

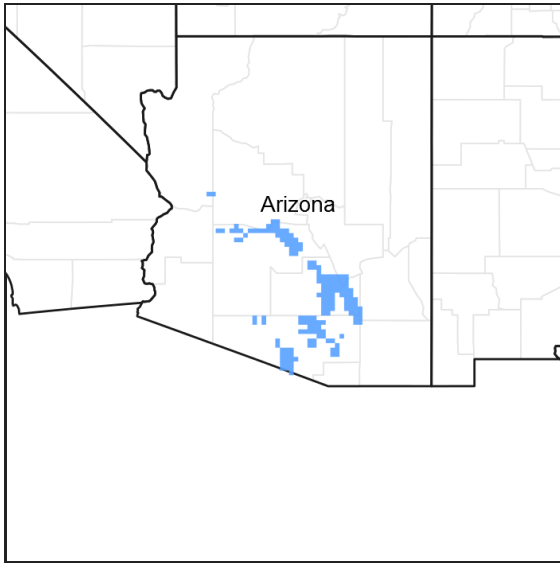
# Ecological site R040XA120AZ

## Clay Loam Upland 10"-13" p.z.

Accessed: 11/02/2024

### 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.

### Associated sites

R040XA108AZ	<b>Limy Fan 10"-13" p.z.</b>
R040XA112AZ	<b>Loamy Swale 10"-13" p.z.</b>
R040XA114AZ	<b>Loamy Upland 10"-13" p.z.</b>

## Similar sites

R041XC305AZ	Clay Loam Upland 12-16" p.z.
R041XB204AZ	Clay Loam Upland 8-12" p.z.
R040XB205AZ	Clay Loam Upland 7"-10" p.z.

Table 1. Dominant plant species

Tree	(1) <i>Prosopis velutina</i> (2) <i>Parkinsonia microphylla</i>
Shrub	Not specified
Herbaceous	(1) <i>Pleuraphis mutica</i>

## Physiographic features

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

Table 2. Representative physiographic features

Landforms	(1) Fan (2) Terrace (3) Stream terrace
Flooding duration	Extremely brief (0.1 to 4 hours)
Flooding frequency	None to rare
Ponding frequency	None
Elevation	2,000–3,400 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
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## 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 clayey alluvium of mixed origins. They are not calcareous. Cemented lime pans may occur at moderate depths. These soils exhibit slight cracking but no soil churning. Plant-soil moisture relationships are fair.

Soils mapped on this site include: in

SSA-627 Southern Mohave County MU's Aquarius-8, Continental-34, 35, 36 & 37, Eba-114 & 115, Vekol family-126;

SSA-645 Aguilla-Carefree MU's Continental-65, Eba-33, 34, 37 & 40, Mohave-85, Pinaleno-40, 42, 96 & 97;

SSA-661 Eastern Pinal Southern Gila counties MU's Nahda-650 & Tubac-870;

SSA-668 Tucson Avra Valley MU's Anway-Aw, Mohave-Mo & Tubac-TuA & TuB;

SSA-669 Eastern Pima county MU's Nahda-48 & 50 & Tubac-80;

SSA-703 Tohono O'odham MU Tubac-58.

**Table 4. Representative soil features**

Surface texture	(1) Gravelly loam (2) Clay loam (3) Gravelly clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderately slow to slow
Soil depth	25–60 in
Surface fragment cover <=3"	0–60%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	4–9 in
Calcium carbonate equivalent (0-40in)	0–15%
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)	0–60%
Subsurface fragment volume >3" (Depth not specified)	0–20%

## Ecological dynamics

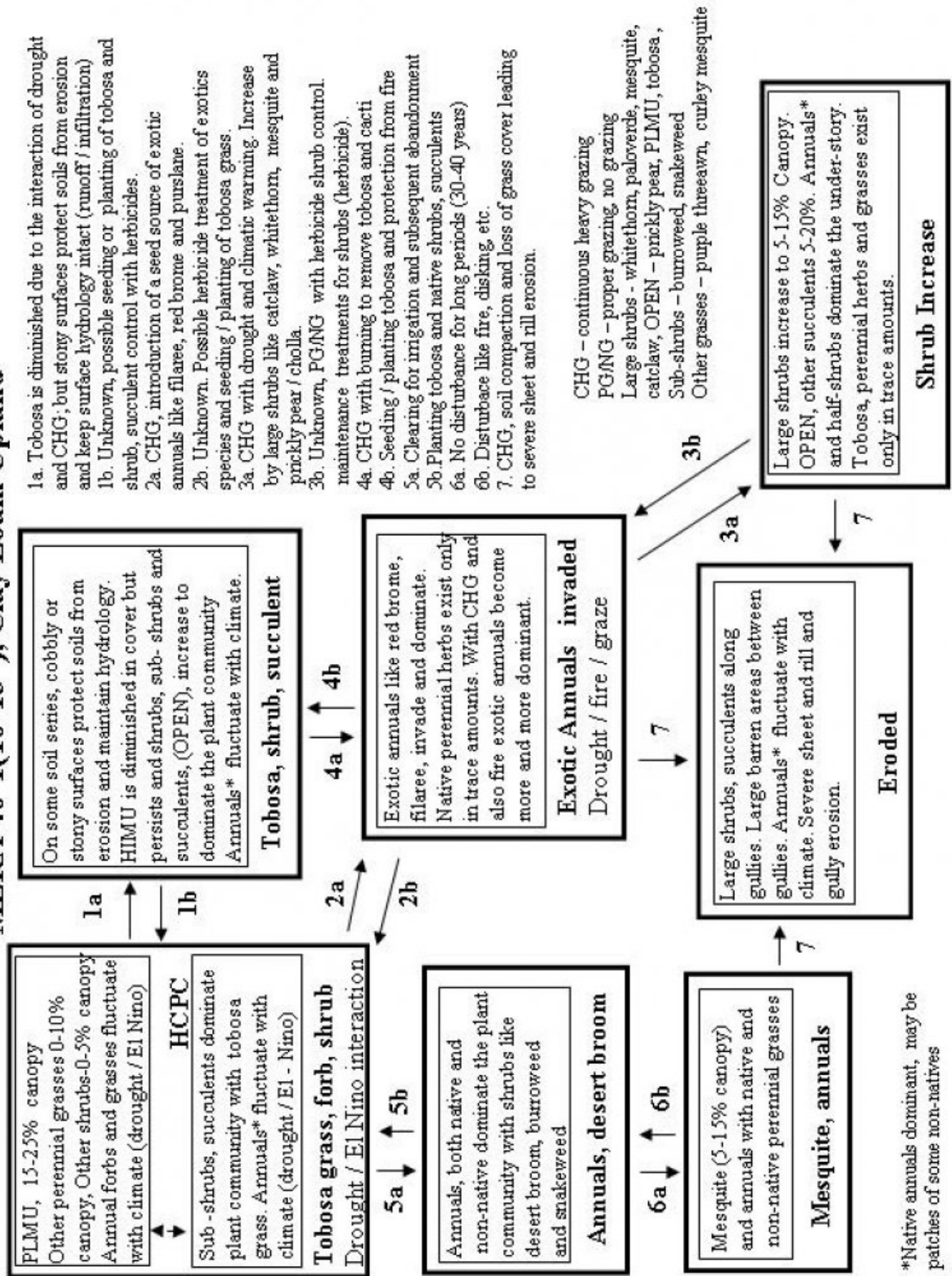
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The Historical Climax Plant Community represents the natural potential plant communities found on relict or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

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

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

## **State and transition model**

# MLRA 40-1(10-13"), Clay Loam Upland



\*Native annuals dominant, may be patches of some non-natives

Figure 4. State and Transition model, Clay Loam Upland 10-13

**State 1**  
**Historical Climax Plant Community**

## Community 1.1 Historical Climax Plant Community

The potential plant community is a diverse mixture of desert trees, shrubs, and cactii with understories of halfshrubs, tobosa grass and annuals. The aspect is shrubland. With continuous, heavy grazing, perennial grass species are removed from the plant community and half shrubs like bursage and snakeweed can increase in the understory. Tree species tend to be shrubby on this site due to clayey textures at the surface. With loss of herbaceous cover, this site becomes a very ineffective user of summer rainfall. A 5% tree canopy is very important in this site to keep diversity in the community. The potential of the site to produce grass is reduced as tree cover exceeds this amount. Prickly pear and cholla can increase with heavy grazing pressure. This site is an effective user of winter moisture and will produce tremendous amounts of annuals in a wet spring. It is not an efficient user of intense summer storms and production of summer annuals will be much less.

**Table 5. Annual production by plant type**

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	108	300	775
Forb	10	150	650
Shrub/Vine	8	75	130
Tree	5	25	50
<b>Total</b>	<b>131</b>	<b>550</b>	<b>1605</b>

**Table 6. Soil surface cover**

Tree basal cover	0%
Shrub/vine/liana basal cover	0-2%
Grass/grasslike basal cover	1-3%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	5-15%
Litter	15-70%
Surface fragments >0.25" and <=3"	0-60%
Surface fragments >3"	0-10%
Bedrock	0%
Water	0%
Bare ground	10-75%

**Table 7. Canopy structure (% cover)**

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	1-25%	0-25%
>0.5 <= 1	–	0-2%	1-10%	1-20%
>1 <= 2	–	0-2%	5-15%	1-20%
>2 <= 4.5	–	15-5%	0-1%	0-1%
>4.5 <= 13	0-5%	–	–	–
>13 <= 40	0-2%	–	–	–
>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

### Tobosa, shrub increase, cobbly surfaces

#### Community 2.1

##### Tobosa, shrub increase, cobbly surfaces

On some areas of the site, cobbly surfaces protect the soil surface from erosion. Tobosa diminishes and shrubs and succulents increase to dominate the site with annuals. Cobbly surfaces help retain good hydrologic characteristics and stabilize the site.

## State 3

### Exotic annuals

#### Community 3.1

##### Exotic annuals

Exotic annuals like filaree, red brome, schismus, London rocket and purslane invade the native plant community. These species displace native annual grasses and forbs.

## State 4

### Shrub increased state

#### Community 4.1

##### Shrub increased state

This state occurs where the native grass cover of tobosa has been depleted and shrubs and succulents increase to dominate the plant community. Soil compaction and reduced herbaceous cover leads to accelerated sheet erosion.

## State 5

### Annuals, desert broom

#### Community 5.1

##### Annuals, desert broom

This state occurs after clearing for irrigation and subsequent abandonment. Early stages of plant succession lead to dominance by annual forbs and grasses (both native and non-native). Tumbleweed (Russian thistle) will persist with continued disturbance like disking. Desert broom can invade and may dominate the upper layer of the plant community. This state will persist for several years before other shrubs and desert trees come in and assume dominance. It will persist for long periods of time with continued disturbance. Natural flooding is reduced or eliminated by dikes, ditches and levees that were built to protect irrigated fields.

## State 6

### Mesquite, grass and shrubs

#### Community 6.1

##### Mesquite, grass and shrubs

This state will result from long term rest of areas that were cleared and then abandoned. Without disturbance for 30 or 40 years mesquite will come in with other shrubs like pencil cholla and whitethorn acacia and form an open overstory. Perennial grasses, both native and non-native will dominate the understory especially in areas where water accumulates; the bottom ends of fields and along borders and old ditches. Some areas (with heavy soil crusting due to silty clayloam textures) will be entirely barren until a wet winter is effective in producing a crop of annuals. Annual forbs and grasses (both native and exotic) will fluctuate with climate. This appears to be a stable community without fire or other disturbance like continuous grazing. Usually water control features (dikes, ditches) are left intact and natural flooding of these areas does not occur.

## State 7

### Eroded

#### Community 7.1

##### Eroded

This state occurs where the site has severe sheet, rill and gully erosion. Lack of plant cover, soil compaction and concentration of surface water flow will lead to rilling and gully formation. Usually these areas lack any perennial cover except along drainage ways.

## Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Dominant Perennial Grasses</b>			100–250	
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	100–250	–
2	<b>Short perennial grasses</b>			1–150	
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	1–150	–
	Rothrock's grama	BORO2	<i>Bouteloua rothrockii</i>	0–100	–
	red grama	BOTR2	<i>Bouteloua trifida</i>	0–100	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–10	–
	ring muhly	MUTO2	<i>Muhlenbergia torreyi</i>	0–5	–
3	<b>Perennial threeawns</b>			2–100	
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	1–100	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	1–50	–
	spidergrass	ARTEG	<i>Aristida ternipes var. gentilis</i>	0–25	–
	Parish's threeawn	ARPUP5	<i>Aristida purpurea var. parishii</i>	0–20	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea var. longiseta</i>	0–15	–



4	<b>Misc perennial grasses</b>			0–25	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	0–10	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–10	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	0–10	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	0–10	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	0–10	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–10	–
	large-spike bristlegrass	SEMA5	<i>Setaria macrostachya</i>	0–10	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	0–5	–
	tanglehead	HECO10	<i>Heteropogon contortus</i>	0–5	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–5	–
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	0–2	–
	slender grama	BORE2	<i>Bouteloua repens</i>	0–2	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	0–2	–
	Wooton's threeawn	ARPA9	<i>Aristida pansa</i>	0–2	–
	blue threeawn	ARPUN	<i>Aristida purpurea</i> var. <i>nealleyi</i>	0–2	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	0–2	–
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	0–1	–
	burrograss	SCBR2	<i>Scleropogon brevifolius</i>	0–1	–
	squirreltail	ELELE	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	0–1	–
	nineawn pappusgrass	ENDE	<i>Enneapogon desvauxii</i>	0–1	–
	slim tridens	TRMU	<i>Tridens muticus</i>	0–1	–
5	<b>Annual grasses</b>			5–250	
	mucronate sprangletop	LEPAB	<i>Leptochloa panicea</i> ssp. <i>brachiata</i>	1–200	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	1–100	–
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	1–100	–
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	0–50	–
	little barley	HOPU	<i>Hordeum pusillum</i>	0–50	–
	Mexican panicgrass	PAHI5	<i>Panicum hirticaule</i>	0–50	–
	Arizona signalgrass	URAR	<i>Urochloa arizonica</i>	0–20	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0–15	–
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	0–10	–
	sticky sprangletop	LEVI5	<i>Leptochloa viscida</i>	0–10	–
	canyon cupgrass	ERLE7	<i>Eriochloa lemmonii</i>	0–5	–
	tufted lovegrass	ERPEP2	<i>Eragrostis pectinacea</i> var. <i>pectinacea</i>	0–2	–
	delicate muhly	MUFR	<i>Muhlenbergia fragilis</i>	0–2	–
	littleseed muhly	MUMI	<i>Muhlenbergia microsperma</i>	0–2	–
	Eastwood fescue	VUMIC	<i>Vulpia microstachys</i> var. <i>ciliata</i>	0–2	–
	Pacific fescue	VUMIP	<i>Vulpia microstachys</i> var. <i>pauciflora</i>	0–2	–
	Bigelow's bluegrass	POBI	<i>Poa bigelovii</i>	0–2	–
	Mexican sprangletop	LEFUU	<i>Leptochloa fusca</i> ssp. <i>uninervia</i>	0–2	–
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	0–2	–
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	0–2	–

Forb

6	<b>Perennial forbs</b>			5–50	
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	1–15	–
	Coues' cassia	SECO10	<i>Senna covesii</i>	0–10	–
	dense ayenia	AYMI	<i>Ayenia microphylla</i>	0–10	–
	slender janusia	JAGR	<i>Janusia gracilis</i>	0–10	–
	lacy tansyaster	MAPIP4	<i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i> var. <i>pinnatifida</i>	0–5	–
	Indian rushpea	HOGL2	<i>Hoffmannseggia glauca</i>	0–5	–
	bluedicks	DICAC5	<i>Dichelostemma capitatum</i> ssp. <i>capitatum</i>	0–5	–
	spreading fleabane	ERDI4	<i>Erigeron divergens</i>	0–5	–
	weakleaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	1–5	–
	slender poreleaf	POGR5	<i>Porophyllum gracile</i>	0–5	–
	desert tobacco	NIOBO	<i>Nicotiana obtusifolia</i> var. <i>obtusifolia</i>	0–2	–
	brownplume wirelettuce	STPA4	<i>Stephanomeria pauciflora</i>	0–2	–
	spreading fanpetals	SIAB	<i>Sida abutifolia</i>	0–2	–
	silverleaf nightshade	SOEL	<i>Solanum elaeagnifolium</i>	0–2	–
	dwarf desertpeony	ACNA2	<i>Acourtia nana</i>	0–2	–
	red-gland spurge	CHME5	<i>Chamaesyce melanadenia</i>	0–2	–
	San Felipe dogweed	ADPO	<i>Adenophyllum porophylloides</i>	0–2	–
	wishbone-bush	MILAV	<i>Mirabilis laevis</i> var. <i>villosa</i>	0–1	–
	Davis Mountain mock vervain	GLBIC	<i>Glandularia bipinnatifida</i> var. <i>ciliata</i>	0–1	–
	desert rosemallow	HICO	<i>Hibiscus coulteri</i>	0–1	–
	leatherweed	CRPOP	<i>Croton pottsii</i> var. <i>pottsii</i>	0–1	–
	pricklyburr	DAIN2	<i>Datura inoxia</i>	0–1	–
	desert marigold	BAMU	<i>Baileya multiradiata</i>	0–1	–
	climbing wartclub	BOSC	<i>Boerhavia scandens</i>	0–1	–
	brownfoot	ACWR5	<i>Acourtia wrightii</i>	0–1	–
	field anoda	ANPE4	<i>Anoda pentaschista</i>	0–1	–
	New Mexico silverbush	ARNE2	<i>Argythamnia neomexicana</i>	0–1	–
	Coulter's wrinklefruit	TECO	<i>Tetradlea coulteri</i>	0–1	–
	orange fameflower	PHAU13	<i>Phemeranthus aurantiacus</i>	0–1	–
	twinleaf senna	SEBA3	<i>Senna bauhinioides</i>	0–1	–
7	<b>Annual forbs</b>			5–600	
	California poppy	ESCAM	<i>Eschscholzia californica</i> ssp. <i>mexicana</i>	0–100	–
	shaggyfruit pepperweed	LELA	<i>Lepidium lasiocarpum</i>	0–100	–
	Nuttall's povertyweed	MONU	<i>Monolepis nuttalliana</i>	0–100	–
	Arizona popcornflower	PLAR	<i>Plagiobothrys arizonicus</i>	0–100	–
	Coulter's lupine	LUSP2	<i>Lupinus sparsiflorus</i>	0–50	–
	mesa tansyaster	MATA	<i>Machaeranthera tagetina</i>	0–50	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0–50	–
	thelypody	THELY	<i>Thelypodium</i>	0–50	–
	foothill deervetch	LOHU2	<i>Lotus humistratus</i>	0–50	–
	Arizona poppy	KAGR	<i>Kallstroemia grandiflora</i>	0–50	–

western tansymustard	DEPI	<i>Descurainia pinnata</i>	0-50	-
bristly fiddleneck	AMTE3	<i>Amsinckia tessellata</i>	0-50	-
wheelscale saltbush	ATEL	<i>Atriplex elegans</i>	0-50	-
yellow tackstem	CAPA7	<i>Calycoseris parryi</i>	0-25	-
white tackstem	CAWR	<i>Calycoseris wrightii</i>	0-25	-
coastal bird's-foot trefoil	LOSA	<i>Lotus salsuginosus</i>	0-25	-
miniature woollystar	ERDI2	<i>Eriastrum diffusum</i>	0-25	-
combseed	PECTO	<i>Pectocarya</i>	0-25	-
manybristle chinchweed	PEPA2	<i>Pectis papposa</i>	0-20	-
desert Indianwheat	PLOV	<i>Plantago ovata</i>	0-20	-
cleftleaf wildheliotrope	PHCR	<i>Phacelia crenulata</i>	0-20	-
Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	0-20	-
Lindley's silverpuffs	MILI5	<i>Microseris lindleyi</i>	0-20	-
wedgeleaf draba	DRCU	<i>Draba cuneifolia</i>	0-20	-
fringed redmaids	CACI2	<i>Calandrinia ciliata</i>	0-20	-
smallflowered milkvetch	ASNU4	<i>Astragalus nuttallianus</i>	0-20	-
exserted Indian paintbrush	CAEXE	<i>Castilleja exserta ssp. exserta</i>	0-15	-
pitseed goosefoot	CHBE4	<i>Chenopodium berlandieri</i>	0-15	-
buckwheat	ERIOG	<i>Eriogonum</i>	0-15	-
California desertdandelion	MACA6	<i>Malacothrix californica</i>	0-15	-
Coulter's globemallow	SPCO2	<i>Sphaeralcea coulteri</i>	0-10	-
New Mexico plumeseed	RANE	<i>Rafinesquia neomexicana</i>	0-10	-
sleepy silene	SIAN2	<i>Silene antirrhina</i>	0-10	-
Mexican fireplant	EUHE4	<i>Euphorbia heterophylla</i>	0-10	-
pincushion flower	CHFR	<i>Chaenactis fremontii</i>	0-10	-
Sonoran sandmat	CHMI7	<i>Chamaesyce micromera</i>	0-10	-
Esteve's pincushion	CHST	<i>Chaenactis stevioides</i>	0-10	-
cryptantha	CRYPT	<i>Cryptantha</i>	0-10	-
carelessweed	AMPA	<i>Amaranthus palmeri</i>	0-10	-
white easterbonnets	ANLA7	<i>Antheropeas lanosum</i>	0-10	-
fringed amaranth	AMFI	<i>Amaranthus fimbriatus</i>	0-10	-
American wild carrot	DAPU3	<i>Daucus pusillus</i>	0-5	-
California suncup	CACA32	<i>Camissonia californica</i>	0-5	-
Texas stork's bill	ERTE13	<i>Erodium texanum</i>	0-5	-
Arizona cottonrose	LOAR12	<i>Logfia arizonica</i>	0-5	-
limestone bedstraw	GAPR	<i>Galium proliferum</i>	0-5	-
star gilia	GIST	<i>Gilia stellata</i>	0-5	-
California mustard	GULA4	<i>Guillenia lasiophylla</i>	0-5	-
woollyhead neststraw	STMI2	<i>Stylocline micropoides</i>	0-5	-
Louisiana vetch	VILU	<i>Vicia ludoviciana</i>	0-5	-
whitestem blazingstar	MEAL6	<i>Mentzelia albicaulis</i>	0-5	-
distant phacelia	PHDI	<i>Phacelia distans</i>	0-5	-
Arizona phacelia	PHAR13	<i>Phacelia arizonica</i>	0-5	-

	green carpetweed	MOVE	<i>Mollugo verticillata</i>	0-5	-
	woolly tidestromia	TILA2	<i>Tidestromia lanuginosa</i>	0-3	-
	redseed plantain	PLRH	<i>Plantago rhodosperma</i>	0-3	-
	bluedicks	DICAC5	<i>Dichelostemma capitatum ssp. capitatum</i>	0-3	-
	desert trumpet	ERIN4	<i>Eriogonum inflatum</i>	0-3	-
	common fiddleneck	AMMEI2	<i>Amsinckia menziesii var. intermedia</i>	0-3	-
	flatspine stickseed	LAOCO	<i>Lappula occidentalis var. occidentalis</i>	0-2	-
	hoary bowlesia	BOIN3	<i>Bowlesia incana</i>	0-2	-
	Palmer's spectaclepod	DICA31	<i>Dimorphocarpa candicans</i>	0-2	-
	New Mexico thistle	CINE	<i>Cirsium neomexicanum</i>	0-2	-
	purslane	PORTU	<i>Portulaca</i>	0-2	-
	doubleclaw	PRPA2	<i>Proboscidea parviflora</i>	0-2	-
	Lemmon's ragwort	SELE8	<i>Senecio lemmonii</i>	0-2	-
	Florida pellitory	PAFL3	<i>Parietaria floridana</i>	0-2	-
	Mojave desertstar	MOBE2	<i>Monoptilon bellioides</i>	0-2	-
	slender goldenweed	MAGR10	<i>Machaeranthera gracilis</i>	0-1	-
	tanseyleaf tansyaster	MATA2	<i>Machaeranthera tanacetifolia</i>	0-1	-
	desert evening primrose	OEPR	<i>Oenothera primiveris</i>	0-1	-
	sand fringe pod	THCU	<i>Thysanocarpus curvipes</i>	0-1	-
	lyreleaf jewelflower	STCAA	<i>Streptanthus carinatus ssp. arizonicus</i>	0-1	-
	London rocket	SIIR	<i>Sisymbrium irio</i>	0-1	-
	sand pygmyweed	CRCOC	<i>Crassula connata var. connata</i>	0-1	-
	dainty desert hideseed	EUMI2	<i>Eucrypta micrantha</i>	0-1	-
	scarlet spiderling	BOCO	<i>Boerhavia coccinea</i>	0-1	-

#### Shrub/Vine

8	<b>Half Shrubs</b>			2-50	
	fairyduster	CAER	<i>Calliandra eriophylla</i>	1-20	-
	littleleaf ratany	KRER	<i>Krameria erecta</i>	1-20	-
	rough menodora	MESC	<i>Menodora scabra</i>	0-15	-
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0-15	-
	Eastern Mojave buckwheat	ERFA2	<i>Eriogonum fasciculatum</i>	0-10	-
	bastardsage	ERWR	<i>Eriogonum wrightii</i>	0-5	-
	burweed	ISTE2	<i>Isocoma tenuisecta</i>	0-5	-
	triangle bur ragweed	AMDE4	<i>Ambrosia deltoidea</i>	0-5	-
	desert zinnia	ZIAC	<i>Zinnia acerosa</i>	0-5	-
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0-2	-
	plains blackfoot	MELE2	<i>Melampodium leucanthum</i>	0-2	-
	yerba de pasmo	BAPT	<i>Baccharis pteronioides</i>	0-2	-
	Coulter's brickellbush	BRCO	<i>Brickellia coulteri</i>	0-1	-
	brittlebush	ENFA	<i>Encelia farinosa</i>	0-1	-
	threadleaf snakeweed	GUMI	<i>Gutierrezia microcephala</i>	0-1	-
	white ratany	KRGR	<i>Krameria grayi</i>	0-1	-
	American threefold	TRCA8	<i>Trixis californica</i>	0-1	-

	rayless goldenhead	ACSP	<i>Acamptopappus sphaerocephalus</i>	0–1	–
9	<b>Large shrubs</b>			1–30	
	joboba	SICH	<i>Simmondsia chinensis</i>	0–10	–
	catclaw acacia	ACGR	<i>Acacia greggii</i>	0–5	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0–5	–
	Warnock's snakewood	COWA	<i>Condalia warnockii</i>	0–2	–
	snakewood	CONDA	<i>Condalia</i>	0–2	–
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	0–2	–
	water jacket	LYAN	<i>Lycium andersonii</i>	0–2	–
	Berlandier's wolfberry	LYBE	<i>Lycium berlandieri</i>	0–2	–
	Arizona desert-thorn	LYEX	<i>Lycium exsertum</i>	0–2	–
	plains blackfoot	MELE2	<i>Melampodium leucanthum</i>	0–2	–
	Mexican bladdersage	SAME	<i>Salazaria mexicana</i>	0–2	–
	slender janusia	JAGR	<i>Janusia gracilis</i>	0–2	–
	Joshua tree	YUBR	<i>Yucca brevifolia</i>	0–2	–
	soaptree yucca	YUEL	<i>Yucca elata</i>	0–2	–
	pelotazo	ABIN	<i>Abutilon incanum</i>	0–2	–
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	0–1	–
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	0–1	–
	creosote bush	LATR2	<i>Larrea tridentata</i>	0–1	–
	banana yucca	YUBA	<i>Yucca baccata</i>	0–1	–
	sangre de cristo	JACA2	<i>Jatropha cardiophylla</i>	0–1	–
	knifeleaf condalia	COSP3	<i>Condalia spathulata</i>	0–1	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	0–1	–
	longleaf jointfir	EPTR	<i>Ephedra trifurca</i>	0–1	–
	turpentine bush	ERLA12	<i>Ericameria laricifolia</i>	0–1	–
	crucifixion thorn	CAEM4	<i>Castela emoryi</i>	0–1	–
	Wright's beebrush	ALWR	<i>Aloysia wrightii</i>	0–1	–
10	<b>Succulents</b>			5–50	
	saguaro	CAGI10	<i>Carnegiea gigantea</i>	0–20	–
	cactus apple	OPEN3	<i>Opuntia engelmannii</i>	5–15	–
	Arizona pencil cholla	CYAR14	<i>Cylindropuntia arbuscula</i>	0–10	–
	jumping cholla	CYFU10	<i>Cylindropuntia fulgida</i>	0–5	–
	purple pricklypear	OPMA8	<i>Opuntia macrocentra</i>	0–5	–
	tulip pricklypear	OPPH	<i>Opuntia phaeacantha</i>	0–5	–
	buck-horn cholla	CYAC8	<i>Cylindropuntia acanthocarpa</i>	0–5	–
	walkingstick cactus	CYSP8	<i>Cylindropuntia spinosior</i>	0–5	–
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	0–2	–
	Christmas cactus	CYLE8	<i>Cylindropuntia leptocaulis</i>	0–2	–
	devil's cholla	GRKU	<i>Grusonia kunzei</i>	0–1	–
	Graham's nipple cactus	MAGR9	<i>Mammillaria grahamii</i>	0–1	–
	Thornber's nipple cactus	MATH	<i>Mammillaria thornberi</i>	0–1	–
	heavertail pricklypear	OPBA2	<i>Opuntia basilaris</i>	0–1	–

	dollarjoint pricklypear	OPCH	<i>Opuntia chlorotica</i>	0–1	–
	Whipple cholla	CYWH	<i>Cylindropuntia whipplei</i>	0–1	–
	Engelmann's hedgehog cactus	ECEN	<i>Echinocereus engelmannii</i>	0–1	–
	pinkflower hedgehog cactus	ECFA	<i>Echinocereus fasciculatus</i>	0–1	–
	spiny star	ESVIV	<i>Escobaria vivipara var. vivipara</i>	0–1	–
<b>Tree</b>					
11	<b>Trees</b>			5–50	
	yellow paloverde	PAMI5	<i>Parkinsonia microphylla</i>	1–30	–
	velvet mesquite	PRVE	<i>Prosopis velutina</i>	1–30	–
	blue paloverde	PAFL6	<i>Parkinsonia florida</i>	0–10	–
	crucifixion thorn	CAHO3	<i>Canotia holacantha</i>	0–5	–
	desert ironwood	OLTE	<i>Olneya tesota</i>	0–5	–

## Animal community

The plant community on this site is suitable for grazing by livestock mainly in wet seasons when annual forbs and grasses are available. Perennial forage species like tobosa grow year-round with available moisture. Clayey horizons give this site a longer spring green season than other coarser textured upland sites.

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

## Hydrological functions

Heavy textured soils are good producers of runoff.

## Recreational uses

Hunting, hiking, camping, horseback riding, photography,

## Wood products

Limited mesquite for campfires and branding fires.

## Other products

Mesquite beans, hog potatoes, blue dicks and cactus fruits.

## Type locality

Location 1: Cochise County, AZ	
Township/Range/Section	T13S R19E S25
General legal description	Cascabel area, Banderilla Ranch
Location 2: Pima County, AZ	
Township/Range/Section	T17S R6E S11
General legal description	Sells FO - Shuck Toak District San Juan Trail
Location 3: Pima County, AZ	
Township/Range/Section	T18S R12E S16

## 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)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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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):**

- 
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**
- 
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**
- 
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**
- 
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant:
- Sub-dominant:
- Other:
- Additional:
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
- 
14. **Average percent litter cover (%) and depth ( in):**
- 
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
- 
16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**
- 
17. **Perennial plant reproductive capability:**
-