

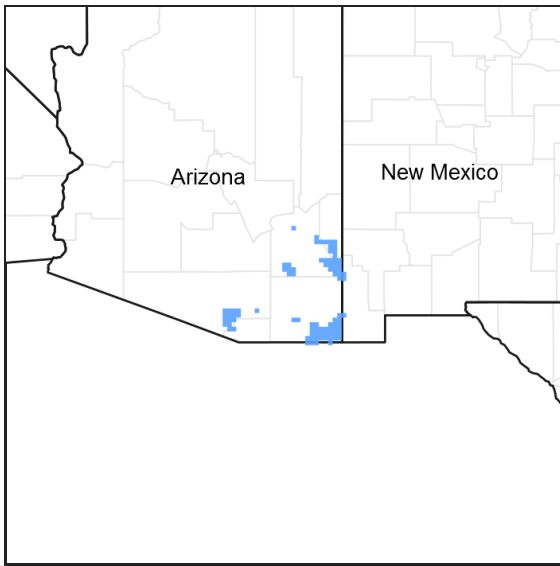
# Ecological site R041XC304AZ

## Clayey Upland 12-16" p.z.

Last updated: 7/21/2020  
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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.

### Associated sites

R041XC301AZ	<b>Basalt Hills 12-16" p.z.</b>
R041XC302AZ	<b>Clayey Swale 12-16" p.z.</b>
R041XC305AZ	<b>Clay Loam Upland 12-16" p.z.</b>

## Similar sites

R040XA104AZ	Clayey Upland 10"-13" p.z.
R038XA102AZ	Clayey Upland 12-16" p.z.
R041XB203AZ	Clayey Upland 8-12" p.z.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>pleuraphis mutica</i> (2) <i>panicum obtusum</i>

## Physiographic features

This site occurs in the middle elevations of the Madrean Basin and Range province in southeastern Arizona. It occurs on pediments, old fan terraces, basalt flows and mesa tops. It is always in an upland position.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Lava flow (3) Plain
Flooding frequency	None
Ponding frequency	None
Elevation	975–1,524 m
Slope	1–15%
Aspect	Aspect is not a significant factor

## 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 duration and low intensity. 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 nutritious 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)	
Precipitation total (average)	406 mm

## Influencing water features

There are no water features associated with this site.

## Soil features

These are moderately deep to deep soils that have formed in clayey alluvium of basic igneous origin or from shale parent materials. They are very dark colored and have high shrink-swell potentials. Churning and cracking cause very uneven surfaces and has resulted in most of the gravels and cobbles being pushed to the surface. Plant-soil moisture relationships are good.

Soils mapped on this site include: SSA-661 Eastern Pinal & Southern Gila counties MU 39 Sontag; SSA-663 Gila--Duncan area MU 5 Bonita; SSA-664 San Simon area MU 8 Bonita; SSA-669 Pima county Eastern part MU 31 Graham; SSA-671 Cochise county Douglas-Tombstone part MU's 13 Bonita, 57 & 114 Outlaw, 61 Epitaph CbVCL, 114 Epitaph and Paramore.

**Table 4. Representative soil features**

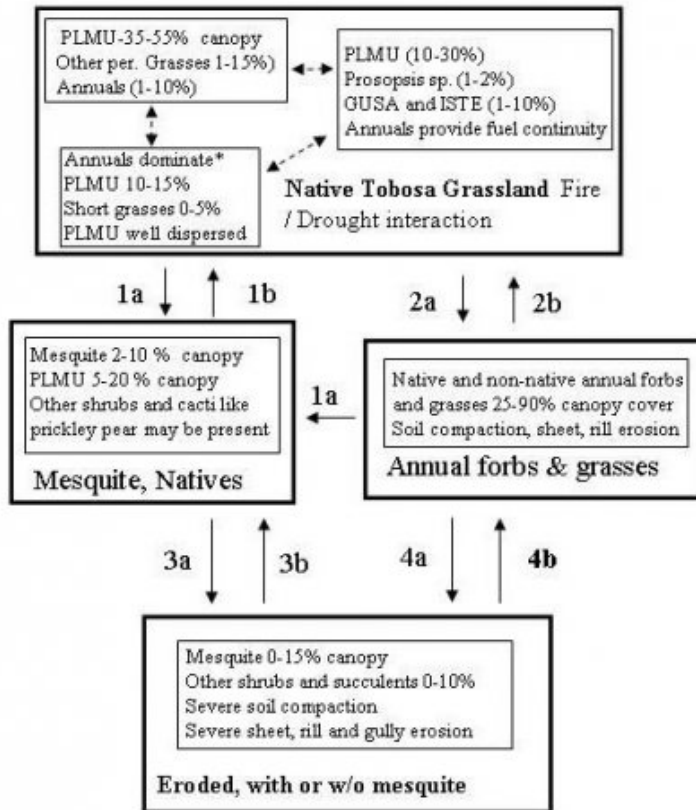
Parent material	(1) Alluvium-basalt
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderately slow to slow
Soil depth	76-152 cm
Surface fragment cover <=3"	5-20%
Surface fragment cover >3"	0-10%
Available water capacity (0-101.6cm)	9.14-18.29 cm
Calcium carbonate equivalent (0-101.6cm)	1-15%
Electrical conductivity (0-101.6cm)	0-2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0-2
Soil reaction (1:1 water) (0-101.6cm)	6.6-8.4
Subsurface fragment volume <=3" (Depth not specified)	0-10%
Subsurface fragment volume >3" (Depth not specified)	0-5%

## Ecological dynamics

This plant community is tobosa grassland with a canopy cover from 35 to 55%. It has a diverse flora of native annual forbs and grasses and minor amounts of shrubs. Periodic wildfires occurred, June thru August, and controlled shrubs encroaching from adjacent sites, and maintained tobosa in good vigor. When the tobosa canopy is reduced to less than 5% and its cover is patchy in distribution it will not be able to re-colonize large areas. Tobosa is a very poor seed producer, in the wild, and has almost no viable seed in the soil seed-bank. It is not known what influence the presence of non-native annuals has on the diversity of native species. Lehmann lovegrass is not adapted to this site and will not invade. Possible invasive and exotic weeds on this site include; yellow and malta starthistle, Russian and spotted knapweed; these may occur, especially where cultivated areas have been abandoned.

## State and transition model

## MLRA 41-3 (12-16"), Clayey Upland



- 1a. Proximity to seed source, introduction of seeds, lack of fire for long periods of time.
- 1b. Herbicide or mechanical means to remove mesquite. PG/NG
- 2a. CHG (managing for annuals), persistent low per. grass cover, 1. Reduction of A horizon OM and litter, compaction, persistent reduced infiltration or 2. Cultivation and abandonment
- 2b. PG/NG, seeding or planting of tobosa and vine mesquite. Soil ripping, contouring and / or mulching
- 3a. CHG coupled with drought (or fire), low grass cover. Reduction of A horizon OM and litter, compaction, sheet, rill and gully erosion. Persistent reduced infiltration and very limited recruitment of grass.
- 3b. Mechanical/herbicide treatment of shrubs, PG/NG, seeding planting of native grasses, maintenance treatments for shrubs, rill and gully erosion control
- 4a. CHG, interruption of overland flow, diversion of runoff, Severe soil compaction from traffic (livestock or equipment)
- 4b. Mechanical control of rills and gullies. PG/NG

CHG – continuous heavy grazing  
 PG/NG – proper grazing, no grazing  
 PRsp. – mesquite, ISTE – burroweed, GUSA – snakeweed,  
 HIBE – curly mesquite, PLMU - tobosa

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

### State 1 Native Tobosa Grassland

#### Community 1.1 Historic Climax Plant Community

The potential plant community on this site is dominated by warm season perennial grasses, primarily tobosa and vine mesquite. Vine mesquite occurs in patches which are not evenly dispersed across the site. With continuous grazing, patches develop which are dominated by annual forbs and grasses, with larger patches of almost pure tobosa. Palatable perennial grasses and forbs disappear. Mesquite does not appear to be able to dominate on this site, perhaps due to soil churning and cracking. Natural fire was important in the development of the potential plant community.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	538	981	1345
Forb	45	112	247
Shrub/Vine	–	28	112
<b>Total</b>	<b>583</b>	<b>1121</b>	<b>1704</b>

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	8-15%

Forb basal cover	0-1%
Non-vascular plants	0-1%
Biological crusts	1-5%
Litter	25-55%
Surface fragments >0.25" and <=3"	0-20%
Surface fragments >3"	0-5%
Bedrock	0%
Water	0%
Bare ground	15-25%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	0-5%	1-5%
>0.15 <= 0.3	–	0-1%	2-15%	1-10%
>0.3 <= 0.6	–	0-1%	35-55%	0-2%
>0.6 <= 1.4	–	0-1%	0-5%	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 5. Plant community growth curve (percent production by month). AZ4134, 41.3 12-16" p.z. other sites. Growth begins in the spring, semi-dormancy occurs during the May through June drought, most growth occurs during the summer rains..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	0	0	30	35	15	5	0	0

## State 2

### Annual forbs and grasses

#### Community 2.1

### Annual forbs and grasses



Figure 6. Clayey Upland 12-16" p.z., annuals and shrubs

Tobosa canopy is reduced (less than 5%) due the interactions of drought, heavy grazing and / or fire. Some areas of this state have been created by cultivation for irrigated farming; with subsequent abandonment. Native and non-native annual species dominate. Tobosa canopy is gone or very low and patchy in distribution. Tobosa will not be able to re-colonize this state due to a lack of seed production and viable seeds in the soil seed-bank. Vertic soil properties maintain good soil tilth and good infiltration rates, when soils are dry. Plant production remains high, even with the lack of perennial grass cover, due to soil churning and cracking and good hydrologic relationships. Some mesquite, prickly pear, and other shrubs or succulents may be present.

### **State 3**

#### **Mesquite, native grasses**

#### **Community 3.1**

##### **Mesquite, native grasses**

Mesquite has invaded and occurs at canopy levels from 2 to 10%. Other shrubs may also occur like whitethorn acacia and prickly pear. Fire has been excluded for long periods of time. Tobosa still dominates the under-story with annual grasses and forbs, both native and non-native. Fires can still burn through this community, but mesquite is well established and will sprout and quickly re-assume dominance.

### **State 4**

#### **Eroded state**

#### **Community 4.1**

##### **Eroded state**

Very heavy traffic by livestock and or machinery has caused persistent compaction. Diversion of overland flow and runoff water in farming areas may also have caused rilling and / or gullies to form. The soil profile no longer gets wet so the inherent, vertic, soil properties cannot act to maintain good soil tilth and good rainfall infiltration. This state usually occurs in cultivated regions where small areas of rangeland are used as feeding areas for livestock and roads and bar-ditches have interrupted normal hydrologic patterns.

#### **Transition T1A**

##### **State 1 to 2**

Continuous heavy grazing (managing for annuals) or cultivation and abandonment

#### **Transition T1B**

##### **State 1 to 3**

Proximity to seed source, introduction of seed, lack of fire for long periods of time

#### **Restoration pathway R1A**

##### **State 2 to 1**

Brush management, prescribed grazing

#### **Transition T2A**

##### **State 2 to 4**

Continuous heavy grazing, interruption of overland flow, diversion of run-off, mechanical soil compaction (livestock or equipment)

#### **Restoration pathway R3A**

##### **State 3 to 1**

Brush management, prescribed grazing

## Transition T3A

### State 3 to 4

Continuous heavy grazing coupled with drought or fire

## Restoration pathway R4A

### State 4 to 2

mechanical control of rills and gullies, prescribed grazing

## Restoration pathway R3B

### State 4 to 3

brush management, mechanical land treatment, mechanical gully control, range seeding, prescribed grazing

## Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Dominant mid grasses</b>			504–897	
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	504–729	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–90	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	22–84	–
2	<b>Miscellaneous perennial grasses</b>			22–78	
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	0–56	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–39	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	0–34	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–34	–
	green sprangletop	LEDU	<i>Leptochloa dubia</i>	0–22	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	0–11	–
	creeping muhly	MURE	<i>Muhlenbergia repens</i>	0–11	–
	Hall's panicgrass	PAHA	<i>Panicum hallii</i>	0–11	–
	burrograss	SCBR2	<i>Scleropogon brevifolius</i>	0–11	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	0–11	–
	Rothrock's grama	BORO2	<i>Bouteloua rothrockii</i>	0–11	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	0–11	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	0–11	–
	plains lovegrass	ERIN	<i>Eragrostis intermedia</i>	0–11	–
3	<b>Perennial threeawns</b>			0–56	
	Fendler threeawn	ARPUL	<i>Aristida purpurea var. longiseta</i>	0–22	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	0–22	–
	spidergrass	ARTEG	<i>Aristida ternipes var. gentilis</i>	0–22	–
	poverty threeawn	ARDI5	<i>Aristida divaricata</i>	0–11	–
	Havard's threeawn	ARHA3	<i>Aristida havardii</i>	0–11	–
	Wooton's threeawn	ARPA9	<i>Aristida pansa</i>	0–11	–
4	<b>Annual grasses</b>			11–168	

	little barley	HOPU	<i>Hordeum pusillum</i>	1-112	-
	Mexican sprangletop	LEFUU	<i>Leptochloa fusca ssp. uninervia</i>	1-56	-
	mucronate sprangletop	LEPAB	<i>Leptochloa panicea ssp. brachiata</i>	1-56	-
	Arizona signalgrass	URAR	<i>Urochloa arizonica</i>	1-56	-
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	1-56	-
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	0-56	-
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0-56	-
	needle grama	BOAR	<i>Bouteloua aristoides</i>	1-56	-
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	0-56	-
	Mexican panicgrass	PAHI5	<i>Panicum hirticaule</i>	1-28	-
	sticky sprangletop	LEVI5	<i>Leptochloa viscida</i>	0-28	-
	feather fingergrass	CHVI4	<i>Chloris virgata</i>	0-28	-
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	0-22	-
	tapertip cupgrass	ERACA	<i>Eriochloa acuminata var. acuminata</i>	0-17	-
	Mexican lovegrass	ERME	<i>Eragrostis mexicana</i>	0-17	-
	witchgrass	PACA6	<i>Panicum capillare</i>	0-17	-
	tufted lovegrass	ERPE	<i>Eragrostis pectinacea</i>	0-11	-
	desert lovegrass	ERPEM	<i>Eragrostis pectinacea var. miserrima</i>	0-11	-
	delicate muhly	MUFR	<i>Muhlenbergia fragilis</i>	0-6	-
	littleseed muhly	MUMI	<i>Muhlenbergia microsperma</i>	0-6	-
	Bigelow's bluegrass	POBI	<i>Poa bigelovii</i>	0-6	-

**Forb**

5	<b>Perennial forbs</b>			22-78	
	Lewis flax	LILE3	<i>Linum lewisii</i>	0-28	-
	Indian rushpea	HOGL2	<i>Hoffmannseggia glauca</i>	6-22	-
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	6-22	-
	bluedicks	DICA14	<i>Dichelostemma capitatum</i>	1-17	-
	spreading fleabane	ERDI4	<i>Erigeron divergens</i>	0-17	-
	Arizona snakecotton	FRAR2	<i>Froelichia arizonica</i>	0-11	-
	coyote gourd	CUPA	<i>Cucurbita palmata</i>	0-11	-
	pearly globe amaranth	GONI	<i>Gomphrena nitida</i>	0-11	-
	weakleaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	1-11	-
	milkvetch	ASTRA	<i>Astragalus</i>	0-11	-
	fingerleaf gourd	CUDI	<i>Cucurbita digitata</i>	0-11	-
	Louisiana vetch	VILUL2	<i>Vicia ludoviciana ssp. ludoviciana</i>	0-11	-
	evening primrose	OENOT	<i>Oenothera</i>	0-11	-
	Wright's cudweed	PSCAC2	<i>Pseudognaphalium canescens ssp. canescens</i>	0-6	-
	Wright's deervetch	LOWR	<i>Lotus wrightii</i>	0-6	-
	brownplume wirelettuce	STPA4	<i>Stephanomeria pauciflora</i>	0-6	-
	American vetch	VIAM	<i>Vicia americana</i>	0-6	-
	New Mexico fanpetals	SINE	<i>Sida neomexicana</i>	0-6	-
	Missouri gourd	CUFO	<i>Cucurbita foetidissima</i>	0-6	-



	dwarf desertpeony	ACNA2	<i>Acourtia nana</i>	0-6	-
	brownfoot	ACWR5	<i>Acourtia wrightii</i>	0-6	-
	largeflower onion	ALMA4	<i>Allium macropetalum</i>	0-6	-
	scarlet spiderling	BOCO	<i>Boerhavia coccinea</i>	0-6	-
	whitemouth dayflower	COER	<i>Commelina erecta</i>	0-6	-
	southwestern mock vervain	GLGO	<i>Glandularia gooddingii</i>	0-6	-
	small matweed	GUDE	<i>Guilleminea densa</i>	0-2	-
	desert mariposa lily	CAKE	<i>Calochortus kennedyi</i>	0-2	-
	sego lily	CANU3	<i>Calochortus nuttallii</i>	0-2	-
	silverleaf nightshade	SOEL	<i>Solanum elaeagnifolium</i>	0-2	-
	variableleaf bushbean	MAGI2	<i>Macroptilium gibbosifolium</i>	0-2	-
	twinleaf senna	SEBA3	<i>Senna bauhinioides</i>	0-2	-
	shrubby purslane	POSU3	<i>Portulaca suffrutescens</i>	0-2	-
	ragged nettlespurge	JAMA	<i>Jatropha macrorhiza</i>	0-1	-
6	<b>Annual Forbs</b>			22-168	
	longleaf false goldeneye	HELOA2	<i>Heliomeris longifolia</i> var. <i>annua</i>	0-56	-
	carelessweed	AMPA	<i>Amaranthus palmeri</i>	0-34	-
	camphorweed	HESU3	<i>Heterotheca subaxillaris</i>	0-28	-
	tanseyleaf tansyaster	MATA2	<i>Machaeranthera tanacetifolia</i>	0-28	-
	sensitive partridge pea	CHNI2	<i>Chamaecrista nictitans</i>	1-28	-
	Arizona popcornflower	PLAR	<i>Plagiobothrys arizonicus</i>	0-28	-
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	0-22	-
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0-22	-
	Arizona poppy	KAGR	<i>Kallstroemia grandiflora</i>	0-22	-
	intermediate pepperweed	LEVIM	<i>Lepidium virginicum</i> var. <i>medium</i>	0-22	-
	crestrub morning-glory	IPCO2	<i>Ipomoea costellata</i>	0-17	-
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0-17	-
	spreading fanpetals	SIAB	<i>Sida abutifolia</i>	0-17	-
	slender goldenweed	MAGR10	<i>Machaeranthera gracilis</i>	0-11	-
	shaggyfruit pepperweed	LELA	<i>Lepidium lasiocarpum</i>	0-11	-
	coastal bird's-foot trefoil	LOSAB	<i>Lotus salsuginosus</i> var. <i>brevivexillus</i>	0-11	-
	goosefoot	CHENO	<i>Chenopodium</i>	0-11	-
	miniature woollystar	ERDI2	<i>Eriastrum diffusum</i>	0-11	-
	Coulter's spiderling	BOCO2	<i>Boerhavia coulteri</i>	0-11	-
	New Mexico thistle	CINE	<i>Cirsium neomexicanum</i>	0-11	-
	scrambled eggs	COAU2	<i>Corydalis aurea</i>	0-11	-
	cryptantha	CRYPT	<i>Cryptantha</i>	0-6	-
	fringed redmaids	CACI2	<i>Calandrinia ciliata</i>	0-6	-
	sorrel buckwheat	ERPO4	<i>Eriogonum polycladon</i>	0-6	-
	California poppy	ESCAM	<i>Eschscholzia californica</i> ssp. <i>mexicana</i>	0-6	-
	spurge	EUPHO	<i>Euphorbia</i>	0-6	-

	blanketflower	GAILL	<i>Gaillardia</i>	0-6	-
	star gilia	GIST	<i>Gilia stellata</i>	0-6	-
	Coulter's lupine	LUSP2	<i>Lupinus sparsiflorus</i>	0-6	-
	hollowleaf annual lupine	LUSU3	<i>Lupinus succulentus</i>	0-6	-
	Nuttall's povertyweed	MONU	<i>Monolepis nuttalliana</i>	0-6	-
	green carpetweed	MOVE	<i>Mollugo verticillata</i>	0-6	-
	foothill deervetch	LOHU2	<i>Lotus humistratus</i>	0-6	-
	Goodding's bladderpod	LEGO2	<i>Lesquerella gooddingii</i>	0-6	-
	wheelscale saltbush	ATEL	<i>Atriplex elegans</i>	0-6	-
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	0-6	-
	woolly tidentromia	TILA2	<i>Tidentromia lanuginosa</i>	0-6	-
	purslane	PORTU	<i>Portulaca</i>	0-6	-
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	0-6	-
	sawtooth sage	SASU7	<i>Salvia subincisa</i>	0-6	-
	Texas stork's bill	ERTE13	<i>Erodium texanum</i>	0-3	-
	wedgeleaf draba	DRCU	<i>Draba cuneifolia</i>	0-2	-
	American wild carrot	DAPU3	<i>Daucus pusillus</i>	0-2	-
	sacred thorn-apple	DAWR2	<i>Datura wrightii</i>	0-2	-
	Lemmon's linanthus	LELE29	<i>Leptosiphon lemmonii</i>	0-2	-
	manybristle chinchweed	PEPA2	<i>Pectis papposa</i>	0-2	-
	phlox	PHLOX	<i>Phlox</i>	0-2	-
	Arizona lupine	LUAR4	<i>Lupinus arizonicus</i>	0-2	-
	New Mexico copperleaf	ACNE	<i>Acalypha neomexicana</i>	0-2	-
	ragwort	SENEC	<i>Senecio</i>	0-2	-
	desert unicorn-plant	PRAL4	<i>Proboscidea althaeifolia</i>	0-2	-
	doubleclaw	PRPA2	<i>Proboscidea parviflora</i>	0-2	-
<b>Shrub/Vine</b>					
7	<b>Half shrubs</b>			0-56	
	bastardsage	ERWR	<i>Eriogonum wrightii</i>	1-28	-
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0-11	-
	burroweed	ISTE2	<i>Isocoma tenuisecta</i>	0-6	-
	yerba de pasmo	BAPT	<i>Baccharis pteronioides</i>	0-6	-
	threadleaf snakeweed	GUMI	<i>Gutierrezia microcephala</i>	0-2	-
8	<b>Miscellaneous shrubs</b>			0-28	
	catclaw acacia	ACGR	<i>Acacia greggii</i>	0-6	-
	pale desert-thorn	LYPA	<i>Lycium pallidum</i>	0-6	-
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa var. biuncifera</i>	0-6	-
	western honey mesquite	PRGLT	<i>Prosopis glandulosa var. torreyana</i>	0-2	-
	velvet mesquite	PRVE	<i>Prosopis velutina</i>	0-2	-
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	0-2	-
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0-2	-
	fourwing saltbush	CAEB	<i>Calliandra eriophylla</i>	0-2	-

	Common Name	Code	Scientific Name	Abundance	Notes
	knifeleaf condalia	COSP3	<i>Condalia spathulata</i>	0-2	-
	Warnock's snakewood	COWA	<i>Condalia warnockii</i>	0-2	-
	trailing krameria	KRLA	<i>Krameria lanceolata</i>	0-2	-
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0-2	-
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	0-2	-
9	<b>Succulents</b>			0-28	
	walkingstick cactus	CYSP8	<i>Cylindropuntia spinosior</i>	0-11	-
	cactus apple	OPEN3	<i>Opuntia engelmannii</i>	0-11	-
	tulip pricklypear	OPPH	<i>Opuntia phaeacantha</i>	0-6	-
	banana yucca	YUBA	<i>Yucca baccata</i>	0-6	-
	Christmas cactus	CYLE8	<i>Cylindropuntia leptocaulis</i>	0-6	-
	dollarjoint pricklypear	OPCH	<i>Opuntia chlorotica</i>	0-6	-
	sacahuista	NOMI	<i>Nolina microcarpa</i>	0-2	-
	soaptree yucca	YUEL	<i>Yucca elata</i>	0-2	-
	Palmer's century plant	AGPA3	<i>Agave palmeri</i>	0-2	-
	rainbow cactus	ECPEP	<i>Echinocereus pectinatus var. pectinatus</i>	0-1	-
	spiny star	ESVI2	<i>Escobaria vivipara</i>	0-1	-
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	0-1	-

## Animal community

The plant community on this site is suitable for grazing at any season by all classes of cattle. Clay soils make for a long summer green season. Dark colored soils, high in organic matter and exchangeable bases make for fairly good quality, green tobosa herbage. Fencing and grazing systems will be needed to effectively utilize this site and take adequate care of adjacent and/or included sites that produce more palatable forage. Herbaceous forage will be deficient in protein in the winter. Dormant tobosa is very unpalatable.

Water developments are very important to wildlife species on this site. Being open grassland, this site is home to a variety of small herbivores, birds, and their associated predators. With the exception of antelope, larger wildlife species use this site mainly as a foraging area.

## Hydrological functions

Due to severe soil cracking and churning (producing rough and porous surfaces), this site has very high infiltration rates when soils are dry. It produces runoff only when soils are moist. Vertic soil properties eliminate soil compaction by livestock traffic each year, as long as stocking rates are moderate and heavy stocking is not persistent during times of the year when soils are moist.

## Recreational uses

Hunting, hiking, horseback riding, photography and bird-watching.

## Wood products

Mesquite is shrubby if on this site due to clayey soils. Mesquite fuelwood, if present, is barely sufficient for campfires and branding fires.

## Other products

Clay

## Inventory data references

Range 417s include 4 in good condition and 1 in fair condition.

## Type locality

Location 1: Cochise County, AZ	
Township/Range/Section	T23S R30E S1
General legal description	Peterson Ranch
Location 2: Graham County, AZ	
Township/Range/Section	T11S R22E S9
General legal description	Sierra Bonita Ranch
Location 3: Greenlee County, AZ	
Township/Range/Section	T10S R31E S14
General legal description	Lazy B Ranch

## Contributors

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## Approval

Scott Woodall, 7/21/2020

## 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
Contact for lead author	NRCS Tucson Area Office
Date	02/24/2005
Approved by	Scott Woodall
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** None present on this site.

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2. **Presence of water flow patterns:** Uncommon; probably cover no more than 2-5% of area; discontinuous, 2-20 feet in length in low gravel cover areas, broken by plants and micro topography from cracking and swelling; High gravel cover areas (50% cover) at this site results in sheet flow of these areas; Gravel cover averaged 9% across site.

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3. **Number and height of erosional pedestals or terracettes:** Accumulated pedestals are 1 inch tall and are common on perennial grass plants; terracettes are very uncommon due to low slope.
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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Estimated from 200 points at 60%.
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5. **Number of gullies and erosion associated with gullies:** None present on this site.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** None present on this site.
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7. **Amount of litter movement (describe size and distance expected to travel):** All litter size classes staying in place.
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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** No slake test done; expect values of 1-2 in bare ground areas and 4-6 in canopy areas.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Thin (1/8 inch) rain drop compacted laminar layer, weak granular; Color is 10YR5/4 Dry, 10YR3/3 Moist; No A horizon, Clayloam texture to 6 inches.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Cover estimated from 200 points was: Canopy 14%, Basal 7% Litter 7% and Gravel 9%; 85% of canopy cover is perennial grasses and 14% is subshrubs and 1% shrubs & succulents. Cover is relatively well dispersed throughout site, with bare patches 10-20 feet wide 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. Penetrometer tests with weight dropped 5 times at a distance from top of weight to top of impact ring = 2.24 feet were: average = 3.26 inches, s.d = 0.46 inches.
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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: Perennial grass
- Sub-dominant: subshrubs
- Other: annual forbs
- Additional: Perennial grass >> subshrubs > annual forbs > shrubs > perennial forbs > succulents

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** 20% basal mortality (prior years mortality not well evidenced).

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14. **Average percent litter cover (%) and depth ( in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 600 lbs/acre unfavorable precipitation, 1,000 lbs/acre normal precipitation, 1,500 lbs/acre 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:** None present on this site. Shrubs not likely to tolerate shrink/swell soil properties.

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17. **Perennial plant reproductive capability:** Not affected even following several years of prolonged drought period for region.

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