

Ecological site R040XA121AZ **Granitic Upland 10"-13" 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.

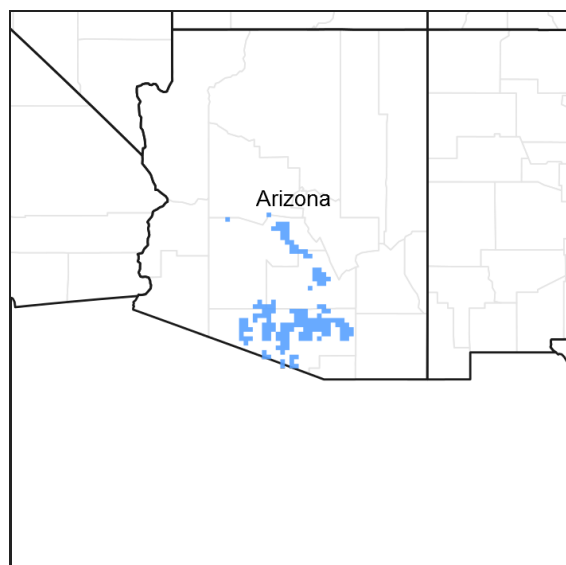


Figure 1. Mapped extent

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): 040X–Sonoran Basin and Range

AZ 40.1 – Upper Sonoran Desert

Elevations range from 2000 to 3200 feet and precipitation averages 10 to 13 inches per year. Vegetation includes saguaro, palo verde, mesquite, creosotebush, triangle bursage, prickly pear, cholla, limberbush, wolfberry, bush muhly, threeawns, ocotillo, and globe mallow. The soil temperature regime is thermic and the soil moisture regime is typic aridic. 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

R040XA105AZ	Shallow Hills 10"-13" p.z.
R040XA123AZ	Volcanic Hills 10"-13" P.Z.

Similar sites

R041XC322AZ	Shallow Upland 12-16" p.z.
R040XB220AZ	Granitic Upland 7"-10" p.z.

Table 1. Dominant plant species

Tree	(1) <i>Parkinsonia microphylla</i> (2) <i>Carnegia gigantea</i>
Shrub	(1) <i>Calliandra eriophylla</i>
Herbaceous	(1) <i>Janusia gracilis</i> (2) <i>Aristida purpurea</i>

Physiographic features

This site occurs in the upper elevations of the Sonoran Desert in southern Arizona. This site occurs on gently sloping to moderately steep pediments, flanking mountain areas. Numerous small areas of rock outcrop occur throughout areas of this site.

Table 2. Representative physiographic features

Landforms	(1) Pediment
Flooding frequency	None
Ponding frequency	None
Elevation	610–1,006 m
Slope	1–15%
Aspect	Aspect is not a significant factor

Climatic features

Precipitation in the sub resource area ranges from 10 to 13 inches in the southern part, along the Mexican border with elevations from about 1900 to 3200 feet. Precipitation in the northern part of the resource area ranges from 11 to 14 inches with elevations from about 1700 to 3500 feet. Winter-summer rainfall ratios range from 40%-60% in the southern portions of the land resource unit, to 50%-50% in the central portions, to 60%-40% in the northern part of the land resource unit. As one moves from east to west in this resource area rains become slightly more unpredictable and variable with Coefficients of Variation of annual rainfall equal to 29% at Tucson and 36% at Carefree. Summer rains fall July through Sept., originate in the Gulf of Mexico, and are convective, usually brief, intense thunderstorms. Cool season moisture tends to be frontal, originating in the Pacific and Gulf of California. This winter precipitation falls in widespread storms with long duration and low intensity. Snow is rare and seldom lasts more than an hour or two. May and June are the driest months of the year. Humidity is generally very low.

Winter temperatures are mild, with very few days recording freezing temperatures in the morning. Summer temperatures are warm to hot, with several days in June and July exceeding 105 degrees F.

Both the spring and the summer growing seasons are equally important for perennial grass, forb and shrub growth. Cool and warm season annual forbs and grasses can be common in their respective seasons with above average rainfall. Perennial forage species can remain green throughout the year with available moisture.

Table 3. Representative climatic features

Frost-free period (average)	265 days
Freeze-free period (average)	0 days
Precipitation total (average)	330 mm

Influencing water features

There are no water features associated with this site.

Soil features

These soils have developed in place on granitic and rhyolitic types of parent material. They are shallow, non-calcareous and the underlying bedrock is fractured and weathered. Soil surfaces are well covered by small gravels. Plant-soil moisture relationships range from fair to poor for shallow and very shallow soils respectively.

Soils mapped on this site include:

SSA-645 Aguila-Carefree area MU's Gran-61 & Wickenburg-61;

SSA-661 Eastern Pinal-Southern Gila Counties MU Anklam-240;

SSA-669 Eastern Pima County MU's Lehmans-13, Chimenea-16 & Granolite-58;

SSA-703 Tohono O'odham area MU's Anklam-3 & Granolite-48.

Table 4. Representative soil features

Parent material	(1) Residuum–granite
Surface texture	(1) Very gravelly sandy loam (2) Gravelly sandy loam (3) Cobbly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to moderately slow
Soil depth	13–51 cm
Surface fragment cover ≤3"	35–70%
Surface fragment cover >3"	5–25%
Available water capacity (0–101.6cm)	1.52–5.59 cm
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)	7.4–8
Subsurface fragment volume ≤3" (Depth not specified)	35–65%
Subsurface fragment volume >3" (Depth not specified)	0–20%

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 the 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 40-1 (10-13"), Granitic Upland

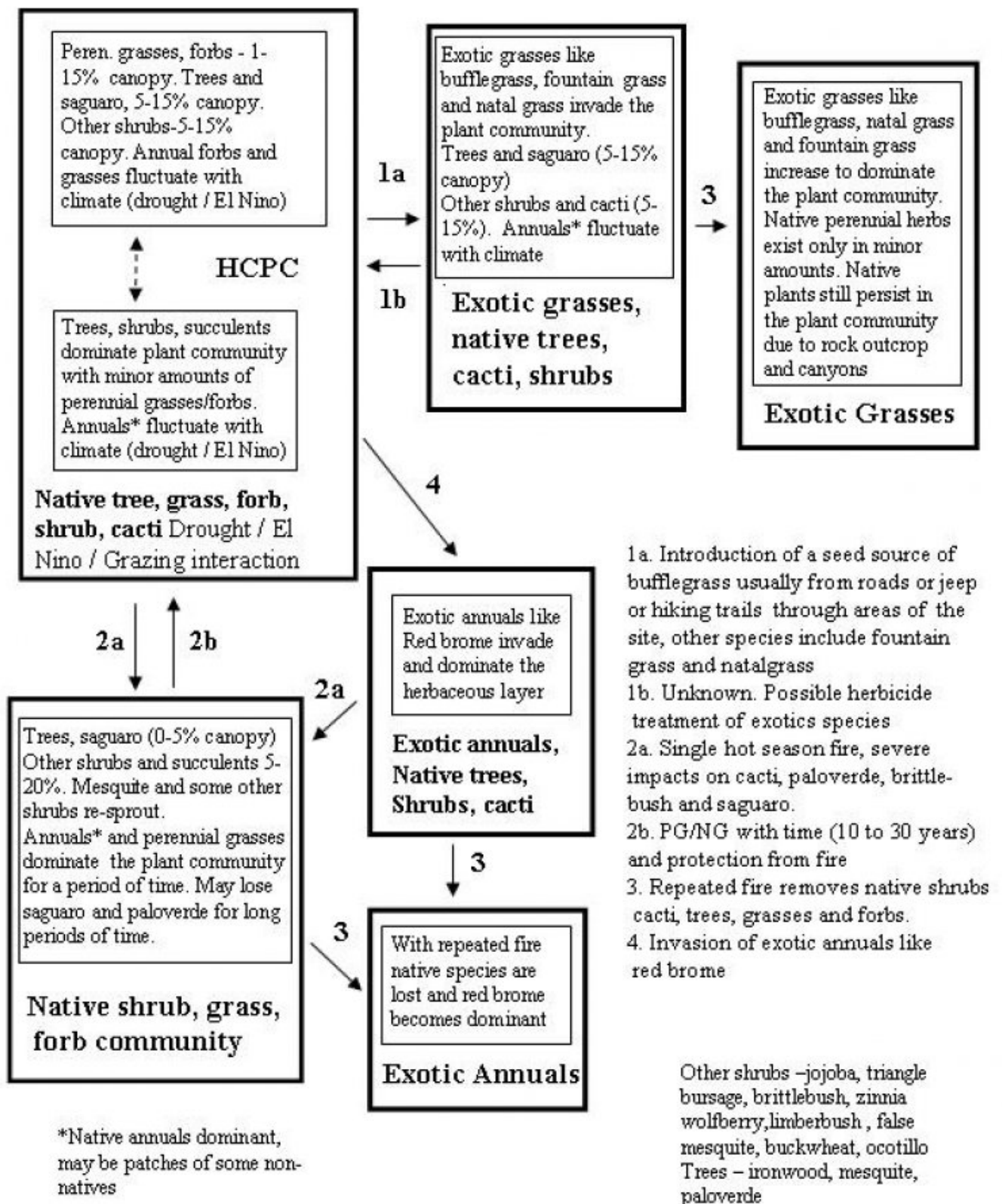


Figure 4. State and Transition model, Granitic Upland 10-13"

State 1

Historical Climax Plant Community

Community 1.1

Historical Climax Plant Community

The potential plant community on the site is a diverse mixture of desert shrubs, cacti, trees and perennial grasses and forbs. Annuals are of minor importance on the site. All of the major shrub and perennial grass and forb species on the site tend to be well dispersed throughout the plant community. The aspect is shrubland. With continuous, heavy grazing, forage species like bush muhly, false mesquite, desert zinnia, janusia, and range ratany are removed from the plant community and replaced by increases in shrubs like triangle bursage, turpentine bush, snakeweed and cacti. Trees tend to be shrubby on this site due to shallow soils. This site generally lacks the cobble and stone cover of adjacent hillsites. Gravel size and cover may be inadequate on moderate slopes in preventing water erosion. Saguaro can usually be found on this site in many age classes due to numerous rocky areas offering good seedling habitat in most years. Stands of mature saguaro will result in fewer trees on the site and vice versa.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	7	67	269
Shrub/Vine	52	179	247
Tree	67	135	179
Forb	11	67	179
Total	137	448	874

Table 6. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	1-2%
Grass/grasslike basal cover	0-1%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0-5%
Litter	5-30%
Surface fragments >0.25" and <=3"	35-70%
Surface fragments >3"	5-15%
Bedrock	1-10%
Water	0%
Bare ground	5-55%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	0-1%	0-15%	0-10%
>0.15 <= 0.3	—	1-5%	1-5%	1-5%
>0.3 <= 0.6	—	2-10%	0-2%	0-5%
>0.6 <= 1.4	—	0-2%	—	—
>1.4 <= 4	0-1%	—	—	—
>4 <= 12	1-10%	—	—	—
>12 <= 24	—	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

Figure 6. Plant community growth curve (percent production by month).
AZ4013, 40.1 10-13" p.z. other sites. Growth begins in the late winter, goes

semi-dormant in the drought period of late May through early July, growth continues in the summer through early fall..

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

State 2

Native trees, shrubs, cacti and fire

Community 2.1

Native trees, shrubs, cacti and fire

This plant community occurs as a result of a single hot season fire. Paloverde and saguaro can be severely impacted and may take long periods of time (30-50 years) to recover to pre-fire levels. Annual grasses and forbs dominate the community for some time until perennial grasses, forbs and shrubs can recover. This plant community can produce enough herbaceous fuel from native species of grasses and / or forbs to carry fire only in unusually wet winter or summers. The natural incidence of fire in this MLRA is very low and fires are much more common from man-made ignitions. Areas of the site close to urban zones or along heavily travelled roads and highways will experience a higher rate of fires.

State 3

Exotic perennial grasses with natives

Community 3.1

Exotic perennial grasses with natives

This community occurs where buffleggrass, natal grass or fountain grass invade the native plant community. These species occupy the niches of low shrubs like brittlebush or triangle bursage and woody forbs like janusia, ayenia and deer weed.

State 4

Exotic perennial grasses and fire

Community 4.1

Exotic perennial grasses and fire

This community occurs where a native plant community that has been invaded by buffleggrass or fountain grass has burned one or more times. Increasing amounts of buffleggrass leads to more uniform fine fuels. In areas adjacent to roads and urban areas the risk of repeated fires will increase. As fire frequency increases the dominance of the exotic grasses increase.

State 5

Native plant community with exotic annuals

Community 5.1

Native plant community with exotic annuals

This plant community occurs where the native community has been invaded by red brome, schismus and / or filaree. These species occupy the niche of the native winter annual forbs and grasses. These exotic annual grasses will fluctuate from nearly nothing in a dry winter to dominance of the understory plant community in a El Nino winter.

State 6

Exotic annuals and fire

Community 6.1

Exotic annuals and fire

This plant community occurs where a native plant community which has been invaded by red brome, schismus or filaree has burned repeatedly. As fires become more frequent the native trees, shrubs and succulents are removed from the plant community and these species become dominant. In areas of the site near urban areas and along heavily travelled roads this will be a more common occurrence due to an increased source of ignitions.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Dominant perennial grasses			6–90	
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	1–45	–
	tanglehead	HECO10	<i>Heteropogon contortus</i>	1–45	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	1–45	–
	slim tridens	TRMU	<i>Tridens muticus</i>	1–34	–
	Parish's threeawn	ARPUP5	<i>Aristida purpurea</i> var. <i>parishii</i>	0–22	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	1–22	–
	spidergrass	ARTEG	<i>Aristida ternipes</i> var. <i>gentilis</i>	0–11	–
	Santa Rita threeawn	ARCAG	<i>Aristida californica</i> var. <i>glabrata</i>	0–11	–
2	Misc perennial grasses			1–22	
	red grama	BOTR2	<i>Bouteloua trifida</i>	0–11	–
	blue threeawn	ARPUN	<i>Aristida purpurea</i> var. <i>nealleyi</i>	0–6	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–6	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	0–6	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	0–2	–
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	0–2	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	0–2	–
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	0–2	–
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	0–2	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–2	–
	Havard's threeawn	ARHA3	<i>Aristida havardii</i>	0–2	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	0–1	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	0–1	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	0–1	–
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	0–1	–
3	Dominant short grasses			0–45	
	slender grama	BORE2	<i>Bouteloua repens</i>	0–22	–
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	0–22	–
	Rothrock's grama	BORO2	<i>Bouteloua rothrockii</i>	0–17	–
4	Annual grasses			0–112	
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	0–112	–
	mucronate sprangeltop	LEPAB	<i>Leptochloa panicea</i> ssp. <i>brachiata</i>	0–22	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–22	–
	Mexican panicgrass	PAHI5	<i>Panicum hirticaule</i>	0–11	–
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	0–11	–

	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	0–11	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0–6	–
	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	–
	desert lovegrass	ERPEM	<i>Eragrostis pectinacea</i> var. <i>miserrima</i>	0–2	–
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	0–1	–
Forb					
5	Perennial forbs			11–67	
	slender janusia	JAGR	<i>Janusia gracilis</i>	2–22	–
	shrubby deervetch	LORI3	<i>Lotus rigidus</i>	1–17	–
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	2–17	–
	brownplume wirelettuce	STPA4	<i>Stephanomeria pauciflora</i>	0–11	–
	lacy tansyaster	MAPIP4	<i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i> var. <i>pinnatifida</i>	1–11	–
	wishbone-bush	MILAV	<i>Mirabilis laevis</i> var. <i>villosa</i>	0–11	–
	desert marigold	BAMU	<i>Baileya multiradiata</i>	0–11	–
	Arizona wrightwort	CAAR7	<i>Carlowrightia arizonica</i>	0–6	–
	red-gland spurge	CHME5	<i>Chamaesyce melanadenia</i>	1–6	–
	San Felipe dogweed	ADPO	<i>Adenophyllum porophylloides</i>	0–6	–
	bluedicks	DICA14	<i>Dichelostemma capitatum</i>	0–6	–
	Parry's false prairie-clover	MAPA7	<i>Marina parryi</i>	0–6	–
	desert trumpet	ERIN4	<i>Eriogonum inflatum</i>	1–6	–
	dense ayenia	AYMI	<i>Ayenia microphylla</i>	0–6	–
	Parry's beardtongue	PEPA24	<i>Penstemon parryi</i>	0–2	–
	glandleaf milkwort	POMA7	<i>Polygala macradenia</i>	0–2	–
	spearleaf	MAPA9	<i>Matelea parvifolia</i>	0–2	–
	weakleaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	0–2	–
	tuber anemone	ANTU	<i>Anemone tuberosa</i>	0–1	–
	narrowleaf silverbush	ARLA12	<i>Argythamnia lanceolata</i>	0–1	–
	New Mexico silverbush	ARNE2	<i>Argythamnia neomexicana</i>	0–1	–
	Braun's rockcress	ARPE3	<i>Arabis perstellata</i>	0–1	–
	trailing windmills	ALIN	<i>Allionia incarnata</i>	0–1	–
	dwarf desertpeony	ACNA2	<i>Acourtia nana</i>	0–1	–
	brownfoot	ACWR5	<i>Acourtia wrightii</i>	0–1	–
	hairy five eyes	CHSO	<i>Chamaesaracha sordida</i>	0–1	–
	Parish's larkspur	DEPAP3	<i>Delphinium parishii</i> ssp. <i>parishii</i>	0–1	–
	tall mountain larkspur	DESC	<i>Delphinium scaposum</i>	0–1	–
	desert mariposa lily	CAKE	<i>Calochortus kennedyi</i>	0–1	–
	lipfern	CHEIL	<i>Cheilanthes</i>	0–1	–
	scarlet spiderling	BOCO	<i>Boerhavia coccinea</i>	0–1	–
	wild dwarf morning-glory	EVAR	<i>Evolvulus arizonicus</i>	0–1	–
	California fagonbush	FAI A	<i>Fagonia laevis</i>	0–1	–

	California rege...	ERDI4	<i>Erigeron divergens</i>	0-1	-
	desert rosemallow	HICO	<i>Hibiscus coulteri</i>	0-1	-
	paleface	HIDE	<i>Hibiscus denudatus</i>	0-1	-
	spreading fleabane	ERDI4	<i>Erigeron divergens</i>	0-1	-
	plains blackfoot	MELE2	<i>Melampodium leucanthum</i>	0-1	-
	desert tobacco	NIOBO	<i>Nicotiana obtusifolia</i> var. <i>obtusifolia</i>	0-1	-
	cloak fern	NOTHO	<i>Notholaena</i>	0-1	-
	cliffbrake	PELLA	<i>Pellaea</i>	0-1	-
	Arizona spikemoss	SEAR2	<i>Selaginella arizonica</i>	0-1	-
	spreading fanpetals	SIAB	<i>Sida abutifolia</i>	0-1	-
	slender poreleaf	POGR5	<i>Porophyllum gracile</i>	0-1	-
6	Annual forbs			0-112	
	California poppy	ESCAM	<i>Eschscholzia californica</i> ssp. <i>mexicana</i>	0-22	-
	coastal bird's-foot trefoil	LOSAB	<i>Lotus salsuginosus</i> var. <i>brevivexillus</i>	0-22	-
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	0-22	-
	Coulter's lupine	LUSP2	<i>Lupinus sparsiflorus</i>	0-17	-
	exserted Indian paintbrush	CAEXE	<i>Castilleja exserta</i> ssp. <i>exserta</i>	0-17	-
	smallflowered milkvetch	ASNU4	<i>Astragalus nuttallianus</i>	0-11	-
	Coulter's spiderling	BOCO2	<i>Boerhavia coulteri</i>	0-11	-
	common fiddleneck	AMMEI2	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	0-11	-
	Sonoran sandmat	CHMI7	<i>Chamaesyce micromera</i>	0-11	-
	cryptantha	CRYPT	<i>Cryptantha</i>	0-11	-
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	0-11	-
	miniature woollystar	ERDI2	<i>Eriastrum diffusum</i>	0-11	-
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0-11	-
	combseed	PECTO	<i>Pectocarya</i>	0-11	-
	foothill deervetch	LOHU2	<i>Lotus humistratus</i>	0-11	-
	distant phacelia	PHDI	<i>Phacelia distans</i>	0-11	-
	thelypody	THELY	<i>Thelypodium</i>	0-11	-
	woolly tidestromia	TILA2	<i>Tidestromia lanuginosa</i>	0-11	-
	American wild carrot	DAPU3	<i>Daucus pusillus</i>	0-6	-
	Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	0-6	-
	shaggyfruit pepperweed	LELA	<i>Lepidium lasiocarpum</i>	0-3	-
	flatcrown buckwheat	ERDE6	<i>Eriogonum deflexum</i>	0-2	-
	Florida pellitory	PAFL3	<i>Parietaria floridana</i>	0-2	-
	glandular threadplant	NEGL	<i>Nemacladus glanduliferus</i>	0-2	-
	Arizona phacelia	PHAR13	<i>Phacelia arizonica</i>	0-2	-
	cleftleaf wildheliotrope	PHCR	<i>Phacelia crenulata</i>	0-2	-
	chia	SACO6	<i>Salvia columbariae</i>	0-2	-
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	0-2	-
	star gilia	GIST	<i>Gilia stellata</i>	0-2	-
	woollyhead neststraw	STMI2	<i>Stylocline micropoides</i>	0-2	-
	buckwheat	ERIOG	<i>Eriogonum</i>	0-2	-

	hairy prairie clover	DAMO	<i>Dalea mollis</i>	0–2	–
	devil's spineflower	CHRI	<i>Chorizanthe rigida</i>	0–2	–
	Esteve's pincushion	CHST	<i>Chaenactis stevioides</i>	0–2	–
	New Mexico thistle	CINE	<i>Cirsium neomexicanum</i>	0–2	–
	pincushion flower	CHFR	<i>Chaenactis fremontii</i>	0–2	–
	carelessweed	AMPA	<i>Amaranthus palmeri</i>	0–2	–
	bristly fiddleneck	AMTE3	<i>Amsinckia tessellata</i>	0–2	–
	white easterbonnets	ANLA7	<i>Antheropeas lanosum</i>	0–2	–
	hoary bowlesia	BOIN3	<i>Bowlesia incana</i>	0–2	–
	yellow tackstem	CAPA7	<i>Calycoseris parryi</i>	0–2	–
	white tackstem	CAWR	<i>Calycoseris wrightii</i>	0–2	–
	pitseed goosefoot	CHBE4	<i>Chenopodium berlandieri</i>	0–2	–
	brittle spineflower	CHBR	<i>Chorizanthe brevicornu</i>	0–2	–
	Chiricahua Mountain sandmat	CHFL3	<i>Chamaesyce florida</i>	0–1	–
	California suncup	CACA32	<i>Camissonia californica</i>	0–1	–
	fringed amaranth	AMFI	<i>Amaranthus fimbriatus</i>	0–1	–
	sand pygmyweed	CRCOC	<i>Crassula connata</i> var. <i>connata</i>	0–1	–
	wedgeleaf draba	DRCU	<i>Draba cuneifolia</i>	0–1	–
	Abert's buckwheat	ERAB2	<i>Eriogonum abertianum</i>	0–1	–
	sorrel buckwheat	ERPO4	<i>Eriogonum polycladon</i>	0–1	–
	Texas stork's bill	ERTE13	<i>Erodium texanum</i>	0–1	–
	sand fringe pod	THCU	<i>Thysanocarpus curvipes</i>	0–1	–
	Louisiana vetch	VILU	<i>Vicia ludoviciana</i>	0–1	–
	Palmer's grapplinghook	HAPA7	<i>Harpagonella palmeri</i>	0–1	–
	California goldfields	LACAC2	<i>Lasthenia californica</i> ssp. <i>californica</i>	0–1	–
	flatspine stickseed	LAOCO	<i>Lappula occidentalis</i> var. <i>occidentalis</i>	0–1	–
	Mexican fireplant	EUHE4	<i>Euphorbia heterophylla</i>	0–1	–
	spring pygmy cudweed	EVVE	<i>Evax verna</i>	0–1	–
	limestone bedstraw	GAPR	<i>Galium proliferum</i>	0–1	–
	California desert dandelion	MACA6	<i>Malacothrix californica</i>	0–1	–
	slender goldenweed	MAGR10	<i>Machaeranthera gracilis</i>	0–1	–
	mesa tansyaster	MATA	<i>Machaeranthera tagetina</i>	0–1	–
	whitestem blazingstar	MEAL6	<i>Mentzelia albicaulis</i>	0–1	–
	Lindley's silverpuffs	MILI5	<i>Microseris lindleyi</i>	0–1	–
	Mojave desertstar	MOBE2	<i>Monoptilon bellioides</i>	0–1	–
	lyreleaf jewelflower	STCAA	<i>Streptanthus carinatus</i> ssp. <i>arizonicus</i>	0–1	–
	manybristle chinchweed	PEPA2	<i>Pectis papposa</i>	0–1	–
	desert evening primrose	OEPR	<i>Oenothera primiveris</i>	0–1	–
	Arizona cottonrose	LOAR12	<i>Logfia arizonica</i>	0–1	–
Shrub/Vine					
8	Dominant low shrubs			22–67	

	fairyduster	CAER	<i>Calliandra eriophylla</i>	6–28	–
	Eastern Mojave buckwheat	ERFA2	<i>Eriogonum fasciculatum</i>	0–17	–
	bastardsage	ERWR	<i>Eriogonum wrightii</i>	0–11	–
	triangle bur ragweed	AMDE4	<i>Ambrosia deltoidea</i>	1–11	–
	Coulter's brickellbush	BRCO	<i>Brickellia coulteri</i>	1–11	–
	littleleaf ratany	KRER	<i>Krameria erecta</i>	1–11	–
	white ratany	KRGR	<i>Krameria grayi</i>	0–11	–
	desert zinnia	ZIAC	<i>Zinnia acerosa</i>	1–11	–
	rough menodora	MESC	<i>Menodora scabra</i>	0–6	–
	brittlebush	ENFA	<i>Encelia farinosa</i>	0–6	–
	Palmer's Indian mallow	ABPA	<i>Abutilon palmeri</i>	0–6	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–6	–
	American threefold	TRCA8	<i>Trixis californica</i>	0–2	–
9	Dominant large shrubs			17–90	
	jojoba	SICH	<i>Simmondsia chinensis</i>	6–28	–
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	6–22	–
	sangre de cristo	JACA2	<i>Jatropha cardiophylla</i>	0–17	–
	pelotazo	ABIN	<i>Abutilon incanum</i>	0–17	–
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	0–11	–
	desert lavender	HYEM	<i>Hyptis emoryi</i>	0–11	–
	Berlandier's wolfberry	LYBE	<i>Lycium berlandieri</i>	1–6	–
10	Miscellaneous shrubs			1–11	
	Wright's beebrush	ALWR	<i>Aloysia wrightii</i>	0–3	–
	Tucson bur ragweed	AMCO4	<i>Ambrosia cordifolia</i>	0–2	–
	burrobush	AMDU2	<i>Ambrosia dumosa</i>	0–2	–
	Warnock's snakewood	COWA	<i>Condalia warnockii</i>	0–2	–
	sweetbush	BEJU	<i>Bebbia juncea</i>	0–2	–
	creosote bush	LATRT	<i>Larrea tridentata</i> var. <i>tridentata</i>	0–2	–
	water jacket	LYAN	<i>Lycium andersonii</i>	0–1	–
	Arizona desert-thorn	LYEX	<i>Lycium exsertum</i>	0–1	–
	Arizona mimosa	MIDIL	<i>Mimosa distachya</i> var. <i>laxiflora</i>	0–1	–
	whitestem paperflower	PSCO2	<i>Psilostrophe cooperi</i>	0–1	–
	toothleaf goldeneye	VIDE3	<i>Viguiera dentata</i>	0–1	–
	banana yucca	YUBA	<i>Yucca baccata</i>	0–1	–
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	0–1	–
	spiny hackberry	CEEH	<i>Celtis ehrenbergiana</i>	0–1	–
	rosary babybonnets	COGL8	<i>Coursetia glandulosa</i>	0–1	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	0–1	–
	longleaf jointfir	EPTR	<i>Ephedra trifurca</i>	0–1	–
	turpentine bush	ERLA12	<i>Ericameria laricifolia</i>	0–1	–
	burrobrush	HYSA	<i>Hymenoclea salsola</i>	0–1	–
	burroweed	ISTE2	<i>Isocoma tenuisecta</i>	0–1	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0–1	–

	prairie acacia	ACANH	<i>Acacia angustissima</i> var. <i>hirta</i>	0–1	–
	rayless goldenhead	ACSP	<i>Acamptopappus sphaerocephalus</i>	0–1	–
11	Succulents			11–90	
	saguaro	CAGI10	<i>Carnegiea gigantea</i>	6–56	–
	walkingstick cactus	CYSP8	<i>Cylindropuntia spinosior</i>	0–11	–
	staghorn cholla	CYVE3	<i>Cylindropuntia versicolor</i>	1–11	–
	cactus apple	OPEN3	<i>Opuntia engelmannii</i>	1–11	–
	purple pricklypear	OPMA8	<i>Opuntia macrocentra</i>	0–11	–
	tulip pricklypear	OPPH	<i>Opuntia phaeacantha</i>	0–11	–
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	1–6	–
	Christmas cactus	CYLE8	<i>Cylindropuntia leptocaulis</i>	1–6	–
	teddybear cholla	CYBI9	<i>Cylindropuntia bigelovii</i>	0–6	–
	jumping cholla	CYFU10	<i>Cylindropuntia fulgida</i>	0–6	–
	pinkflower hedgehog cactus	ECFA	<i>Echinocereus fasciculatus</i>	1–6	–
	buck-horn cholla	CYAC8	<i>Cylindropuntia acanthocarpa</i>	0–6	–
	Arizona pencil cholla	CYAR14	<i>Cylindropuntia arbuscula</i>	0–2	–
	Schott's century plant	AGSC3	<i>Agave schottii</i>	0–2	–
	Graham's nipple cactus	MAGR9	<i>Mammillaria grahamii</i>	1–2	–
	Thornber's nipple cactus	MATH	<i>Mammillaria thornberi</i>	0–1	–
	soaptree yucca	YUEL	<i>Yucca elata</i>	0–1	–
	rainbow cactus	ECPE	<i>Echinocereus pectinatus</i>	0–1	–
	spiny star	ESVIV	<i>Escobaria vivipara</i> var. <i>vivipara</i>	0–1	–
	candle cholla	CYKL	<i>Cylindropuntia kleiniae</i>	0–1	–
	Engelmann's hedgehog cactus	ECEN	<i>Echinocereus engelmannii</i>	0–1	–
	redspine fishhook cactus	ECER2	<i>Echinomastus erectocentrus</i>	0–1	–
	long-tubercle beehive cactus	COROR	<i>Coryphantha robustispina</i> ssp. <i>robustispina</i>	0–1	–
	desert agave	AGDE	<i>Agave deserti</i>	0–1	–
Tree					
12	Trees			67–179	
	yellow paloverde	PAMI5	<i>Parkinsonia microphylla</i>	67–135	–
	desert ironwood	OLTE	<i>Olneya tesota</i>	0–90	–
	velvet mesquite	PRVE	<i>Prosopis velutina</i>	0–28	–
	catclaw acacia	ACGR	<i>Acacia greggii</i>	0–17	–

Animal community

This site produces very little herbaceous forage for livestock. The plant community has a good variety of evergreen browse species making it suitable for winter grazing. Areas of this site are associated with steep rough hillsites and will be over used unless grazing systems allow enough rest for recovery or unless fencing is used to isolate the site from the hillsites. Water may be available in the bedrock canyons bisecting the site in both the winter and summer. The site provides good habitat for a variety of desert wildlife including the larger mammals. Water developments are very important to wildlife on this site.

Although free water may be found in rocky drainages in the rainy seasons, water developments would help ensure year-round use of the site by the large desert mammals. Cover, forage plant diversity and topography are good enough for a great variety of wildlife.

Hydrological functions

This site is a fair to good producer of runoff due to moderate slopes and shallow to very shallow soils. Very gravelly soil surfaces help to hold water on the site.

Recreational uses

Hunting, hiking, birdwatching, photography, horseback riding, rock hounding, recreational mining

Wood products

Some paloverde, ironwood and mesquite for camp-fires and branding fires.

Other products

Stones and cobbles, decomposed granite, saguaro ribs, cholla skeletons. Traditional foods like saguaro fruits, prickly pear tunas, cactus flower buds and jojoba nuts. Traditional herbs like coyote tobacco, mint bush, club moss, globe mallow and limberbush.

Type locality

Location 1: Pima County, AZ	
Township/Range/Section	T14S R16E S28
General legal description	Tucson FO - Saguaro Nat'l. Monument East
Location 2: Pima County, AZ	
General legal description	Sells FO - Quijotoa Mountains 112 7' X 32 11' (unsurveyed)
Location 3: Pima County, AZ	
Township/Range/Section	T15S R9E S9
General legal description	La Tortuga Ranch, in the Tortuga pasture 2 miles south of Turtle well. Ungrazed 15 years.

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, Dan Robinett, Emilio Carrillo
Contact for lead author	NRCS Tucson Area Office
Date	03/08/2005
Approved by	S Cassady
Approval date	

Indicators

1. **Number and extent of rills:** Rills are present on this site but follow joints, bedding planes, and fractures in the bedrock parent materials.

2. **Presence of water flow patterns:** Discontinuous, 10-15 feet in length.

3. **Number and height of erosional pedestals or terracettes:** No pedestals on plants, rock or gravel fragments and no terracettes are present.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10-60% (low values due to high rock and gravel cover).

5. **Number of gullies and erosion associated with gullies:** None

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Most litter size classes stay in place. Herbaceous litter moves 10-15 feet in flow paths.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Expect ratings of 1-3 in perennial plant interspaces, 4-5 under shrub canopies.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thin platy to granular; color is 7.5-10YR5/4 dry, 7.5-10YR4/4 moist; thickness to 2 inches.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy 15-20%; 50-65% shrubs, 15-20 trees, 5-10% succulents, 2-5% perennial grasses. Cove is well dispersed throughout site.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None

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 shrubs > trees > winter annuals > shrubs > perennial forbs > perennial grasses > summer annuals > succulents

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** 20-50% tree & shrub canopy mortality; 75-90% perennial grass mortality
-

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):** 122 lbs/ac unfavorable precipitation; 400 lbs/ac normal precipitation; 780 lbs/ac favorable precipitation.
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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:** triangle bursage, turpentine bush, snakeweed, cacti, buffleggrass
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17. **Perennial plant reproductive capability:** Not impaired for shrubs, drought impaired for perennial grasses and forbs.
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