

# Ecological site R038XA117AZ Volcanic Hills 12-16" p.z. Clayey

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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): 038X–Mogollon Transition South

# AZ 38.1 – Lower Mogollon Transition

Elevations range from 3000 to 4500 feet and precipitation averages 12 to 16 inches per year. Vegetation includes canotia, one-seed juniper, mesquite, catclaw acacia, jojoba, turbinella oak, ratany, shrubby buckwheat, algerita, skunkbush, tobosa, vine mesquite, bottlebrush squirreltail, grama species, curly mesquite, desert needlegrass and New Mexico feathergrass. The soil temperature regime is thermic and the soil moisture regime is ustic aridic. This unit occurs within the Transition Zone Physiographic Province and is characterized by canyons and structural troughs or valleys. Igneous, metamorphic and sedimentary rock classes occur on rough mountainous terrain in association with less extensive sediment filled valleys exhibiting little integrated drainage.

# **Classification relationships**

Similar site to TES (Terrestrial Ecosystem site)map unit numbers 378 and 428, on the Prescott national Forest in Yavapai county in central Arizona.

# Associated sites

R038XA102AZ	Clayey Upland 12-16" p.z.
R038XA103AZ	Clay Loam Upland 12-16" p.z.

## Similar sites

R041XC301AZ Basalt Hills 12-16" p.z.

#### Table 1. Dominant plant species

Tree	(1) Canotia (2) Parkinsonia
Shrub	(1) Simmondsia chinensis (2) Opuntia engelmannii var. engelmannii
Herbaceous	(1) Pleuraphis mutica (2) Bouteloua curtipendula

# **Physiographic features**

This site occurs in the lower elevations of the interior chaparral zone, south of the Mogollon Rim in central Arizona. This site occurs in an upland position. It occurs on rugged mountain slopes, ridge-tops and mesa sides. Elevations range from 3200 to 4600 feet. Slopes are from 15 to 70%.

#### Table 2. Representative physiographic features

Landforms	<ul><li>(1) Mountain</li><li>(2) Mountain slope</li><li>(3) Ridge</li></ul>
Flooding frequency	None
Elevation	3,100–4,600 ft
Slope	15–70%
Aspect	N, E, S

# **Climatic features**

Precipitation in this common resource area averages 12 to 16 inches annually. The winter-summer rainfall ratio ranges from about 60/40% in the northwest part of the area to 50/50% in the southeast part. Summer rains fall; July through September, and are from high-intensity, convective, thunderstorms. This moisture originates primarily from the Gulf of Mexico, but can come from the remnants of Pacific hurricanes in September. Winter moisture is frontal, originates in the north Pacific, and falls as rain or snow in widespread storms of low intensity and long duration. Snowfall ranges from a trace to 10 inches per year and can occur from November through March. Snow seldom persists for more than a day except on north aspects. May and June are the driest months of the year. Humidity is generally low all year. Average annual air temperatures range from 59 to 70 degrees F (thermic temperature regime). Daytime temperatures in the summer are commonly in the high 90's. Freezing temperatures are common from October through April, usually during the night or early morning hours. The actual precipitation, available moisture and temperature vary, depending on, region, elevation, rain shadow effect and aspect.

#### Table 3. Representative climatic features

Frost-free period (average)	230 days
Freeze-free period (average)	285 days
Precipitation total (average)	16 in

# Influencing water features

There are no water features associated with this site.

# **Soil features**

These soils are shallow (10 to 20 inches) and dark colored. They are clayey throughout (smectitic) and well drained. They have formed in residuum and slope alluvium from basalt, andesite and related volcanic tuffs and ash. The surface textures are clayloam to clay. Surfaces are well covered by dark colored; gravels, cobbles and stones. The effective rooting depth is limited by hard bedrock at 10 to 20 inches. Runoff is moderate to high on moist soils. The erosion hazard is slight due to gravel, cobble and rock covers. The soils mapped on this site include: from SSA-627 Mohave County Southern Part MU's Gonzales-49 & 87, Courthouse family-40 & 41, Graham-55, Lampshire-75; SSA-637 Yavapai County Western Part MU's Faraway GrVL, CbVL, GrVSL, CbVSL-FIE, FIF, Venezia StVL-VrF, VtE, Luzena-FIE, LwD, LxD, FIF; SSA-675 San Carlos IR Area MU's Eskiminzin-535 & 565, Brewster-315, Cammerman-650, Woodcutter-315, SSA-697 Mohave County Central Part MU's Gonzales-42 & Graham-46.

Parent material	<ul><li>(1) Residuum–basalt</li><li>(2) Slope alluvium–andesite</li></ul>
Surface texture	<ul><li>(1) Very cobbly clay loam</li><li>(2) Cobbly clay</li></ul>
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to slow
Soil depth	10–20 in
Surface fragment cover <=3"	25–50%
Surface fragment cover >3"	5–12%
Available water capacity (0-40in)	0.8–2.4 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	15-45%
Subsurface fragment volume >3" (Depth not specified)	1–10%

#### Table 4. Representative soil features

# **Ecological dynamics**

The historic native plant community is a diverse mixture of desert trees, shrubs, succulents, forbs and grasses. This includes a diverse flora of native annual grasses and forbs of both the winter and summer seasons. Periodic wildfires occurred at moderate intervals (15 to 30 years) and helped maintain a balance between herbs and shrubs. In the absence of fire for longer periods, shrubby species and cacti can become dominant. The interactions of drought, fire and continuous livestock grazing can, over time, result in the loss of palatable grasses, half shrubs and suffrutescent forbs. In some situations non-native annuals can dominate the site. These species can, over time, diminish the soil seed-bank of native annual species. Non-native annuals can act to increase the fire frequency of areas of the site near roads and urban areas, where the incidence of man-made fires is high.

## State and transition model

# MLRA 38.1 (12-16"), Volcanic Hills, clayey



\*Annual grasses include natives and non-natives 4, 5. Accelerated soil erosion may occur where herbaceous patches are absent.

3. Introduction of seed source, El Nino type event,

catastrophic fire.

2b. Unknown

Figure 4. State & Transition, Volcanic Hills, clayey 12-16"

## State 1 **Mixed Shrub-Grass State**

## Community 1.1 **Historic Native Plant Community**

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Mixed shrub - grassland state



 Left photo is potential plant community (tobora, side outs) grama, canotia and jojoba) 10 15 years after fire · Right photo is potential plant community on a western exposure at 3400 feet elevation · Total canopy cover ranges from 40% to 60%

·Left photo is dominated by high cenopy of whitethorn acacia, mesquite, jojoba and one seed jumper. It has not burned in over 50 years Right photo shows a expect, with indper and whitethom aracia; routh aspect with jojoba and rague

Skrubs like mesquite, canotia, jurdper, outclaw acacia, whitethors scacia, and succulents like prickley pear, amole and bauma yucca increase to dominate the overstory • Annuals , both native and non-native, (an dominate the understory Trailing from heavy livestock use ap action and ac calenated

CREASE OF sheet and rill are sion.

Shrub dominated state



Shrub dominated, eroded state



Winter annuals in El Nino years



·Left photo is of a west facing slope hish with winter enough like poppy and hprine in the wet spring of 1993 · Right photo is of a north aspect will a heavy stand of red bronne after the ret spring of 2001. Non native annuals like red bronne, dis signess and wild outs can dominate the site with frequent,

Figure 5. Volcanic Hills, clayey 12-16" pz. photos

The historic native plant community is a diverse mixture of perennial grasses, suffrutescent forbs, shrubs, succulents and desert trees. A rich flora of native annual forbs and grasses, of both the winter and summer seasons, exist in the plant community. Periodic, naturally occurring, wildfires were important in maintaining the potential plant community. Northern exposures have a higher percentage of mid-grasses and some cool season grasses that will not occur on south slopes. North slopes will also be more likely to experience tree increases especially juniper species, mesquite and canotia. Southern exposures will have a higher percentage of shrubs and succulents in the plant community. More xeric grasses will dominate southern exposures (tanglehead). At elevations near precipitation zone upper boundaries the northern slopes will look more like the plant community of the 16 to 20 inch precipitation zone in MLRA 38. At lower precipitation zone boundaries southern exposures will look more like the plant community of the site in the 10 to 13 inch zone of MLRA 40 (Upper Sonoran).

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	390	700	1050
Shrub/Vine	210	325	500
Forb	50	150	350
Tree	20	50	100
Total	670	1225	2000

#### Table 6. Ground cover

Tree foliar cover	0-1%
Shrub/vine/liana foliar cover	2-5%
Grass/grasslike foliar cover	3-6%
Forb foliar cover	0-1%
Non-vascular plants	0-1%
Biological crusts	0-2%
Litter	10-45%
Litter Surface fragments >0.25" and <=3"	10-45% 25-50%
Litter Surface fragments >0.25" and <=3" Surface fragments >3"	10-45% 25-50% 5-15%
Litter Surface fragments >0.25" and <=3" Surface fragments >3" Bedrock	10-45% 25-50% 5-15% 5-25%
Litter Surface fragments >0.25" and <=3" Surface fragments >3" Bedrock Water	10-45% 25-50% 5-15% 5-25% 0%

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

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	-	-	0-5%	0-1%
>0.5 <= 1	-	0-2%	2-10%	1-5%
>1 <= 2	-	1-10%	20-30%	0-1%
>2 <= 4.5	-	10-15%	_	_
>4.5 <= 13	0-10%	1-5%	_	_
>13 <= 40	0-5%	_	_	_
>40 <= 80	-	_	_	_
>80 <= 120	-	_	_	_
>120	-	_	_	_

Figure 7. Plant community growth curve (percent production by month). AZ3811, 38.1 12-16" p.z. all sites. Growth begins in the spring, most growth occurs in the summer..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	1	7	15	20	22	20	10	5	0	0

State 2 Shrub Dominated State

Community 2.1 Shrub Dominated Plant Community Perennial grass canopy cover is reduced due to the interactions of drought, grazing and / or fire. Desert shrubs and cacti dominate the plant community. Shrub cover exceeds 30%. Annuals, both native and non-native, dominate the under-story. Fire frequency is reduced but the site can still burn, especially after "El Nino" years produce heavy fuel loads of annual grasses and forbs.

# State 3 Exotic Invaded State

# Community 3.1 Exotic Forb and Grass Invaded Plant Community

Non-native annual grasses and forbs like; red brome, cheatgrass, and wild oats, can invade and dominate areas of the site with very low perennial grass cover. These species can, over time, reduce the seed-bank of native annual grasses and forbs. Their presence can increase the fire frequency (of man made fires) especially where roads and urban areas are adjacent to areas of the site.

# State 4 Shrub Dominated, Eroded State

# Community 4.1 Shrub Dominated, Eroded Plant Community

Shrubs like; whitethorn acacia, mesquite, wait a bit mimosa and catclaw acacia; and succulents like; prickly pear, cholla and banana yucca increase to dominate the site in the absence of fire for very long periods of time. Native and non-native annual forbs and grasses dominate the under-story. In "El Nino" years, herbaceous fuels can be sufficient to carry fire through the heavy canopy of shrubs. The major woody shrubs are, however, fire resistant once established. Such fires would remove less tolerant species like cacti and leave intact the sprouting woody plants to become more and more dominant. Extreme rainfall events coupled with the fire, drought and grazing interaction, can lead to rilling of steep slopes.

# Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)			
Grass	Grass/Grasslike							
1	mid grasses			200–450				
	sideoats grama	BOCU	Bouteloua curtipendula	100–250	-			
	tobosagrass	PLMU3	Pleuraphis mutica	50–200	_			
	tanglehead	HECO10	Heteropogon contortus	25–100	-			
2	cool season grasses	-		15–100				
	desert needlegrass	ACSP12	Achnatherum speciosum	0–50	_			
	squirreltail	ELEL5	Elymus elymoides	5–50	_			
	prairie Junegrass	KOMA	Koeleria macrantha	0–25	_			
	muttongrass	POFE	Poa fendleriana	0–20	_			
3	misc. perennial grasses	6		150–200				
	spidergrass	ARTE3	Aristida ternipes	10–50	_			
	cane bluestem	BOBA3	Bothriochloa barbinodis	0–50	_			
	black grama	BOER4	Bouteloua eriopoda	10–50	_			
	vine mesquite	PAOB	Panicum obtusum	0–50	_			
	big galleta	PLRI3	Pleuraphis rigida	0–25	_			
	alaina kuistlassaa		Ostanialaissta	0.05				

	plains pristiegrass	SEVUZ	Setana vuipiseta	U-20	
	bush muhly	MUPO2	Muhlenbergia porteri	0–25	_
	spidergrass	ARTEG	Aristida ternipes var. gentilis	0–25	_
	purple threeawn	ARPUP6	Aristida purpurea var. purpurea	0–25	_
	Arizona cottontop	DICA8	Digitaria californica	0–20	_
	southwestern bristlegrass	SESC2	Setaria scheelei	0–20	_
	green sprangletop	LEDU	Leptochloa dubia	0–20	_
	common wolfstail	LYPH	Lycurus phleoides	0–15	-
	sand dropseed	SPCR	Sporobolus cryptandrus	0–15	_
	plains lovegrass	ERIN	Eragrostis intermedia	0–15	_
	nineawn pappusgrass	ENDE	Enneapogon desvauxii	0–10	_
	blue threeawn	ARPUN	Aristida purpurea var. nealleyi	0–10	_
	Parish's threeawn	ARPUP5	Aristida purpurea var. parishii	0–10	_
	bullgrass	MUEM	Muhlenbergia emersleyi	0–10	_
	Fendler threeawn	ARPUL	Aristida purpurea var. longiseta	0–5	_
	low woollygrass	DAPU7	Dasyochloa pulchella	0–5	-
4	short grasses			25–150	
	curly-mesquite	HIBE	Hilaria belangeri	5–50	-
	Hall's panicgrass	PAHA	Panicum hallii	1–50	_
	slender grama	BORE2	Bouteloua repens	5–50	_
	red grama	BOTR2	Bouteloua trifida	0–25	-
	slim tridens	TRMU	Tridens muticus	0–25	_
	hairy grama	BOHI2	Bouteloua hirsuta	0–25	-
	sprucetop grama	BOCH	Bouteloua chondrosioides	0–10	_
5	annual grasses			25–200	
	sixweeks threeawn	ARAD	Aristida adscensionis	0–100	_
	prairie threeawn	AROL	Aristida oligantha	0–100	_
	needle grama	BOAR	Bouteloua aristidoides	0–100	_
	Mexican sprangletop	LEFUU	Leptochloa fusca ssp. uninervia	20–100	_
	mucronate sprangeltop	LEPAB	Leptochloa panicea ssp. brachiata	20–100	_
	Mexican panicgrass	PAHI5	Panicum hirticaule	0–100	_
	sticky sprangletop	LEVI5	Leptochloa viscida	0–50	_
	witchgrass	PACA6	Panicum capillare	0–50	_
	small fescue	VUMI	Vulpia microstachys	0–50	-
	Eastwood fescue	VUMIC	Vulpia microstachys var. ciliata	0–50	-
	sixweeks fescue	VUOC	Vulpia octoflora	0–50	_
	sixweeks grama	BOBA2	Bouteloua barbata	0–50	_
	Arizona brome	BRAR4	Bromus arizonicus	0–50	_
	feather fingergrass	CHVI4	Chloris virgata	0–50	-
	little barley	HOPU	Hordeum pusillum	0–30	_
	delicate muhly	MUFR	Muhlenbergia fragilis	0–25	_
	littleseed muhly	МОМІ	Muhlenbergia microsperma	0–25	_
	canyon cupgrass	ERLE7	Eriochloa lemmonii	0–25	_
	L EL = al   a a anno a a		Fur and the section of	0.05	

	tunea lovegrass	EKPE	Eragrosus pecunacea	U-20		
	desert lovegrass	ERPEM	Eragrostis pectinacea var. miserrima	0–25	_	
	Bigelow's bluegrass	POBI	Poa bigelovii	0–25	_	
	Arizona signalgrass	URAR	Urochloa arizonica	0–25	-	
Forb						
6	perennial forbs			25–50		
	largeflower onion	ALMA4	Allium macropetalum	0–15	_	
	weakleaf bur ragweed	AMCO3	Ambrosia confertiflora	1–15	-	
	bluedicks	DICA14	Dichelostemma capitatum	2–15	_	
	Indian rushpea	HOGL2	Hoffmannseggia glauca	1–15	_	
	desert globemallow	SPAM2	Sphaeralcea ambigua	1–15	-	
	brownplume wirelettuce	STPA4	Stephanomeria pauciflora	0–15	-	
	longflower tube tongue	JULO3	Justicia longii	0–10	-	
	shrubby deervetch	LORI3	Lotus rigidus	0–10	_	
	Wright's deervetch	LOWR	Lotus wrightii	0–10	_	
	lacy tansyaster	MAPI	Machaeranthera pinnatifida	1–10		
	wishbone-bush	MILAV	Mirabilis laevis var. villosa	1–10	_	
	scarlet spiderling	BOCO	Boerhavia coccinea	0–10	_	
	Arizona wrightwort	CAAR7	Carlowrightia arizonica	0–10	_	
	white sagebrush	ARLUM2	Artemisia ludoviciana ssp. mexicana	1–10	_	
	Braun's rockcress	ARPE3	Arabis perstellata	0–5	_	
	tuber anemone	ANTU	Anemone tuberosa	0–5	_	
	Forb, perennial	2FP	Forb, perennial	0–5	_	
	dwarf Indian mallow	ABPA3	Abutilon parvulum	0–5	_	
	brownfoot	ACWR5	Acourtia wrightii	0–5	_	
	San Felipe dogweed	ADPO	Adenophyllum porophylloides	1–5	_	
	fleabane	ERIGE2	Erigeron	1–5	_	
	Cooley's bundleflower	DECO2	Desmanthus cooleyi	0–5	_	
	plains blackfoot	MELE2	Melampodium leucanthum	0–5	_	
	Parry's beardtongue	PEPA24	Penstemon parryi	0–5	_	
	canaigre dock	RUHY	Rumex hymenosepalus	0–5	_	
	twinleaf senna	SEBA3	Senna bauhinioides	0–5	_	
	Coues' cassia	SECO10	Senna covesii	0–5	_	
	Lemmon's ragwort	SELE8	Senecio lemmonii	0–5	_	
	branched noseburn	TRRA5	Tragia ramosa	0–5	_	
	vetch	VICIA	Vicia	0–5	_	
	orange fameflower	PHAU13	Phemeranthus aurantiacus	0–5	_	
	slender poreleaf	POGR5	Porophyllum gracile	0–5	_	
	southwestern mock vervain	GLGO	Glandularia gooddingii	0–5	_	
	ragged nettlespurge	JAMA	Jatropha macrorhiza	0–2	_	
	New Mexico groundsel	PANE7	Packera neomexicana	0–2	_	
	desert larkspur	DEPA	Delphinium parishii	0–2		
	tall mountain larkspur	DESC	Delphinium scaposum	0–2		
	NA-:		Final and a colinal abo	0.0		

	wojave spurge	EUSCO	Eupnorbia schizoloba	0-2	_
	sego lily	CANU3	Calochortus nuttallii	0–2	_
	wavyleaf Indian paintbrush	CAAPM	Castilleja applegatei ssp. martinii	0–2	_
	Oak Creek ragwort	PAQU8	Packera quercetorum	0–1	_
	toadflax penstemon	PELI2	Penstemon linarioides	0–1	_
	desert penstemon	PEPS	Penstemon pseudospectabilis	0–1	_
	scurfpea	PSORA2	Psoralidium	0–1	_
7	annual forbs			25–300	
	bristly fiddleneck	AMTE3	Amsinckia tessellata	0–75	_
	California poppy	ESCAM	Eschscholzia californica ssp. mexicana	0–75	_
	trefoil	LOTUS	Lotus	0–50	_
	Arizona lupine	LUAR4	Lupinus arizonicus	0–50	_
	longleaf false goldeneye	HELOA2	Heliomeris longifolia var. annua	0–50	_
	crestrib morning-glory	IPCO2	Ipomoea costellata	0–50	_
	milkvetch	ASTRA	Astragalus	0–50	_
	carelessweed	AMPA	Amaranthus palmeri	0–50	_
	Forb, annual	2FA	Forb, annual	0–50	_
	slender goldenweed	MAGR10	Machaeranthera gracilis	0–50	_
	tanseyleaf tansyaster	MATA2	Machaeranthera tanacetifolia	0–50	_
	Coulter's lupine	LUSP2	Lupinus sparsiflorus	0–50	_
	manybristle chinchweed	PEPA2	Pectis papposa	0–50	_
	Arizona popcornflower	PLAR	Plagiobothrys arizonicus	5–50	_
	creamcups	PLCA5	Platystemon californicus	0–50	_
	desert Indianwheat	PLOV	Plantago ovata	1–50	_
	woolly plantain	PLPA2	Plantago patagonica	1–50	_
	purslane	PORTU	Portulaca	0–25	_
	New Mexico plumeseed	RANE	Rafinesquia neomexicana	0–25	_
	phacelia	PHACE	Phacelia	0–25	_
	hollowleaf annual lupine	LUSU3	Lupinus succulentus	0–25	_
	Coulter's spiderling	BOCO2	Boerhavia coulteri	0–25	_
	fivewing spiderling	BOIN	Boerhavia intermedia	0–25	_
	hoary bowlesia	BOIN3	Bowlesia incana	0–25	_
	New Mexico thistle	CINE	Cirsium neomexicanum	0–25	_
	western tansymustard	DEPI	Descurainia pinnata	0–25	_
	miniature woollystar	ERDI2	Eriastrum diffusum	0–25	_
	spreading fleabane	ERDI4	Erigeron divergens	0–25	
	California goldfields	LACA7	Lasthenia californica	0–25	
	Goodding's bladderpod	LEGO2	Lesquerella gooddingii	0–25	_
	shaggyfruit pepperweed	LELA	Lepidium lasiocarpum	0–25	
	Thurber's pepperweed	LETH2	Lepidium thurberi	0–25	
	foothill deervetch	LOHU2	Lotus humistratus	0–25	
	miniature lupine	LUBI	Lupinus bicolor	0–25	
	coastal bird's-foot trefoil	LOSA	Lotus salsuginosus	0–25	
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	spurge	EUPHU	Еирпогріа	U−∠⊃	_
	cryptantha	CRYPT	Cryptantha	0–25	-
	American wild carrot	DAPU3	Daucus pusillus	0–15	_
	scrambled eggs	COAU2	Corydalis aurea	0–15	-
	sorrel buckwheat	ERPO4	Eriogonum polycladon	0–15	-
	green carpetweed	MOVE	Mollugo verticillata	0–15	-
	evening primrose	OENOT	Oenothera	0–15	-
	Florida pellitory	PAFL3	Parietaria floridana	0–15	_
	ragwort	SENEC	Senecio	0–15	-
	spreading fanpetals	SIAB	Sida abutifolia	0–15	-
	sleepy silene	SIAN2	Silene antirrhina	0–15	-
	New Mexico fanpetals	SINE	Sida neomexicana	0–15	-
	sand fringepod	THCU	Thysanocarpus curvipes	0–15	-
	desert unicorn-plant	PRAL4	Proboscidea althaeifolia	0–15	-
	doubleclaw	PRPA2	Proboscidea parviflora	0–15	-
	annual agoseris	AGHE2	Agoseris heterophylla	0–10	-
	miner's lettuce	CLPEP	Claytonia perfoliata ssp. perfoliata	0–5	-
	desertparsley	LOMAT	Lomatium	0–5	-
Shrub	shrub/Vine				
8	shrubs			100–200	
	jojoba	SICH	Simmondsia chinensis	5–150	_
	ocotillo	FOSP2	Fouquieria splendens	5–50	_
	whitethorn acacia	ACCO2	Acacia constricta	5–50	_
	catclaw acacia	ACGR	Acacia greggii	5–25	_
	Wright's beebrush	ALWR	Aloysia wrightii	1–25	_
	snapdragon penstemon	KEANM	Keckiella antirrhinoides ssp. microphylla	0–25	_
	Sonoran scrub oak	QUTU2	Quercus turbinella	0–15	_
	fourwing saltbush	ATCA2	Atriplex canescens	1–15	_
	desert sweet	CHMI2	Chamaebatiaria millefolium	0–15	_
	Warnock's snakewood	COWA	Condalia warnockii	0–15	_
	Florida hopbush	DOVI	Dodonaea viscosa	0–15	_
	Nevada jointfir	EPNE	Ephedra nevadensis	0–15	-
	desert ceanothus	CEGR	Ceanothus greggii	0–10	_
	Arizona necklacepod	SOAR3	Sophora arizonica	0–10	_
	Mexican bladdersage	SAME	Salazaria mexicana	0–10	_
	ambrosia leaf bur ragweed	AMAM2	Ambrosia ambrosioides	0–10	_
	Thurber's desert honeysuckle	ANTH2	Anisacanthus thurberi	0–10	_
	catclaw mimosa	MIACB	Mimosa aculeaticarpa var. biuncifera	0–5	_
	skunkbush sumac	RHTR	Rhus trilobata	0–5	_
	lotebush	ZIOBC	Ziziphus obtusifolia var. canescens	0–5	_
	winterfat	KRLA2	Krascheninnikovia lanata	0–5	_
	spiny hackberry	CEEH	Celtis ehrenbergiana	0–5	_
	pale desert-thorn	LYPA	Lycium pallidum	0–2	_

	algerita	MATR3	Mahonia trifoliolata	0–2	-
	redberry buckthorn	RHCR	Rhamnus crocea	0–1	-
	littleleaf sumac	RHMI3	Rhus microphylla	0–1	_
	red barberry	MAHA4	Mahonia haematocarpa	0–1	_
9	half shrubs		•	0–50	
	bastardsage	ERWR	Eriogonum wrightii	0–50	_
	rough menodora	MESC	Menodora scabra	2–50	_
	Eastern Mojave buckwheat	ERFA2	Eriogonum fasciculatum	0–25	_
	slender janusia	JAGR	Janusia gracilis	2–15	_
	littleleaf ratany	KRER	Krameria erecta	0–15	_
	sweetbush	BEJU	Bebbia juncea	0–15	_
	Coulter's brickellbush	BRCO	Brickellia coulteri	0–15	_
	Parish's goldeneye	VIPA14	Viguiera parishii	0–15	_
	longleaf phlox	PHLO2	Phlox longifolia	0–10	_
	fairyduster	CAER	Calliandra eriophylla	0–10	_
	ragged rockflower	CRBI2	Crossosoma bigelovii	0–10	_
	shortleaf baccharis	BABR	Baccharis brachyphylla	0–10	_
	Goodding's tansyaster	MAPIG2	Machaeranthera pinnatifida ssp. gooddingii var. gooddingii	0–10	_
	starry bedstraw	GAST	Galium stellatum	0–10	-
	yerba de pasmo	BAPT	Baccharis pteronioides	0–5	-
10	succulents			50–100	
	Schott's century plant	AGSC3	Agave schottii	0–50	-
	cactus apple	OPEN3	Opuntia engelmannii	5–50	-
	buck-horn cholla	CYAC8	Cylindropuntia acanthocarpa	0–25	-
	walkingstick cactus	CYSP8	Cylindropuntia spinosior	0–25	-
	sacahuista	NOMI	Nolina microcarpa	0–25	_
	tulip pricklypear	OPPH	Opuntia phaeacantha	0–20	_
	banana yucca	YUBA	Yucca baccata	1–20	_
	goldenflower century plant	AGCH2	Agave chrysantha	0–15	_
	Whipple cholla	CYWH	Cylindropuntia whipplei	0–10	
	candy barrelcactus	FEWI	Ferocactus wislizeni	1–10	_
	dollarjoint pricklypear	OPCH	Opuntia chlorotica	0–10	
	Graham's nipple cactus	MAGR9	Mammillaria grahamii	1–5	_
	Christmas cactus	CYLE8	Cylindropuntia leptocaulis	0–5	_
	common sotol	DAWH2	Dasylirion wheeleri	0–5	
	Arizona hedgehog cactus	ECCOA	Echinocereus coccineus var. arizonicus	0–5	_
	Engelmann's hedgehog cactus	ECEN	Echinocereus engelmannii	0–2	_
	pinkflower hedgehog cactus	ECFE	Echinocereus fendleri	0–2	-
	spinystar	ESVI2	Escobaria vivipara	0–1	—
11	increaser half-shrubs			10–100	

10–100

	broom snakeweed	GUSA2	Gutierrezia sarothrae	1–30	_
	brittlebush	ENFA	Encelia farinosa	0–25	_
	button brittlebush	ENFR	Encelia frutescens	0–15	-
	turpentine bush	ERLA12	Ericameria laricifolia	0–15	-
	burroweed	ISTE2	Isocoma tenuisecta	0–15	-
	rayless goldenhead	ACSP	Acamptopappus sphaerocephalus	0–15	-
	narrowleaf goldenbush	ERLI6	Ericameria linearifolia	0–10	-
	threadleaf snakeweed	GUMI	Gutierrezia microcephala	0–5	_
	whitestem paperflower	PSCO2	Psilostrophe cooperi	0–5	_
	turpentinebroom	тнмо	Thamnosma montana	0–5	_
Tree	-	-	-		
12	desert trees			20–100	
	crucifixion thorn	CAHO3	Canotia holacantha	0–50	-
	redberry juniper	JUCO11	Juniperus coahuilensis	0–50	_
	oneseed juniper	JUMO	Juniperus monosperma	0–50	-
	Utah juniper	JUOS	Juniperus osteosperma	0–25	-
	blue paloverde	PAFL6	Parkinsonia florida	0–25	_
	yellow paloverde	PAMI5	Parkinsonia microphylla	0–25	-
	saguaro	CAGI10	Carnegiea gigantea	0–25	_
	netleaf hackberry	CELAR	Celtis laevigata var. reticulata	0–15	_

## **Animal community**

This site is suitable for grazing year round, but is not easily traversed by livestock. Livestock grazing use is concentrated on south slopes, canyon bottoms and ridge-tops. North slopes are little used. Slopes greater than 50% and areas with very cobbly surfaces limit grazing use by cattle. Areas of rock outcrop and rock slides form barriers to livestock movement. The site is susceptible to erosion in overgrazed areas like bed-grounds, livestock trails and lower slopes adjacent to water.

The site has good habitat diversity for a great variety of desert and grassland wildlife species.

# Hydrological functions

This site has very rough surfaces, due to a high cover of gravels, cobbles and stones, which act to hold water on the site. When the soils are dry, it produces little runoff. It produces significant runoff only when heavy rain falls on snow or moist soils.

## **Recreational uses**

Hunting, camping, horseback riding, backpacking, rock hounding, photography.

# Wood products

Limited harvest of fuel-wood, fence posts and stays from mesquite, juniper and saguaro.

# **Other products**

There is some native harvest of food plants like; wild onions, grass nuts, thistle, prickly pear tunas and mescal.

# 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.

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Date	07/01/2014
Approved by	Byron Lambeth
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

- 1. **Number and extent of rills:** A few natural rills are present and seem to follow fault lines or bedding planes of the volcanic parent material.
- Presence of water flow patterns: Water flow patterns occupy about 10% of the area. They are very short (2-5 ft.) in length and discontinuous where gravel/rock cover is high (>35%). They are terminated by cobble cover and / or terracettes of perennial grasses, shrubs and cacti. They are longer (10-15 ft.) where gravel/rock covers are low (< 20%).</li>
- 3. Number and height of erosional pedestals or terracettes: Erosional pedestals are very uncommon. High cover values of gravel, cobble and stones result in surface stability. Terracettes are common, cover less than 10% of the area and usually are formed by a combination of cobbles, perennial grasses, cacti and shrubs. They are from 10 to 30 feet apart and have elevation differences of 2 to 4 inches.
- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): 1 to 15% (from cover estimates in 10, 9.6 sq.ft. frames). Bare, non-vegetated, areas are large, not connected.
- 5. Number of gullies and erosion associated with gullies: None
- 6. Extent of wind scoured, blowouts and/or depositional areas: None

water flow patterns where herbaceous litter moves a few feet.

- 8. Soil surface (top few mm) resistance to erosion (stability values are averages most sites will show a range of values): Soil surface has high organic content both under plant canopies and in pockets of bare soil surrounded by cobbles (slake values 4-6).
- 9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Surface structure is granular to sub-angular blocky. The A horizon is 1-3 inches thick and is very dark colored (10YR 3/2).
- Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Cover of perennial grasses range from 20-30%, cover of shrubs and cacti range from 10-25%. Basal cover of perennial plants ranges from 3-6%. Covers of gravels, cobbles and stones range from 40 to 85%. The cover of all plant species is well-distributed across the area.
- 11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): None.
- 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: Perennial grasses >= shrubs

Sub-dominant: annual forbs and grasses > succulents > perennial forbs

Other:

Additional: in "El Nino" years, annuals exceed all other groups

- 13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Less than 1% of shrubs and perennial mid-grasses show signs of mortality. Curly mesquite and slender grama on warm exposures can lose up to 75% of their basal cover during several years of drought.
- 14. Average percent litter cover (%) and depth ( in):
- 15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annualproduction): From ecological site description annual production is; 700 lbs/ac(drought), 1000 lbs/ac(average year), 2000 lbs/ac (wet year).
- 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: whitethorn acacia, mesquite, one-seed juniper, snakeweed, prickley pear, red brome, cheatgrass, wild oats, canotia

17. **Perennial plant reproductive capability:** Not impaired in any way for shrubs and mid-grasses. Short grasses growing on warm exposures will not produce seed during several years of severe drought.