USDA Natural Resources Conservation Service

Ecological site R041XB204AZ
Clay Loam Upland 8-12" 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 41.2 – Chihuahuan – Sonoran Desert Shrubs

Elevations range from 2600 to 4000 feet and precipitation ranges from 8 to 12 inches per year. Vegetation includes mesquite, palo verde, catclaw acacia, soaptree yucca, creosotebush, whitethorn, staghorn cholla, desert saltbush, Mormon tea, burroweed, snakeweed, tobosa, black grama, threeawns, bush muhly, dropseed, and burrograss. The soil temperature regime is thermic and the soil moisture regime is typic aridic. This unit occurs within the Basin and Range Physiographic Province and is characterized by numerous mountain ranges that rise abruptly from broad, plain-like valleys and basins. Igneous and metamorphic rock classes dominate the mountain ranges and sediments filling the basins represent combinations of fluvial, lacustrine, colluvial and alluvial deposits.

Associated sites

R041XB203AZ	**Clayey Upland 8-12" p.z.**
R041XB210AZ	**Loamy Upland 8-12" p.z.**

Similar sites

R041XC305AZ	**Clay Loam Upland 12-16" p.z.**
R040XA120AZ	**Clay Loam Upland 10"-13" p.z.**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Opuntia phaeacantha* (2) *Opuntia kunzei*
Herbaceous	(1) *Pleuraphis mutica* (2) *aristida*

Physiographic features

This site occurs in the lowest elevations of the Madrean Basin and Range province in southeastern Arizona. It occurs on rolling low ridges, fan terraces, mesas and gently sloping uplands; generally below the hills and above the plains. The site is usually dissected by numerous water courses.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Fan piedmont (3) Mesa
Flooding frequency	None
Ponding frequency	None
Elevation	792–1,219 m
Slope	1–15%
Aspect	Aspect is not a significant factor

Climatic features

Precipitation ranges from 8-12 inches annually. More than half falls during Jul-Sep in brief, but often heavy, thunderstorms. The rest of the moisture comes as light rain or snow that falls slowly for a day or more, but rarely lasts more than a day. May and June are normally the driest months. Humidity is generally very low.

Temperatures are mild throughout most of the year. Freezing temperatures are common at night Dec-Feb; brief 0 F may be observed some nights. During June, July & August, some days may exceed 100 F.

In years of average or greater winter precipitation, annual grasses and forbs occur abundantly in the interspaces.

Table 3. Representative climatic features

Frost-free period (average)	240 days
Freeze-free period (average)	
Precipitation total (average)	

Influencing water features

There are no water features associated with this site.

Soil features

These soils are moderately deep to deep and clayey textured. They have thin (1-2 inch) surface horizons that range from sandyloam to loam in texture. They lack vertic soil properties. They usually have well developed covers of

surface gravels and cobbles. Surface soils (10 inches) are non-calcareous, but some soils have calcic horizons below the argillic horizon.

Soil series mapped on areas of this site include: SSA-663 Gila-Duncan area MU's 4 Artesia, 8 & 9 Continental, 16 Glendale, 40 Stellar, 41 Tapco and 43 Continental; SSA-664 San Simon area MU's 3 Artesia, 16 & 17 Eba, 22 & 23 Glendale, 41 Tubac and 45 Forrest; SSA-675 San Carlos IR area MU 93 Topawa.

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam (2) Gravelly loam (3) Gravelly clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderately slow to slow
Soil depth	76–152 cm
Surface fragment cover <=3"	5–60%
Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	10.16–22.86 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
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)	7–8
Subsurface fragment volume <=3" (Depth not specified)	5–55%
Subsurface fragment volume >3" (Depth not specified)	0–15%

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 grazing, fire, 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 shown for the group. Divide the resulting total by the total normal year production shown in the plant community description. If 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

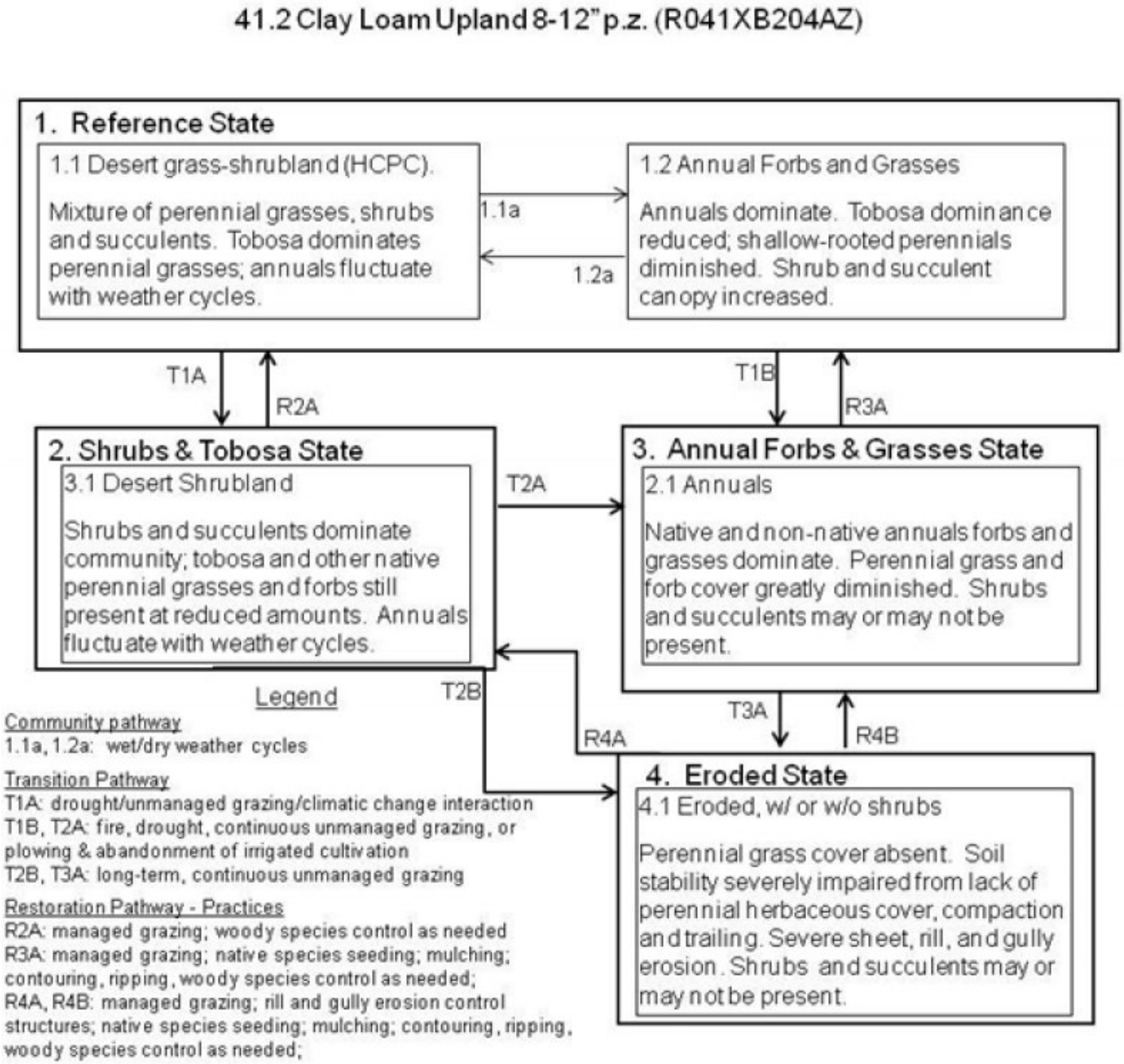

Figure 4. 41-2 Clay Loam Upland STM Diagram

State 1
Reference

Community 1.1
Desert grass-shrubland (HCPC)

Figure 5. Clayloam Upland 8-12" pz.

The native potential plant community on this site is a mixture of perennial grasses and desert shrubs and cacti. Annual forbs and grasses, of both the winter and summer seasons, are very important in the plant community in their respective (wet) seasons. Tobosa is the dominant perennial grass, with lesser amounts of gramas and threeawns. The cover of some shallow rooted grass species, like curley mesquite, fluctuate widely from wet to dry years.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	140	224	560
Forb	6	56	196
Shrub/Vine	19	56	123
Total	**165**	**336**	**879**

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0-1%
Grass/grasslike basal cover	1-3%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0-10%
Litter	10-75%
Surface fragments >0.25" and <=3"	15-50%
Surface fragments >3"	0-10%
Bedrock	0%
Water	0%
Bare ground	5-75%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	1-5%	1-10%	1-10%
>0.15 <= 0.3	–	1-5%	1-10%	1-20%
>0.3 <= 0.6	–	1-5%	5-10%	0-10%
>0.6 <= 1.4	–	1-5%	0-2%	0-2%
>1.4 <= 4	–	0-5%	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Community 1.2
Annual Forbs and Grasses

This community phase follows a drought period during which the shallow-rooted perennial grasses such as curly mesquite are negatively impacted. Annuals dominate the subsequent bare areas, shrubs and succulents may or may not increase, tobosa is slightly reduced.

Pathway 1.1a
Community 1.1 to 1.2

Dry weather cycles such as La Nina accompanied by below average monsoons.

Conservation practices

Upland Wildlife Habitat Management
Prescribed Grazing

Pathway 1.2a
Community 1.2 to 1.1

Wet weather cycles such as El Nino and higher than average monsoons.

Conservation practices

Upland Wildlife Habitat Management
Prescribed Grazing

State 2
Shrubs, tobosa

Community 2.1
Desert Shrubland

This state occurs where shrub and cacti species including mesquite and prickly pear have increased to dominate the plant community but there is still a remnant cover of tobosa and other native grasses and forbs. Shrub increases are due to the interaction of drought and continuous grazing and perhaps to climatic warming (prickly pear).

State 3
Annual Forbs & Grasses

Community 3.1
Annuals

This state occurs where the native grass cover has been depleted due too the interactions of fire, drought and continuous grazing. Annual grasses and forbs (native and non-native) dominate the plant community. Some situations may be due to the cultivation for irrigation and subsequent abandonment.

State 4
Eroded

Community 4.1
Eroded, with or without Shrubs

This State is characterized by loss of soil site stability due to exposed, compacted soil,and accelerated erosion (sheet, rill, and gully erosion); hydrologic functioning is impaired due to lack of infiltration; the biotic community is no longer intact. Native and non-native annuals fluctuate with weather patterns. Perennial grasses and forbs are largely absent. Shrubs and succulents may or may not be present.

Transition T1A
State 1 to 2

Continous unmanaged grazing and/or a long-term dry weather cycle will negatively impact the perennial herbaceous component of the plant community. Shrubs will largely be unaffected and continue to expand in canopy cover. Climatic shift toward higher amounts of winter rainfall and lesser amounts summer rainfall favors shrub and, in particular, succulent growth.

Transition T1B
State 1 to 3

Continous unmanaged grazing and repeated burning to remove undesirable old growth from tobosa. Some situations may have arisen from cultivation and abandonment of irrigated farming.

Restoration pathway R2A
State 2 to 1

Managed grazing and, as needed, woody species control and/or native species seeding.

Conservation practices

Brush Management
Range Planting
Upland Wildlife Habitat Management
Prescribed Grazing

Transition T2A
State 2 to 4

Long-term unmanaged grazing negatively impacts above-ground herbaceous growth and causes soil compaction limiting root development. Animal trailing and soil surface compaction compound the affect of plant community changes (increased shrub/decreased perennial grass community) to increase surface water run-off.

Transition T3A
State 3 to 4

Restoration pathway R4A

State 4 to 2

Restoration of this state involves a mechanical woody species control and native herbaceous species planting plus control structures to inhibit gully and rill erosion.

Conservation practices

Brush Management
Critical Area Planting
Grade Stabilization Structure
Access Control
Grazing Land Mechanical Treatment
Range Planting
Heavy Use Area Protection
Upland Wildlife Habitat Management
Grade Stabilization Structure-Tire Bales
Prescribed Grazing

Restoration pathway R4B
State 4 to 3

Restoration of this state involves a broad spectrum approach to slow erosion and provide short-term infiltration during native seed (in situ or planted) establishment. Projects involve treating the compacted areas with contour ripping, mulching, and native seed planting; rills and gullies should be treated with mechanical control structures.

Conservation practices

Brush Management
Critical Area Planting
Grade Stabilization Structure
Access Control
Mulching
Grazing Land Mechanical Treatment
Range Planting
Rock Barrier
Heavy Use Area Protection
Upland Wildlife Habitat Management
Livestock Use Area Protection
Grade Stabilization Structure-Tire Bales
Prescribed Grazing
Road/Trail/Landing Closure and Treatment
Grazing Management Plan - Written
Grazing Management Plan - Applied

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)

Grass/Grasslike					
1	**Dominant Perennial Grass**			112–224	
	tobosagrass	PLMU3	*Pleuraphis mutica*	112–224	–
2	**Miscellaneous Perennial Grasses**			15–112	
	black grama	BOER4	*Bouteloua eriopoda*	11–56	–
	curly-mesquite	HIBE	*Hilaria belangeri*	1–56	–
	Arizona cottontop	DICA8	*Digitaria californica*	0–22	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	1–22	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	1–22	–
	Hall's panicgrass	PAHA	*Panicum hallii*	0–11	–
	vine mesquite	PAOB	*Panicum obtusum*	0–11	–
	burrograss	SCBR2	*Scleropogon brevifolius*	0–11	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	0–11	–
	green sprangletop	LEDU	*Leptochloa dubia*	0–11	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–11	–
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	0–6	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–6	–
	squirreltail	ELEL5	*Elymus elymoides*	0–2	–
	tanglehead	HECO10	*Heteropogon contortus*	0–2	–
3	**Perennial threeawns**			11–112	
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	0–28	–
	spidergrass	ARTE3	*Aristida ternipes*	6–28	–
	purple threeawn	ARPU9	*Aristida purpurea*	6–28	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–17	–
	spidergrass	ARTEG	*Aristida ternipes var. gentilis*	0–17	–
	poverty threeawn	ARDI5	*Aristida divaricata*	0–6	–
	blue threeawn	ARPUN	*Aristida purpurea var. nealleyi*	0–6	–
4	**Annual grasses**			1–112	
	mucronate sprangeltop	LEPAB	*Leptochloa panicea ssp. brachiata*	0–28	–
	sixweeks threeawn	ARAD	*Aristida adscensionis*	1–28	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	1–28	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–22	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–22	–
	Arizona signalgrass	URAR	*Urochloa arizonica*	0–22	–
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	0–17	–
	prairie threeawn	AROL	*Aristida oligantha*	1–11	–
	witchgrass	PACA6	*Panicum capillare*	0–11	–
	Mexican panicgrass	PAHI5	*Panicum hirticaule*	0–11	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	0–6	–
	Arizona brome	BRAR4	*Bromus arizonicus*	0–6	–
	feather fingergrass	CHVI4	*Chloris virgata*	0–6	–
	tapertip cupgrass	ERACA	*Eriochloa acuminata var. acuminata*	0–6	–
	desert lovegrass	ERPEM	*Eragrostis pectinacea var. miserrima*	0–6	–
	tufted lovegrass	ERPEP2	*Eragrostis pectinacea var. pectinacea*	0–6	–

	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	0–6	–
	delicate muhly	MUFR	*Muhlenbergia fragilis*	0–2	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	0–2	–
Forb					
5	**Perennial Forbs**			6–28	
	dwarf desertpeony	ACNA2	*Acourtia nana*	1–11	–
	bluedicks	DICA14	*Dichelostemma capitatum*	0–6	–
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	1–6	–
	Indian rushpea	HOGL2	*Hoffmannseggia glauca*	1–6	–
	slender janusia	JAGR	*Janusia gracilis*	1–6	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1–6	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	0–6	–
	slender poreleaf	POGR5	*Porophyllum gracile*	1–6	–
	Coues' cassia	SECO10	*Senna covesii*	0–1	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	0–1	–
	pricklyleaf dogweed	THAC	*Thymophylla acerosa*	0–1	–
	Rocky Mountain zinnia	ZIGR	*Zinnia grandiflora*	0–1	–
	ragged nettlespurge	JAMA	*Jatropha macrorhiza*	0–1	–
	San Pedro daisy	LAPO4	*Lasianthaea podocephala*	0–1	–
	Parry's false prairie-clover	MAPA7	*Marina parryi*	0–1	–
	lacy tansyaster	MAPIP4	*Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida*	0–1	–
	plains blackfoot	MELE2	*Melampodium leucanthum*	0–1	–
	wishbone-bush	MILAV	*Mirabilis laevis var. villosa*	0–1	–
	desert tobacco	NIOB	*Nicotiana obtusifolia*	0–1	–
	tuber anemone	ANTU	*Anemone tuberosa*	0–1	–
	narrowleaf silverbush	ARLA12	*Argythamnia lanceolata*	0–1	–
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	0–1	–
	perennial rockcress	ARPE2	*Arabis perennans*	0–1	–
	dense ayenia	AYMI	*Ayenia microphylla*	0–1	–
	hairyseed bahia	BAAB	*Bahia absinthifolia*	0–1	–
	desert marigold	BAMU	*Baileya multiradiata*	0–1	–
	scarlet spiderling	BOCO	*Boerhavia coccinea*	0–1	–
	desert mariposa lily	CAKE	*Calochortus kennedyi*	0–1	–
	sego lily	CANU3	*Calochortus nuttallii*	0–1	–
	whitemargin sandmat	CHAL11	*Chamaesyce albomarginata*	0–1	–
	leatherweed	CRPO5	*Croton pottsii*	0–1	–
	fingerleaf gourd	CUDI	*Cucurbita digitata*	0–1	–
	coyote gourd	CUPA	*Cucurbita palmata*	0–1	–
	spreading fleabane	ERDI4	*Erigeron divergens*	0–1	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	0–1	–
	southwestern mock vervain	GLGO	*Glandularia gooddingii*	0–1	–
	brownfoot	ACWR5	*Acourtia wrightii*	0–1	

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	poreleaf dogweed	ADPO2	*Adenophyllum porophyllum*	0–1	–
	trailing windmills	ALIN	*Allionia incarnata*	0–1	–
	largeflower onion	ALMA4	*Allium macropetalum*	0–1	–
6	**Annual forbs**			0–168	
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–28	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–22	–
	Arizona popcornflower	PLAR	*Plagiobothrys arizonicus*	0–22	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–22	–
	combseed	PECTO	*Pectocarya*	0–22	–
	tanseyleaf tansyaster	MATA2	*Machaeranthera tanacetifolia*	0–17	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–17	–
	intermediate pepperweed	LEVIM	*Lepidium virginicum var. medium*	0–17	–
	coastal bird's-foot trefoil	LOSAB	*Lotus salsuginosus var. brevivexillus*	0–17	–
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–17	–
	Arizona poppy	KAGR	*Kallstroemia grandiflora*	0–11	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–11	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–11	–
	manybristle chinchweed	PEPA2	*Pectis papposa*	0–11	–
	New Mexico plumeseed	RANE	*Rafinesquia neomexicana*	0–6	–
	Nuttall's povertyweed	MONU	*Monolepis nuttalliana*	0–6	–
	slender goldenweed	MAGR10	*Machaeranthera gracilis*	0–6	–
	sorrel buckwheat	ERPO4	*Eriogonum polycladon*	0–6	–
	Texas stork's bill	ERTE13	*Erodium texanum*	0–6	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	0–6	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–6	–
	wedgeleaf draba	DRCU	*Draba cuneifolia*	0–6	–
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	0–6	–
	cryptantha	CRYPT	*Cryptantha*	0–6	–
	pitseed goosefoot	CHBE4	*Chenopodium berlandieri*	0–6	–
	milkvetch	ASTRA	*Astragalus*	0–6	–
	wheelscale saltbush	ATEL	*Atriplex elegans*	0–6	–
	Coulter's spiderling	BOCO2	*Boerhavia coulteri*	0–6	–
	carelessweed	AMPA	*Amaranthus palmeri*	0–6	–
	white tackstem	CAWR	*Calycoseris wrightii*	0–2	–
	fringed redmaids	CACI2	*Calandrinia ciliata*	0–2	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	0–2	–
	hyssopleaf sandmat	CHHY3	*Chamaesyce hyssopifolia*	0–2	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–2	–
	hairy prairie clover	DAMO	*Dalea mollis*	0–2	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–2	–
	Arizona lupine	LUAR4	*Lupinus arizonicus*	0–2	–

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	hairy desertsunflower	GECA2	*Geraea canescens*	0–2	–
	star gilia	GIST	*Gilia stellata*	0–2	–
	longleaf false goldeneye	HELOA2	*Heliomeris longifolia var. annua*	0–2	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–2	–
	woollyhead neststraw	STMI2	*Stylocline micropoides*	0–2	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–2	–
	green carpetweed	MOVE	*Mollugo verticillata*	0–2	–
	phacelia	PHACE	*Phacelia*	0–2	–
	desert evening primrose	OEPR	*Oenothera primiveris*	0–2	–
	Florida pellitory	PAFL3	*Parietaria floridana*	0–2	–
	chia	SACO6	*Salvia columbariae*	0–1	–
	sawtooth sage	SASU7	*Salvia subincisa*	0–1	–
	spreading fanpetals	SIAB	*Sida abutifolia*	0–1	–
	bristly nama	NAHI	*Nama hispidum*	0–1	–
	glandular threadplant	NEGL	*Nemacladus glanduliferus*	0–1	–
	Fendler's desertdandelion	MAFE	*Malacothrix fendleri*	0–1	–
	whitestem blazingstar	MEAL6	*Mentzelia albicaulis*	0–1	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	0–1	–
	doubleclaw	PRPA2	*Proboscidea parviflora*	0–1	–
	sand fringepod	THCU	*Thysanocarpus curvipes*	0–1	–
	tumblemustard	THELY3	*Thelypodiopsis*	0–1	–
	camphorweed	HESU3	*Heterotheca subaxillaris*	0–1	–
	crestrib morning-glory	IPCO2	*Ipomoea costellata*	0–1	–
	common woolly sunflower	ERLA6	*Eriophyllum lanatum*	0–1	–
	Mexican fireplant	EUHE4	*Euphorbia heterophylla*	0–1	–
	scrambled eggs	COAU2	*Corydalis aurea*	0–1	–
	exserted Indian paintbrush	CAEXE	*Castilleja exserta ssp. exserta*	0–1	–
	yellow tackstem	CAPA7	*Calycoseris parryi*	0–1	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–1	–
	southwestern pricklypoppy	ARPL3	*Argemone pleiacantha*	0–1	–
	annual agoseris	AGHE2	*Agoseris heterophylla*	0–1	–
Shrub/Vine					
7	**Dominant shrubs**			11–56	
	jojoba	SICH	*Simmondsia chinensis*	0–45	–
	western honey mesquite	PRGLT	*Prosopis glandulosa var. torreyana*	6–22	–
	creosote bush	LATR2	*Larrea tridentata*	0–11	–
	whitethorn acacia	ACCO2	*Acacia constricta*	0–11	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	0–6	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–6	–

8	**Miscellaneous shrubs**			0–11	
	catclaw acacia	ACGR	*Acacia greggii*	0–1	–
	crucifixion thorn	CAHO3	*Canotia holacantha*	0–1	–
	spiny hackberry	CEEH	*Celtis ehrenbergiana*	0–1	–
	American tarwort	FLCE	*Flourensia cernua*	0–1	–
	ocotillo	FOSP2	*Fouquieria splendens*	0–1	–
	water jacket	LYAN	*Lycium andersonii*	0–1	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	0–1	–
	pale desert-thorn	LYPA	*Lycium pallidum*	0–1	–
	catclaw mimosa	MIACB	*Mimosa aculeaticarpa var. biuncifera*	0–1	–
	blue paloverde	PAFL6	*Parkinsonia florida*	0–1	–
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	0–1	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–1	–
9	**Half shrubs**			2–34	
	fairyduster	CAER	*Calliandra eriophylla*	1–17	–
	desert zinnia	ZIAC	*Zinnia acerosa*	0–11	–
	rough menodora	MESC	*Menodora scabra*	0–6	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–6	–
	littleleaf ratany	KRER	*Krameria erecta*	1–6	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–1	–
	burroweed	ISTE2	*Isocoma tenuisecta*	0–1	–
	turpentine bush	ERLA12	*Ericameria laricifolia*	0–1	–
	threadleaf snakeweed	GUMI	*Gutierrezia microcephala*	0–1	–
	rayless goldenhead	ACSP	*Acamptopappus sphaerocephalus*	0–1	–
	shortleaf baccharis	BABR	*Baccharis brachyphylla*	0–1	–
10	**Succulents**			6–22	
	devil's cholla	GRKU	*Grusonia kunzei*	1–6	–
	cactus apple	OPEN3	*Opuntia engelmannii*	0–6	–
	tulip pricklypear	OPPH	*Opuntia phaeacantha*	1–6	–
	banana yucca	YUBA	*Yucca baccata*	0–6	–
	soaptree yucca	YUEL	*Yucca elata*	0–2	–
	purple pricklypear	OPMA8	*Opuntia macrocentra*	0–2	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	0–2	–
	walkingstick cactus	CYSP8	*Cylindropuntia spinosior*	0–1	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–1	–
	pinkflower hedgehog cactus	ECFA	*Echinocereus fasciculatus*	0–1	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	0–1	–
	Graham's nipple cactus	MAGR9	*Mammillaria grahamii*	0–1	–
	buck-horn cholla	CYAC8	*Cylindropuntia acanthocarpa*	0–1	–

Animal community

This site produces some perennial forage for livestock. It wet (El Nino) winters it produces a tremendous amount of

annual forbs and grasses, all of which are excellent forage. The site is home to a variety of small mammals and birds and their associated predators. It is mainly a foraging area for larger mammals like mule deer and javalina.

Hydrological functions

These soils are heavy textured and good producers of runoff.

Recreational uses

Hunting, horseback riding, hiking, wildlife observation, photography, rock hounding and bird watching.

Wood products

Limited mesquite wood for campfires.

Other products

Red clay for pot making.

Contributors

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Approval

Curtis Talbot, 4/09/2021

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)	Wilma Renken, Dan Robinett, Larry Humphrey
Contact for lead author	USDA-NRCS Tucson MLRA Soil Survey Office
Date	12/12/2012
Approved by	Curtis Talbot
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None

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2. **Presence of water flow patterns:** Water flow paths occupy less than 5% of the surface area. Sheet flow predominates as a process on this site with water flow patterns generated from sheet flow off bare areas. Sheet flow lengths are less than 10 feet. Vegetated areas are densely covered with no visible flow patterns.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are infrequent on all longer lived grasses and sub-shrubs. Terracettes are not common on the site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** ESD cover ranges for bare soil is 5-75%, gravel ranges from 15-50% and basal cover of live perennial grasses is 1-3%. Bare areas not covered by perennial plant canopy are moderately sized (2-3 ft in diameter) and generally connected. Bare areas make up approximately 50% of the area.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter size classes are moving less than a foot in sheet flow areas. Coarse litter stays in place.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Values from soil slake test score 2-3 on bare areas and 4-6 from protected areas.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A horizon is a gravelly sandy loam 0.5 inches thick, structureless. Colors are 5 YR 5/4 dry and 5 YR 3/4 moist.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial grasses dominate the site. Hydrology functions are sheet flow run-off originating on bare areas, run-off slowing and infiltration occurring within perennial grass patches. Total canopy cover approximately 40-45%. Perennial grass canopy = 27-37%, succulent canopy = 1-5%, shrubs and half-shrubs = 1-5%. Annual grass canopy fluctuates with seasonal rainfall; canopy cover can exceed 40% and mask the vegetation distribution pattern. Perennial grasses exhibit patch-distribution with scattered shrubs and succulents.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None present, average depth of penetration from an ARS field penetrometer with a 2.2 kg. sliding hammer is 5.1 cm. The dense argillic horizon at 3 inches can be mistaken for a compacted layer.

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: Dominant perennial grass (tobosa)>

    Sub-dominant: > miscellaneous perennial grasses = perennial three-awns = dominant shrubs >/= annual forbs >/=

annual grasses >

Other: > half-shrubs, succulents, misc.shrubs, perennial forbs

Additional: annual grasses and forbs can fluctuate within ranking based on seasonal precipitation

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Mortality due to drought (2009 and very dry winter spring of 2011) about 20% on cane cholla. All other species show only natural rates of approximately 5-10% mortality.

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14. **Average percent litter cover (%) and depth (in):** Litter cover ranges from 10-75% on this site. Litter cover was 65% on this date. Ground cover was collected as point cover data concurrently with pace frequency method (300 pts).

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 147 lbs/ac. in a below average year; 300 lbs/ac. in an average year; 785 lbs/ac. in an above average year. Production of summer annual grasses can exceed expected on years with above average seasonal 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:** Cholla and prickly pear common across site with about 300 plants per acre amounting to 4% canopy cover. Mesquite is scattered across site at 1% canopy cover and with a density of 25 plants per acre. Other invasive species: Lehmann lovegrass and Boers lovegrass.

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17. **Perennial plant reproductive capability:** Not impaired on any species.
