USDA Natural Resources Conservation Service

Ecological site R041XC322AZ
Shallow Upland 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.

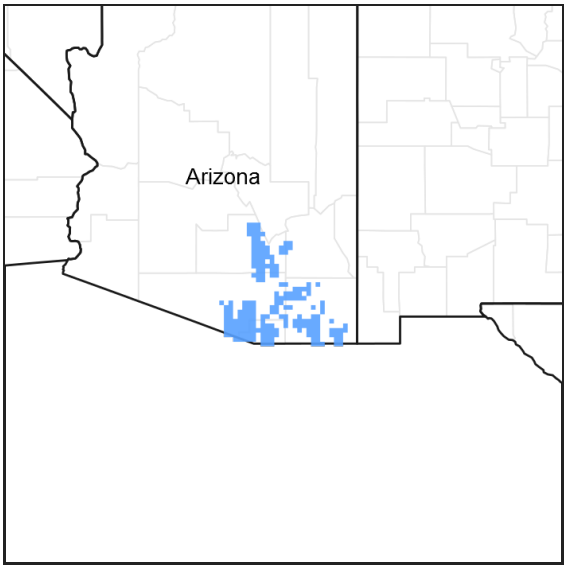


Figure 1. Mapped extent

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

R041XC306AZ	**Shallow Hills 12-16" p.z.**
R041XC316AZ	**Sandy Wash 12-16" p.z.**
R041XC318AZ	**Sandy Loam 12-16" p.z. Deep**

Similar sites

R041XA117AZ	**Shallow Upland 16-20" p.z.**
R040XA121AZ	**Granitic Upland 10"-13" p.z.**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *calliandra eriophylla* (2) *krameria erecta*
Herbaceous	(1) *bouteloua repens* (2) *bouteloua eriopoda*

Physiographic features

This site occurs in the middle elevations of the Madrean Basin and Range province in southeastern Arizona, southwestern New Mexico and Chihuahua and Sonora, Mexico. It occurs on gently sloping to moderately steep pediments which flank mountain areas. Numerous small areas of rock out-crop occur throughout areas of this site.

Table 2. Representative physiographic features

Landforms	(1) Mountain valley (2) Pediment
Flooding frequency	None
Ponding frequency	None
Elevation	975–1,585 m
Slope	1–15%
Aspect	N, E, S

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)	
Precipitation total (average)	406 mm

Influencing water features

There are no water features associated with this site.

Soil features

These soils have developed in place on various types of acid igneous to sedimentary parent material. They are shallow to very shallow and non-calcareous. The underlying bedrock is fractured and weathered and may be calcareous in places. Soil surfaces are well covered by small gravels. Plant-soil moisture relationships range from fair to poor for shallow and very shallow soils respectively.

Soils mapped on this site include: SSA-661 Eastern Pinal and Southern Gila counties MU's 8 Chiricahua, 71 Oracle & Romero, 83 Lampshire, 86 Surge; SSA-665 Gila-Duncan area MU LuD Luzena; SSA-666 Cochise county NW part MU's 11 Brunkcow & Chiricahua, 70 Romero & Oracle; SSA-667 Santa Cruz area MU's CrD Chiricahua, GhD Graham, LaE Lampshire GrVSL, ScD Schrap very shaly CL; SSA-669 Pima county E part MU's 17 Chiricahua & Lampshire, 25 Deloro & Schrap, 31 Pantak and 52 Oracle; SSA-671 Cochise county Douglas-Tombstone part MU's 18 Brunkcow & Chiricahua, 101 Chiricahua and 132 Schiefflin StVLS; SSA-703 Tohono O'odham Nation MU 46 Oracle & Romero.

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Very gravelly sandy loam (3) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to moderately slow
Soil depth	25–51 cm
Surface fragment cover <=3"	25–65%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	1.27–6.1 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
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)	6.1–8
Subsurface fragment volume <=3" (Depth not specified)	15–65%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

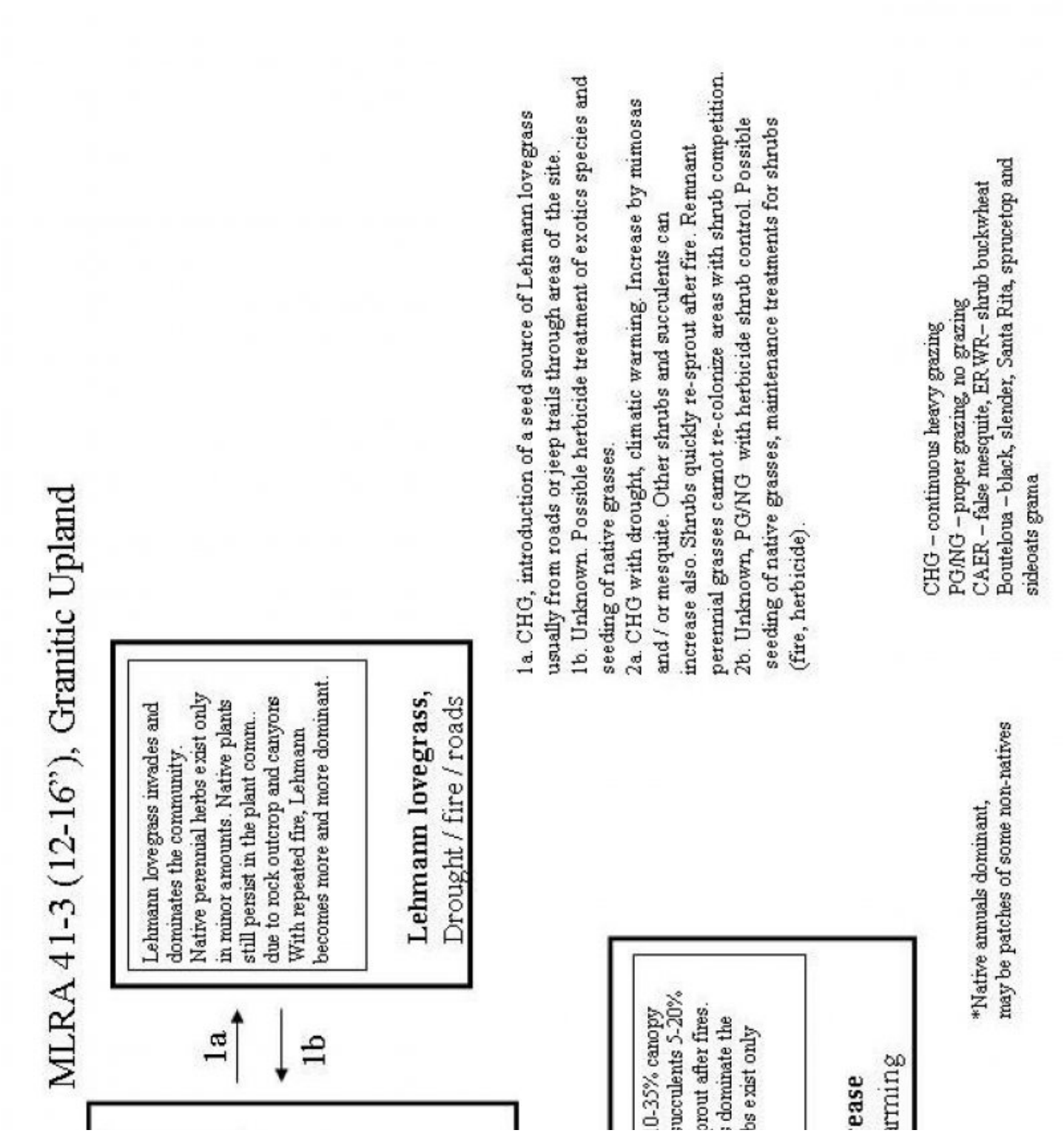
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The Historical Climax Plant Community represents the natural potential plant communities found on relict or 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 of a plant community described in this site description. To determine Similarity Index, compare the production (air dry weight) of each species to that shown in the plant community description. For each species, count no more than the maximum amount shown for the species, and for each group, count no more than the maximum amount shown for the 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



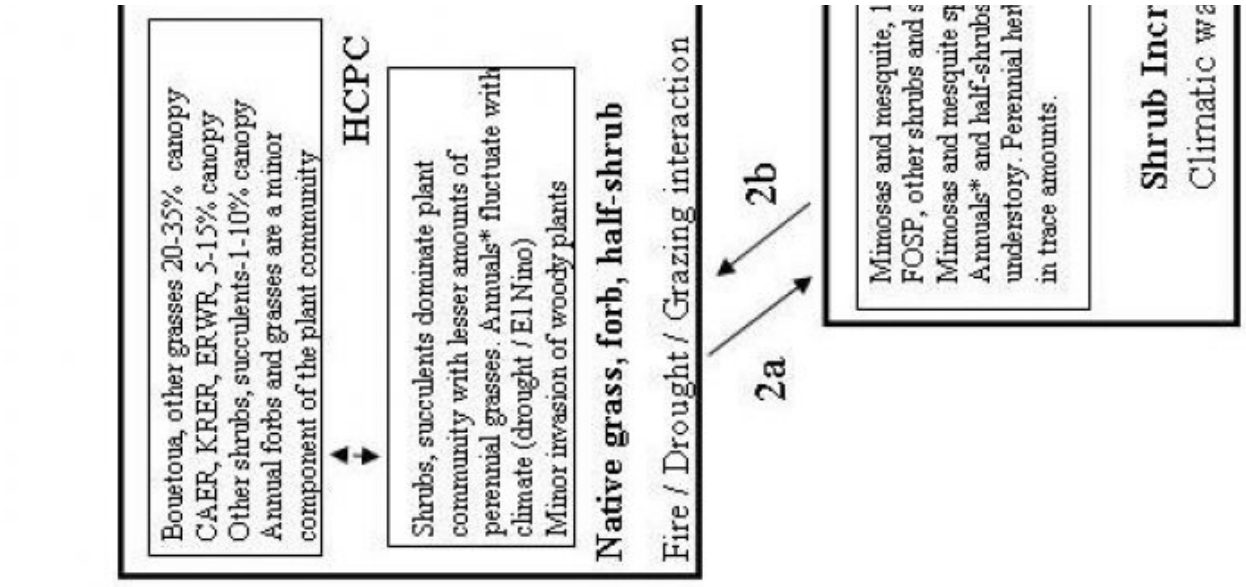


Figure 4. State and Transition, Granitic Upland 12-16" pz.

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

Figure 5. Shallow upland 12-16" pz. HCPC

This site includes 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 on this site is dominated by warm season perennial grasses and several species of low shrubs. Perennial forbs and annuals are of minor importance on this site. The aspect is shrub dotted grassland. All of the major perennial grasses and shrubs on the site are well dispersed throughout the plant community. Drought and or fire can open up the grass community for a few years, but the major species of short gramas will quickly recover. The dominant half shrubs on the site are vigorous sprouters after fire. Shrubby buckwheat can diminish in severe drought.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	280	504	740
Shrub/Vine	112	151	224
Forb	7	11	50
Tree	–	1	11
Total	**399**	**667**	**1025**

Table 6. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	3-5%
Grass/grasslike basal cover	3-10%
Forb basal cover	0-1%
Non-vascular plants	0-1%
Biological crusts	0-1%
Litter	15-50%
Surface fragments >0.25" and <=3"	25-65%
Surface fragments >3"	0-10%
Bedrock	1-10%
Water	0%
Bare ground	5-50%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	0-5%	5-10%	0-1%
>0.15 <= 0.3	–	5-10%	10-25%	0-1%
>0.3 <= 0.6	–	5-10%	5-10%	0-2%
>0.6 <= 1.4	–	0-5%	0-2%	–
>1.4 <= 4	0-2%	0-1%	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 7. Plant community growth curve (percent production by month). AZ4131, 41.3 12-16" p.z. hill sites. Growth begins in the spring, semi-dormancy occurs during the June drought, most growth occurs during the summer rainy season..

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

State 2
Lehmann lovegrass invaded

Community 2.1

Lehmann lovegrass invaded

Figure 8. Granitic Upland 12-16" pz. Lehmann lovegrass

This state occurs where Lehmann lovegrass has invaded from existing stands along roads, trails and rights of ways through areas of the site. Lehmann is especially prone to form monotypic stands on Chiricahua soil series. As Lehmann lovegrass increases in dominance the amounts of native grasses and herbs diminish both in diversity and density. The dominant half shrubs seem to be able to persist in the plant community with Lehmann lovegrass. Above ground biomass production is higher on sites dominated by Lehmann lovegrass. As fires and droughts cause openings in the plant community, Lehmann quickly assumes dominance.

State 3
Shrub increased

Community 3.1
Shrub increased

Figure 9. Shallow Upland 12-16" pz. shrub increase

In the absence of fires for long periods of time shrubs like mesquite, mimosa, ocotillo and succulents like prickly pear and amole can increase to dominate the plant community. Climatic warming may be driving the increase in wait-a-bit and velvetpod mimosas. Mature shrubs are fire tolerant and sprout back vigorously after being top killed. As canopy levels approach 25% the site can no longer support much in the herbaceous layer; further limiting the effect and incidence of fire on the plant community.

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 Short Grasses**			235–448	
	black grama	BOER4	*Bouteloua eriopoda*	73–168	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	56–168	–
	slender grama	BORE2	*Bouteloua repens*	50–168	–
	purple grama	BORA	*Bouteloua radicosa*	0–112	–
	sprucetop grama	BOCH	*Bouteloua chondrosioides*	50–112	–
	Santa Rita Mountain grama	BOEL	*Bouteloua eludens*	0–112	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–56	–
	Hall's panicgrass	PAHA	*Panicum hallii*	0–56	–
	common wolfstail	LYPH	*Lycurus phleoides*	6–45	–
2	**Occasional Perennial Short Grasses**			11–56	
	curly-mesquite	HIBE	*Hilaria belangeri*	6–34	–

	Arizona muhly	MUAR3	*Muhlenbergia arizonica*	0–34	–
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	0–22	–
	fall witchgrass	DICO6	*Digitaria cognata*	0–17	–
	slim tridens	TRMU	*Tridens muticus*	0–17	–
	nineawn pappusgrass	ENDE	*Enneapogon desvauxii*	0–11	–
	Kunth's smallgrass	MIKU	*Microchloa kunthii*	0–11	–
3	**Native Common Perennial Mid Grasses**			28–135	
	sideoats grama	BOCU	*Bouteloua curtipendula*	22–56	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	1–34	–
	tanglehead	HECO10	*Heteropogon contortus*	0–34	–
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	0–22	–
	green sprangletop	LEDU	*Leptochloa dubia*	0–17	–
	Arizona cottontop	DICA8	*Digitaria californica*	0–11	–
4	**Occasional Perennial Mid Grasses**			1–34	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–11	–
	tobosagrass	PLMU3	*Pleuraphis mutica*	0–11	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	0–6	–
	spiked crinkleawn	TRSP12	*Trachypogon spicatus*	0–6	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–6	–
	squirreltail	ELEL5	*Elymus elymoides*	0–6	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	0–6	–
	vine mesquite	PAOB	*Panicum obtusum*	0–6	–
	woolyspike balsamscale	ELBA	*Elionurus barbiculmis*	0–2	–
	sedge	CAREX	*Carex*	0–1	–
5	**Perennial Threeawns**			6–34	
	Santa Rita threeawn	ARCAG	*Aristida californica var. glabrata*	0–17	–
	spidergrass	ARTE3	*Aristida ternipes*	2–17	–
	spidergrass	ARTEG	*Aristida ternipes var. gentilis*	1–17	–
	purple threeawn	ARPU9	*Aristida purpurea*	0–11	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–6	–
	blue threeawn	ARPUN	*Aristida purpurea var. nealleyi*	0–6	–
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	0–6	–
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	0–6	–
	poverty threeawn	ARDI5	*Aristida divaricata*	0–6	–
	Havard's threeawn	ARHA3	*Aristida havardii*	0–2	–
	Wooton's threeawn	ARPA9	*Aristida pansa*	0–2	–
	Orcutt's threeawn	ARSCO	*Aristida schiedeana var. orcuttiana*	0–2	–
6	**Common Annual Grasses**			1–34	
	Mexican panicgrass	PAHI5	*Panicum hirticaule*	0–17	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–17	–
	sweet tanglehead	HEME	*Heteropogon melanocarpus*	0–11	–
	sixweeks threeawn	ARAD	*Aristida adscensionis*	0–11	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–11	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–6	

	sixweeks grama	BOBA2	*Bouteloua barbata*	0–6	–
	Parry's grama	BOPA2	*Bouteloua parryi*	0–6	–
	prairie threeawn	AROL	*Aristida oligantha*	0–6	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	0–6	–
	mucronate sprangeltop	LEPAB	*Leptochloa panicea ssp. brachiata*	0–6	–
	delicate muhly	MUFR	*Muhlenbergia fragilis*	0–6	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	0–6	–
	witchgrass	PACA6	*Panicum capillare*	0–6	–
	Eastwood fescue	VUMIC	*Vulpia microstachys var. ciliata*	0–6	–
	desert fescue	VUMIM	*Vulpia microstachys var. microstachys*	0–6	–
	Arizona signalgrass	URAR	*Urochloa arizonica*	0–2	–
	feather fingergrass	CHVI4	*Chloris virgata*	0–2	–
	Mexican lovegrass	ERME	*Eragrostis mexicana*	0–2	–
	tufted lovegrass	ERPEP2	*Eragrostis pectinacea var. pectinacea*	0–2	–
	tapertip cupgrass	ERACA	*Eriochloa acuminata var. acuminata*	0–1	–
Forb					
7	**Common Perennial Forbs**			6–22	
	slender janusia	JAGR	*Janusia gracilis*	0–11	–
	shrubby deervetch	LORI3	*Lotus rigidus*	0–11	–
	lacy tansyaster	MAPI	*Machaeranthera pinnatifida*	0–6	–
	cliffbrake	PELLA	*Pellaea*	0–6	–
	slender poreleaf	POGR5	*Porophyllum gracile*	0–6	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0–6	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	0–6	–
	rockloving spikemoss	SERU2	*Selaginella rupincola*	0–6	–
	Thurber's morning-glory	IPTH	*Ipomoea thurberi*	0–6	–
	lipfern	CHEIL	*Cheilanthes*	0–6	–
	wild dwarf morning-glory	EVAR	*Evolvulus arizonicus*	0–6	–
	trailing windmills	ALIN	*Allionia incarnata*	0–6	–
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	0–6	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–6	–
	perennial rockcress	ARPE2	*Arabis perennans*	0–6	–
	dense ayenia	AYMI	*Ayenia microphylla*	0–6	–
	desert marigold	BAMU	*Baileya multiradiata*	0–6	–
	scarlet spiderling	BOCO	*Boerhavia coccinea*	0–2	–
	climbing wartclub	BOSC	*Boerhavia scandens*	0–2	–
	Palmer's Indian mallow	ABPA	*Abutilon palmeri*	0–2	–
	Lewis flax	LILE3	*Linum lewisii*	0–2	–
	longflower tube tongue	JULO3	*Justicia longii*	0–2	–
	Cooley's bundleflower	DECO2	*Desmanthus cooleyi*	0–2	–
	Thurber's cotton	GOTH	*Gossypium thurberi*	0–2	–
	desert rosemallow	HICO	*Hibiscus coulteri*	0–2	–
	Rocky Mountain zinnia	ZIGR	*Zinnia grandiflora*	0–2	–
	Arizona cudweed	PSAR13	*Pseudognaphalium arizonicum*	0–2	

	Arizona cudweed	PSAR12	*Pseudognaphalium arizonicum*	0–2	–
	Coues' cassia	SECO10	*Senna covesii*	0–2	–
	cloak fern	NOTHO	*Notholaena*	0–2	–
	tufted evening primrose	OECA10	*Oenothera caespitosa*	0–1	–
	Oak Creek ragwort	PAQU8	*Packera quercetorum*	0–1	–
	Wright's deervetch	LOWR	*Lotus wrightii*	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	–
	Schott's yellowhood	NISC	*Nissolia schottii*	0–1	–
	velvet leaf senna	SELI4	*Senna lindheimeriana*	0–1	–
	twinleaf senna	SEBA3	*Senna bauhinioides*	0–1	–
	velvetseed milkwort	POOB	*Polygala obscura*	0–1	–
	shrubby purslane	POSU3	*Portulaca suffrutescens*	0–1	–
	Parry's beardtongue	PEPA24	*Penstemon parryi*	0–1	–
	orange fameflower	PHAU13	*Phemeranthus aurantiacus*	0–1	–
	hairy fournwort	TENE	*Tetramerium nervosum*	0–1	–
	branched noseburn	TRRA5	*Tragia ramosa*	0–1	–
	New Mexico fanpetals	SINE	*Sida neomexicana*	0–1	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	0–1	–
	bluedicks	DICA14	*Dichelostemma capitatum*	0–1	–
	spreading fleabane	ERDI4	*Erigeron divergens*	0–1	–
	narrowleaf stoneseed	LIIN2	*Lithospermum incisum*	0–1	–
	Arizona snakecotton	FRAR2	*Froelichia arizonica*	0–1	–
	fringed twinevine	FUCYC	*Funastrum cynanchoides ssp. cynanchoides*	0–1	–
	southwestern mock vervain	GLGO	*Glandularia gooddingii*	0–1	–
	pearly globe amaranth	GONI	*Gomphrena nitida*	0–1	–
	rose heath	CHER2	*Chaetopappa ericoides*	0–1	–
	whitemouth dayflower	COER	*Commelina erecta*	0–1	–
	leatherweed	CRPO5	*Croton pottsii*	0–1	–
	dwarf desertpeony	ACNA2	*Acourtia nana*	0–1	–
	brownfoot	ACWR5	*Acourtia wrightii*	0–1	–
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	0–1	–
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	0–1	–
	tarragon	ARDR4	*Artemisia dracunculus*	0–1	–
	Arizona wrightwort	CAAR7	*Carlowrightia arizonica*	0–1	–
	Indian paintbrush	CASTI2	*Castilleja*	0–1	–
	hairyseed bahia	BAAB	*Bahia absinthifolia*	0–1	–
	Watson's dutchman's pipe	ARWA	*Aristolochia watsonii*	0–1	–
8	**Common Annual Forbs**			1–28	
	sensitive partridge pea	CHNI2	*Chamaecrista nictitans*	1–17	–
	longleaf false goldeneye	HELOA2	*Heliomeris longifolia var. annua*	0–11	–
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	0–6	–

	spreading fanpetals	SIAB	*Sida abutifolia*	1–6	–
	exserted Indian paintbrush	CAEXE	*Castilleja exserta ssp. exserta*	0–6	–
	goosefoot	CHENO	*Chenopodium*	0–6	–
	cryptantha	CRYPT	*Cryptantha*	0–2	–
	New Mexico copperleaf	ACNE	*Acalypha neomexicana*	0–2	–
	carelessweed	AMPA	*Amaranthus palmeri*	0–2	–
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–2	–
	fewflower beggarticks	BILE	*Bidens leptocephala*	0–2	–
	Coulter's spiderling	BOCO2	*Boerhavia coulteri*	0–2	–
	fringed redmaids	CACI2	*Calandrinia ciliata*	0–2	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–2	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–2	–
	sorrel buckwheat	ERPO4	*Eriogonum polycladon*	0–2	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–2	–
	spurge	EUPHO	*Euphorbia*	0–2	–
	sacred thorn-apple	DAWR2	*Datura wrightii*	0–2	–
	wedgeleaf draba	DRCU	*Draba cuneifolia*	0–2	–
	crestrib morning-glory	IPCO2	*Ipomoea costellata*	0–2	–
	Arizona poppy	KAGR	*Kallstroemia grandiflora*	0–2	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–2	–
	intermediate pepperweed	LEVIM	*Lepidium virginicum var. medium*	0–2	–
	sawtooth sage	SASU7	*Salvia subincisa*	0–2	–
	Arizona lupine	LUAR4	*Lupinus arizonicus*	0–2	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–2	–
	slender goldenweed	MAGR10	*Machaeranthera gracilis*	0–2	–
	tanseyleaf tansyaster	MATA2	*Machaeranthera tanacetifolia*	0–2	–
	combseed	PECTO	*Pectocarya*	0–2	–
	phacelia	PHACE	*Phacelia*	0–2	–
	Arizona popcornflower	PLAR	*Plagiobothrys arizonicus*	0–2	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–2	–
	woolly plantain	PLPA2	*Plantago patagonica*	0–2	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–2	–
	purslane	PORTU	*Portulaca*	0–1	–
	desert unicorn-plant	PRAL4	*Proboscidea althaeifolia*	0–1	–
	doubleclaw	PRPA2	*Proboscidea parviflora*	0–1	–
	sweet four o'clock	MILO2	*Mirabilis longiflora*	0–1	–
	green carpetweed	MOVE	*Mollugo verticillata*	0–1	–
	desert evening primrose	OEPR	*Oenothera primiveris*	0–1	–
	Fendler's desertdandelion	MAFE	*Malacothrix fendleri*	0–1	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–1	–
	coastal bird's-foot trefoil	LOSAB	*Lotus salsuginosus var. brevivexillus*	0–1	–
	warty caltrop	KAPA	*Kallstroemia parviflora*	0–1	–

	Thurber's morning-glory	IPTH	*Ipomoea thurberi*	0–1	–
	sanddune wallflower	ERCA14	*Erysimum capitatum*	0–1	–
	camphorweed	HESU3	*Heterotheca subaxillaris*	0–1	–
	star gilia	GIST	*Gilia stellata*	0–1	–
	sand fringepod	THCU	*Thysanocarpus curvipes*	0–1	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–1	–
	New Mexico thistle	CINE	*Cirsium neomexicanum*	0–1	–
	scrambled eggs	COAU2	*Corydalis aurea*	0–1	–
Shrub/Vine					
9	**Dominant Half Shrubs**			84–135	
	fairyduster	CAER	*Calliandra eriophylla*	50–84	–
	Gregg's prairie clover	DAGR2	*Dalea greggii*	6–28	–
	bastardsage	ERWR	*Eriogonum wrightii*	6–28	–
	littleleaf ratany	KRER	*Krameria erecta*	17–28	–
	trailing krameria	KRLA	*Krameria lanceolata*	0–28	–
	rough menodora	MESC	*Menodora scabra*	0–17	–
	desert zinnia	ZIAC	*Zinnia acerosa*	0–11	–
	prairie acacia	ACAN	*Acacia angustissima*	0–11	–
	Coulter's brickellbush	BRCO	*Brickellia coulteri*	0–6	–
	Schott's stickpea	ZAFOS	*Zapoteca formosa var. schottii*	0–6	–
10	**Miscellaneous Shrubs**			34–73	
	pelotazo	ABIN	*Abutilon incanum*	0–22	–
	Sonoran scrub oak	QUTU2	*Quercus turbinella*	0–17	–
	ocotillo	FOSP2	*Fouquieria splendens*	1–17	–
	algerita	MATR3	*Mahonia trifoliolata*	0–11	–
	catclaw mimosa	MIACB	*Mimosa aculeaticarpa var. biuncifera*	0–11	–
	velvetpod mimosa	MIDY	*Mimosa dysocarpa*	0–11	–
	catclaw acacia	ACGR	*Acacia greggii*	0–11	–
	knifeleaf condalia	COSP3	*Condalia spathulata*	0–11	–
	spiny hackberry	CEEH	*Celtis ehrenbergiana*	0–11	–
	desert ceanothus	CEGR	*Ceanothus greggii*	0–11	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	0–11	–
	Eastern Mojave buckwheat	ERFAP	*Eriogonum fasciculatum var. polifolium*	0–6	–
	Warnock's snakewood	COWA	*Condalia warnockii*	0–6	–
	Kearney's snakewood	COWAK	*Condalia warnockii var. kearneyana*	0–6	–
	yerba de pasmo	BAPT	*Baccharis pteronioides*	0–6	–
	desert-thorn	LYCIU	*Lycium*	0–6	–
	littleleaf sumac	RHMI3	*Rhus microphylla*	0–6	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–6	–
	turpentine bush	ERLA12	*Ericameria laricifolia*	0–6	–
	Tahitian kidneywood	EYOR	*Eysenhardtia orthocarpa*	0–6	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–6	–
	whitethorn acacia	ACCO2	*Acacia constricta*	0–6	–

	whitethorn acacia	ACCOP9	*Acacia constricta var. paucispina*	0–6	–
	desert lavender	HYEM	*Hyptis emoryi*	0–2	–
	burroweed	ISTE2	*Isocoma tenuisecta*	0–2	–
	physicnut	JACU	*Jatropha cuneata*	0–2	–
	desert olive	FOSH	*Forestiera shrevei*	0–2	–
	evergreen sumac	RHVIC	*Rhus virens var. choriophylla*	0–2	–
	yellow trumpetbush	TEST	*Tecoma stans*	0–2	–
	American threefold	TRCA8	*Trixis californica*	0–2	–
	California brickellbush	BRCA3	*Brickellia californica*	0–2	–
	milfoil wattle	ACMI	*Acacia millefolia*	0–2	–
	Wright's beebrush	ALWR	*Aloysia wrightii*	0–2	–
	Thurber's desert honeysuckle	ANTH2	*Anisacanthus thurberi*	0–2	–
	pointleaf manzanita	ARPU5	*Arctostaphylos pungens*	0–2	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–2	–
	shortleaf baccharis	BABR	*Baccharis brachyphylla*	0–2	–
	Florida hopbush	DOVI	*Dodonaea viscosa*	0–2	–
	coralbean	ERFL7	*Erythrina flabelliformis*	0–2	–
	rosary babybonnets	COGL8	*Coursetia glandulosa*	0–2	–
	Parish's goldeneye	VIPA14	*Viguiera parishii*	0–2	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–2	–
	heartleaf goldeneye	VICO	*Viguiera cordifolia*	0–1	–
	threadleaf snakeweed	GUMI	*Gutierrezia microcephala*	0–1	–
11	**Succulents**			6–22	
	sacahuista	NOMI	*Nolina microcarpa*	1–17	–
	banana yucca	YUBA	*Yucca baccata*	0–17	–
	cactus apple	OPEN3	*Opuntia engelmannii*	1–11	–
	common sotol	DAWH2	*Dasylirion wheeleri*	0–11	–
	walkingstick cactus	CYSP8	*Cylindropuntia spinosior*	0–6	–
	staghorn cholla	CYVE3	*Cylindropuntia versicolor*	0–6	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–6	–
	pinkflower hedgehog cactus	ECFE	*Echinocereus fendleri*	0–6	–
	smallflower century plant	AGPA5	*Agave parviflora*	0–6	–
	Schott's century plant	AGSC3	*Agave schottii*	0–6	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	0–6	–
	soaptree yucca	YUEL	*Yucca elata*	0–6	–
	Graham's nipple cactus	MAGR9	*Mammillaria grahamii*	0–2	–
	purple pricklypear	OPMAM	*Opuntia macrocentra var. macrocentra*	0–2	–
	desert agave	AGDE	*Agave deserti*	0–2	–
	rainbow cactus	ECPEP	*Echinocereus pectinatus var. pectinatus*	0–2	–
	spinystar	ESVI2	*Escobaria vivipara*	0–1	–
	white fishhook cactus	ECIN2	*Echinomastus intertextus*	0–1	–

	pinkflower hedgehog cactus	ECBO2	*Echinocereus bonkerae*	0–1	–
	Palmer's century plant	AGPA3	*Agave palmeri*	0–1	–
	Parry's agave	AGPA4	*Agave parryi*	0–1	–
	saguaro	CAGI10	*Carnegiea gigantea*	0–1	–
	jumping cholla	CYFU10	*Cylindropuntia fulgida*	0–1	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	0–1	–
	little nipple cactus	MAHE2	*Mammillaria heyderi*	0–1	–
Tree					
12	**Trees**			0–11	
	oneseed juniper	JUMO	*Juniperus monosperma*	0–11	–
	velvet mesquite	PRVE	*Prosopis velutina*	0–11	–
	blue paloverde	PAFL6	*Parkinsonia florida*	0–6	–
	western honey mesquite	PRGLT	*Prosopis glandulosa var. torreyana*	0–6	–

Animal community

With continuous heavy grazing, the short gramas are replaced by increases in false mesquite, shrubby buckwheat, and threeawns. With severe deterioration, shrubby species like snakeweed, turpentine bush, catclaw mimosa, ocotillos, and burroweed can increase to dominate the plant community. Mesquite can increase on the site, but due to shallow soils, individual plants are shrubby in nature. This site generally lacks the cobble and stone cover of adjacent hill sites. Gravel size cover is inadequate, on moderately steep slopes, in preventing water erosion. Natural fire was an important factor in the development of the potential plant community. Water developments are very important to wildlife on the site. The site produces a diverse mixture of low shrubs and perennial grasses. It is a poor producer of annual grasses and annual and perennial forbs.

Hydrological functions

Shallow soil and bedrock outcrops with moderate slopes make this site a producer of runoff in large storm events.

Recreational uses

Hunting, hiking, horseback riding, bird-watching, photography, rock-hounding, prospecting.

Wood products

Very limited firewood for campfires.

Other products

Gold, silver, turquoise, decomposed granite.

Inventory data references

Range 417s include 2 in excellent condition, 5 in good condition and 4 in fair condition.

Type locality

Location 1: Pima County, AZ	
Township/Range/Section	T20s R7E S34
General legal description	Santa Margarita Ranch-Las Moras Pas.

Location 2: Santa Cruz County, AZ	
Township/Range/Section	T23S R14E S20
General legal description	Santa Fe Ranch-back pasture
Location 3: Pinal County, AZ	
Township/Range/Section	T10S R13E S9
General legal description	Falcon Valley Ranch-Carpas Canyon
Location 4: Pima County, AZ	
Township/Range/Section	T8E R17S S7
General legal description	Tohono Tribal Herd Ranch-Alhambre Unit

Contributors

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Approval

Curtis Talbot, 4/12/2021

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)	Dave Womack, Emilio Carrillo, Dan Robinett, Tom Reis
Contact for lead author	NRCS Tucson Area Office
Date	03/07/2005
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:** Occupy <5% of the area, broken by rock and gravel cover, highly discontinuous.

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3. **Number and height of erosional pedestals or terracettes:** Erosional pedestals are very uncommon (1 per 20 plants observed); Terracettes are fairly uncommon.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 15-25%

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

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

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7. **Amount of litter movement (describe size and distance expected to travel):** All litter size classes are 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 ratings of 1-3 in plant, rock and gravel interspaces.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak granular; color is 2.5-7.5 YR4/4 Dry; 2.5-7.5YR3/4 Moist; thickness to 3 inches.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy 25-35%, Basal 5-10%; Litter 10-20%: 60-70% of canopy cover is perennial mid grasses, 15-20% sub shrubs, 5-10% trees & shrubs, 5-10% annual forbs and grasses. Cover is well dispersed throughout site.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None

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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 shrubs > annual forbs & grasses > perennial forbs > trees & shrubs > succulents

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** 15% of basal cover of perennial grass species has been slost due to prolonged drought.

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

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 400 lbs/ac unfavorable precipitation; 650 lbs/ac normal precipitation; 900 lbs/ac favorable precipitation.

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Lehmann lovegrass, mesquite, prickly pear, ocotillo

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