

Ecological site R040XA114AZ **Loamy Upland 10"-13" p.z.**

Accessed: 05/19/2024

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.

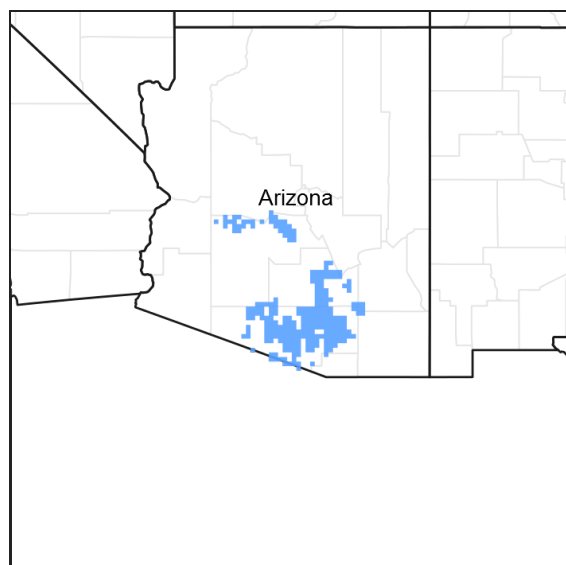


Figure 1. Mapped extent

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.

Classification relationships

Similar to TES mapping units 290 and 291 on the Tonto National Forest. Tonto Basin

Associated sites

R040XA110AZ	Limy Slopes 10"-13" p.z.
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R040XA118AZ	Sandy Loam Upland 10"-13" p.z.
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Similar sites

R041XC313AZ	Loamy Upland 12"-16" p.z.
R041XB210AZ	Loamy Upland 8-12" p.z.

Table 1. Dominant plant species

Tree	(1) <i>Parkinsonia microphylla</i> (2) <i>Prosopis velutina</i>
Shrub	(1) <i>Zinnia acerosa</i> (2) <i>Ambrosia deltoidea</i>
Herbaceous	(1) <i>Janusia gracilis</i> (2) <i>Bouteloua eriopoda</i>

Physiographic features

This site occurs in the upper elevations of the Sonoran Desert in southern Arizona. It occurs on fan terraces and old stream terraces.

Table 2. Representative physiographic features

Landforms	(1) Fan (2) Stream terrace (3) Mesa
Flooding frequency	None
Ponding frequency	None
Elevation	579–1,036 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
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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 are deep soils which have formed in loamy alluvium of mixed origin. Surface textures range from very gravelly sandy loam to loam. Sandy loam surfaces can be no thicker than four inches (eight inches for GRV-SL). These soils all have argillic horizons near the surface. Plant-soil moisture relationships are fairly good. Soils on this site are the thin surfaced versions of Continental, Mohave, Pinaleno, and Topowa.

Soils mapped on this site include: in

SSA-627 Southern Mohave County MU's Vekol family-125; in

SSA-645 Aguilla-Carefree MU's Eba-25, 36, 38 & 42, Mohave-27, 82, 83, 87, 88 & 89, Ohaco-28 & 95, Tres Hermanos-121, 89, 96, 97, 120;

SSA-661 Eastern Pinal Southern Gila counties MU's Bucklebar-515 & Ohaco-840;

SSA-668 Tucson Avra Valley MU's Anway-Au, Estrella-Es, Grabe-GkB, Mohave-MdA, MdB, MhA, MhB, MtB & TmB, Palo Verdes-PaB & RxD, Pinaleno-PnB, Sonoita-Sn, So & Sr, Tubac-TwB; SSA-669 Eastern Pima county MU's Mohave-47 & 72, Nahda-49, Palos Verdes-54, 55 & 61, Pinaleno-48, 60 & 62, Tubac-81;

SSA-703 Tohono O'odham MU's Nahda-45 & Topawa-56.

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Very gravelly sandy loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to slow
Soil depth	152 cm
Surface fragment cover <=3"	5–75%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	12.7–27.43 cm
Calcium carbonate equivalent (0-101.6cm)	0–30%
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)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–65%
Subsurface fragment volume >3" (Depth not specified)	0–10%

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"), Loamy Upland

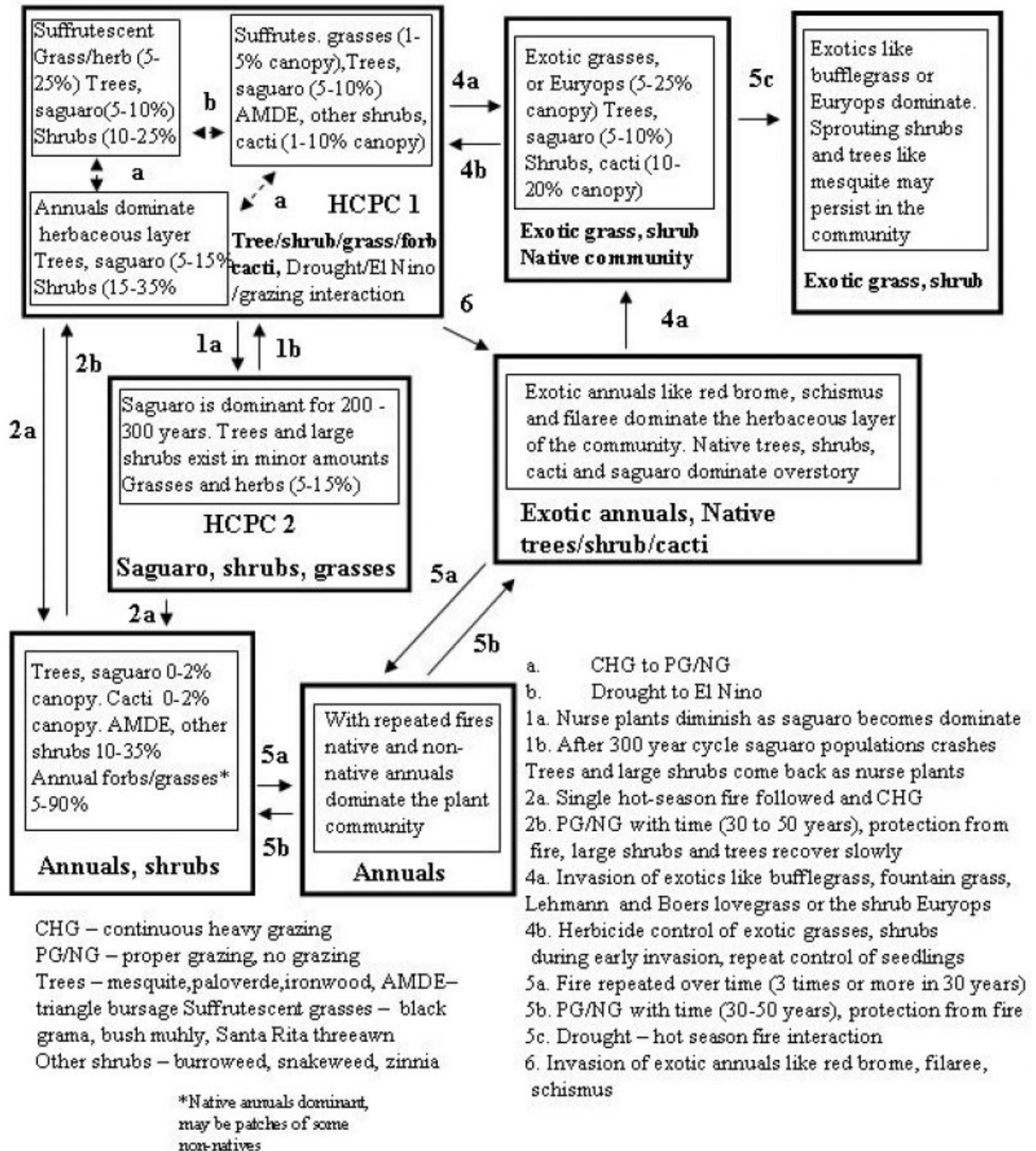


Figure 4. State and Transition model, Loamy Upland 10-13" pz

State 1

Historical Climax Plant Community

Community 1.1

Historical Climax Plant Community

The potential plant community is an open stand of desert trees with an understory of low shrubs, cacti and perennial grasses and forbs. The aspect is shrubby. With continuous, heavy grazing, perennial grass species are removed from the plant community and shrubs like triangle bursage and snakeweed can increase to dominate the understory. Mesquite tends to be shrubby on this site due to the thin surfaces over clayey horizons. Paloverde and ironwood reach moderate size on the site. With thin soil surfaces this site can be a very ineffective user of intense summer rainfall if the herbaceous cover has been depleted. A 5 to 10% tree canopy is important on the site to keep diversity in the plant community. The potential of the site to produce grass is reduced as tree cover exceeds these amounts. Triangle bursage understories are long lived, persistent, and will not easily be replaced by perennial grass, as will snakeweed or burroweed understories with good grazing management. In severe drought the cover of perennial grasses and herbs as well as bursage and burroweed can be greatly reduced in the plant community. Recovery can go back to perennial grasses and herbs if good summer rains follow drought. Recovery can go back to the half shrubs if good cool season rains follow the drought. Prickly pear can increase under heavy grazing pressure. Jumping cholla can increase due to poor grazing management or such increases can be episodic due to climate. Stand lifespans range from 50-70 years without reproduction.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	50	112	336
Shrub/Vine	73	168	336
Tree	118	224	308
Forb	15	112	252
Total	256	616	1232

Table 6. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	1-4%
Grass/grasslike basal cover	0-4%
Forb basal cover	0-2%
Non-vascular plants	0%
Biological crusts	15-30%
Litter	10-70%
Surface fragments >0.25" and <=3"	1-65%
Surface fragments >3"	0-10%
Bedrock	0%
Water	0%
Bare ground	25-75%

Table 7. Canopy structure (% cover)

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

Exotic perennial grasses or Euryops with natives

Community 2.1

Exotic perennial grasses or Euryops with natives

This community occurs where buffleggrass, Lehmann lovegrass, Boer lovegrass, natal grass, fountain grass or the African shrubs, *Euryops multifidus* and *Pentzia incana*, invade the native plant community. These species occupy the niches of perennial grasses like bush muhly and black grama, slender janusia, ayenia and low shrubs like snakeweed, false mesquite and triangle bursage.

State 3

Exotic perennial grasses and fire

Community 3.1

Exotic perennial grasses and fire

This community occurs where a native plant community that has been invaded by buffleggrass, Lovegrasses or fountain grass has burned one or more times. Increasing amounts of exotic perennial grasses 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 4

Exotic annuals

Community 4.1

Exotic annuals

This plant community occurs where the native plant community has been invaded by annuals like schismus, red brome and filaree. These species occupy the niche of the native winter annual forbs and grasses. The 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 5

Annuals, half shrubs and fire

Community 5.1

Annuals, half shrubs and fire

This plant community occurs as a result of a single hot season fire. Paloverde, ironwood, cacti and saguaro can be severely impacted and may take long periods of time (30-50 years) to recover to pre-fire levels. Mesquite (except the very old trees and the very young) will sprout after fire. Perennial and annual grasses and forbs dominate the community for some time until shrubs like bursage recover. Some perennials like black grama, desert zinnia and slender janusia make take very long times to recover.

State 6

Annuals and fire

Community 6.1

Annuals and fire

This plant community occurs where a native plant community has burned repeatedly. As fires become more frequent the native trees, shrubs and succulents are removed from the plant community and annuals becomes 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. This can occur both in areas with only native annuals species present as well as those which have been invaded by schismus and red brome.

State 7

HCPC - 2 - Saguaro state

Community 7.1

HCPC - 2 - Saguaro state

There is a 300 year cycle on this site that swings between dominance of native trees and large shrubs (that serve as nurse plants) and mature saguaro forest. Saguaros establish wholesale in very favorable years (El Nino years like 1983) only in the presence of plentiful nurse plants like paloverde, ironwood, mesquite, wolfberry, creosote and jojoba. As saguaro plants top their nurse plants (40-60 years) the trees and shrubs begin to die. Saguaro stands reach maturity at 150 to 200 years and begin to diminish over the next 100 years as the large shrubs and trees come back into the plant community.

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	Suffrutescent grasses			22-112	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	11-56	—
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	11-56	—
2	Short lived perennial grasses			2-67	
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	0-28	—
	Rothrock's grama	BORO2	<i>Bouteloua rothrockii</i>	1-22	—
	red grama	BOTR2	<i>Bouteloua trifida</i>	0-22	—
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	1-17	—
	Parry's grama	BOPA2	<i>Bouteloua parryi</i>	0-11	—
	slender grama	BORE2	<i>Bouteloua repens</i>	0-11	—

	nineawn pappusgrass	ENDE	<i>Enneapogon desvauxii</i>	0–6	–
3	Perennial threeawns			22–67	
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	17–56	–
	Santa Rita threeawn	ARCAG	<i>Aristida californica</i> var. <i>glabrata</i>	6–22	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	1–17	–
	spidergrass	ARTEG	<i>Aristida ternipes</i> var. <i>gentilis</i>	0–6	–
	Parish's threeawn	ARPUP5	<i>Aristida purpurea</i> var. <i>parishii</i>	0–6	–
4	Miscellaneous perennial grasses			0–34	
	whiplash pappusgrass	PAVA2	<i>Pappophorum vaginatum</i>	0–28	–
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	0–17	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	0–11	–
	tanglehead	HECO10	<i>Heteropogon contortus</i>	0–11	–
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	0–6	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	0–6	–
	blue threeawn	ARPUN	<i>Aristida purpurea</i> var. <i>nealleyi</i>	0–6	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	0–6	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–2	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	0–2	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	0–2	–
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	0–2	–
	slim tridens	TRMU	<i>Tridens muticus</i>	0–2	–
	squirreltail	ELELE	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	0–2	–
	buryseed umbrellagrass	ENCH	<i>Enteropogon chlorideus</i>	0–2	–
5	Annual grasses			2–112	
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	0–28	–
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	1–28	–
	Mexican panicgrass	PAHI5	<i>Panicum hirticaule</i>	0–28	–
	mucronate sprangletop	LEPAB	<i>Leptochloa panicea</i> ssp. <i>brachiata</i>	0–28	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	1–28	–
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	0–17	–
	feather fingergrass	CHVI4	<i>Chloris virgata</i>	0–6	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0–6	–
	delicate muhly	MUFR	<i>Muhlenbergia fragilis</i>	0–6	–
	littleseed muhly	MUMI	<i>Muhlenbergia microsperma</i>	0–6	–
	witchgrass	PACA6	<i>Panicum capillare</i>	0–6	–
	Bigelow's bluegrass	POBI	<i>Poa bigelovii</i>	0–2	–
	Arizona signalgrass	URAR	<i>Urochloa arizonica</i>	0–2	–
	bearded cupgrass	ERAR5	<i>Eriochloa aristata</i>	0–2	–
	canyon cupgrass	ERLE7	<i>Eriochloa lemmonii</i>	0–2	–
	desert lovegrass	ERPEM	<i>Eragrostis pectinacea</i> var. <i>miserrima</i>	0–2	–
	tufted lovegrass	ERPEP2	<i>Eragrostis pectinacea</i> var. <i>pectinacea</i>	0–2	–
	Mexican sprangletop	LEFUU	<i>Leptochloa fusca</i> ssp. <i>uninervia</i>	0–1	–
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	0–1	–

	Madagascar dropseed	SPPY2	<i>Sporobolus pyramidatus</i>	0–1	–
Forb					
6	Suffrutescent forbs			11–112	
	slender janusia	JAGR	<i>Janusia gracilis</i>	6–28	–
	rough menodora	MESC	<i>Menodora scabra</i>	0–17	–
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	1–17	–
	San Felipe dogweed	ADPO	<i>Adenophyllum porophylloides</i>	1–17	–
	dense ayenia	AYMI	<i>Ayenia microphylla</i>	1–17	–
	slender poreleaf	POGR5	<i>Porophyllum gracile</i>	1–11	–
	Coues' cassia	SECO10	<i>Senna covesii</i>	0–11	–
	brownplume wirelettuce	STPA4	<i>Stephanomeria pauciflora</i>	0–6	–
7	Perennial forbs			2–17	
	wealeaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	1–6	–
	whitemargin sandmat	CHAL11	<i>Chamaesyce albomarginata</i>	0–6	–
	lacy tansyaster	MAPIP4	<i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i> var. <i>pinnatifida</i>	1–6	–
	bluedicks	DICAP	<i>Dichelostemma capitatum</i> ssp. <i>pauciflorum</i>	0–6	–
	desert marigold	BAMU	<i>Baileya multiradiata</i>	0–2	–
	dwarf desertpeony	ACNA2	<i>Acourtia nana</i>	0–2	–
	Parry's false prairie-clover	MAPA7	<i>Marina parryi</i>	0–2	–
	brownfoot	ACWR5	<i>Acourtia wrightii</i>	0–1	–
	whitemouth dayflower	COER	<i>Commelina erecta</i>	0–1	–
	leatherweed	CRPOP	<i>Croton pottsii</i> var. <i>pottsii</i>	0–1	–
	fingerleaf gourd	CUDI	<i>Cucurbita digitata</i>	0–1	–
	coyote gourd	CUPA	<i>Cucurbita palmata</i>	0–1	–
	New Mexico silverbush	ARNE2	<i>Argythamnia neomexicana</i>	0–1	–
	scarlet spiderling	BOCO	<i>Boerhavia coccinea</i>	0–1	–
	climbing wartclub	BOSC	<i>Boerhavia scandens</i>	0–1	–
	wild dwarf morning-glory	EVAR	<i>Evolvulus arizonicus</i>	0–1	–
	ragged nettlespurge	JAMA	<i>Jatropha macrorhiza</i>	0–1	–
	wishbone-bush	MILAV	<i>Mirabilis laevis</i> var. <i>villosa</i>	0–1	–
	orange fameflower	PHAU13	<i>Phemeranthus aurantiacus</i>	0–1	–
	shrubby purslane	POSU3	<i>Portulaca suffrutescens</i>	0–1	–
	twingleaf senna	SEBA3	<i>Senna bauhinioides</i>	0–1	–
	spreading fanpetals	SIAB	<i>Sida abutifolia</i>	0–1	–
	silverleaf nightshade	SOEL	<i>Solanum elaeagnifolium</i>	0–1	–
	Coulter's wrinklefruit	TECO	<i>Tetradlea coulteri</i>	0–1	–
8	Annual forbs			1–123	
	California poppy	ESCAM	<i>Eschscholzia californica</i> ssp. <i>mexicana</i>	0–56	–
	Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	0–28	–
	mesa tansyaster	MATA	<i>Machaeranthera tagetina</i>	0–28	–
	combseed	PECTO	<i>Pectocarya</i>	1–28	–
	Coulter's lupine	LUSP2	<i>Lupinus sparsiflorus</i>	0–22	–

	bristly fiddleneck	AMTE3	<i>Amsinckia tessellata</i>	0-22	—
	milkvetch	ASTRA	<i>Astragalus</i>	0-11	—
	Coulter's spiderling	BOCO2	<i>Boerhavia coulteri</i>	0-11	—
	buckwheat	ERIOG	<i>Eriogonum</i>	0-11	—
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	0-11	—
	miniature woollystar	ERDI2	<i>Eriastrum diffusum</i>	0-11	—
	yellow tackstem	CAPA7	<i>Calycoseris parryi</i>	0-11	—
	white tackstem	CAWR	<i>Calycoseris wrightii</i>	0-11	—
	prostrate sandmat	CHPR6	<i>Chamaesyce prostrata</i>	0-11	—
	Esteve's pincushion	CHST	<i>Chaenactis stevioides</i>	0-11	—
	Arizona phacelia	PHAR13	<i>Phacelia arizonica</i>	0-11	—
	Arizona popcornflower	PLAR	<i>Plagiobothrys arizonicus</i>	0-11	—
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	0-11	—
	woolly tidentromia	TILA2	<i>Tidentromia lanuginosa</i>	0-11	—
	coastal bird's-foot trefoil	LOSA	<i>Lotus salsuginosus</i>	0-6	—
	purslane	PORTU	<i>Portulaca</i>	0-6	—
	Tucson Mountain spiderling	BOME	<i>Boerhavia megaptera</i>	0-6	—
	fringed redmaids	CACI2	<i>Calandrinia ciliata</i>	0-6	—
	pitseed goosefoot	CHBE4	<i>Chenopodium berlandieri</i>	0-6	—
	American wild carrot	DAPU3	<i>Daucus pusillus</i>	0-6	—
	cryptantha	CRYPT	<i>Cryptantha</i>	0-6	—
	common woolly sunflower	ERLA6	<i>Eriophyllum lanatum</i>	0-6	—
	Texas stork's bill	ERTE13	<i>Erodium texanum</i>	0-6	—
	shaggyfruit pepperweed	LELA	<i>Lepidium lasiocarpum</i>	0-6	—
	Arizona poppy	KAGR	<i>Kallstroemia grandiflora</i>	0-6	—
	Nuttall's povertyweed	MONU	<i>Monolepis nuttalliana</i>	0-6	—
	green carpetweed	MOVE	<i>Mollugo verticillata</i>	0-6	—
	wheelscale saltbush	ATEL	<i>Atriplex elegans</i>	0-6	—
	carelessweed	AMPA	<i>Amaranthus palmeri</i>	0-3	—
	slender goldenweed	MAGR10	<i>Machaeranthera gracilis</i>	0-2	—
	tanseyleaf tansyaster	MATA2	<i>Machaeranthera tanacetifolia</i>	0-2	—
	star gilia	GIST	<i>Gilia stellata</i>	0-2	—
	New Mexico plumeseed	RANE	<i>Rafinesquia neomexicana</i>	0-2	—
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	0-2	—
	lyreleaf jewelflower	STCAA	<i>Streptanthus carinatus ssp. arizonicus</i>	0-2	—
	woollyhead neststraw	STMI2	<i>Stylocline micropoides</i>	0-1	—
	Coulter's globemallow	SPCO2	<i>Sphaeralcea coulteri</i>	0-1	—
	doubleclaw	PRPA2	<i>Proboscidea parviflora</i>	0-1	—
	slimjim bean	PHFI3	<i>Phaseolus filiformis</i>	0-1	—
	manybristle chinchweed	PEPA2	<i>Pectis papposa</i>	0-1	—
	Arizona cottonrose	LOAR12	<i>Loefia arizonica</i>	0-1	—

	Arizona cottonrose	LOAN12	<i>Logfia arizonica</i>	0-1	-
	hairy desert sunflower	GECA2	<i>Geraea canescens</i>	0-1	-
	Lindley's silverpuffs	MILI5	<i>Microseris lindleyi</i>	0-1	-
	bristly nama	NAHI	<i>Nama hispidum</i>	0-1	-
	evening primrose	OENOT	<i>Oenothera</i>	0-1	-
	Florida pellitory	PAFL3	<i>Parietaria floridana</i>	0-1	-
	pricklyburr	DAIN2	<i>Datura inoxia</i>	0-1	-
	spreading fleabane	ERDI4	<i>Erigeron divergens</i>	0-1	-
	Palmer's spectaclepod	DICA31	<i>Dimorphocarpa candicans</i>	0-1	-
	hyssop leaf sandmat	CHHY3	<i>Chamaesyce hyssopifolia</i>	0-1	-
	sensitive partridge pea	CHNI2	<i>Chamaecrista nictitans</i>	0-1	-
	New Mexico thistle	CINE	<i>Cirsium neomexicanum</i>	0-1	-
	hoary bowlesia	BOIN3	<i>Bowlesia incana</i>	0-1	-
Shrub/Vine					
9	Dominant half shrubs			45-112	
	triangle bur ragweed	AMDE4	<i>Ambrosia deltoidea</i>	34-62	-
	desert zinnia	ZIAC	<i>Zinnia acerosa</i>	11-45	-
	fairyduster	CAER	<i>Calliandra eriophylla</i>	1-17	-
	burweed	ISTE2	<i>Isocoma tenuisecta</i>	0-11	-
	sangre de cristo	JACA2	<i>Jatropha cardiophylla</i>	0-6	-
	littleleaf ratany	KRER	<i>Krameria erecta</i>	1-6	-
	white ratany	KRGR	<i>Krameria grayi</i>	0-6	-
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0-6	-
	brittlebush	ENFA	<i>Encelia farinosa</i>	0-6	-
	narrowleaf silverbush	ARLA12	<i>Argythamnia lanceolata</i>	0-6	-
	Coulter's brickellbush	BRCO	<i>Brickellia coulteri</i>	0-2	-
	threadleaf snakeweed	GUMI	<i>Gutierrezia microcephala</i>	0-2	-
	burrobush	AMDU2	<i>Ambrosia dumosa</i>	0-1	-
	rayless goldenhead	ACSP	<i>Acamptopappus sphaerocephalus</i>	0-1	-
	whitestem paperflower	PSCO2	<i>Psilostrophe cooperi</i>	0-1	-
	American threefold	TRCA8	<i>Trixis californica</i>	0-1	-
10	Dominant large shrubs			6-112	
	jojoba	SICH	<i>Simmondsia chinensis</i>	1-84	-
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	1-22	-
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	0-17	-
	creosote bush	LATR2	<i>Larrea tridentata</i>	0-11	-
	Berlandier's wolfberry	LYBE	<i>Lycium berlandieri</i>	1-11	-
	catclaw acacia	ACGR	<i>Acacia greggii</i>	0-6	-
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0-6	-
	Eastern Mojave buckwheat	ERFA2	<i>Eriogonum fasciculatum</i>	0-2	-
	Arizona desert-thorn	LYEX	<i>Lycium exsertum</i>	0-2	-
	water jacket	LYAN	<i>Lycium andersonii</i>	0-2	-
	Mexican bladdersage	SAME	<i>Salazaria mexicana</i>	0-1	-
	turnentine bush	ERLA12	<i>Eriogonum laevifolium</i>	0-1	-

	terpentine bush	ENLA12	<i>Eriogonum laetevirens</i>	0-1	-
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	0-1	-
	cattle saltbush	ATPO	<i>Atriplex polycarpa</i>	0-1	-
	Warnock's snakewood	COWA	<i>Condalia warnockii</i>	0-1	-
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	0-1	-
11	Succulents			22-112	
	saguaro	CAGI10	<i>Carnegiea gigantea</i>	6-28	-
	cactus apple	OPEN3	<i>Opuntia engelmannii</i>	11-28	-
	jumping cholla	CYFU10	<i>Cylindropuntia fulgida</i>	0-11	-
	walkingstick cactus	CYSP8	<i>Cylindropuntia spinosior</i>	0-11	-
	staghorn cholla	CYVE3	<i>Cylindropuntia versicolor</i>	0-11	-
	tulip pricklypear	OPPH	<i>Opuntia phaeacantha</i>	0-11	-
	Eastern Mojave buckwheat	ERFA2	<i>Eriogonum fasciculatum</i>	0-6	-
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	0-6	-
	creosote bush	LATRT	<i>Larrea tridentata</i> var. <i>tridentata</i>	0-6	-
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0-6	-
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	1-6	-
	cattle saltbush	ATPO	<i>Atriplex polycarpa</i>	0-3	-
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	0-2	-
	water jacket	LYAN	<i>Lycium andersonii</i>	0-2	-
	desert-thorn	LYCIU	<i>Lycium</i>	0-2	-
	Arizona desert-thorn	LYEX	<i>Lycium exsertum</i>	0-2	-
	Mexican bladdersage	SAME	<i>Salazaria mexicana</i>	0-2	-
	banana yucca	YUBA	<i>Yucca baccata</i>	0-2	-
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	0-2	-
	catclaw acacia	ACGR	<i>Acacia greggii</i>	0-2	-
	candle cholla	CYKL	<i>Cylindropuntia kleiniae</i>	0-2	-
	Christmas cactus	CYLE8	<i>Cylindropuntia leptocaulis</i>	0-2	-
	purple pricklypear	OPMA8	<i>Opuntia macrocentra</i>	0-2	-
	long-tubercle beehive cactus	COROR	<i>Coryphantha robustispina</i> ssp. <i>robustispina</i>	0-2	-
	buck-horn cholla	CYAC8	<i>Cylindropuntia acanthocarpa</i>	0-2	-
	Arizona pencil cholla	CYAR14	<i>Cylindropuntia arbuscula</i>	0-1	-
	Engelmann's hedgehog cactus	ECEN	<i>Echinocereus engelmannii</i>	0-1	-
	redspine fishhook cactus	ECER2	<i>Echinomastus erectocentrus</i>	0-1	-
	pinkflower hedgehog cactus	ECFA	<i>Echinocereus fasciculatus</i>	0-1	-
	spiny star	ESVIV	<i>Escobaria vivipara</i> var. <i>vivipara</i>	0-1	-
	devil's cholla	GRKU	<i>Grusonia kunzei</i>	0-1	-
	Thornber's nipple cactus	MATH	<i>Mammillaria thornberi</i>	0-1	-
	soaptree yucca	YUEL	<i>Yucca elata</i>	0-1	-
	Santa Rita pricklypear	OPSA	<i>Opuntia santa-rita</i>	0-1	-

	nightblooming cereus	PEGR3	<i>Peniocereus greggii</i>	0–1	–
	organpipe cactus	STTH3	<i>Stenocereus thurberi</i>	0–1	–
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	0–1	–
Tree					
12	Trees			118–308	
	yellow paloverde	PAMI5	<i>Parkinsonia microphylla</i>	112–168	–
	desert ironwood	OLTE	<i>Oleña tesota</i>	0–112	–
	velvet mesquite	PRVE	<i>Prosopis velutina</i>	6–56	–
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	0–11	–

Animal community

The plant community on this site is suitable for grazing by all classes of cattle. Forage species grow year-round with available moisture. Clayey horizons near the soil surface limit infiltration of summer rainfall making this site more productive of cool season forage species than warm season forage species. The plant community on this site provides adequate nutrition for livestock throughout the year.

Water developments are very important to wildlife species on this site. Vegetative cover and forage diversity are good enough for a great variety of wildlife including the large mammals.

Hydrological functions

This site has thin coarse textured soil surfaces over clayey subsoils and low gradient slopes and is a fair producer of runoff.

Recreational uses

Hunting, horseback riding, hiking, photography, birdwatching, camping, picniking.

Wood products

Mesquite furnishes limited firewood. In freeze free areas dead ironwood trees furnish wood for hobby uses and firewood.

Other products

Saguaro ribs, cholla skeletons, prickly pear tunas and pads, cholla buds, jojoba nuts and mesquite beans.

Inventory data references

Range 417s include 2 in good condition.

Type locality

Location 1: Pima County, AZ	
Township/Range/Section	T185 R14E S30
General legal description	Tucson Field Office - Santa Rita Exp. Range Exclosure #32, 36
Location 2: Pima County, AZ	
Township/Range/Section	T16S R7E S3
General legal description	Sells Field Office - Tribal Herd Ranch
Location 3: Pima County, AZ	
Township/Range/Section	T16S R9E S32

General legal description	Kings Anvil Ranch, Cactus pasture, along jeep trail to Ironwood tank.
Location 4: Gila County, AZ	
Township/Range/Section	T4N R12E S35
General legal description	Tonto National Monument, ungrazed 50 years. Soil map unit no.8, Topawa soil series.

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, Tom Reis
Contact for lead author	NRCS Tucson Area Office
Date	02/09/2005
Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** none present on this site.

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2. **Presence of water flow patterns:** Occupy approximately 10% of the area; discontinuous & long; ranging in length from 15-50 feet where gravel cover is less than 5%; flow appears to be strictly sheet flow where gravel cover is high.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are common on half shrubs and suffrutescent forbs, ranging in height from 1-2 inches; terracettes are infrequent, 40-80 feet apart with a 1-3 inch elevation difference from above to below the terracette. CCC rock spreader structures in the enclosure have created terracettes with a 2-4 inch elevation difference from above to below the terracette.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20-70%; on moist areas with higher slopes the gravel cover is higher and bare ground cover lower.

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5. **Number of gullies and erosion associated with gullies:** None
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6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Litter is trapped and stays in place where gravel and vegetative cover levels are high. Litter moves in flow paths where gravel and vegetative cover levels are low.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** No slake test done. Expect ratings of 1-3 in bare ground areas and 4-5 under shrub canopies.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Thin platy compacted structure from rain drop impact, weak angular to subangular blocky structure from 1/8 to 4 inches; reference site has thickness to 2 inches.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy cover estimated at 18% (3% trees & shrubs, 7% subshrubs & suffrutescent forbs, 6% succulents, 2% perennial grasses), basal cover 1% is irregular patches with approximately 50% cover occupy 5-10% of area.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer present. Shallow argillic horizon on this site feels like a compacted layer, but is not.

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: Half shrubs & suffrutescent forbs > large shrubs > succulents > annual forbs & grasses > perennial grasses > cryptogams.

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Basal cover reduced 50%, primarily for perennial grass plants; canopy cover reduced 50% on half shrubs and suffrutescent forbs; canopy cover reduced > 50% on large shrubs and trees.

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): 228 lbs/ac unfavorable precipitation; 550 lbs/ac normal precipitation; 1100 lbs/ac favorable precipitation.

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: Euryops, Lehmann lovegrass, buffelgrass, fountaingrass, malta star-thistle, snakeweed & burroweed can increase to dominate with heavy livestock grazing. Introduced cool season annuals (red brome, filaree, Mediterranean grass).
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17. **Perennial plant reproductive capability:** Not affected. Good size class distribution of subshrubs.
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