USDA Natural Resources
Conservation Service

Ecological site R040XB201AZ
Basalt Hills 7"-10" p.z.

Accessed: 05/12/2025

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.

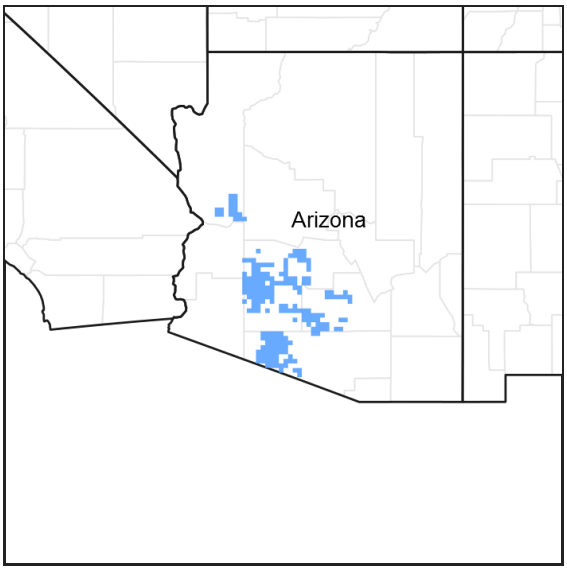


Figure 1. Mapped extent

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 40.2 – Middle Sonoran Desert

Elevations range from 1200 to 2000 feet and precipitation averages 7 to 10 inches per year. Vegetation includes saguaro, palo verde, creosotebush, triangle bursage, brittlebush, prickly pear, cholla, desert saltbush, wolfberry bush muhly, threeawns, and big galleta. The soil temperature regime is hyperthermic 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.

Table 1. Dominant plant species

Tree	(1) *Parkinsonia microphylla*
Shrub	(1) *Encelia farinosa* (2) *Ambrosia dumosa*
Herbaceous	(1) *Muhlenbergia porteri* (2) *Pleuraphis rigida*

Physiographic features

This site occurs on hillslopes and ridgetops associated with basalt, diabase, and related bedrock. Ths soils are shallow loams. Large areas of talus or rock slides occur intermingled with soil areas and make up about 15 to 30 percent of the site. Rock outcrop makes up a small percentage of the area.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain (3) Ridge
Elevation	1,100–2,000 ft
Slope	15–50%

Climatic features

Precipitation in the sub-resource area ranges from 7 to 10 inches. Elevations range from 900 to 2050 feet. Winter-summer rainfall ratios range from 40% to 60% in the southern part along the international boundary, to 60% to 40% in the central and northern parts of the sub-resource area. As one moves from east to west in this resource area rains become more unpredictable and variable with Coefficients of Variation of annual rainfall equal to 38% at Florence and 46% at Aguila. Summer rains fall July- September, originate in the Gulf of Mexico, and are convective, usually brief, intense thunderstorms. Summer precipitation is extremely erratic and undependable in this area. Cool season moisture tends to be frontal, originates in the Pacific and Gulf of California, and falls in widespread storms with long duration and low intensity. This is the dependable moisture supply for vegetation in the area. Snow is very rare and usually melts on contact. May-June is the driest time of the year. Humidity is very low.

Winter temperatures are very mild with very few days recording freezing for short periods of time. Summertime temperatures are hot to very hot with many days in June-July exceeding 105 degrees F. Frost-free days range from 280 at stations in major river valleys with cold air drainage to 320 to 350 days at upland stations.

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)	350 days
Freeze-free period (average)	0 days
Precipitation total (average)	10 in

Influencing water features

Soil features

These are shallow soils formed on basalt, diabase, and related igneous rock. They are calcareous, loamy textured, and have a well developed cover of stones and cobbles (malapais). Cobble and stone cover averages 80 to 90 percent. Bedrock is dark colored, very hard and unweathered. Soil moisture reltionships are fair to poor. Well developed cobble and stone cover protects the surface from erosion. The dark surface of stones warms the soil in the winter allowing the plants to grow in the coolest weather. Percent bare ground averages 15 percent.
Soils mapped on this site include: in
SSA-627 Southern Mohave County MU Cherioni-2;
SSA-645 Aguila-Carefree area MU Cherioni-18;
SSA-651 Central Maricopa County MU Cherioni-RS;
SSA-653 Gila Bend-Ajo area MU's Cipriano-9 & Hyder-9;
SSA-658 Gila River Indian Reservation MU Lomitas-25;

SSA-659 Western Pinal County MU Cherioni-7;
SSA-661 Eastern Pinal-Southern Gila Counties MU Cherioni-202;
SSA-703 Tohono O'odham area MU's Guvo-37 & Hyder all greater than 15% slopes-37.
Parent material kind may include slope alluvium.

Table 4. Representative soil features

Parent material	(1) Slope alluvium–diabase
Surface texture	(1) Gravelly loam (2) Very gravelly fine sandy loam (3) Very cobbly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	4–20 in
Surface fragment cover <=3"	15–45%
Surface fragment cover >3"	10–25%
Available water capacity (0-40in)	0.3–2.2 in
Calcium carbonate equivalent (0-40in)	5–25%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	15–45%
Subsurface fragment volume >3" (Depth not specified)	3–15%

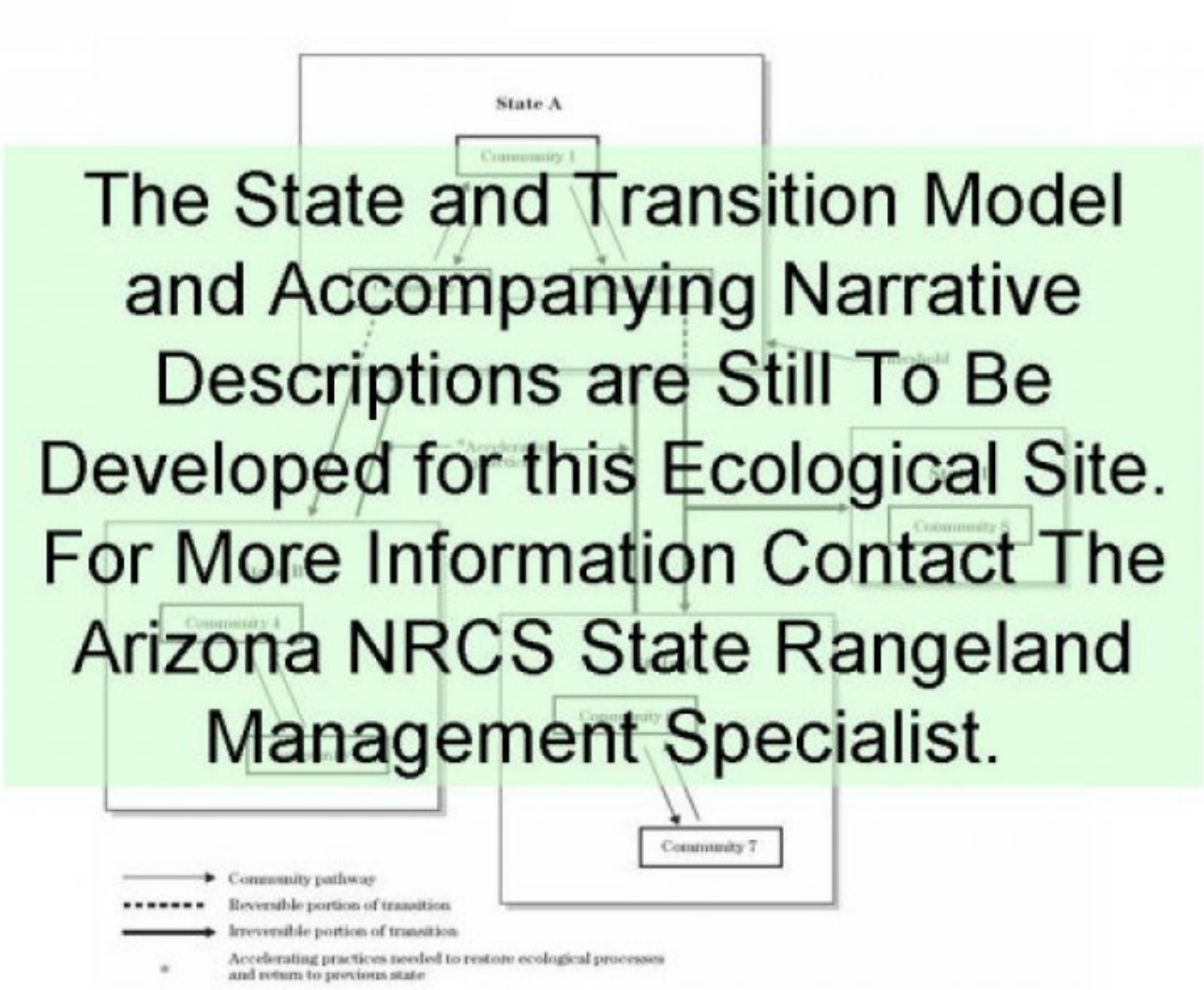
Ecological dynamics

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



State 1
Historical Climax Plant Community

Community 1.1
Historical Climax Plant Community

The perennial plant community is a mixture of desert trees, shrubs and cacti. The aspect is shrubland. Crytogam cover is low on the bare ground portion. Lichens on stone exist in trace amounts even on northern exposures. Perennial plant basal cover is about 1% on the site. Plant populations of major species range from 300 to 600 plants per acre for the brittlebush, globemallow group, 25 to 100 for palo verde, 50 to 200 for creosotebush, 100 to 400 for cholla species, 1 to 25 for saguaro, and 1 to 50 for ocotillo. Desert globemallow tends to dominate on north aspects, and brittlebush on south aspects. Both species are very sensitive to drought on this site and it is not uncommon to have 50 to 75 percent mortlity on the site after a severe drought period. Teddybear cholla predominateds on southern exposures and buckhorn cholla on northern exposures. 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 available moisture.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	260	–	320
Forb	40	–	100
Grass/Grasslike	20	–	80
Tree	5	–	20
Total	**325**	**–**	**520**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				5–20	
	bush muhly	MUPO2	*Muhlenbergia porteri*	0–3	–
	big galleta	PLRI3	*Pleuraphis rigida*	0–2	–
	slim tridens	TRMU	*Tridens muticus*	0–2	–
	southwestern bristlegrass	SESC2	*Setaria scheelei*	0–1	–
	purple threeawn	ARPU9	*Aristida purpurea*	0–1	–
	blue threeawn	ARPUN	*Aristida purpurea var. nealleyi*	0–1	–
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	0–1	–
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	0–1	–
	spidergrass	ARTE3	*Aristida ternipes*	0–1	–
	spidergrass	ARTEG	*Aristida ternipes var. gentilis*	0–1	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–1	–
	Arizona cottontop	DICA8	*Digitaria californica*	0–1	–
	nineawn pappusgrass	ENDE	*Enneapogon desvauxii*	0–1	–
	tanglehead	HECO10	*Heteropogon contortus*	0–1	–
2				20–60	
	sixweeks threeawn	ARAD	*Aristida adscensionis*	0–10	–
	prairie threeawn	AROL	*Aristida oligantha*	0–10	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–10	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–10	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–10	–
	delicate muhly	MUFR	*Muhlenbergia fragilis*	0–5	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	0–5	–
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	0–5	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	0–5	–
	Eastwood fescue	VUMIC	*Vulpia microstachys var. ciliata*	0–5	–
	Pacific fescue	VUMIP	*Vulpia microstachys var. pauciflora*	0–5	–
	Arizona brome	BRAR4	*Bromus arizonicus*	0–1	–
	desert lovegrass	ERPEM	*Eragrostis pectinacea var. miserrima*	0–1	–
	tufted lovegrass	ERPEP2	*Eragrostis pectinacea var. pectinacea*	0–1	–

	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	0–1	–
	mucronate sprangletop	LEPA6	*Leptochloa panicea*	0–1	–
	witchgrass	PACA6	*Panicum capillare*	0–1	–
	Hall's panicgrass	PAHA	*Panicum hallii*	0–1	–
Forb					
3				20–40	
	desert tobacco	NIOB	*Nicotiana obtusifolia*	1000–5000	–
	slender janusia	JAGR	*Janusia gracilis*	2–10	–
	Parry's false prairie-clover	MAPA7	*Marina parryi*	2–8	–
	California fagonbush	FALA	*Fagonia laevis*	2–8	–
	narrowleaf silverbush	ARLA12	*Argythamnia lanceolata*	2–5	–
	whitemargin sandmat	CHAL11	*Chamaesyce albomarginata*	0–3	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	0–3	–
	Graham's nipple cactus	MAGR9	*Mammillaria grahamii*	0–2	–
	lacy tansyaster	MAPIP4	*Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida*	0–2	–
4				20–60	
	California evening primrose	OECA2	*Oenothera californica*	0–5	–
	combseed	PECTO	*Pectocarya*	0–5	–
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–5	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–5	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–5	–
	slender poreleaf	POGR5	*Porophyllum gracile*	0–3	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	0–3	–
	glandular threadplant	NEGL	*Nemacladus glanduliferus*	0–3	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–3	–
	pebble pincushion	CHCA	*Chaenactis carphoclinia*	0–2	–
	devil's spineflower	CHRI	*Chorizanthe rigida*	0–2	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–1	–
	New Mexico thistle	CINE	*Cirsium neomexicanum*	0–1	–
	cryptantha	CRYPT	*Cryptantha*	0–1	–
	hairy prairie clover	DAMO	*Dalea mollis*	0–1	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–1	–
	desert larkspur	DEPA	*Delphinium parishii*	0–1	–
	lipfern	CHEIL	*Cheilanthes*	0–1	–
	goosefoot	CHENO	*Chenopodium*	0–1	–
	hyssopleaf sandmat	CHHY3	*Chamaesyce hyssopifolia*	0–1	–
	coastal bird's-foot trefoil	LOSA	*Lotus salsuginosus*	0–1	–
	strigose bird's-foot trefoil	LOSTT	*Lotus strigosus var. tomentellus*	0–1	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–1	–
	blazingstar	MENTZ	*Mentzelia*	0–1	–
	rough menodora	MESC	*Menodora scabra*	0–1	–
	green carpetweed	MOVE	*Mollugo verticillata*	0–1	

	green carpetweed	MOVE	*Mollugo verticillata*	0–1	–
	bristly nama	NAHI	*Nama hispidum*	0–1	–
	cloak fern	NOTHO	*Notholaena*	0–1	–
	Florida pellitory	PAFL3	*Parietaria floridana*	0–1	–
	Emory's rockdaisy	PEEM	*Perityle emoryi*	0–1	–
	cliffbrake	PELLA	*Pellaea*	0–1	–
	manybristle chinchweed	PEPA2	*Pectis papposa*	0–1	–
	phacelia	PHACE	*Phacelia*	0–1	–
	tall mountain larkspur	DESC	*Delphinium scaposum*	0–1	–
	bluedicks	DICA14	*Dichelostemma capitatum*	0–1	–
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	0–1	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–1	–
	spreading fleabane	ERDI4	*Erigeron divergens*	0–1	–
	buckwheat	ERIOG	*Eriogonum*	0–1	–
	woolly sunflower	ERIOP2	*Eriophyllum*	0–1	–
	wand fleabane	EROX2	*Erigeron oxyphyllus*	0–1	–
	Texas stork's bill	ERTE13	*Erodium texanum*	0–1	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–1	–
	beetle spurge	EUER2	*Euphorbia eriantha*	0–1	–
	starry bedstraw	GASTE2	*Galium stellatum ssp. eremicum*	0–1	–
	desert rosemallow	HICO	*Hibiscus coulteri*	0–1	–
	paleface	HIDE	*Hibiscus denudatus*	0–1	–
	Newberry's velvetmallow	HONE	*Horsfordia newberryi*	0–1	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	0–1	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–1	–
	flax	LINUM	*Linum*	0–1	–
	milkvetch	ASTRA	*Astragalus*	0–1	–
	Coulter's spiderling	BOCO2	*Boerhavia coulteri*	0–1	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–1	–
	Tucson Mountain spiderling	BOME	*Boerhavia megaptera*	0–1	–
	exserted Indian paintbrush	CAEXE	*Castilleja exserta ssp. exserta*	0–1	–
	white tackstem	CAWR	*Calycoseris wrightii*	0–1	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	0–1	–
	California copperleaf	ACCA3	*Acalypha californica*	0–1	–
	poreleaf dogweed	ADPO2	*Adenophyllum porophyllum*	0–1	–
	trailing windmills	ALIN	*Allionia incarnata*	0–1	–
	carelessweed	AMPA	*Amaranthus palmeri*	0–1	–
	sand fringepod	THCU	*Thysanocarpus curvipes*	0–1	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–1	–
	New Mexico plumeseed	RANE	*Rafinesquia neomexicana*	0–1	–
	chia	SACO6	*Salvia columbariae*	0–1	–
	Coues' cassia	SECO10	*Senna covesii*	0–1	–

	sleepy silene	SIAN2	*Silene antirrhina*	0–1	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	0–1	–
Shrub/Vine					
5				100–180	
	brittlebush	ENFA	*Encelia farinosa*	60–100	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	40–80	–
6				60–100	
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	20–50	–
	creosote bush	LATR2	*Larrea tridentata*	10–30	–
	ocotillo	FOSP2	*Fouquieria splendens*	5–20	–
7				20–40	
8				20–40	
	triangle bur ragweed	AMDE4	*Ambrosia deltoidea*	5–20	–
	white ratany	KRGR	*Krameria grayi*	5–10	–
	water jacket	LYAN	*Lycium andersonii*	2–5	–
	Fremont's desert-thorn	LYFR	*Lycium fremontii*	2–5	–
9				5–20	
	saguaro	CAGI10	*Carnegiea gigantea*	0–3	–
	organpipe cactus	STTH3	*Stenocereus thurberi*	0–2	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	0–2	–
	Thornber's nipple cactus	MATH	*Mammillaria thornberi*	0–1	–
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	0–1	–
	cactus apple	OPEN3	*Opuntia engelmannii*	0–1	–
	senita cactus	PASC14	*Pachycereus schottii*	0–1	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–1	–
	Leconte's barrel cactus	FECYL	*Ferocactus cylindraceus var. lecontei*	0–1	–
	Emory's barrel cactus	FEEM	*Ferocactus emoryi*	0–1	–
10				5–20	
	burrobush	AMDU2	*Ambrosia dumosa*	0–3	–
	Sonoran croton	CRSO	*Croton sonorae*	0–2	–
	sweetbush	BEJU	*Bebbia juncea*	0–2	–
	Coulter's brickellbush	BRCO	*Brickellia coulteri*	0–1	–
	fragrant bursera	BUFA	*Bursera fagaroides*	0–1	–
	elephant tree	BUMI	*Bursera microphylla*	0–1	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	0–1	–
	desert lavender	HYEM	*Hyptis emoryi*	0–1	–
	sangre de cristo	JACA2	*Jatropha cardiophylla*	0–1	–
	littleleaf ratany	KRER	*Krameria erecta*	0–1	–
	desert ironwood	OLTE	*Olneya tesota*	0–1	–
	bush arrowleaf	PLPL	*Pleurocoronis pluriseta*	0–1	–
	Mexican bladdersage	SAME	*Salazaria mexicana*	0–1	–
	arrow poision plant	SEBI9	*Sebastiania bilocularis*	0–1	–
	American threefold	TRCA8	*Trixis californica*	0–1	–

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Parish's goldeneye	VIPA14	*Viguiera parishii*	0–1	–
	rush milkweed	ASSU	*Asclepias subulata*	0–1	–
	Indian mallow	ABUTI	*Abutilon*	0–1	–
	whitethorn acacia	ACCOP9	*Acacia constricta var. paucispina*	0–1	–

Animal community

Steep slopes, very cobbly and stony surfaces and large areas of rock slides severely limit livestock distribution. Stocker cattle are best adapted to use of this site. The plant community provides limited amounts of usable forage in the winter-spring season. Natural water is unavailable on this site.

Water developments are very important to wildlife species on this site. Cover, diversity and topography make this site home to a variety of desert animals. Large mammals use this site seasonally unless permanent water supplies exist nearby. Desert tortoises den on cobbly or stony southern aspects. Javalina bed on north aspects in palo verde thickets.

Recreational uses

Hot summertime temperatures limit the use of this site to primarily fall through spring periods. Steep slopes and the extensive cover of cobbles and gravels make traversing the site difficult. Hiking and hunting are the primary uses of this ecological site.

Wood products

No significant wood products are produced on the site.

Type locality

Location 1: Pima County, AZ	
Township/Range/Section	T12S R4W S5
General legal description	Tucson FO - Childs Ranch, by Burro Gap Well
Location 2: Maricopa County, AZ	
Township/Range/Section	T7S R2E S6
General legal description	Buckeye FO - AK Ranch, Palo Verde Mountains
Location 3: Maricopa County, AZ	
Township/Range/Section	T3N R6E S32
General legal description	Chandler FO - Salt River Indian Community, Sawik Mountains
Location 4: Maricopa County, AZ	
Township/Range/Section	T4N R3E S10
General legal description	Phoenix FO - Union Hills
Location 5: Pima County, AZ	
Township/Range/Section	T8S R4E S17
General legal description	Sells FO - Sif Oidak District, Vaiva Vo Hills

Contributors

Dan Robinett
Dan Robinett, Jack Norris
Larry D. Ellicott
Steve Barker

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	03/07/2005
Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Common on this site only in areas where rock and gravel cover is low. Rills follow joints, fractures and bedding planes in the bedrock parent materials.

2. **Presence of water flow patterns:** Water flow patterns are common, continuous, and cover 15-20% of area.

3. **Number and height of erosional pedestals or terracettes:** There are no pedestals or terracettes on this site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 1-5%

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** No evidence of soil movement by wind.

7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter can move by wind and water. Woody litter remains under shrub canopies.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil surface resistance to erosion is good under shrub canopies & areas with high rock and gravel cover to moderate in soil interspaces due to crusts formed by raindrop impact.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thir

platy to granular; 7.5-10YR6/4 dry; 7.5-10YR4/4 moist, to 2 inches

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy 10-15%; 70-80% shrubs, 5% trees and 10-15% succulents. 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: subshrubs > large shrubs > winter annuals > summer annuals > perennial grasses and forbs > cryptgams (Note: In El Nino years annual forbs and grasses are #1 in above ground weight)

    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):** 0-50% canopy mortality

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14. **Average percent litter cover (%) and depth (in):** Herbaceous litter is not persistent on the site and may be 20-60% in El Nino years.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 250 lbs/ac unfavorable precipitation; 400 lbs/ac normal precipitation; 650 lbs/ac favorable precipitation

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Sahara mustard (potential)

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

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