USDA Natural Resources
Conservation Service

Ecological site R040XA118AZ
Sandy Loam 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.

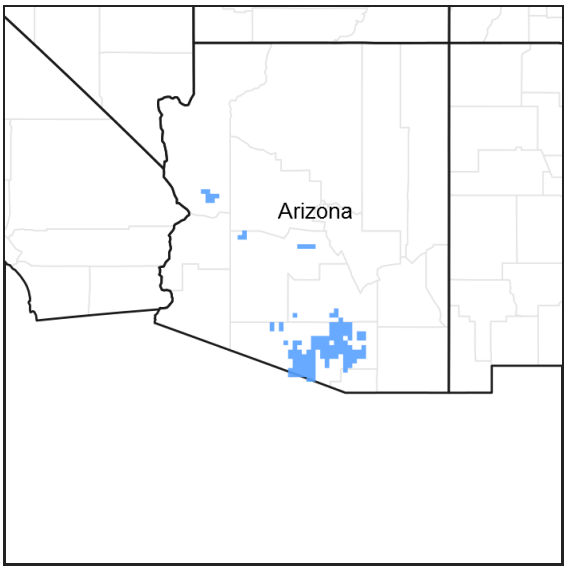

Figure 1. Mapped extent

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.

Classification relationships

Similar to TES mapping unit 287 on the Tonto National Forest. Tonto basin.

Associated sites

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

R040XA115AZ	**Sandy Wash 10"-13" p.z.**
R040XA117AZ	**Sandy Loam Upland, Deep 10"-13" p.z.**

Similar sites

R041XB215AZ	**Sandy Loam Upland 8-12" p.z.**
R041XC319AZ	**Sandy Loam Upland 12-16" p.z.**

Table 1. Dominant plant species

Tree	(1) *Parkinsonia microphylla* (2) *Prosopis velutina*
Shrub	(1) *Ambrosia deltoidea* (2) *Isocoma tenuisecta*
Herbaceous	(1) *Muhlenbergia porteri* (2) *Aristida ternipes*

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) Terrace (3) Stream terrace
Flooding frequency	None
Ponding frequency	None
Elevation	1,900–3,300 ft
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)	13 in

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 origins. Surface textures range from sandy loam to very gravelly sandy loam and must be as thick or thicker than four inches (eight inches for GRV-SL). These soils have clayey horizons at shallow depths (either argillic or cambic). Plant-soil moisture relationships are very good.
Soils mapped on this site include:
SSA-627 Southern Mohave County MU Amole-5;
SSA-645 Aguila-Carefree area MU's Gila-54 & Vado-122;
SSA-659 Western Pinal County Sonoita-35;
SSA-668 Tucson-Avra Valley area MU's Anway-At, Grabe-GgB, Sonoita-AsB, PaB, SmA, SmB, StB & VnB, Tubac-StB, TtA, TtB & TxB, Valencia-CvB, VaA, VaB, VcB, VgB & VnB;
SSA-669 Eastern Pima County MU's Bucklebar-8 & 29, Sahuarita-8, 36 & 55, Tubac-80 & 82 and
SSA-703 Tohono O'odham area MU's Bucklebar-6 & Tubac-58.

Table 4. Representative soil features

Surface texture	(1) Sandy loam (2) Gravelly sandy loam (3) Very gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately slow
Soil depth	60 in
Surface fragment cover <=3"	5–40%
Surface fragment cover >3"	0–5%
Available water capacity (0-40in)	6.5–8.2 in
Calcium carbonate equivalent (0-40in)	0–10%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	5–55%
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 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

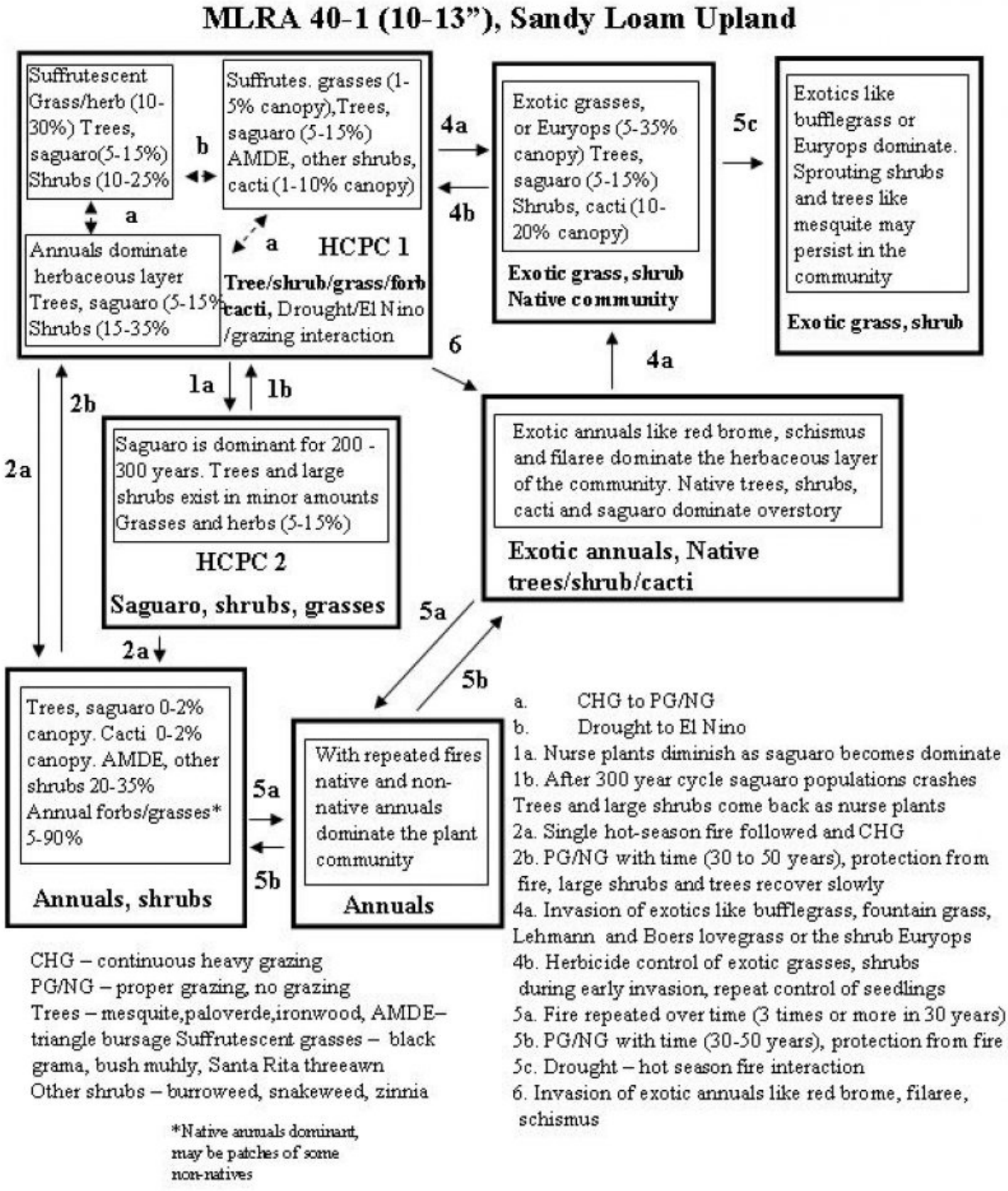

Figure 4. State and Transition, Sandyloam upland 10-13" pz.

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 a shrub, cacti and grass understory. The major grass species are well dispersed throughout the plant community. The aspect is savannah. With continuous, heavy grazing, perennial grasses and suffrutescent forb species are removed from the plant community and shrubs like; triangle bursage, burroweed, and snakeweed, can increase to dominate the understory. With thick, coarse textured soil surfaces, trees can reach moderate size on the site. A tree canopy of 5 to 10% 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 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. Jumping cholla can increase with heavy grazing or increases can be episodic due to climate. Stand lifespans can range from 40-60 years without reproduction. Prickley pear can also increase under heavy grazing pressure.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	50	400	770
Forb	5	100	220
Tree	100	150	200
Shrub/Vine	20	100	150
Total	**175**	**750**	**1340**

Table 6. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	0-4%
Grass/grasslike basal cover	1-8%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	5-15%
Litter	15-90%
Surface fragments >0.25" and <=3"	0-55%
Surface fragments >3"	0-5%
Bedrock	0%
Water	0%
Bare ground	5-80%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	0-1%	0-30%	0-15%
>0.5 <= 1	–	0-5%	1-25%	0-10%
>1 <= 2	–	1-15%	1-10%	0-1%
>2 <= 4.5	0-1%	0-2%	0-5%	0-1%
>4.5 <= 13	5-10%	–	–	–
>13 <= 40	0-1%	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

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 bufflegrass, 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, spidergrass threeawn, Arizona cottontop and low shrubs like burroweed 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 bufflegrass, 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 can recover. Perennial grasses can recover rapidly if grazing pressure is low and summer rains are sufficient. This plant community can produce enough herbaceous fuel from native species of grasses and / or forbs to carry fire in El Nino years or after unusually wet 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 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 occurence 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 (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Short lived perennial grasses**			10–160	
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	10–150	–
	Parry's grama	BOPA2	*Bouteloua parryi*	0–100	–
	slender grama	BORE2	*Bouteloua repens*	0–40	–
2	**Dominant mid grasses**			20–200	
	Arizona cottontop	DICA8	*Digitaria californica*	5–100	–
	whiplash pappusgrass	PAVA2	*Pappophorum vaginatum*	0–100	–
	purple threeawn	ARPU9	*Aristida purpurea*	0–50	–

	spidergrass	ARTE3	*Aristida ternipes*	5–45	–
	spidergrass	ARTEG	*Aristida ternipes var. gentilis*	0–25	–
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	0–20	–
	tanglehead	HECO10	*Heteropogon contortus*	0–20	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	0–20	–
	big galleta	PLRI3	*Pleuraphis rigida*	0–10	–
	large-spike bristlegrass	SEMA5	*Setaria macrostachya*	0–3	–
3	**Dominant suffrutescent grasses**			10–150	
	bush muhly	MUPO2	*Muhlenbergia porteri*	5–100	–
	Santa Rita threeawn	ARCAG	*Aristida californica var. glabrata*	1–50	–
	black grama	BOER4	*Bouteloua eriopoda*	0–40	–
4	**Miscellaneous perennial grasses**			0–10	
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	0–5	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–5	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	0–2	–
	slim tridens	TRMU	*Tridens muticus*	0–2	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–2	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–2	–
	nineawn pappusgrass	ENDE	*Enneapogon desvauxii*	0–2	–
	spike dropseed	SPCO4	*Sporobolus contractus*	0–1	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0–1	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	0–1	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–1	–
5	**Annual grasses**			10–250	
	needle grama	BOAR	*Bouteloua aristidoides*	5–150	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–50	–
	Mexican panicgrass	PAHI5	*Panicum hirticaule*	0–50	–
	sixweeks threeawn	ARAD	*Aristida adscensionis*	0–50	–
	prairie threeawn	AROL	*Aristida oligantha*	1–50	–
	mucronate sprangeltop	LEPAB	*Leptochloa panicea ssp. brachiata*	0–25	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–25	–
	feather fingergrass	CHVI4	*Chloris virgata*	0–25	–
	desert lovegrass	ERPEM	*Eragrostis pectinacea var. miserrima*	0–10	–
	tufted lovegrass	ERPEP2	*Eragrostis pectinacea var. pectinacea*	0–10	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	0–10	–
	bearded cupgrass	ERAR5	*Eriochloa aristata*	0–5	–
	witchgrass	PACA6	*Panicum capillare*	0–5	–
	canyon cupgrass	ERLE7	*Eriochloa lemmonii*	0–2	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	0–2	–
	Madagascar dropseed	SPPY2	*Sporobolus pyramidatus*	0–2	–
	Arizona signalgrass	URAR	*Urochloa arizonica*	0–2	–
	delicate muhly	MUFR	*Muhlenbergia fragilis*	0–2	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	0–2	–
	Arizona brome	BRAR4	*Bromus arizonicus*	0–1	–

	Arizona brome	BRAR7	*Bromus arizonicus*	0–1	
Forb					
6	**Perennial forbs**			2–20	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1–10	–
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	1–5	–
	Coues' cassia	SECO10	*Senna covesii*	0–5	–
	lacy tansyaster	MAPIP4	*Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida*	1–5	–
	wishbone-bush	MILAV	*Mirabilis laevis var. villosa*	0–2	–
	evening primrose	OENOT	*Oenothera*	0–2	–
	slender poreleaf	POGR5	*Porophyllum gracile*	0–2	–
	whitemargin sandmat	CHAL11	*Chamaesyce albomarginata*	0–2	–
	spreading fleabane	ERDI4	*Erigeron divergens*	0–2	–
	wild dwarf morning-glory	EVAR	*Evolvulus arizonicus*	0–2	–
	desert lily	HEUN2	*Hesperocallis undulata*	0–2	–
	slender janusia	JAGR	*Janusia gracilis*	0–2	–
	smooth threadleaf ragwort	SEFLM	*Senecio flaccidus var. monoensis*	0–2	–
	spreading fanpetals	SIAB	*Sida abutifolia*	0–2	–
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	0–2	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	0–2	–
	Coulter's wrinklefruit	TECO	*Tetraclea coulteri*	0–1	–
	catnip noseburn	TRNE	*Tragia nepetifolia*	0–1	–
	Watson's dutchman's pipe	ARWA	*Aristolochia watsonii*	0–1	–
	dense ayenia	AYMI	*Ayenia microphylla*	0–1	–
	desert marigold	BAMU	*Baileya multiradiata*	0–1	–
	climbing wartclub	BOSC	*Boerhavia scandens*	0–1	–
	shrubby purslane	POSU3	*Portulaca suffrutescens*	0–1	–
	canaigre dock	RUHY	*Rumex hymenosepalus*	0–1	–
	twinleaf senna	SEBA3	*Senna bauhinioides*	0–1	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	0–1	–
	field anoda	ANPE4	*Anoda pentaschista*	0–1	–
	dwarf desertpeony	ACNA2	*Acourtia nana*	0–1	–
	brownfoot	ACWR5	*Acourtia wrightii*	0–1	–
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	0–1	–
	ragged nettlespurge	JAMA	*Jatropha macrorhiza*	0–1	–
	whitemouth dayflower	COER	*Commelina erecta*	0–1	–
	leatherweed	CRPOP	*Croton pottsii var. pottsii*	0–1	–
	fingerleaf gourd	CUDI	*Cucurbita digitata*	0–1	–
	coyote gourd	CUPA	*Cucurbita palmata*	0–1	–
	Arizona wrightwort	CAAR7	*Carlowrightia arizonica*	0–1	–
	orange fameflower	PHAU13	*Phemeranthus aurantiacus*	0–1	–
7	**Annual forbs**			1–200	
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–50	–
	Coulter's goldfields	BOCO2	*Baeria coulteri*	0–50	

	Coulter's spiderling	BOCO2	*Boerhavia coulteri*	0–50	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–50	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–50	–
	combseed	PECTO	*Pectocarya*	1–50	–
	Arizona phacelia	PHAR13	*Phacelia arizonica*	0–25	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–25	–
	Arizona poppy	KAGR	*Kallstroemia grandiflora*	0–25	–
	thelypody	THELY	*Thelypodium*	0–25	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–25	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–20	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–20	–
	wheelscale saltbush	ATEL	*Atriplex elegans*	0–20	–
	pitseed goosefoot	CHBE4	*Chenopodium berlandieri*	0–20	–
	milkvetch	ASTRA	*Astragalus*	0–15	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–15	–
	mesa tansyaster	MATA	*Machaeranthera tagetina*	0–15	–
	tanseyleaf tansyaster	MATA2	*Machaeranthera tanacetifolia*	0–10	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	0–10	–
	Texas stork's bill	ERTE13	*Erodium texanum*	0–10	–
	cryptantha	CRYPT	*Cryptantha*	0–10	–
	buckwheat	ERIOG	*Eriogonum*	0–10	–
	carelessweed	AMPA	*Amaranthus palmeri*	0–10	–
	Tucson Mountain spiderling	BOME	*Boerhavia megaptera*	0–10	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–5	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–5	–
	manybristle chinchweed	PEPA2	*Pectis papposa*	0–5	–
	Arizona lupine	LUAR4	*Lupinus arizonicus*	0–5	–
	Arizona popcornflower	PLAR	*Plagiobothrys arizonicus*	0–5	–
	purslane	PORTU	*Portulaca*	0–5	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–5	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	0–5	–
	New Mexico thistle	CINE	*Cirsium neomexicanum*	0–3	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–3	–
	hyssopleaf sandmat	CHHY3	*Chamaesyce hyssopifolia*	0–2	–
	sensitive partridge pea	CHNI2	*Chamaecrista nictitans*	0–2	–
	pricklyburr	DAIN2	*Datura inoxia*	0–2	–
	common woolly sunflower	ERLA6	*Eriophyllum lanatum*	0–2	–
	Mexican fireplant	EUHE4	*Euphorbia heterophylla*	0–2	–
	hairy desertsunflower	GECA2	*Geraea canescens*	0–2	–
	star gilia	GIST	*Gilia stellata*	0–2	–
	slimjim bean	PHFI3	*Phaseolus filiformis*	0–2	–
	green carpetweed	MOVE	*Mollugo verticillata*	0–2	–
	Arizona cottonrose	LOAR12	*Logfia arizonica*	0–2	–

	coastal bird's-foot trefoil	LOSA	*Lotus salsuginosus*	0–2	–
	slender goldenweed	MAGR10	*Machaeranthera gracilis*	0–2	–
	doubleclaw	PRPA2	*Proboscidea parviflora*	0–2	–
	sand fringepod	THCU	*Thysanocarpus curvipes*	0–2	–
	New Mexico plumeseed	RANE	*Rafinesquia neomexicana*	0–1	–
	lyreleaf jewelflower	STCAA	*Streptanthus carinatus ssp. arizonicus*	0–1	–
	woolly plantain	PLPA2	*Plantago patagonica*	0–1	–
	Florida pellitory	PAFL3	*Parietaria floridana*	0–1	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	0–1	–
	hairy prairie clover	DAMO	*Dalea mollis*	0–1	–
	Palmer's spectaclepod	DICA31	*Dimorphocarpa candicans*	0–1	–
	desert thorn-apple	DADI2	*Datura discolor*	0–1	–
	prostrate sandmat	CHPR6	*Chamaesyce prostrata*	0–1	–
	milkweed	ASCLE	*Asclepias*	0–1	–
	desert sand verbena	ABVI	*Abronia villosa*	0–1	–
	trailing windmills	ALIN	*Allionia incarnata*	0–1	–
	common fiddleneck	AMMEI2	*Amsinckia menziesii var. intermedia*	0–1	–
Shrub/Vine					
8	**Dominant half shrubs**			5–95	
	triangle bur ragweed	AMDE4	*Ambrosia deltoidea*	0–50	–
	burroweed	ISTE2	*Isocoma tenuisecta*	1–50	–
	desert zinnia	ZIAC	*Zinnia acerosa*	1–30	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–10	–
	rough menodora	MESC	*Menodora scabra*	0–1	–
	buckwheat	ERIOG	*Eriogonum*	0–1	–
9	**Miscellaneous shrubs**			0–10	
	Thurber's penstemon	PETH3	*Penstemon thurberi*	0–5	–
	shortleaf baccharis	BABR	*Baccharis brachyphylla*	0–3	–
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	0–2	–
	narrowleaf goldenbush	ERLI6	*Ericameria linearifolia*	0–2	–
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	0–2	–
	burrobush	AMDU2	*Ambrosia dumosa*	0–2	–
	snakewood	CONDA	*Condalia*	0–2	–
	littleleaf ratany	KRER	*Krameria erecta*	0–2	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–2	–
	Goodding's tansyaster	MAPIG	*Machaeranthera pinnatifida ssp. gooddingii*	0–2	–
	Mexican bladdersage	SAME	*Salazaria mexicana*	0–2	–
	jojoba	SICH	*Simmondsia chinensis*	0–2	–
	turpentinebroom	THMO	*Thamnosma montana*	0–2	–
	American threefold	TRCA8	*Trixis californica*	0–1	–
	banana yucca	YUBA	*Yucca baccata*	0–1	–
	lacy tansyaster	MAPIP4	*Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida*	0–1	–

	white ratany	KRGR	*Krameria grayi*	0–1	–
	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	0–1	–
	rayless goldenhead	ACSP	*Acamptopappus sphaerocephalus*	0–1	–
	bastardsage	ERWR	*Eriogonum wrightii*	0–1	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	0–1	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	0–1	–
	yerba de pasmo	BAPT	*Baccharis pteronioides*	0–1	–
	Coulter's brickellbush	BRCO	*Brickellia coulteri*	0–1	–
	fairyduster	CAER	*Calliandra eriophylla*	0–1	–
10	**Large shrubs**			1–20	
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–5	–
	creosote bush	LATRT	*Larrea tridentata var. tridentata*	0–5	–
	ocotillo	FOSP2	*Fouquieria splendens*	0–2	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	0–2	–
	Arizona desert-thorn	LYEX	*Lycium exsertum*	0–2	–
	cattle saltbush	ATPO	*Atriplex polycarpa*	0–2	–
	spiny hackberry	CEEH	*Celtis ehrenbergiana*	0–2	–
	catclaw acacia	ACGR	*Acacia greggii*	0–2	–
	Warnock's snakewood	COWA	*Condalia warnockii*	0–1	–
	whitethorn acacia	ACCO2	*Acacia constricta*	0–1	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–1	–
	sangre de cristo	JACA2	*Jatropha cardiophylla*	0–1	–
	water jacket	LYAN	*Lycium andersonii*	0–1	–
11	**Succulents**			5–25	
	saguaro	CAGI10	*Carnegiea gigantea*	1–15	–
	cactus apple	OPEN3	*Opuntia engelmannii*	1–10	–
	tulip pricklypear	OPPH	*Opuntia phaeacantha*	0–5	–
	staghorn cholla	CYVE3	*Cylindropuntia versicolor*	0–5	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	1–5	–
	Arizona pencil cholla	CYAR14	*Cylindropuntia arbuscula*	0–2	–
	jumping cholla	CYFU10	*Cylindropuntia fulgida*	0–2	–
	purple pricklypear	OPMA8	*Opuntia macrocentra*	0–2	–
	soaptree yucca	YUEL	*Yucca elata*	0–2	–
	walkingstick cactus	CYSP8	*Cylindropuntia spinosior*	0–2	–
	Santa Rita pricklypear	OPSA	*Opuntia santa-rita*	0–1	–
	nightblooming cereus	PEGR3	*Peniocereus greggii*	0–1	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	0–1	–
	Graham's nipple cactus	MAGR9	*Mammillaria grahamii*	0–1	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–1	–
	pinkflower hedgehog cactus	ECFA	*Echinocereus fasciculatus*	0–1	–
	spinystar	ESVIV	*Escobaria vivipara var. vivipara*	0–1	–
	long-tubercle beehive cactus	COROR	*Coryphantha robustispina ssp. robustispina*	0–1	–

	buck-horn cholla	CYAC8	*Cylindropuntia acanthocarpa*	0–1	–
Tree					
14	**Trees**			100–200	
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	50–150	–
	velvet mesquite	PRVE	*Prosopis velutina*	50–100	–
	desert ironwood	OLTE	*Olneya tesota*	0–50	–
	blue paloverde	PAFL6	*Parkinsonia florida*	0–15	–
	Joshua tree	YUBR	*Yucca brevifolia*	0–2	–

Animal community

The plant community on this site is suitable for grazing by all classes of livestock at any season. Forage species grow year-round with available moisture. Due to thick, coarse-textured surfaces, which can absorb intense rainfall, and clayey horizons below, which can slowly release this moisture to plants, this site has a longer green season than other, coarse textured sites. 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 coarse textured soil surfaces and low gradient slopes and is a poor producer of runoff.

Recreational uses

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

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 and mesquite beans.

Inventory data references

Range 417s include 2 in good condition.

Type locality

Location 1: Pima County, AZ	
Township/Range/Section	T16S R7E S3
General legal description	Sells Field Office - Tribal Herd Ranch
Location 2: Pima County, AZ	
Township/Range/Section	T17S R9E S30
General legal description	Palo Alto ranch, NW corner of West pasture
Location 3: Pima County, AZ	
Township/Range/Section	T15S R9E S1

General legal description	La Tortuga Ranch, Tortuga pasture, Transect location T-6. Ungrazed 18 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, Tom Reis, Emilio Carrillo
Contact for lead author	NRCS Tucson Area Office
Date	02/08/2005
Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Infrequent, 40-60 feet apart, not well defined.

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2. **Presence of water flow patterns:** Fairly common, cover approximately 10% of the area; approximately 30-50 feet in length before hitting an obstruction.

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3. **Number and height of erosional pedestals or terracettes:** Most perennial grass and shrub plants have accumulated pedestals 1-2 inches in height, respectively. Terrecettes are 15-20 feet apart along water flow paths with a 2-inch elevation difference from above to below the terracete. Terracettes are not as stable as those observed in 12-16" pz, in that they are breached more often on this site.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 40-45%; some areas have higher cover on gentler slopes and lower cover on steeper slopes.

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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

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter transported in water flow paths 30-50 feet in length and herbaceous litter moving from bare soil areas.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** No slake test done. Expect ratings of 2-3 in bare areas, and 4-5 under shrub and perennial grass canopies.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak angular to subangular blocky; color is 10YR7/3 dry, 10YR5/3 moist; thickness to 13 inches.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** 30% canopy cover of large shrubs, succulents, half shrubs and grasses; 50-55% litter cover; approximately 2.5% basal cover; 25% of cover is perennial grasses; 30% of cover is trees and shrubs; cover is well dispersed throughout the site. Note: reference area has a higher cover of mesquite than expected for the site.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer on this site; bare soil areas have thin laminar crust from raindrop impact; penetrometer tests with weight drop distance from top of weight to top of impact ring = 2.24 feet were: average = 3.92 inches, s.d. = 1.19 inches. Tests outside IBP exclosure on SRER were average = 2.17, s.d. = 0.4.

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: large shrubs (mesquite #1, desert hackberry #2, blue paloverde #3, and mormon tea) > perennial grasses > succulents > half shrubs = annual forbs & grasses.

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Approximately 50% basal cover of perennial grass species and 50% basal cover of sub shrub species has been lost due to prolonged drought.

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 175 lbs/ac unfavorable precipitation; 750 lbs/ac normal precipitation; 1340 lbs/ac favorable precipitaton.

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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:** mesquite, Opuntia, burroweed, & snakeweed are increasing not invading. Bufflegrass and Lehmann lovegrass.

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17. **Perennial plant reproductive capability:** Not affected even following several years of drought period for the region. Good age class distribution of plants.
