

# Ecological site R041XC301AZ Basalt Hills 12-16" 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): 041X–Madrean Archipelago

# AZ 41.3 - Chihuahuan - Sonoran Semidesert Grasslands

Elevations range from 3200 to 5000 feet and precipitation ranges from 12 to 16 inches per year. Vegetation includes mesquite, catclaw acacia, netleaf hackberry, palo verde, false mesquite, range ratany, fourwing saltbush, tarbush, littleleaf sumac, sideoats grama, black grama, plains lovegrass, cane beardgrass, tobosa, vine mesquite, threeawns, Arizona cottontop and bush muhly. The soil temperature regime is thermic and the soil moisture regime is ustic 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	Not specified
Shrub	Not specified
Herbaceous	Not specified

# Physiographic features

This site occurs on hillslopes and ridgetops. Slope aspect is site differentiating at elevations near land resource area boundaries.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	1,158–1,676 m
Slope	15–70%

# **Climatic features**

Precipitation in this common resource area ranges from 12-16 inches yearly in the eastern part with elevations from 3600-5000 feet, and 13-17 inches in the western part where elevations are 3300-4500 feet. Winter-Summer rainfall ratios are 40-60% in the west and 30-70% in the east. Summer rains fall July-September, originate in the Gulf of Mexico and are convective, usually brief, intense thunderstorms. Cool season moisture tends to be frontal, originate in the Pacific and Gulf of California, and falls in widespread storms with long durarion and low density. Snow rarely lasts more than one day. May and June are the driest months of the year. Humidity is generally very low.

Temperatures are mild. Freezing temperatures are common at night from December-April; however temperatures during the day are frequently above 50 F. Occasionally in December-February, brief 0 F temperatures may be experienced some nights. During June, July and August, some days may exceed 100 F.

Cool season plants start growth in early spring and mature in early summer. Warm season plants take advantage of summer rains and are growing and nutritions July-September. Warm season grasses may remain green throughout the year.

#### Table 3. Representative climatic features

Frost-free period (average)	220 days
Freeze-free period (average)	0 days
Precipitation total (average)	406 mm

# Influencing water features

# Soil features

These are shallow soils formed in slope alluvium of mixed basic igneous and cargonatic minerology. Soils are calcareous loams and clay loams with a complete cover of basalt cobbles and stones. Large areas of talus or rock slides occur intermingled with soil areas. Plant-soil moisture relationships are fair.

Soils mapped on this site include: SSA-664 San Simon area MU's 5 & 25 Graham; SSA-669 Pima county Eastern part MU 32 Graham; SSA-671 Cochise county Douglas-Tombstone part MU's 16 Boss, Krentz & Paramore, 75 Graham & Lampshire.

#### Table 4. Representative soil features

Parent material	(1) Slope alluvium-basalt
Surface texture	(1) Loam (2) Clay loam

# **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 resulting total by the total normal year production shown in the plant community description. If the rainfall has ben 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 Historic Climax Plant Community

# Community 1.1 Historic Climax Plant Community

The potential plant community on this site is dominated by warm season perennial grasses. Shrubs are well represented on the site, as well as perennial and annual forbs. The major grass species tend to be well dispersed througout the plant community. Shrubs are concentrated at the edge of outcrops and along talus slides. The aspect is dotted grassland.

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

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	605	-	706
Shrub/Vine	202	-	303
Forb	101	-	151
Total	908	-	1160

Figure 5. Plant community growth curve (percent production by month). AZ4131, 41.3 12-16" p.z. hill sites. Growth begins in the spring, semidormancy occurs during the June drought, most growth occurs during the summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	10	0	30	30	10	5	0	0

#### Additional community tables

#### Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass	/Grasslike		•		
1				202–303	
	black grama	BOER4	Bouteloua eriopoda	202–303	_
2		•		151–252	
	sideoats grama	BOCU	Bouteloua curtipendula	151–252	_
3				303	
	cane bluestem	BOBA3	Bothriochloa barbinodis	303	_
	Arizona cottontop	DICA8	Digitaria californica	303	_
	bush muhly	MUPO2	Muhlenbergia porteri	303	_
4				50–101	
	Orcutt's threeawn	ARSCO	Aristida schiedeana var. orcuttiana	50–101	_
	spidergrass	ARTE3	Aristida ternipes	50–101	-
	spidergrass	ARTEG	Aristida ternipes var. gentilis	50–101	_
	plains lovegrass	ERIN	Eragrostis intermedia	50–101	-
	tanglehead	HECO10	Heteropogon contortus	50–101	-
	green sprangletop	LEDU	Leptochloa dubia	50–101	-
	tobosagrass	PLMU3	Pleuraphis mutica	50–101	_
	plains bristlegrass	SEVU2	Setaria vulpiseta	50–101	
	spike dropseed	SPCO4	Sporobolus contractus	50–101	_

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	sand dropseed	SPCR	Sporobolus cryptandrus	50–101	_
5				10–50	
	sixweeks threeawn	ARAD	Aristida adscensionis	10–50	-
	needle grama	BOAR	Bouteloua aristidoides	10–50	-
	sixweeks grama	BOBA2	Bouteloua barbata	10–50	-
	Arizona brome	BRAR4	Bromus arizonicus	10–50	-
	feather fingergrass	CHVI4	Chloris virgata	10–50	-
	desert lovegrass	ERPEM	Eragrostis pectinacea var. miserrima	10–50	-
	little barley	HOPU	Hordeum pusillum	10–50	-
	Mexican sprangletop	LEFUU	Leptochloa fusca ssp. uninervia	10–50	Ι
	mucronate sprangletop	LEPA6	Leptochloa panicea	10–50	-
	Arizona signalgrass	URAR	Urochloa arizonica	10–50	Ι
	sixweeks fescue	VUOC	Vulpia octoflora	10–50	_
6				10–50	
	low woollygrass	DAPU7	Dasyochloa pulchella	10–50	_
	nineawn pappusgrass	ENDE	Enneapogon desvauxii	10–50	_
	Palmer's crinklemat	TIPA	Tiquilia palmeri	10–50	Ι
	slim tridens	TRMU	Tridens muticus	10–50	-
7				10–50	
	sprucetop grama	BOCH	Bouteloua chondrosioides	10–50	Ι
	blue grama	BOGR2	Bouteloua gracilis	10–50	-
	hairy grama	BOHI2	Bouteloua hirsuta	10–50	Ι
	purple grama	BORA	Bouteloua radicosa	10–50	-
	slender grama	BORE2	Bouteloua repens	10–50	Ι
	curly-mesquite	HIBE	Hilaria belangeri	10–50	Ι
	common wolfstail	LYPH	Lycurus phleoides	10–50	_
	Hall's panicgrass	PAHA	Panicum hallii	10–50	Ι
	vine mesquite	PAOB	Panicum obtusum	10–50	_
8				10–50	
	poverty threeawn	ARDI5	Aristida divaricata	10–50	-
	Havard's threeawn	ARHA3	Aristida havardii	10–50	-
	Wooton's threeawn	ARPA9	Aristida pansa	10–50	Ι
	purple threeawn	ARPU9	Aristida purpurea	10–50	-
	blue threeawn	ARPUN	Aristida purpurea var. nealleyi	10–50	-
	sedge	CAREX	Carex	10–50	-
	squirreltail	ELELE	Elymus elymoides ssp. elymoides	10–50	-
	bullgrass	MUEM	Muhlenbergia emersleyi	10–50	-
	creeping muhly	MURE	Muhlenbergia repens	10–50	_
	slender muhly	MUTE4	Muhlenbergia tenuifolia	10–50	_
	Texas bluestem	SCCI2	Schizachyrium cirratum	10–50	_
	slim tridens	TRMUE	Tridens muticus var. elongatus	10–50	_
Forb					
9				50–101	

	dwart Indian mallow	АВРАЗ	Abutilon parvulum	50–101	_
	San Felipe dogweed	ADPO	Adenophyllum porophylloides	50–101	-
	trailing windmills	ALIN	Allionia incarnata	50–101	-
	weakleaf bur ragweed	AMCO3	Ambrosia confertiflora	50–101	-
	anoda	ANODA	Anoda	50–101	
	desert marigold	BAMU	Baileya multiradiata	50–101	-
	spreading fleabane	ERDI4	Erigeron divergens	50–101	
	Arizona snakecotton	FRAR2	Froelichia arizonica	50–101	-
	haplopappus	HAPLO11	Haplopappus	50–101	-
	slender janusia	JAGR	Janusia gracilis	50–101	
	tree tobacco	NIGL	Nicotiana glauca	50–101	-
	Wright's cudweed	PSCAC2	Pseudognaphalium canescens ssp. canescens	50–101	-
	twinleaf senna	SEBA3	Senna bauhinioides	50–101	
	spreading fanpetals	SIAB	Sida abutifolia	50–101	
	desert globemallow	SPAM2	Sphaeralcea ambigua	50–101	
	brownplume wirelettuce	STPA4	Stephanomeria pauciflora	50–101	
10		-	-	50	
	carelessweed	AMPA	Amaranthus palmeri	50	-
	pioneer rockcress	ARPL	Arabis platysperma	50	_
	clasping milkweed	ASAM	Asclepias amplexicaulis	50	_
	aster	ASTER	Aster	50	_
	milkvetch	ASTRA	Astragalus	50	_
	hairyseed bahia	BAAB	Bahia absinthifolia	50	_
	spiderling	BOERH2	Boerhavia	50	_
	hoary bowlesia	BOIN3	Bowlesia incana	50	_
	lipfern	CHEIL	Cheilanthes	50	_
	goosefoot	CHENO	Chenopodium	50	_
	fingerleaf gourd	CUDI	Cucurbita digitata	50	_
	American wild carrot	DAPU3	Daucus pusillus	50	_
	western tansymustard	DEPI	Descurainia pinnata	50	_
	fetid marigold	DYPA	Dyssodia papposa	50	_
	flatcrown buckwheat	ERDE6	Eriogonum deflexum	50	_
	spurge	EUPHO	Euphorbia	50	_
	Indian rushpea	HOGL2	Hoffmannseggia glauca	50	_
	redstar	IPCO3	Ipomoea coccinea	50	_
	ragged nettlespurge	JAMA	Jatropha macrorhiza	50	_
	prickly lettuce	LASE	Lactuca serriola	50	_
	shaggyfruit pepperweed	LELA	Lepidium lasiocarpum	50	_
	intermediate pepperweed	LEVIM	Lepidium virginicum var. medium	50	_
	common deerweed	LOSC2	Lotus scoparius	50	_
	blazingstar	MENTZ	Mentzelia	50	_
	minerslettuce	MONTI	Montia	50	_
	cloak fern	NOTHO	Notholaena	50	_
	i		<b>_</b> "		

	owl's-clover	ΟΚΙΗΟ	Orthocarpus	50	_
	Florida pellitory	PAFL3	Parietaria floridana	50	_
	chinchweed	PECTI	Pectis	50	_
	cliffbrake	PELLA	Pellaea	50	_
	Parry's beardtongue	PEPA24	Penstemon parryi	50	_
	Nine Mile Canyon phacelia	PHNO	Phacelia novenmillensis	50	_
	desert Indianwheat	PLOV	Plantago ovata	50	_
	silverleaf nightshade	SOEL	Solanum elaeagnifolium	50	_
	pricklyleaf dogweed	THAC	Thymophylla acerosa	50	_
	rue of the mountains	THTE2	Thamnosma texana	50	_
	woolly tidestromia	TILA2	Tidestromia lanuginosa	50	_
	catnip noseburn	TRNE	Tragia nepetifolia	50	_
	verbena	VEPO4	Verbena polystachya	50	-
	American vetch	VIAM	Vicia americana	50	-
	garden vetch	VISAN2	Vicia sativa ssp. nigra	50	_
Shrub	/Vine	-	-		
11				50–101	
	whitethorn acacia	ACCO2	Acacia constricta	50–101	-
	Wright's beebrush	ALWR	Aloysia wrightii	50–101	-
	Palmer's cock's comb	CEPA5	Celosia palmeri	50–101	-
	creosote bush	LATRT	Larrea tridentata var. tridentata	50–101	_
12				50–101	
	pelotazo	ABIN	Abutilon incanum	50–101	_
	fourwing saltbush	ATCA2	Atriplex canescens	50–101	_
	yerba de pasmo	BAPT	Baccharis pteronioides	50–101	_
	resinleaf brickellbush	BRBA2	Brickellia baccharidea	50–101	-
	fairyduster	CAER	Calliandra eriophylla	50–101	_
	Cooley's bundleflower	DECO2	Desmanthus cooleyi	50–101	-
	ookow	DICO19	Dichelostemma congestum	50–101	_
	longleaf jointfir	EPTR	Ephedra trifurca	50–101	_
	bastardsage	ERWR	Eriogonum wrightii	50–101	-
	rock sage	SAPI2	Salvia pinguifolia	50–101	_
	American threefold	TRCA8	Trixis californica	50–101	_
	desert zinnia	ZIAC	Zinnia acerosa	50–101	_
13			-	10–50	
	pelotazo	ABIN	Abutilon incanum	10–50	_
	prairie acacia	ACAN	Acacia angustissima	10–50	_
	catclaw acacia	ACGR	Acacia greggii	10–50	_
	milfoil wattle	ACMI	Acacia millefolia	10–50	_
	netleaf hackberry	CELAR	Celtis laevigata var. reticulata	10–50	_
	oneseed juniper	JUMO	Juniperus monosperma	10–50	_
	desert-thorn	LYCIU	Lycium	10–50	_
	mariola	PAIN2	Parthenium incanum	10–50	_
	honey mesquite	PRGLG	Prosopis glandulosa var. glandulosa	10–50	-

	littleleaf sumac	RHMI3	Rhus microphylla	10–50	_
	Wright's mock buckthorn	SAWR	Sageretia wrightii	10–50	_
	woody crinklemat	TICAC	Tiquilia canescens var. canescens	10–50	_
	lotebush	ZIOB	Ziziphus obtusifolia	10–50	_
14		•	•	10–20	
	desertbroom	BASA2	Baccharis sarothroides	10–20	_
	threadleaf snakeweed	GUMI	Gutierrezia microcephala	10–20	_
	broom snakeweed	GUSA2	Gutierrezia sarothrae	10–20	_
	burroweed	ISTE2	Isocoma tenuisecta	10–20	_
	alyssumleaf phlox	PHALA4	Phlox alyssifolia ssp. abdita	10–20	_
	Douglas' spikemoss	SEDO	Selaginella douglasii	10–20	_
15		•	•	10–50	
	desert agave	AGDE	Agave deserti	10–50	_
	Bill Williams Mountain giant hyssop	AGPA	Agastache pallidiflora	10–50	-
	common sotol	DAWH2	Dasylirion wheeleri	10–50	_
	candy barrelcactus	FEWI	Ferocactus wislizeni	10–50	_
	ocotillo	FOSP2	Fouquieria splendens	10–50	_
	globe cactus	MAMMI	Mammillaria	10–50	_
	sacahuista	NOMI	Nolina microcarpa	10–50	_
	beavertail pricklypear	OPBA2	Opuntia basilaris	10–50	-
	limestone adderstongue	OPEN	Ophioglossum engelmannii	10–50	
	banana yucca	YUBA	Yucca baccata	10–50	_
	Schott's yucca	YUSC	Yucca ×schottii	10–50	_

# **Animal community**

This site produces fair quality herbaceous forage. High soil pH is somewhat offset by inherent soil fertility. The site is not well suited to summertime grazing by cows with calves. Mother cow pairs will only use 300-400 feet, up or down in elevation, from water in the summer. Dry cows will use double that distance in the cool season. Yearling cattle make good use of the site in any season. Slope aspect affects both the intensity of use and seasonal use patterns. North-south trending slopes will be used fairly well even in summer, as the wets slope is shady in the morning and the east slope is shady in the afternoon. South facing slopes are used heavily in the winter-spring due to warmth from cold weather and early greenup of warm season grasses. North facing slopes, bieng shady and cooler, are used in the summer, and especially in the fall as the perennial grasses stay greener longer into the cool season. Very dar colored rock and soil surfaces cause early soil warming and, consequently, earlier greenup of warm season perennial grasses in the spring. Seep and canyon water is available in most winters from December-February.

Water developments are very important to wildlife on this site. The site is home to a wide variety of wildlife species due to the diversity of food, cover and edge.

Location 1: Cochise County, AZ				
Township/Range/Section T23S R29E S29				
General legal description Rocker M Ranch				
Location 2: Pima County, AZ				

# **Type locality**

Township/Range/Section	T18S R10E S28
General legal description	Batamote Ranch
Location 3: Cochise County, AZ	
Township/Range/Section	T20S R24E S7
General legal description	Cowan Ranch

#### 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	USDA-NRCS Tucson Area Office
Date	02/25/2005
Approved by	Byron Lambeth
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

#### Indicators

- 1. Number and extent of rills: None present on this site.
- 2. Presence of water flow patterns: Uncommon; probably cover no more than 10% of area; discontinuous; very short, usually

less than 1 foot in length; broken primarily by high rock and gravel cover.

 Number and height of erosional pedestals or terracettes: Pedestals are uncommon on perennial grass and shrubs; Limited

soil material not conducive to forming continuous stands of plants that promote terracettes; high rock cover forms limited natural terracettes.

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): Estimated at 0-5%.

- 5. Number of gullies and erosion associated with gullies: None present on this site.
- 6. Extent of wind scoured, blowouts and/or depositional areas: None present on this site.
- 7. Amount of litter movement (describe size and distance expected to travel): All litter size classes staying in place.
- Soil surface (top few mm) resistance to erosion (stability values are averages most sites will show a range of values): No slake test done. Expect values of 1-2 in canopy interspaces, and 4 6 under plant canopies.
- 9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Weak coarse granular; Color is 10YR5/4 Dry, 10YR3/2 Moist; thickness to 3 inches.
- Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Cover estimated as: Canopy 20-30%, Basal 5%, Litter 45-55%, and Gravel 30%; 10% of canopy cover is perennial mid grasses, 25% short grasses, 5% perennial forbs, 45% shrubs and 10% subshrubs. Cover is well dispersed throughout site.
- 11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): None present 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: Perennial grass = shrubs

Sub-dominant: annual grasses & forbs > subshrubs > succulents = perennial forbs

Other:

Additional:

- Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): 2-3% of perennial grass plants have died with skeletons still present; 50% of basal cover of perennial grasses has been lost in recent prolonged 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): 600 lbs/acre unfavorable precipitation, 900 lbs/acre normal precipitation, 1,300 lbs/acre 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: turpentine bush, jojoba, whitethorn, mesquite, prickly pear, cane cholla, ocotillo may increase to undesirable levels in the absence of natural fires; Red brome and wild oats.
- 17. **Perennial plant reproductive capability:** Not affected even following several years of prolonged drought period for region.