USDA Natural Resources
Conservation Service

Ecological site R040XA113AZ
Loamy Slopes 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.

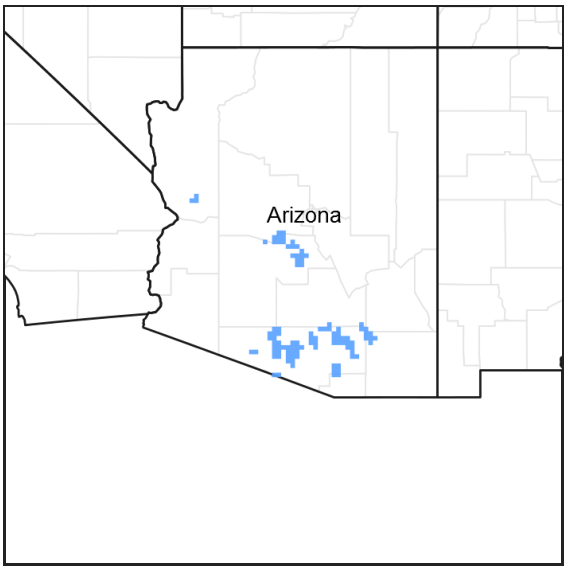

Figure 1. Mapped extent

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

R040XA103AZ	**Clayey Slopes 10"-13" p.z.**
R040XA105AZ	**Shallow Hills 10"-13" p.z.**
R040XA110AZ	**Limy Slopes 10"-13" p.z.**
R040XA123AZ	**Volcanic Hills 10"-13" P.Z.**

Similar sites

R041XC314AZ	**Loamy Slopes 12-16" p.z.**
R040XB212AZ	**Loamy Slopes 7"-10" p.z.**

Table 1. Dominant plant species

Tree	(1) *Parkinsonia microphylla*
Shrub	(1) *Ambrosia deltoidea* (2) *Encelia farinosa*
Herbaceous	(1) *Aristida purpurea*

Physiographic features

This site occurs in the upper elevations of the Sonoran Desert in southern Arizona. Slope aspect is site differentiating at elevations near common resource area boundaries.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	2,200–3,500 ft
Slope	15–45%
Aspect	N, E, S

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 and moderately deep soils which have formed in gravelly loamy alluvium of mixed origin. They are not calcareous but calcareous horizons or bedrock may occur at moderate depths. Soil surfaces are well protected by gravel and cobbles. Plant-soil moisture relationships are good.
Soils mapped on this site include:
SSA-627 Southern Mohave County MU's Bucklebar-15 & Pinaleno-41;
SSA-645 Aguila-Carefree area MU Eba-41;
SSA-666 Northwest Cochise County MU Pinaleno-490;
SSA-668 Tucson-Avra Valley area MU's Rough Broken Land-Rw & Rxd;
SSA-669 Eastern Pima County MU Pinaleno-61;
SSA-703 Tohono O'odham area MU Caracara-17.

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Very gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately slow
Soil depth	30–60 in
Surface fragment cover <=3"	30–75%
Surface fragment cover >3"	1–30%
Available water capacity (0-40in)	3.6–7 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)	7–7.8
Subsurface fragment volume <=3" (Depth not specified)	35–60%
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

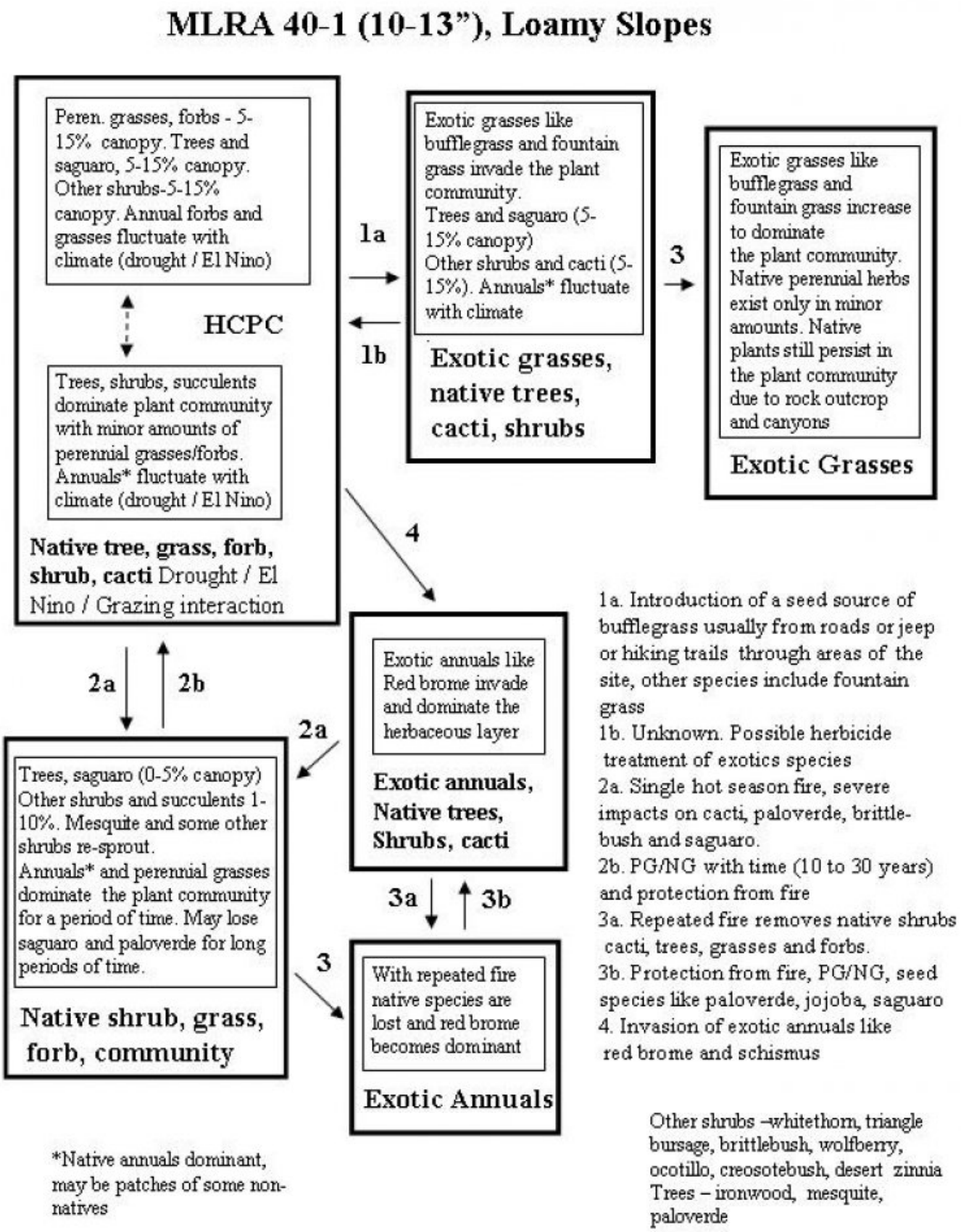

Figure 4. State and Transition model, Loamy Slopes 10-13" pz

State 1
Historical Climax Plant Community

Community 1.1
Historical Climax Plant Community

The potential plant community on this site is a diverse mixture of desert trees, shrubs, cacti, grasses, and forbs. The aspect is shrubland. With continuous, heavy grazing, perennial grasses and forbs are removed from the plant community and shrubs like brittlebush, triangle bursage, prickly pear, and white thorn acacia can increase to dominate the understories. Trees like littleleaf paloverde and mesquite can increase to dominate the overstory. Trees reach moderate size on this site. A 10-15% tree canopy is important on this site to keep diveristy in the understory plant community.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	13	70	400
Shrub/Vine	31	220	300
Tree	80	150	200
Forb	10	60	195
Total	**134**	**500**	**1095**

Table 6. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	1-4%
Grass/grasslike basal cover	0-1%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0-5%
Litter	10-75%
Surface fragments >0.25" and <=3"	35-75%
Surface fragments >3"	5-35%
Bedrock	0%
Water	0%
Bare ground	5-50%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	0-1%	0-15%	0-15%
>0.5 <= 1	–	2-15%	1-10%	1-10%
>1 <= 2	–	5-15%	0-5%	0-5%
>2 <= 4.5	0-1%	1-5%	–	–
>4.5 <= 13	2-15%	–	–	–
>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
Native tree, cacti and shrubs with fire

Community 2.1
Native tree, cacti and shrubs with 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. Perennial and annual grasses and forbs dominate the community for some time until shrubs like bursage and brittlebush can recover. 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 3
Exotic perennial grasses with natives

Community 3.1
Exotic perennial grasses with natives

This community occurs where bufflegrass, 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 and twinberry.

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 bufflegrass or fountain grass has burned one or more times. Increasing amounts of bufflegrass 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 and / or schismus. Red brome occupies the niche of the native winter annual forbs and grasses. This exotic annual grass 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 and / or

schismus has burned repeatedly. As fires become more frequent the native trees, shrubs and succulents are removed from the plant community and red brome 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.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant mid-grasses**			10–100	
	bush muhly	MUPO2	*Muhlenbergia porteri*	5–60	–
	purple threeawn	ARPU9	*Aristida purpurea*	1–25	–
	spidergrass	ARTE3	*Aristida ternipes*	1–25	–
	big galleta	PLRI3	*Pleuraphis rigida*	0–20	–
	black grama	BOER4	*Bouteloua eriopoda*	0–15	–
	Arizona cottontop	DICA8	*Digitaria californica*	0–10	–
	tanglehead	HECO10	*Heteropogon contortus*	1–10	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–5	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	0–5	–
2	**Dominant short grasses**			2–80	
	curly-mesquite	HIBE	*Hilaria belangeri*	1–50	–
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	0–20	–
	slim tridens	TRMU	*Tridens muticus*	1–20	–
	red grama	BOTR2	*Bouteloua trifida*	0–10	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–10	–
	nineawn pappusgrass	ENDE	*Enneapogon desvauxii*	0–10	–
	slender grama	BORE2	*Bouteloua repens*	0–10	–
	Hall's panicgrass	PAHA	*Panicum hallii*	0–10	–
3	**Misc perennial grasses**			0–20	
	tobosagrass	PLMU3	*Pleuraphis mutica*	0–10	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–5	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0–5	–
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	0–5	–
	spidergrass	ARTEG	*Aristida ternipes var. gentilis*	0–5	–
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	0–5	–
	fall witchgrass	DICO6	*Digitaria cognata*	0–2	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	0–2	–
4	**Annual grasses**			1–200	
	sixweeks threeawn	ARAD	*Aristida adscensionis*	0–100	–
	Mexican panicgrass	PAHI5	*Panicum hirticaule*	0–100	–
	mucronate sprangeltop	LEPAB	*Leptochloa panicea ssp. brachiata*	0–50	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–25	–
	prairie threeawn	AROL	*Aristida oligantha*	0–25	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–25	–
	Arizona signalgrass	URAR	*Urochloa arizonica*	0–20	–

	Pacific fescue	VUMIP	*Vulpia microstachys var. pauciflora*	0–10	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–10	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	0–5	–
	Madagascar dropseed	SPPY2	*Sporobolus pyramidatus*	0–2	–
	delicate muhly	MUFR	*Muhlenbergia fragilis*	0–2	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	0–2	–
	witchgrass	PACA6	*Panicum capillare*	0–2	–
	Arizona brome	BRAR4	*Bromus arizonicus*	0–2	–
	feather fingergrass	CHVI4	*Chloris virgata*	0–2	–
	bearded cupgrass	ERAR5	*Eriochloa aristata*	0–2	–
	canyon cupgrass	ERLE7	*Eriochloa lemmonii*	0–2	–
	desert lovegrass	ERPEM	*Eragrostis pectinacea var. miserrima*	0–2	–
	tufted lovegrass	ERPEP2	*Eragrostis pectinacea var. pectinacea*	0–2	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	0–2	–
Forb					
5	**Perennial forbs**			10–45	
	slender janusia	JAGR	*Janusia gracilis*	1–15	–
	Coues' cassia	SECO10	*Senna covesii*	1–15	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1–10	–
	slender poreleaf	POGR5	*Porophyllum gracile*	1–10	–
	lacy tansyaster	MAPIP4	*Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida*	1–10	–
	wishbone-bush	MILAV	*Mirabilis laevis var. villosa*	1–10	–
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	0–5	–
	tuber anemone	ANTU	*Anemone tuberosa*	0–5	–
	desert marigold	BAMU	*Baileya multiradiata*	0–5	–
	Arizona wrightwort	CAAR7	*Carlowrightia arizonica*	0–5	–
	red-gland spurge	CHME5	*Chamaesyce melanadenia*	0–5	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	1–5	–
	hairy five eyes	CHSO	*Chamaesaracha sordida*	0–2	–
	dense ayenia	AYMI	*Ayenia microphylla*	0–2	–
	narrowleaf silverbush	ARLA12	*Argythamnia lanceolata*	0–2	–
	brownfoot	ACWR5	*Acourtia wrightii*	0–2	–
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	0–2	–
	bluedicks	DICA14	*Dichelostemma capitatum*	0–2	–
	spreading fleabane	ERDI4	*Erigeron divergens*	0–2	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	0–2	–
	Parry's beardtongue	PEPA24	*Penstemon parryi*	0–2	–
	mesquite mistletoe	PHCA8	*Phoradendron californicum*	0–1	–
	glandleaf milkwort	POMA7	*Polygala macradenia*	0–1	–
	caliche globemallow	SPLA	*Sphaeralcea laxa*	0–1	–
	spreading fanpetals	SIAB	*Sida abutifolia*	0–1	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	0–1	–
	wild dwarf morning-glory	EVAR	*Evolvulus arizonicus*	0–1	–

	desert rosemallow	HICO	*Hibiscus coulteri*	0–1	–
	paleface	HIDE	*Hibiscus denudatus*	0–1	–
	desert tobacco	NIOBO	*Nicotiana obtusifolia var. obtusifolia*	0–1	–
	ragged nettlespurge	JAMA	*Jatropha macrorhiza*	0–1	–
	spearleaf	MAPA9	*Matelea parvifolia*	0–1	–
	trailing windmills	ALIN	*Allionia incarnata*	0–1	–
	largeflower onion	ALMA4	*Allium macropetalum*	0–1	–
	Braun's rockcress	ARPE3	*Arabis perstellata*	0–1	–
	Palmer's Indian mallow	ABPA	*Abutilon palmeri*	0–1	–
	climbing wartclub	BOSC	*Boerhavia scandens*	0–1	–
	leatherweed	CRPOP	*Croton pottsii var. pottsii*	0–1	–
	Parish's larkspur	DEPAP3	*Delphinium parishii ssp. parishii*	0–1	–
	tall mountain larkspur	DESC	*Delphinium scaposum*	0–1	–
	Coulter's wrinklefruit	TECO	*Tetraclea coulteri*	0–1	–
6	**Annual forbs**			0–150	
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–80	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–50	–
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–25	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–25	–
	exserted Indian paintbrush	CAEXE	*Castilleja exserta ssp. exserta*	0–20	–
	woolly plantain	PLPA2	*Plantago patagonica*	0–20	–
	coastal bird's-foot trefoil	LOSA	*Lotus salsuginosus*	0–20	–
	Arizona poppy	KAGR	*Kallstroemia grandiflora*	0–15	–
	distant phacelia	PHDI	*Phacelia distans*	0–15	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–15	–
	smallflowered milkvetch	ASNU4	*Astragalus nuttallianus*	0–15	–
	Coulter's spiderling	BOCO2	*Boerhavia coulteri*	0–15	–
	wedgeleaf draba	DRCU	*Draba cuneifolia*	0–10	–
	cryptantha	CRYPT	*Cryptantha*	0–10	–
	lyreleaf jewelflower	STCAA	*Streptanthus carinatus ssp. arizonicus*	0–10	–
	Arizona popcornflower	PLAR	*Plagiobothrys arizonicus*	0–10	–
	slender goldenweed	MAGR10	*Machaeranthera gracilis*	0–10	–
	mesa tansyaster	MATA	*Machaeranthera tagetina*	0–10	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–10	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–10	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–5	–
	Arizona phacelia	PHAR13	*Phacelia arizonica*	0–5	–
	Louisiana vetch	VILU	*Vicia ludoviciana*	0–5	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–5	–
	Sonoran sandmat	CHMI7	*Chamaesyce micromera*	0–5	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–5	–
	fringed amaranth	AMFI	*Amaranthus fimbriatus*	0–5	–
	carelessweed	AMPA	*Amaranthus palmeri*	0–5	–

	yellow tackstem	CAPA7	*Calycoseris parryi*	0–5	–
	white tackstem	CAWR	*Calycoseris wrightii*	0–5	–
	fringed redmaids	CACI2	*Calandrinia ciliata*	0–5	–
	New Mexico thistle	CINE	*Cirsium neomexicanum*	0–3	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–2	–
	pincushion flower	CHFR	*Chaenactis fremontii*	0–2	–
	hyssopleaf sandmat	CHHY3	*Chamaesyce hyssopifolia*	0–2	–
	California suncup	CACA32	*Camissonia californica*	0–2	–
	chia	SACO6	*Salvia columbariae*	0–2	–
	cleftleaf wildheliotrope	PHCR	*Phacelia crenulata*	0–2	–
	whitestem blazingstar	MEAL6	*Mentzelia albicaulis*	0–2	–
	California goldfields	LACAC2	*Lasthenia californica ssp. californica*	0–2	–
	limestone bedstraw	GAPR	*Galium proliferum*	0–2	–
	hairy desertsunflower	GECA2	*Geraea canescens*	0–1	–
	star gilia	GIST	*Gilia stellata*	0–1	–
	California mustard	GULA4	*Guillenia lasiophylla*	0–1	–
	Palmer's grapplinghook	HAPA7	*Harpagonella palmeri*	0–1	–
	flatspine stickseed	LAOCO	*Lappula occidentalis var. occidentalis*	0–1	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	0–1	–
	Arizona lupine	LUAR4	*Lupinus arizonicus*	0–1	–
	Arizona cottonrose	LOAR12	*Logfia arizonica*	0–1	–
	Mexican fireplant	EUHE4	*Euphorbia heterophylla*	0–1	–
	Lindley's silverpuffs	MILI5	*Microseris lindleyi*	0–1	–
	Nuttall's povertyweed	MONU	*Monolepis nuttalliana*	0–1	–
	green carpetweed	MOVE	*Mollugo verticillata*	0–1	–
	desert evening primrose	OEPR	*Oenothera primiveris*	0–1	–
	Florida pellitory	PAFL3	*Parietaria floridana*	0–1	–
	manybristle chinchweed	PEPA2	*Pectis papposa*	0–1	–
	California desertdandelion	MACA6	*Malacothrix californica*	0–1	–
	doubleclaw	PRPA2	*Proboscidea parviflora*	0–1	–
	New Mexico plumeseed	RANE	*Rafinesquia neomexicana*	0–1	–
	Lemmon's ragwort	SELE8	*Senecio lemmonii*	0–1	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	0–1	–
	woollyhead neststraw	STMI2	*Stylocline micropoides*	0–1	–
	sand fringepod	THCU	*Thysanocarpus curvipes*	0–1	–
	white easterbonnets	ANLA7	*Antheropeas lanosum*	0–1	–
	Chiricahua Mountain sandmat	CHFL3	*Chamaesyce florida*	0–1	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–1	–
	Tucson Mountain spiderling	BOME	*Boerhavia megaptera*	0–1	–
	sand pygmyweed	CRCOC	*Crassula connata var. connata*	0–1	–
	pricklyburr	DAIN2	*Datura inoxia*	0–1	–
	buckwheat	ERIOG	*Eriogonum*	0–1	–

	buckwheat	ERIOG	*Eriogonum*	0–1	–
	sorrel buckwheat	ERPO4	*Eriogonum polycladon*	0–1	–
	Texas stork's bill	ERTE13	*Erodium texanum*	0–1	–
	Thurber's buckwheat	ERTH3	*Eriogonum thurberi*	0–1	–
	Abert's buckwheat	ERAB2	*Eriogonum abertianum*	0–1	–
	Palmer's spectaclepod	DICA31	*Dimorphocarpa candicans*	0–1	–
Shrub/Vine					
7	**Dominant half shrubs**			10–100	
	triangle bur ragweed	AMDE4	*Ambrosia deltoidea*	5–25	–
	brittlebush	ENFA	*Encelia farinosa*	1–20	–
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	0–10	–
	bastardsage	ERWR	*Eriogonum wrightii*	0–10	–
	littleleaf ratany	KRER	*Krameria erecta*	2–10	–
	fairyduster	CAER	*Calliandra eriophylla*	1–10	–
	rough menodora	MESC	*Menodora scabra*	0–5	–
	American threefold	TRCA8	*Trixis californica*	0–5	–
	desert zinnia	ZIAC	*Zinnia acerosa*	0–5	–
	Coulter's brickellbush	BRCO	*Brickellia coulteri*	0–5	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–2	–
8	**Dominant large shrubs**			10–100	
	jojoba	SICH	*Simmondsia chinensis*	1–30	–
	whitethorn acacia	ACCO2	*Acacia constricta*	0–20	–
	ocotillo	FOSP2	*Fouquieria splendens*	1–15	–
	sangre de cristo	JACA2	*Jatropha cardiophylla*	0–10	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	1–10	–
9	**Misc shrubs**			1–20	
	pelotazo	ABIN	*Abutilon incanum*	0–5	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–5	–
	Warnock's snakewood	COWA	*Condalia warnockii*	0–5	–
	button brittlebush	ENFR	*Encelia frutescens*	0–5	–
	Wright's beebrush	ALWR	*Aloysia wrightii*	0–4	–
	water jacket	LYAN	*Lycium andersonii*	0–3	–
	Arizona desert-thorn	LYEX	*Lycium exsertum*	0–3	–
	Arizona mimosa	MIDIL	*Mimosa distachya var. laxiflora*	0–3	–
	Parish's goldeneye	VIPA14	*Viguiera parishii*	0–2	–
	banana yucca	YUBA	*Yucca baccata*	0–2	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–2	–
	prairie acacia	ACANH	*Acacia angustissima var. hirta*	0–2	–
	rayless goldenhead	ACSP	*Acamptopappus sphaerocephalus*	0–2	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	0–1	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	0–1	–
	turpentine bush	ERLA12	*Ericameria laricifolia*	0–1	–
	burroweed	ISTE2	*Isocoma tenuisecta*	0–1	–
	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	0–1	–

	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	0–1	
10	**Succulents**			10–75	
	saguaro	CAGI10	*Carnegiea gigantea*	5–25	–
	cactus apple	OPEN3	*Opuntia engelmannii*	2–20	–
	tulip pricklypear	OPPH	*Opuntia phaeacantha*	1–10	–
	purple pricklypear	OPMA8	*Opuntia macrocentra*	0–5	–
	jumping cholla	CYFU10	*Cylindropuntia fulgida*	0–5	–
	buck-horn cholla	CYAC8	*Cylindropuntia acanthocarpa*	1–5	–
	walkingstick cactus	CYSP8	*Cylindropuntia spinosior*	0–5	–
	staghorn cholla	CYVE3	*Cylindropuntia versicolor*	1–5	–
	teddybear cholla	CYBI9	*Cylindropuntia bigelovii*	0–2	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	0–2	–
	Graham's nipple cactus	MAGR9	*Mammillaria grahamii*	0–2	–
	Thornber's nipple cactus	MATH	*Mammillaria thornberi*	0–1	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	0–1	–
	organpipe cactus	STTH3	*Stenocereus thurberi*	0–1	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–1	–
	redspine fishhook cactus	ECER2	*Echinomastus erectocentrus*	0–1	–
	pinkflower hedgehog cactus	ECFA	*Echinocereus fasciculatus*	0–1	–
	rainbow cactus	ECPE	*Echinocereus pectinatus*	0–1	–
	spinystar	ESVIV	*Escobaria vivipara var. vivipara*	0–1	–
	desert agave	AGDE	*Agave deserti*	0–1	–
Tree					
11	**Trees**			80–200	
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	80–160	–
	desert ironwood	OLTE	*Olneya tesota*	0–60	–
	velvet mesquite	PRVE	*Prosopis velutina*	0–20	–
	catclaw acacia	ACGR	*Acacia greggii*	0–10	–

Animal community

Steep slopes and gravelly surfaces limit grazing distribution especially in the hotter months of the year. Stocker cattle will use areas of this site fairly well at any season. Forage species grow year round with available moisture. The potential plant community provides adequate nutrition for livestock throughout the year at low stocking rates.

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

Hydrological functions

This site is a fair to good producer of runoff due to steep slopes and soils with argillic horizons near the surface. Very gravelly and cobbly soil surfaces tend to hold water on the site.

Recreational uses

Hunting, hiking, birdwatching, photography, horseback riding, rock hounding.

Wood products

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

Other products

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

Type locality

Location 1: Pima County, AZ	
Township/Range/Section	T9S R18E S26
General legal description	Tucson FO - YLE Ranch
Location 2: Pima County, AZ	
Township/Range/Section	T20S R6E S29
General legal description	Sells FO - Chutum Vaya Assoc. unsurveyed - along San Juan Trail in Mtn. Pass
Location 3: Pima County, AZ	
General legal description	Catalina, Az. Waste Transfer Station, fenced in 1974.
Location 4: Pima County, AZ	
General legal description	Catalina State Park, Ridges along Sutherland and Canyon del Oro washes.

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	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None

2. **Presence of water flow patterns:** Uncommon, probably cover no more than 10% of area; discontinuous; 10-15 feet in length.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are uncomon on perennial grass and shrubs; terracettes are uncommon.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 15-20%

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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):** Most litter size classes stay in place.

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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):** Expect values of 1-3 in canopy interspaces, 4-6 under plant canopies.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thir platy to weak granuar; color is 7.5-10YR4/4 dry, 7.5-10YR3/2 moist; thickness to 1 inch.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy cover 15-25%; 20-30% perennial grasses, 5% perennial forbs,40-50% trees and 10-20% shrubs and subshrubs. Cover is well dispersed throughout 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):** None

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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: trees > shrubs > annual grasses and forbs > succulents = perennial forbs = perennial grasses (Note: this is following several years of prolonged regional drought.)

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** 90-100% perennial grass plants have likely been lost in recent prolonged drought; 20-50% canopy mortality of 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):** 134 lbs/ac unfavorable precipitation; 500 lbs/ac normal precipitation; 1095 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:** triangle bursage, prickly pear, white thorn acacia, bufflegrass

17. **Perennial plant reproductive capability:** Not impaired for shrubs; drought impaire for perennial grasses and forbs.