livestock trailing have caused soil compaction which has sealed the soil surface and resulted in accelerated sheet and rill erosion. Gullies may form in severe situations. Runoff is high and the soil profile is not getting wet and vertic soil properties are not in evidence. Usually a low production plant community of annuals is present.

Transition T1A

State 1 to 2

Interactions of drought, fire and continuous grazing; introduction of non-native annual species

Transition T1B

State 1 to 3

continuous heavy grazing, persistent low perennial grass cover, introduction of Alligator juniper, lack of fire

Transition T1C

State 1 to 4

continuous heavy grazing, loss of grass cover due to drought, fire, grazing; persistent reduced infiltration and limited recruitment of perennial grasses

Restoration pathway R2A

State 2 to 1

None known

Restoration pathway R3A

State 3 to 1

brush management, prescribed grazing/no grazing, range seeding, maintenance of juniper control

Transition T3A

State 3 to 4

continuous heavy grazing, loss of grass cover due to drought, fire, grazing; persistent reduced infiltration and limited recruitment of perennial grasses

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Dominant mid-grasses			560–1233	
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	504–1009	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	28–224	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	0–56	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	11–56	–
	plains lovegrass	ERIN	<i>Eragrostis intermedia</i>	0–56	–
2	Short perennial grasses			56–336	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	28–224	–
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	6–112	–
	sprucetop grama	BOCH	<i>Bouteloua chondrosioides</i>	0–22	–
	purple grama	BORA	<i>Bouteloua radicata</i>	0–22	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	0–11	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–11	–
3	Miscellaneous perennial grasses			0–56	
	squirreltail	ELEL5	<i>Elvmus elvmoides</i>	0–17	–

	spidergrass	ARTE3	<i>Aristida ternipes</i>	0–11	–
	spidergrass	ARTEG	<i>Aristida ternipes</i> var. <i>gentilis</i>	0–6	–
	slender grama	BORE2	<i>Bouteloua repens</i>	0–6	–
	Rothrock's grama	BORO2	<i>Bouteloua rothrockii</i>	0–6	–
	silver bluestem	BOSA	<i>Bothriochloa saccharoides</i>	0–6	–
	tanglehead	HECO10	<i>Heteropogon contortus</i>	0–6	–
	green sprangletop	LEDU	<i>Leptochloa dubia</i>	0–6	–
	poverty threeawn	ARDI5	<i>Aristida divaricata</i>	0–6	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	0–6	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	0–6	–
	fall witchgrass	DICO6	<i>Digitaria cognata</i>	0–6	–
	bullgrass	MUEM	<i>Muhlenbergia emersleyi</i>	0–6	–
	purple muhly	MURI3	<i>Muhlenbergia rigida</i>	0–6	–
	bulb panicgrass	PABU	<i>Panicum bulbosum</i>	0–6	–
	Hall's panicgrass	PAHA	<i>Panicum hallii</i>	0–6	–
	pinyon ricegrass	PIFI	<i>Piptochaetium fimbriatum</i>	0–6	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–6	–
	big sacaton	SPWR2	<i>Sporobolus wrightii</i>	0–6	–
	spiked crinkleawn	TRSP12	<i>Trachypogon spicatus</i>	0–6	–
	burrograss	SCBR2	<i>Scleropogon brevifolius</i>	0–2	–
	densetuft hairsedge	BUCA2	<i>Bulbostylis capillaris</i>	0–2	–
	sedge	CAREX	<i>Carex</i>	0–2	–
	flatsedge	CYPER	<i>Cyperus</i>	0–2	–
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	0–2	–
	woolyspike balsamscale	ELBA	<i>Elionurus barbiculmis</i>	0–1	–
	Arizona muhly	MUAR3	<i>Muhlenbergia arizonica</i>	0–1	–
	nineawn pappusgrass	ENDE	<i>Enneapogon desvauxii</i>	0–1	–
	Texas bluestem	SCCI2	<i>Schizachyrium cirratum</i>	0–1	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	0–1	–
4	Annual grasses			11–112	
	little barley	HOPU	<i>Hordeum pusillum</i>	1–90	–
	mucronate sprangletop	LEPAB	<i>Leptochloa panicea</i> ssp. <i>brachiata</i>	1–56	–
	Mexican panicgrass	PAHI5	<i>Panicum hirticaule</i>	0–28	–
	sticky sprangletop	LEVI5	<i>Leptochloa viscida</i>	0–22	–
	Mexican sprangletop	LEFUU	<i>Leptochloa fusca</i> ssp. <i>uninervia</i>	0–22	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–22	–
	pitscale grass	HAGR3	<i>Hackelochloa granularis</i>	0–11	–
	feather fingergrass	CHVI4	<i>Chloris virgata</i>	0–11	–
	tapertip cupgrass	ERACA	<i>Eriochloa acuminata</i> var. <i>acuminata</i>	0–11	–
	Arizona signalgrass	URAR	<i>Urochloa arizonica</i>	0–11	–
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	0–11	–
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	0–6	–
	Mexican lovegrass	ERME	<i>Eragrostis mexicana</i>	0–6	–

	tufted lovegrass	ERPEP2	<i>Eragrostis pectinacea</i> var. <i>pectinacea</i>	0–6	–
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	0–6	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0–6	–
	Eastwood fescue	VUMIC	<i>Vulpia microstachys</i> var. <i>ciliata</i>	0–2	–
	Pacific fescue	VUMIP	<i>Vulpia microstachys</i> var. <i>pauciflora</i>	0–2	–
	poverty dropseed	SPVA	<i>Sporobolus vaginiflorus</i>	0–2	–
	prairie false oat	TRIN5	<i>Trisetum interruptum</i>	0–2	–
	delicate muhly	MUFR	<i>Muhlenbergia fragilis</i>	0–2	–
	littleseed muhly	MUMI	<i>Muhlenbergia microsperma</i>	0–2	–
	witchgrass	PACA6	<i>Panicum capillare</i>	0–2	–
	matted grama	BOSI2	<i>Bouteloua simplex</i>	0–2	–
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	0–2	–
	fragilegrass	AETE	<i>Aegopogon tenellus</i>	0–2	–

Forb

5	Perennial Forbs			6–34	
	spreading fleabane	ERDI4	<i>Erigeron divergens</i>	0–11	–
	trailing fleabane	ERFL	<i>Erigeron flagellaris</i>	0–11	–
	bluedicks	DICA14	<i>Dichelostemma capitatum</i>	1–11	–
	Indian rushpea	HOGL2	<i>Hoffmannseggia glauca</i>	1–6	–
	largeflower onion	ALMA4	<i>Allium macropetalum</i>	0–6	–
	weakleaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	0–6	–
	sheep milkvetch	ASNO3	<i>Astragalus nothoxys</i>	0–6	–
	brownplume wirelettuce	STPA4	<i>Stephanomeria pauciflora</i>	0–6	–
	orange fameflower	PHAU13	<i>Phemeranthus aurantiacus</i>	0–6	–
	Louisiana vetch	VILUL2	<i>Vicia ludoviciana</i> ssp. <i>ludoviciana</i>	0–6	–
	gooseberryleaf globemallow	SPGR2	<i>Sphaeralcea grossulariifolia</i>	0–3	–
	fingerleaf gourd	CUDI	<i>Cucurbita digitata</i>	0–3	–
	chaparral asphead	ASHI3	<i>Aspicarpa hirtella</i>	0–3	–
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	0–3	–
	wild dwarf morning-glory	EVAR	<i>Evolvulus arizonicus</i>	1–3	–
	Cooley's bundleflower	DECO2	<i>Desmanthus cooleyi</i>	1–3	–
	dwarf prairie clover	DANA	<i>Dalea nana</i>	0–2	–
	pearly globe amaranth	GONI	<i>Gomphrena nitida</i>	0–2	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0–2	–
	whiteflower prairie clover	DAAL	<i>Dalea albiflora</i>	0–2	–
	Texas bindweed	COEQ	<i>Convolvulus equitans</i>	0–2	–
	whitemouth dayflower	COER	<i>Commelina erecta</i>	0–2	–
	leatherweed	CRPO5	<i>Croton pottsii</i>	0–2	–
	American vetch	VIAM	<i>Vicia americana</i>	0–2	–
	winged buckwheat	ERAL4	<i>Eriogonum alatum</i>	0–2	–
	variableleaf bushbean	MAGI2	<i>Macroptilium gibbosifolium</i>	0–2	–

	Texas snoutbean	RHSE1	<i>Rhynchosia senna</i> var. <i>texana</i>	0-2	-
	slimleaf plainsmustard	SCLI12	<i>Schoenocrambe linearifolia</i>	0-1	-
	twinleaf senna	SEBA3	<i>Senna bauhinioides</i>	0-1	-
	Lemmon's ragwort	SELE8	<i>Senecio lemmonii</i>	0-1	-
	New Mexico fanpetals	SINE	<i>Sida neomexicana</i>	0-1	-
	silverleaf nightshade	SOEL	<i>Solanum elaeagnifolium</i>	0-1	-
	Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	0-1	-
	copper globemallow	SPAN3	<i>Sphaeralcea angustifolia</i>	0-1	-
	white prairie aster	SYFAC	<i>Symphyotrichum falcatum</i> var. <i>commutatum</i>	0-1	-
	jewels of Opar	TAPA2	<i>Talinum paniculatum</i>	0-1	-
	Coulter's wrinklefruit	TECO	<i>Tetraclea coulteri</i>	0-1	-
	hairy fourwort	TENE	<i>Tetramerium nervosum</i>	0-1	-
	longstalk greenthread	THLO	<i>Thelesperma longipes</i>	0-1	-
	Hopi tea greenthread	THME	<i>Thelesperma megapotamicum</i>	0-1	-
	pinewoods spiderwort	TRPI	<i>Tradescantia pinetorum</i>	0-1	-
	branched noseburn	TRRA5	<i>Tragia ramosa</i>	0-1	-
	Fort Huachuca vervain	VEGR2	<i>Verbena gracilis</i>	0-1	-
	ivyleaf groundcherry	PHHE4	<i>Physalis hederifolia</i>	0-1	-
	white milkwort	POAL4	<i>Polygala alba</i>	0-1	-
	velvetseed milkwort	POOB	<i>Polygala obscura</i>	0-1	-
	shrubby purslane	POSU3	<i>Portulaca suffrutescens</i>	0-1	-
	slimflower scurfpea	PSTE5	<i>Psoralegium tenuiflorum</i>	0-1	-
	buffpetal	RHPH2	<i>Rhynchosida physocalyx</i>	0-1	-
	copper zephyrlily	ZELO	<i>Zephyranthes longifolia</i>	0-1	-
	Rocky Mountain zinnia	ZIGR	<i>Zinnia grandiflora</i>	0-1	-
	James' prairie clover	DAJA	<i>Dalea jamesii</i>	0-1	-
	coyote gourd	CUPA	<i>Cucurbita palmata</i>	0-1	-
	horsetail milkweed	ASSU2	<i>Asclepias subverticillata</i>	0-1	-
	dense ayenia	AYMI	<i>Ayenia microphylla</i>	0-1	-
	lyreleaf greeneyes	BELY	<i>Berlandiera lyrata</i>	0-1	-
	scarlet spiderling	BOCO	<i>Boerhavia coccinea</i>	0-1	-
	dwarf stickpea	CAHUR	<i>Calliandra humilis</i> var. <i>reticulata</i>	0-1	-
	desert mariposa lily	CAKE	<i>Calochortus kennedyi</i>	0-1	-
	sego lily	CANU3	<i>Calochortus nuttallii</i>	0-1	-
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0-1	-
	whitemargin sandmat	CHAL11	<i>Chamaesyce albomarginata</i>	0-1	-
	rose heath	CHER2	<i>Chaetopappa ericoides</i>	0-1	-
	birdbill dayflower	CODI4	<i>Commelina dianthifolia</i>	0-1	-
	Watson's dutchman's pipe	ARWA	<i>Aristolochia watsonii</i>	0-1	-
	Arizona milkvetch	ASAR6	<i>Astragalus arizonicus</i>	0-1	-
	spider milkweed	ASAS	<i>Asclepias asperula</i>	0-1	-
	dwarf milkweed	ASIN14	<i>Asclepias involucrata</i>	0-1	-
	broadleaf milkweed	ASLA4	<i>Asclepias latifolia</i>	0-1	-

	Lemmon's milkweed	ASLE13	<i>Asclepias lemmonii</i>	0–1	–
	woolly locoweed	ASMOB	<i>Astragalus mollissimus</i> var. <i>bigelovii</i>	0–1	–
	Mexican yellowshow	AMPA3	<i>Amoreuxia palmatifida</i>	0–1	–
	tuber anemone	ANTU	<i>Anemone tuberosa</i>	0–1	–
	melon loco	APUN	<i>Apodanthera undulata</i>	0–1	–
	small matweed	GUDED	<i>Guilleminea densa</i> var. <i>densa</i>	0–1	–
	spreading snakeherb	DYSCD	<i>Dyschoriste schiedeana</i> var. <i>decumbens</i>	0–1	–
	Torrey's craglily	ECFL	<i>Echeandia flavescens</i>	0–1	–
	shaggy dwarf morning-glory	EVNU	<i>Evolvulus nuttallianus</i>	0–1	–
	silver dwarf morning-glory	EVSE	<i>Evolvulus sericeus</i>	0–1	–
	Arizona snakecotton	FRAR2	<i>Froelichia arizonica</i>	0–1	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–1	–
	downy prairie clover	DANE	<i>Dalea neomexicana</i>	0–1	–
	trailing windmills	ALIN	<i>Allionia incarnata</i>	0–1	–
	Mexican fireplant	EUHE4	<i>Euphorbia heterophylla</i>	0–1	–
	sun spurge	EURA2	<i>Euphorbia radians</i>	0–1	–
	lemon beebalm	MOCIA	<i>Monarda citriodora</i> ssp. <i>austromontana</i>	0–1	–
	tufted evening primrose	OECA10	<i>Oenothera caespitosa</i>	0–1	–
	beardlip penstemon	PEBA2	<i>Penstemon barbatus</i>	0–1	–
	Cochise beardtongue	PEDA	<i>Penstemon dasyphyllus</i>	0–1	–
	longstalk chinchweed	PELO	<i>Pectis longipes</i>	0–1	–
	Parry's beardtongue	PEPA24	<i>Penstemon parryi</i>	0–1	–
	slimleaf bean	PHAN3	<i>Phaseolus angustissimus</i>	0–1	–
	red bluet	HORU	<i>Houstonia rubra</i>	0–1	–
	babyslippers	HYVE	<i>Hybanthus verticillatus</i>	0–1	–
	ragged nettlespurge	JAMA	<i>Jatropha macrorhiza</i>	0–1	–
	San Pedro daisy	LAPO4	<i>Lasianthaea podocephala</i>	0–1	–
	Fendler's bladderpod	LEFE	<i>Lesquerella fendleri</i>	0–1	–
	narrowleaf stoneseed	LIIN2	<i>Lithospermum incisum</i>	0–1	–
	Lewis flax	LILE3	<i>Linum lewisii</i>	0–1	–
	Greene's bird's-foot trefoil	LOGR4	<i>Lotus greenei</i>	0–1	–
	Wright's deervetch	LOWR	<i>Lotus wrightii</i>	0–1	–
6	Annual Forbs			1–112	
	longleaf false goldeneye	HELOA2	<i>Heliomeris longifolia</i> var. <i>annua</i>	1–112	–
	bitter rubberweed	HYOD	<i>Hymenoxys odorata</i>	0–56	–
	camphorweed	HESU3	<i>Heterotheca subaxillaris</i>	0–28	–
	curlytop gumweed	GRNUA	<i>Grindelia nuda</i> var. <i>aphanactis</i>	0–22	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0–11	–
	smallflowered milkvetch	ASNU4	<i>Astragalus nuttallianus</i>	0–11	–
	Thurber's milkvetch	ASTH	<i>Astragalus thurberi</i>	0–11	–

	pitseed goosefoot	CHBE4	<i>Chenopodium berlandieri</i>	0–11	–
	New Mexico goosefoot	CHNE3	<i>Chenopodium neomexicanum</i>	0–11	–
	sensitive partridge pea	CHNI2	<i>Chamaecrista nictitans</i>	0–11	–
	New Mexico thistle	CINE	<i>Cirsium neomexicanum</i>	0–11	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	0–6	–
	sorrel buckwheat	ERPO4	<i>Eriogonum polycladon</i>	0–6	–
	carelessweed	AMPA	<i>Amaranthus palmeri</i>	0–6	–
	Abert's buckwheat	ERAB2	<i>Eriogonum abertianum</i>	0–6	–
	Arizona poppy	KAGR	<i>Kallstroemia grandiflora</i>	0–6	–
	intermediate pepperweed	LEVIM	<i>Lepidium virginicum</i> var. <i>medium</i>	0–2	–
	wedgeleaf draba	DRCU	<i>Draba cuneifolia</i>	0–2	–
	sawtooth sage	SASU7	<i>Salvia subincisa</i>	0–2	–
	slender goldenweed	MAGR10	<i>Machaeranthera gracilis</i>	0–2	–
	tanseyleaf tansyaster	MATA2	<i>Machaeranthera tanacetifolia</i>	0–2	–
	New Mexico copperleaf	ACNE	<i>Acalypha neomexicana</i>	0–2	–
	scrambled eggs	COAU2	<i>Corydalis aurea</i>	0–2	–
	cryptantha	CRYPT	<i>Cryptantha</i>	0–1	–
	Chihuahuan prairie clover	DAEX2	<i>Dalea exigua</i>	0–1	–
	American wild carrot	DAPU3	<i>Daucus pusillus</i>	0–1	–
	sacred thorn-apple	DAWR2	<i>Datura wrightii</i>	0–1	–
	poorjoe	DITE2	<i>Diodia teres</i>	0–1	–
	miner's lettuce	CLPEP	<i>Claytonia perfoliata</i> ssp. <i>perfoliata</i>	0–1	–
	California poppy	ESCAM	<i>Eschscholzia californica</i> ssp. <i>mexicana</i>	0–1	–
	Arizona blanketflower	GAAR2	<i>Gaillardia arizonica</i>	0–1	–
	red dome blanketflower	GAPI	<i>Gaillardia pinnatifida</i>	0–1	–
	lesser yellowthroat gilia	GIFL	<i>Gilia flavocincta</i>	0–1	–
	El Paso gilia	GIME	<i>Gilia mexicana</i>	0–1	–
	Dakota mock vervain	GLBIB	<i>Glandularia bipinnatifida</i> var. <i>bipinnatifida</i>	0–1	–
	threadstem sandmat	CHRE4	<i>Chamaesyce revoluta</i>	0–1	–
	thymeleaf sandmat	CHSE6	<i>Chamaesyce serpyllifolia</i>	0–1	–
	slimseed sandmat	CHST8	<i>Chamaesyce stictospora</i>	0–1	–
	royal sandmat	CHDI5	<i>Chamaesyce dioica</i>	0–1	–
	pillpod sandmat	CHHI3	<i>Chamaesyce hirta</i>	0–1	–
	hyssopleaf sandmat	CHHY3	<i>Chamaesyce hyssopifolia</i>	0–1	–
	wheelscale saltbush	ATEL	<i>Atriplex elegans</i>	0–1	–
	fewflower beggarticks	BILE	<i>Bidens leptoccephala</i>	0–1	–
	Coulter's spiderling	BOCO2	<i>Boerhavia coulteri</i>	0–1	–
	erect spiderling	BOER	<i>Boerhavia erecta</i>	0–1	–
	hoary bowlesia	BOIN3	<i>Bowlesia incana</i>	0–1	–
	purple spiderling	BOPU	<i>Boerhavia purpurascens</i>	0–1	–
	fringed redmaids	CACI2	<i>Calandrinia ciliata</i>	0–1	–
	crested anoda	ANCR2	<i>Anoda cristata</i>	0–1	–

	southwestern pricklypoppy	ARPL3	<i>Argemone pleiacantha</i>	0–1	–
	halfmoon milkvetch	ASAL6	<i>Astragalus allochrous</i>	0–1	–
	whitestem blazingstar	MEAL6	<i>Mentzelia albicaulis</i>	0–1	–
	green carpetweed	MOVE	<i>Mollugo verticillata</i>	0–1	–
	desert evening primrose	OEPR	<i>Oenothera primiveris</i>	0–1	–
	Arizona phacelia	PHAR13	<i>Phacelia arizonica</i>	0–1	–
	Mangas Spring phacelia	PHBO4	<i>Phacelia bombycina</i>	0–1	–
	Arizona popcornflower	PLAR	<i>Plagiobothrys arizonicus</i>	0–1	–
	spreading fanpetals	SIAB	<i>Sida abutifolia</i>	0–1	–
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	0–1	–
	streptanthella	STREP	<i>Streptanthella</i>	0–1	–
	golden crownbeard	VEEN	<i>Verbesina encelioides</i>	0–1	–
	purslane	PORTU	<i>Portulaca</i>	0–1	–
	yerba porosa	PORU6	<i>Porophyllum ruderale</i>	0–1	–
	desert unicorn-plant	PRAL4	<i>Proboscidea althaeifolia</i>	0–1	–
	doubleclaw	PRPA2	<i>Proboscidea parviflora</i>	0–1	–
	Wright's cudweed	PSCAC2	<i>Pseudognaphalium canescens</i> ssp. <i>canescens</i>	0–1	–
	Abert's creeping zinnia	SAAB	<i>Sanvitalia abertii</i>	0–1	–
	miniature woollystar	ERDI2	<i>Eriastrum diffusum</i>	0–1	–
	spreading fleabane	ERDI4	<i>Erigeron divergens</i>	0–1	–
	crestrib morning-glory	IPCO2	<i>Ipomoea costellata</i>	0–1	–
	flaxflowered ipomopsis	IPLOL	<i>Ipomopsis longiflora</i> ssp. <i>longiflora</i>	0–1	–
	El Paso skyrocket	IPTH2	<i>Ipomopsis thurberi</i>	0–1	–
	plains flax	LIPU4	<i>Linum puberulum</i>	0–1	–
	foothill deervetch	LOHU2	<i>Lotus humistratus</i>	0–1	–
	coastal bird's-foot trefoil	LOSAB	<i>Lotus salsuginosus</i> var. <i>brevivexillus</i>	0–1	–
	shortstem lupine	LUBR2	<i>Lupinus brevicaulis</i>	0–1	–
	bajada lupine	LUCOC	<i>Lupinus concinnus</i> ssp. <i>concinnus</i>	0–1	–
	Fendler's desertdandelion	MAFE	<i>Malacothrix fendleri</i>	0–1	–
	warty caltrop	KAPA	<i>Kallstroemia parviflora</i>	0–1	–
	Coulter's horseweed	LACO13	<i>Laennecia coulteri</i>	0–1	–
	Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	0–1	–
	broadleaved pepperweed	LELA2	<i>Lepidium latifolium</i>	0–1	–
Shrub/Vine					
7	Dominant half shrubs			1–22	
	bastardsage	ERWR	<i>Eriogonum wrightii</i>	1–11	–
	fairyduster	CAER	<i>Calliandra eriophylla</i>	0–6	–
	prairie acacia	ACAN	<i>Acacia angustissima</i>	0–2	–
	yerba de pasmo	BAPT	<i>Baccharis pteronioides</i>	0–2	–
	littleleaf ratany	KRER	<i>Krameria erecta</i>	0–1	–

	trailing krameria	KRLA	<i>Krameria lanceolata</i>	0–1	–
9	Miscellaneous shrubs			0–17	
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa</i> var. <i>biuncifera</i>	0–2	–
	velvetpod mimosa	MIDY	<i>Mimosa dysocarpa</i>	0–2	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–2	–
	burroweed	ISTE2	<i>Isocoma tenuisecta</i>	0–1	–
	pale desert-thorn	LYPA	<i>Lycium pallidum</i>	0–1	–
	Sonoran scrub oak	QUTU2	<i>Quercus turbinella</i>	0–1	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–1	–
	threadleaf ragwort	SEFLF	<i>Senecio flaccidus</i> var. <i>flaccidus</i>	0–1	–
	catclaw acacia	ACGR	<i>Acacia greggii</i>	0–1	–
	Pringle manzanita	ARPR	<i>Arctostaphylos pringlei</i>	0–1	–
	threadleaf snakeweed	GUMI	<i>Gutierrezia microcephala</i>	0–1	–
10	Succulents			0–11	
	walkingstick cactus	CYSP8	<i>Cylindropuntia spinosior</i>	0–2	–
	pinkflower hedgehog cactus	ECFEF3	<i>Echinocereus fendleri</i> ssp. <i>fendleri</i>	0–1	–
	white fishhook cactus	ECIN2	<i>Echinomastus intertextus</i>	0–1	–
	rainbow hedgehog cactus	ECRI3	<i>Echinocereus rigidissimus</i>	0–1	–
	spiny star	ESVI2	<i>Escobaria vivipara</i>	0–1	–
	MacDougal's nipple cactus	MAHEM	<i>Mammillaria heyderi</i> var. <i>macdougalii</i>	0–1	–
	sacahuista	NOMI	<i>Nolina microcarpa</i>	0–1	–
	cactus apple	OPEN3	<i>Opuntia engelmannii</i>	0–1	–
	twistspine pricklypear	OPMA2	<i>Opuntia macrorhiza</i>	0–1	–
	banana yucca	YUBA	<i>Yucca baccata</i>	0–1	–
	soaptree yucca	YUEL	<i>Yucca elata</i>	0–1	–
	Palmer's century plant	AGPA3	<i>Agave palmeri</i>	0–1	–
	Parry's agave	AGPA4	<i>Agave parryi</i>	0–1	–
Tree					
11	Trees			0–6	
	alligator juniper	JUDE2	<i>Juniperus deppeana</i>	0–6	–
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	0–1	–

Animal community

The plant community on this site is suitable for grazing by all classes of livestock at any season. The plant community will be low in digestible protein in the winter. Phosphorous may be deficient throughout the year. Grazing should be managed to maintain an effective herbaceous cover. This site can erode easily if perennial grass cover is depleted, because the soil surface is heavy textured and rainfall is high. Annual goldeneye and poison bitterweed can cause poisoning problems after flowering in El Nino years following summer drought. Filaree and a few other winter annuals can cause nitrate poisoning problems in the spring during wet winters at these elevations. Perennial locoweeds can be a serious problem in years with dry springs following a wet fall season.

This site is a primary habitat for pronghorn antelope in southeastern Arizona. Water developments are very important to both large and small wildlife species on this site. Being open grassland and rich in grass and forb species, this site is home to a great variety of insect, bird, small mammal and reptile species. In areas adjacent to

wooded bottoms or hill-sites, this site is used as a forage area by mule and Coues whitetail deer and javalina.

Hydrological functions

Due to severe soil cracking and churning (producing rough and porous surfaces), this site has high, initial, infiltration rates. It produces runoff only when rain falls (or snow melts) and the soil surface is wet.

Recreational uses

Hunting, hiking, horseback riding, photography, bird watching, camping.

Wood products

None, unless in areas where juniper has invaded and increased.

Other products

Grass seed, wild onions, clay.

Inventory data references

Range 417s include 2 in good condition.

Type locality

Location 1: Santa Cruz County, AZ	
Township/Range/Section	T23S R17E S35
General legal description	San Rafael State Park, just east of Cameron house.
Location 2: Graham County, AZ	
Township/Range/Section	T9S R21E S21
General legal description	Eureka Springs Ranch, at T-29 - Safford

Contributors

Dan Robinett
Larry D. Ellicott

Approval

Curtis Talbot, 4/09/2021

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	04/09/2021
Approved by	Curtis Talbot

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