

Ecological site R041XC311AZ Loamy Swale 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.

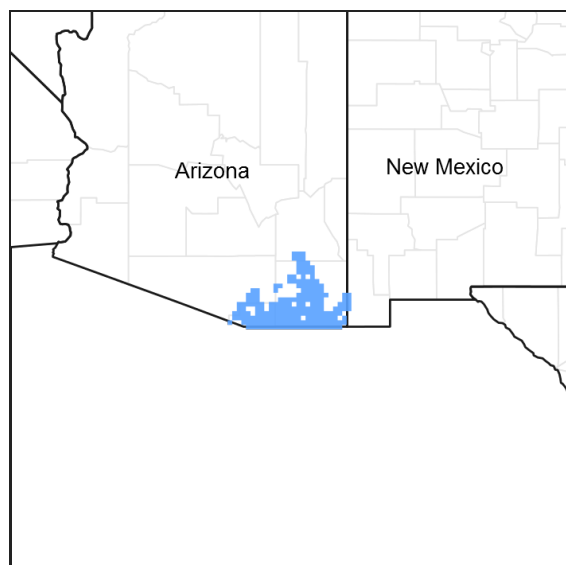


Figure 1. Mapped extent

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.

Associated sites

R041XC308AZ	Limy Slopes 12-16" p.z.
R041XC313AZ	Loamy Upland 12"-16" p.z.
R041XC319AZ	Sandy Loam Upland 12-16" p.z.

Similar sites

R041XC302AZ	Clayey Swale 12-16" p.z.
R041XC312AZ	Loamy Bottom 12-16" p.z.
R040XA112AZ	Loamy Swale 10"-13" p.z.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>bouteloua gracilis</i> (2) <i>bouteloua curtipendula</i>

Physiographic features

This site occurs in the middle elevations of the Madrean Basin and Range province in southeastern Arizona. It occurs in headwater areas; on floodplains of minor tributaries and in swales. It benefits on a regular basis from extra moisture received as runoff from adjacent upland sites. It does not benefit from any kind of water table.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Alluvial fan (3) Swale
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	Occasional to frequent
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None to rare
Elevation	975–1,524 m
Slope	0–2%
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, originates 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)	0 days

Precipitation total (average)	406 mm
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Influencing water features

There are no water features associated with this site.

Soil features

These are young soils on loamy to clayey alluvium of mixed origin. They are deep and dark colored. They do not have vertic properties. Soil churning and cracking are not features of this site. Plant-soil moisture relationships are excellent.

Soils mapped on this site include: SSA-665 Willcox area Gr & Gs Grabe, Pm Pima; SSA-666 Cochise county Northwest part MU 81 Tenneco; SSA-667 Santa Cruz area MU's Pn Pima CL SCL subsoil, Th haplustolls & torrifluvents, GbD Grabe; SSA-671 Cochise county Douglas-Tombstone part MU's 65 Forrest CL, 67 Forrest SL, 68 Forrest SL, 70 Forrest, 125 Ubik, 129 Sasabe SiL frequently flooded, 139 Tenneco FSL, 144 Ubic FSL, 147 Ubic SL, 148 Ubic SL saline-sodic.

Table 4. Representative soil features

Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately slow
Soil depth	152 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0–1%
Available water capacity (0-101.6cm)	25.91–32 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
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)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0–1%

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.

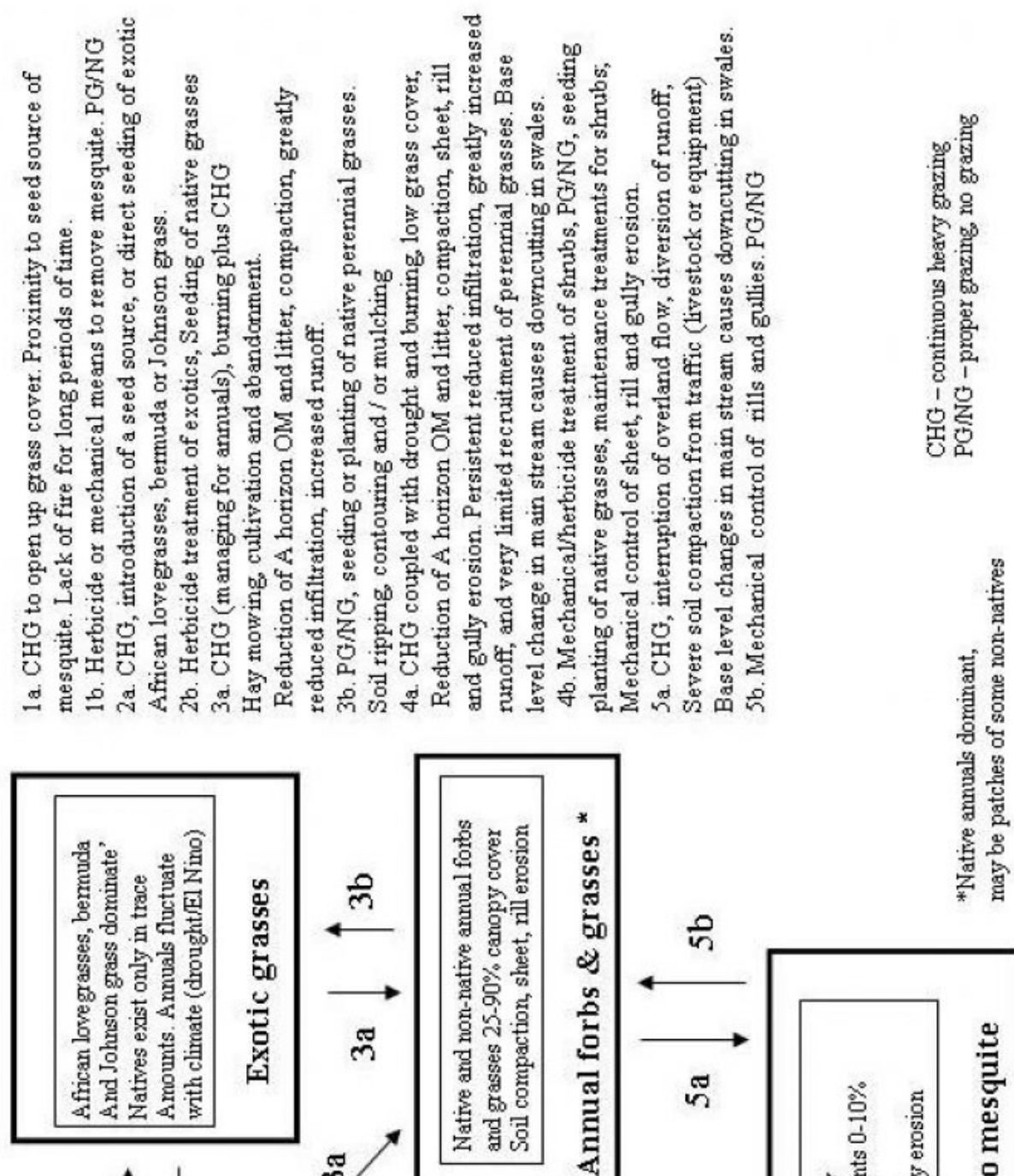
Production data provided in this site description is standardized to air dry weight at the end of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

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 each group. Divide the resulting total by the total normal year production shown in the plant community description. If the rainfall has been significantly above or below normal, use the total production shown for above or below normal years. If field data is not collected at the end of the summer growing season, then the field data must be corrected to the end of the year production before comparing it to the site description. The growth curve can be used as a guide for estimating production at the end of the summer growing season. The site is dominated by warm season perennial grasses. Occasional clumps of trees and shrubs occur in the plant community. Fire was very important in the development of this plant community. The site is very susceptible to gully erosion. Base level changes in large watersheds can lead to erosion of these minor tributaries over time. Woody species like mesquite can invade and increase to dominate the site in the absence of fire for long periods. Johnson grass and bermuda grass are exotic species that occur on many areas of the site and may become dominant.

State and transition model

MLRA 41-3 (12-16"), Loamy Swale



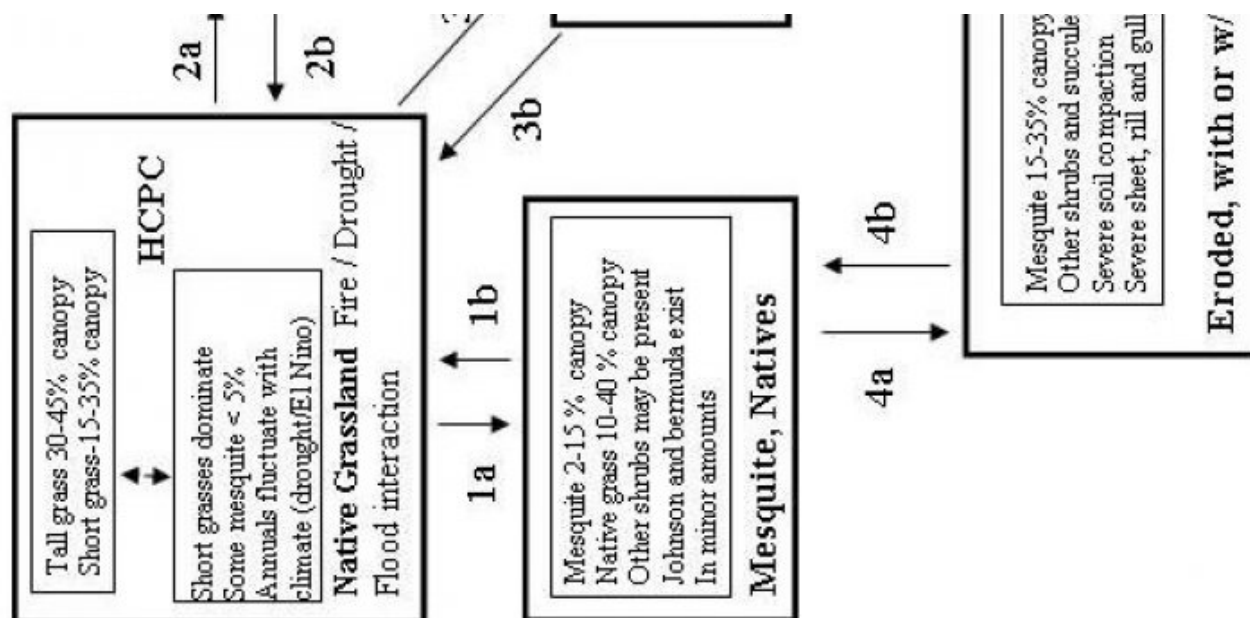


Figure 4. State and Transition, Loamy Swale 12-16" p.z.

State 1

Historical Climax Plant Community

Community 1.1

Historical Climax Plant Community



Figure 5. Loamy Swale 12-16" p.z. HCPC

The historical native state includes the native plant communities that occur on the site, including the historic climax plant community. This state includes other plant communities that naturally occupy the site following fire, drought, flooding, herbivores, and other natural disturbances. The historic climax plant community represents the natural climax community that eventually reoccupies the site with proper management. The potential plant community is dominated by warm season perennial grasses. Occasional trees and shrubs occur in the plant community. The major perennial grasses like blue grama, sideoats grama, tobosa, creeping muhly and vine mesquite, occur in large patches throughout the plant community. Giant sacaton can occur at about 10% cover in the plant community. Annual forbs and grasses can produce heavy stands in wet seasons following drought and/or fire. With continuous grazing, tall and mid grasses are replaced by short grasses like blue grama and creeping muhly. With grazing management the mid to tall species can resume dominance in the plant community. The aspect is grassland.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	818	1793	2914
Forb	17	56	280
Shrub/Vine	11	28	112
Tree	—	11	112
Total	846	1888	3418

Table 6. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	0-1%
Grass/grasslike basal cover	10-20%
Forb basal cover	0-1%
Non-vascular plants	0-1%
Biological crusts	0-5%
Litter	20-65%
Surface fragments >0.25" and <=3"	0-5%
Surface fragments >3"	0-1%
Bedrock	0%
Water	0%
Bare ground	10-25%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	—	1-10%	0-5%
>0.15 <= 0.3	—	0-1%	10-20%	0-5%
>0.3 <= 0.6	—	0-1%	30-60%	0-10%
>0.6 <= 1.4	—	0-1%	0-10%	0-10%
>1.4 <= 4	0-2%	0-1%	0-5%	—
>4 <= 12	—	—	—	—
>12 <= 24	—	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

Figure 7. 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

Exotic grasses

Community 2.1

Exotic grasses

This state occurs where the native plant community has been replaced by non-native warm season perennial grasses like Lehmann, Boers, Wilman and Cochise lovegrass; and / or Johnson and bermuda grass. These species either were directly seeded or invaded areas of this site. Many small areas of this state were cultivated in the past and have come back to exotics. In other areas the natural flooding regime has been altered by diversions, ROWs, and drainage ditches, leaving the native plant community open to invasion by exotics.

State 3

Annual Grasses and Forbs

Community 3.1

Annual Grasses and Forbs

In some areas the interaction of continuous heavy grazing with drought, flood and fire has removed native perennial grass species from the plant community. Some areas of this state have been created by cultivation for irrigated farming and subsequent abandonment. Other areas have been created by diversion of normal patterns of runoff that provides extra water to the site. Native and non-native annual forbs and grasses dominate the site. Perennial grasses are limited to threeawns and short lived natives like Rothrock grama.

State 4

Mesquite, native grasses

Community 4.1

Mesquite, native grasses

Mesquite has invaded the site in the absence of fire for long periods of time. Mesquite canopy ranges from 2 to 15%. Native perennial grasses dominate the under-story. Annuals fluctuate with climate (drought / El Nino). Sediment accumulation around the base of trees protects them from the heat of fires. Non-native perennial grasses like bermuda and Johnson grass can exist in minor amounts.

State 5

Eroded with or w/o mesquite

Community 5.1

Eroded with or w/o mesquite

The interaction of continuous heavy grazing with drought, flood and fire; with or without mesquite invasion, can lead to gully formation. Other areas of this state are caused by head-ward gully erosion coming from the down-cutting of major stream systems. The site no longer holds the flood water it receives from adjacent upland areas. The under-story deteriorates to annual forbs and grasses. Other shrubs and cacti can grow in the understory. Mesquite canopy ranges from 1 to 35%.

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 mid grasses			560–1121	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	448–897	–
	creeping muhly	MURE	<i>Muhlenbergia repens</i>	11–336	–
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	0–336	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	56–224	–
2	Dominant tall grasses			224–1121	

	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	112–673	–
	big sacaton	SPWR2	<i>Sporobolus wrightii</i>	0–448	–
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	56–336	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	11–224	–
3	Miscellaneous perennial grasses			22–224	
	Rothrock's grama	BORO2	<i>Bouteloua rothrockii</i>	11–224	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	11–112	–
	green sprangletop	LEDU	<i>Leptochloa dubia</i>	0–56	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–56	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–56	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	11–56	–
	spidergrass	ARTEG	<i>Aristida ternipes</i> var. <i>gentilis</i>	0–56	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	0–56	–
	whiplash pappusgrass	PAVA2	<i>Pappophorum vaginatum</i>	0–56	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	0–56	–
	burrograss	SCBR2	<i>Scleropogon brevifolius</i>	0–28	–
	plains lovegrass	ERIN	<i>Eragrostis intermedia</i>	0–28	–
	tanglehead	HECO10	<i>Heteropogon contortus</i>	0–28	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0–28	–
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	0–22	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	0–22	–
	fall witchgrass	DICO6	<i>Digitaria cognata</i>	0–22	–
	sprucetop grama	BOCH	<i>Bouteloua chondrosioides</i>	0–22	–
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	0–22	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–22	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	0–17	–
	Parish's threeawn	ARPUP5	<i>Aristida purpurea</i> var. <i>parishii</i>	0–11	–
	slender grama	BORE2	<i>Bouteloua repens</i>	0–11	–
	sedge	CAREX	<i>Carex</i>	0–11	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	0–11	–
	poverty threeawn	ARDI5	<i>Aristida divaricata</i>	0–11	–
	Havard's threeawn	ARHA3	<i>Aristida havardii</i>	0–6	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	0–6	–
	Wooton's threeawn	ARPA9	<i>Aristida pansa</i>	0–6	–
4	Annual grasses			11–448	
	prairie threeawn	AROL	<i>Aristida oligantha</i>	1–112	–
	feather fingergrass	CHVI4	<i>Chloris virgata</i>	1–112	–
	tapertip cupgrass	ERACA	<i>Eriochloa acuminata</i> var. <i>acuminata</i>	0–112	–
	bearded sprangletop	LEFUF	<i>Leptochloa fusca</i> ssp. <i>fascicularis</i>	1–112	–
	Mexican sprangletop	LEFUU	<i>Leptochloa fusca</i> ssp. <i>uninervia</i>	0–112	–
	mucronate sprangletop	LEPAB	<i>Leptochloa panicea</i> ssp. <i>brachiata</i>	0–112	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–112	–
	Arizona signalgrass	URAR	<i>Urochloa arizonica</i>	0–56	–
	Mexican panicgrass	PAHI5	<i>Panicum hirticaule</i>	0–56	–

	sticky sprangletop	LEVI5	<i>Leptochloa viscida</i>	0–56	–
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	0–56	–
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	0–28	–
	Parry's grama	BOPA2	<i>Bouteloua parryi</i>	0–28	–
	Bigelow's bluegrass	POBI	<i>Poa bigelovii</i>	0–28	–
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	0–28	–
	witchgrass	PACA6	<i>Panicum capillare</i>	0–28	–
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	0–22	–
	Mexican lovegrass	ERME	<i>Eragrostis mexicana</i>	0–22	–
	desert lovegrass	ERPEM	<i>Eragrostis pectinacea</i> var. <i>miserrima</i>	0–22	–
	tufted lovegrass	ERPEP2	<i>Eragrostis pectinacea</i> var. <i>pectinacea</i>	0–22	–
	Arizona barley	HOAR	<i>Hordeum arizonicum</i>	0–11	–
	delicate muhly	MUFR	<i>Muhlenbergia fragilis</i>	0–11	–
	littleseed muhly	MUMI	<i>Muhlenbergia microsperma</i>	0–11	–
Forb					
5	Perennial Forbs			11–56	
	weakleaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	1–56	–
	fingerleaf gourd	CUDI	<i>Cucurbita digitata</i>	0–28	–
	Missouri gourd	CUFO	<i>Cucurbita foetidissima</i>	0–28	–
	coyote gourd	CUPA	<i>Cucurbita palmata</i>	0–28	–
	Cooley's bundleflower	DECO2	<i>Desmanthus cooleyi</i>	0–28	–
	beeblossom	GAURA	<i>Gaura</i>	0–28	–
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	0–28	–
	gooseberryleaf globemallow	SPGR2	<i>Sphaeralcea grossulariifolia</i>	0–28	–
	spear globemallow	SPHA	<i>Sphaeralcea hastulata</i>	0–17	–
	brownplume wirelettuce	STPA4	<i>Stephanomeria pauciflora</i>	0–17	–
	Lemmon's ragwort	SELE8	<i>Senecio lemmonii</i>	0–17	–
	Louisiana vetch	VILUL2	<i>Vicia ludoviciana</i> ssp. <i>ludoviciana</i>	0–17	–
	variableleaf bushbean	MAGI2	<i>Macroptilium gibbosifolium</i>	0–17	–
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	0–17	–
	bean	PHASE	<i>Phaseolus</i>	0–17	–
	Lewis flax	LILE3	<i>Linum lewisii</i>	0–17	–
	Texas bindweed	COEQ	<i>Convolvulus equitans</i>	1–17	–
	spreading fleabane	ERDI4	<i>Erigeron divergens</i>	0–17	–
	small matweed	GUDED	<i>Guilleminea densa</i> var. <i>densa</i>	0–17	–
	Indian rushpea	HOGL2	<i>Hoffmannseggia glauca</i>	0–17	–
	scarlet spiderling	BOCO	<i>Boerhavia coccinea</i>	0–17	–
	rose heath	CHER2	<i>Chaetopappa ericoides</i>	0–11	–
	velvet leaf senna	SELI4	<i>Senna lindheimeriana</i>	0–11	–
	Wright's cudweed	PSCAC2	<i>Pseudognaphalium canescens</i> ssp. <i>canescens</i>	0–11	–
	canaigre dock	RUHY	<i>Rumex hymenosepalus</i>	0–11	–
	silverleaf nightshade	SOEL	<i>Solanum elaeagnifolium</i>	1–11	–

	New Mexico fanpetals	SINE	<i>Sida neomexicana</i>	0–6	–
	white prairie aster	SYFAC	<i>Symphyotrichum falcatum</i> var. <i>commutatum</i>	0–6	–
	Sonoita noseburn	TRLA	<i>Tragia laciniata</i>	0–6	–
	American vetch	VIAM	<i>Vicia americana</i>	0–6	–
	Greene's bird's-foot trefoil	LOGR4	<i>Lotus greenei</i>	0–6	–
	Wright's deervetch	LOWR	<i>Lotus wrightii</i>	0–6	–
	ivyleaf groundcherry	PHHE4	<i>Physalis hederifolia</i>	0–6	–
	shrubby purslane	POSU3	<i>Portulaca suffrutescens</i>	0–6	–
	tufted evening primrose	OECA10	<i>Oenothera caespitosa</i>	0–6	–
	woodsorrel	OXALI	<i>Oxalis</i>	0–6	–
	desert marigold	BAMU	<i>Baileya multiradiata</i>	0–6	–
	lyreleaf greeneyes	BELY	<i>Berlandiera lyrata</i>	0–6	–
	bluedicks	DICA14	<i>Dichelostemma capitatum</i>	0–6	–
	spreading snakeherb	DYSCD	<i>Dyschoriste schiedeana</i> var. <i>decumbens</i>	0–6	–
	southwestern pricklypoppy	ARPL3	<i>Argemone pleiacantha</i>	0–6	–
	dwarf desertpeony	ACNA2	<i>Acourtia nana</i>	0–6	–
	Trans-Pecos thimblehead	HYWI	<i>Hymenothrix wislizeni</i>	0–6	–
	wild dwarf morning-glory	EVAR	<i>Evolvulus arizonicus</i>	0–6	–
	whitemouth dayflower	COER	<i>Commelina erecta</i>	0–6	–
	Arizona snakecotton	FRAR2	<i>Froelichia arizonica</i>	0–2	–
	ragged nettlespurge	JAMA	<i>Jatropha macrorhiza</i>	0–2	–
	southwestern mock vervain	GLGO	<i>Glandularia gooddingii</i>	0–2	–
	brownfoot	ACWR5	<i>Acourtia wrightii</i>	0–2	–
	trailing windmills	ALIN	<i>Allionia incarnata</i>	0–2	–
	largeflower onion	ALMA4	<i>Allium macropetalum</i>	0–2	–
	Watson's dutchman's pipe	ARWA	<i>Aristolochia watsonii</i>	0–2	–
	tuber anemone	ANTU	<i>Anemone tuberosa</i>	0–2	–
	desert mariposa lily	CAKE	<i>Calochortus kennedyi</i>	0–2	–
	sego lily	CANU3	<i>Calochortus nuttallii</i>	0–2	–
	velvetseed milkwort	POOB	<i>Polygala obscura</i>	0–2	–
	orange fameflower	PHAU13	<i>Phemeranthus aurantiacus</i>	0–2	–
	jewels of Opar	TAPA2	<i>Talinum paniculatum</i>	0–2	–
	Coulter's wrinklefruit	TECO	<i>Tetradlea coulteri</i>	0–2	–
6	Annual forbs			6–224	
	carelessweed	AMPA	<i>Amaranthus palmeri</i>	1–112	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	1–56	–
	sensitive partridge pea	CHNI2	<i>Chamaecrista nictitans</i>	1–56	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	1–56	–
	longleaf false goldeneye	HELOA2	<i>Heliomeris longifolia</i> var. <i>annua</i>	1–56	–

	campnorweed	HESU3	<i>Heterotheca subaxillaris</i>	1–56	–
	intermediate pepperweed	LEVIM	<i>Lepidium virginicum</i> var. <i>medium</i>	1–56	–
	shaggyfruit pepperweed	LELA	<i>Lepidium lasiocarpum</i>	0–28	–
	morning-glory	IPOMO	<i>Ipomoea</i>	0–28	–
	longleaf false goldeneye	HELOL	<i>Heliomeris longifolia</i> var. <i>longifolia</i>	0–28	–
	New Mexico thistle	CINE	<i>Cirsium neomexicanum</i>	1–28	–
	fewflower beggarticks	BILE	<i>Bidens leptcephala</i>	0–28	–
	goosefoot	CHENO	<i>Chenopodium</i>	0–28	–
	sorrel buckwheat	ERPO4	<i>Eriogonum polycladon</i>	1–28	–
	tanseyleaf tansyaster	MATA2	<i>Machaeranthera tanacetifolia</i>	0–28	–
	Nuttall's povertyweed	MONU	<i>Monolepis nuttalliana</i>	0–28	–
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	0–28	–
	bristly fiddleneck	AMTE3	<i>Amsinckia tessellata</i>	0–28	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–28	–
	New Mexico copperleaf	ACNE	<i>Acalypha neomexicana</i>	0–28	–
	San Pedro matchweed	XAGY	<i>Xanthocephalum gymnospermoides</i>	0–28	–
	woolly tidestromia	TILA2	<i>Tidestromia lanuginosa</i>	0–17	–
	spreading fanpetals	SIAB	<i>Sida abutifolia</i>	0–17	–
	wheelscale saltbush	ATEL	<i>Atriplex elegans</i>	0–17	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0–17	–
	combseed	PECTO	<i>Pectocarya</i>	0–17	–
	Arizona popcornflower	PLAR	<i>Plagiobothrys arizonicus</i>	0–17	–
	California poppy	ESCAM	<i>Eschscholzia californica</i> ssp. <i>mexicana</i>	0–17	–
	Coulter's spiderling	BOCO2	<i>Boerhavia coulteri</i>	0–17	–
	scrambled eggs	COAU2	<i>Corydalis aurea</i>	0–17	–
	horseweed	CONYZ	<i>Conyza</i>	0–17	–
	Arizona gumweed	GRAR2	<i>Grindelia arizonica</i>	0–17	–
	crestrib morning-glory	IPCO2	<i>Ipomoea costellata</i>	0–17	–
	coastal bird's-foot trefoil	LOSAB	<i>Lotus salsuginosus</i> var. <i>brevivexillus</i>	0–17	–
	Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	0–11	–
	Arizona poppy	KAGR	<i>Kallstroemia grandiflora</i>	0–11	–
	sacred thorn-apple	DAWR2	<i>Datura wrightii</i>	0–11	–
	hoary bowlesia	BOIN3	<i>Bowlesia incana</i>	0–11	–
	purslane	PORTU	<i>Portulaca</i>	0–11	–
	foothill deervetch	LOHU2	<i>Lotus humistratus</i>	0–11	–
	doubleclaw	PRPA2	<i>Proboscidea parviflora</i>	0–11	–
	New Mexico plumeseed	RANE	<i>Rafinesquia neomexicana</i>	0–6	–
	sawtooth sage	SASU7	<i>Salvia subincisa</i>	0–6	–
	desert unicorn-plant	PRAL4	<i>Proboscidea althaeifolia</i>	0–6	–
	slender goldenweed	MAGR10	<i>Machaeranthera gracilis</i>	0–6	–
	whitestem blazingstar	MEAL6	<i>Mentzelia albicaulis</i>	0–6	–
	minerslettuce	MONTI	<i>Montia</i>	0–6	–
	green carpetweed	MOVE	<i>Mollugo verticillata</i>	0–6	–

	desert evening primrose	OEPR	<i>Oenothera primiveris</i>	0–6	–
	Florida pellitory	PAFL3	<i>Parietaria floridana</i>	0–6	–
	Mexican passionflower	PAME2	<i>Passiflora mexicana</i>	0–6	–
	phlox	PHLOX	<i>Phlox</i>	0–6	–
	fringed redmaids	CACI2	<i>Calandrinia ciliata</i>	0–6	–
	cryptantha	CRYPT	<i>Cryptantha</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	–
	pearly globe amaranth	GONI	<i>Gomphrena nitida</i>	0–6	–
	wedgeleaf draba	DRCU	<i>Draba cuneifolia</i>	0–6	–
	miniature woollystar	ERDI2	<i>Eriastrum diffusum</i>	0–6	–
	warty caltrop	KAPA	<i>Kallstroemia parviflora</i>	0–6	–
	Arizona lupine	LUAR4	<i>Lupinus arizonicus</i>	0–6	–
	Coulter's lupine	LUSP2	<i>Lupinus sparsiflorus</i>	0–6	–
	hollowleaf annual lupine	LUSU3	<i>Lupinus succulentus</i>	0–6	–
	plains flax	LIPU4	<i>Linum puberulum</i>	0–2	–
	American wild carrot	DAPU3	<i>Daucus pusillus</i>	0–2	–
	phacelia	PHACE	<i>Phacelia</i>	0–2	–
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	0–2	–
	golden crownbeard	VEEN	<i>Verbesina encelioides</i>	0–2	–
	rough cocklebur	XAST	<i>Xanthium strumarium</i>	0–2	–
	Fendler's desertdandelion	MAFE	<i>Malacothrix fendleri</i>	0–1	–

Shrub/Vine

7	Miscellaneous shrubs			11–112	
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	22–112	–
	gum bully	SILAL3	<i>Sideroxylon lanuginosum</i> ssp. <i>lanuginosum</i>	0–28	–
	Apache plume	FAPA	<i>Fallugia paradoxa</i>	0–28	–
	bastardsage	ERWR	<i>Eriogonum wrightii</i>	0–22	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0–17	–
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa</i> var. <i>biuncifera</i>	0–17	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–17	–
	woolly groundsel	PACA15	<i>Packera cana</i>	0–11	–
	littleleaf sumac	RHMI3	<i>Rhus microphylla</i>	0–11	–
	soaptree yucca	YUEL	<i>Yucca elata</i>	0–11	–
	yerba de pasmo	BAPT	<i>Baccharis pteronioides</i>	0–11	–
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	0–11	–
	Thurber's desert honeysuckle	ANTH2	<i>Anisacanthus thurberi</i>	0–11	–
	spiny hackberry	CEEH	<i>Celtis ehrenbergiana</i>	0–6	–
	Drummond's clematis	CLDR	<i>Clematis drummondii</i>	0–6	–
	knifeleaf condalia	COSP3	<i>Condalia spathulata</i>	0–6	–
	Warnock's snakewood	COWA	<i>Condalia warnockii</i>	0–6	–

	walkingstick cactus	CYSP8	<i>Cylindropuntia spinosior</i>	0–6	–
	longleaf jointfir	EPTR	<i>Ephedra trifurca</i>	0–6	–
	fringed twinevine	FUCYC	<i>Funastrum cynanchoides</i> ssp. <i>cynanchoides</i>	0–6	–
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	0–6	–
	pale desert-thorn	LYPA	<i>Lycium pallidum</i>	0–6	–
	velvetpod mimosa	MIDY	<i>Mimosa dysocarpa</i>	0–6	–
	sacahuista	NOMI	<i>Nolina microcarpa</i>	0–6	–
	cactus apple	OPEN3	<i>Opuntia engelmannii</i>	0–6	–
	burroweed	ISTE2	<i>Isocoma tenuisecta</i>	0–2	–
	trailing krameria	KRLA	<i>Krameria lanceolata</i>	0–2	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–2	–
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	0–2	–
	American tarwort	FLCE	<i>Flourensia cernua</i>	0–2	–
	shortleaf baccharis	BABR	<i>Baccharis brachyphylla</i>	0–2	–
	Christmas cactus	CYLE8	<i>Cylindropuntia leptocaulis</i>	0–2	–
Tree					
8	Trees			0–112	
	mesquite	PROSO	<i>Prosopis</i>	0–112	–
	catclaw acacia	ACGR	<i>Acacia greggii</i>	0–28	–
	netleaf hackberry	CELAR	<i>Celtis laevigata</i> var. <i>reticulata</i>	0–28	–
	desert willow	CHLI2	<i>Chilopsis linearis</i>	0–28	–
	velvet ash	FRVE2	<i>Fraxinus velutina</i>	0–11	–
	Arizona walnut	JUMA	<i>Juglans major</i>	0–11	–
	Jerusalem thorn	PAAC3	<i>Parkinsonia aculeata</i>	0–11	–
	western soapberry	SASAD	<i>Sapindus saponaria</i> var. <i>drummondii</i>	0–11	–

Animal community

This site is suitable for grazing by domestic livestock at any time of the year. This site has a long green season, during and after the summer rainy season, has occasional free water in potholes and will often be overused before proper use is made of adjacent upland areas. Shade is lacking unless mesquite has increased on the site. The plant community is excellent habitat for a wide variety of native wildlife species of desert grasslands. Nesting cover for ground nesting birds is usually very good.

Hydrological functions

These small floodplains receive and hold flood water from adjacent upland areas for short periods of time (1-2 days). They are important in the hydrology of major streams by trapping sediment eroding from uplands and retaining flood waters for slower release to the larger stream system. Gullied swales pass large flood events in less than one day.

Recreational uses

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

Wood products

Swales that are invaded by mesquite furnish good quantities of fuel-wood and limited quantities of posts.

Inventory data references

Range 417s include 2 in excellent condition, 6 in good condition and 3 in fair condition.

Type locality

Location 1: Pima County, AZ	
Township/Range/Section	T19S R17E S30
General legal description	Empire Ranch
Location 2: Santa Cruz County, AZ	
Township/Range/Section	T21S R18E S23
General legal description	Research Ranch
Location 3: Pima County, AZ	
Township/Range/Section	T19S R17E S33
General legal description	Empire ranch at KA 10 in the Johnson Pasture.

Contributors

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Unknown

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, Emilio Carrillo, Dan Robinett
Contact for lead author	NRCS Tucson Area Office
Date	02/16/2005
Approved by	S. Cassady
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:** Uncommon; probably cover no more than 3-5% of area; short, 2-4 feet in length. Discontinuous.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are uncommon, only observed where basal area killed by recent fire 0.5-0.75 inches of soil loss at these spots. Terracettes are fairly common, 3-8 feet apart with a 1-inch

elevation difference from above to below the terracette.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 5-10%; areas dominated by blue grama have higher bare ground than areas dominated by sideoats grama, mat muhly and vie mesquite.
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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):** Very little litter movement occurring only in flow paths.
-
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 ratings of 5-6 across site.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak granular to subangular blocky; color is 10YR3/2 dry, 10YR2/2 moist; thickness to 10+ inches.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Cover estimated at: canopy 60%; Basal 15%; litter 30%; 60% of canopy cover is perennial mid grasses, 10% is short grasses, 25% is annual forbs, and 5% is perennial forbs and annual grasses. Cover is well dispersed throughout the site.
-
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: mid-grasses >> short grasses > annual forbs > annual grasses = perennial forbs
- Sub-dominant:
- Other:
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or**

decadence): Very low basal area loss is masked by litter decomposition. Only a few plants lost by recent fire.

14. **Average percent litter cover (%) and depth (in):** Some areas dominated by vine mesquite have litter 5-6 inches deep.
-

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1000 lbs/ac unfavorable precipitation; 2000 lbs/ac normal precipitation; 2500 lbs/ac favorable precipitation
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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** wait-a-bit, Lehmann lovegrass, emsquite, bermuda grass, johnson grass, burroweed
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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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