USDA Natural Resources Conservation Service

Ecological site R041XA114AZ
Loamy Bottom 16-20" 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 41.1 – Mexican Oak-Pine Forest and Oak Savannah

Elevations range from 4500 to 10,700 feet and precipitation ranges from 16 to 30 inches. Vegetation includes Emory oak, Mexican blue oak, Arizona white oak, one-seed juniper, alligator juniper, sacahuista, California bricklebush, skunkbush sumac, Arizona rosewood, wait-a-bit mimosa, sideoats grama, blue grama, purple grama, wooly bunchgrass, plains lovegrass, squirreltail, and pinyon ricegrass. The soil temperature regime ranges from thermic to mesic and the soil moisture regime ranges from aridic ustic to typic ustic. 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

F041XA112AZ	**Sandy Wash 16-20" p.z. woodland**
F041XA113AZ	**Sandy Bottom 16-20" p.z. woodland**
R041XA104AZ	**Limy Slopes 16-20" p.z.**

R041XA108AZ	**Loamy Upland 16-20" p.z.**
R041XA115AZ	**Loamy Swale 16-20" p.z.**

Similar sites

R041XA115AZ	**Loamy Swale 16-20" p.z.**
R041XC311AZ	**Loamy Swale 12-16" p.z.**
R041XC312AZ	**Loamy Bottom 12-16" p.z.**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *sporobolus wrightii*

Physiographic features

This site occurs in the middle elevations of the Madrean Basin and Range province in southeastern Arizona. It occurs on floodplains and low stream terraces of major drainage-ways and first and second order tributaries. It benefits on a regular basis from extra moisture received as over-bank flooding. It also benefits from shallow water tables at depths of 5-20 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream terrace
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None to rare
Elevation	1,433–1,676 m
Slope	0–3%
Aspect	Aspect is not a significant factor

Climatic features

Precipitation in this zone of the common resource area ranges from 16-20 inches per year with elevations from 4700-5500 feet. Approximately 40% of this moisture comes as gentle rain or snow during the winter-spring (Oct-Apr) season; originates in the north Pacific and Gulf of California and comes as frontal storms with long duration and low intensity. The remaining 60% falls in the summer season (May-Sep); originates in the Gulf of Mexico and are convective, usually brief, intense thunderstorms. Snow is common Dec-Mar, averaging 5-15 inches per year, but rarely lasts more than a week. May and June are the driest months. Humidity is low.

Temperatures are mild. Freezing temperatures are common at night from Oct-May, but daytime temperatures are almost always over 40 F. Below 0 F temperatures can occur Dec-Feb. Daytime summer highs rarely exceed 95 F.

Species like plains lovegrass, wooly bunchgrass, false mesquite, shrubby buckwheat and ratany begin growth in late March to April. Warm season grasses begin growth in July or August with receipt of the first summer rains.

Table 3. Representative climatic features

Frost-free period (average)	
Freeze-free period (average)	175 days

Precipitation total (average)	457 mm

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. Plant-soil moisture relationships are excellent.

Soils mapped on this site include: SSA-661 Eastern Pinal & Southern Gila counties MU 94 Stanford; SSA-671 Cochise county Douglas-Tombstone part MU 26 Leslie creek.

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Silt loam (3) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	152 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0–1%
Available water capacity (0-101.6cm)	21.34–32 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)	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.

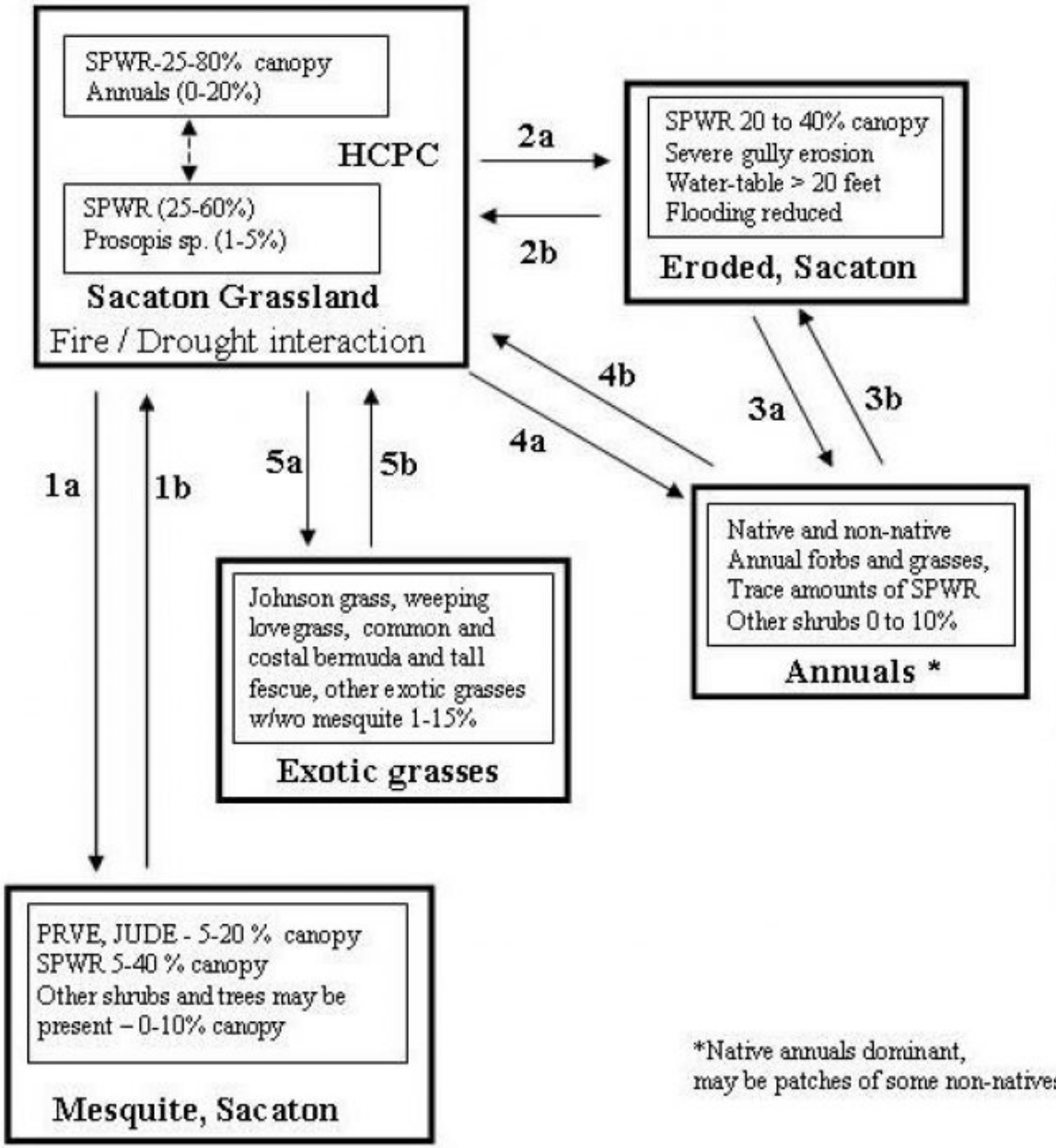
Production data provided in this site description is standardized to air dry weight at the end of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

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 potential plant community on this site is a giant sacaton grassland. Occasional clumps and strands of trees occur along shallow drainageways and discontinuous gullies. Natural fires during the summer months were important in maintaining the plant community.
The site is very susceptible to gully, channel and bank erosion, especially when the tall grass cover is depleted due to repeated burning and overgrazing or when structures such as dikes, roads, etc., are placed on the floodplain. The lowering of the base level of the main stream of a watershed will eventually cause channeling of the site. Grade stabilization will be required to prevent deterioration under such conditions. Excessive pumping of ground water can, over time, lower water tables causing depletion of grass cover and site deterioration from gully erosion. With severe erosion, the effectiveness of flooding is reduced, water tables are lowered, the grass cover is thinned and woody plants, especially mesquite, will increase to dominate the plant community. Bermuda grass and Johnson grass are introduced species which can be troublesome on this site.

State and transition model

MLRA 41-1 (16-20"), Loamy Bottom



1a. Mesquite, juniper seed source present or introduced. Lack of fire for long periods of time. Shrubs increases to 20% canopy.
1b. Herbicide or mechanical means to remove shrubs. PG/NG
2a. CHG, Base level changes cause gully and head-ward erosion. Flooding reduced, water-table lowered to >20 feet.
2b. PG/NG, Mechanical control of gullies at headcuts with dikes, Diversions and spillways. Dams below headcuts to re-establish base level and flooding.
3a. Irrigated cultivation and abandonment. CHG managing for Annual forbs and grasses, some perennial weeds.
3b. PG/NG, Seeding SPWR with weed control and water.
4a. CHG combined with drought, burning with low soil moisture. Plowing of SPWR for cultivation with subsequent abandonment. Introduction of seeds of exotic annual grasses and forbs.
4b. Herbicide or mechanical control of annual species, seeding of SPWR with continued weed control, irrigation, fertilization and / or flooding.
5a. Introduction of a seed source of exotic perennials via direct seeding or accident. CHG with burning in dry winters.
5b. Unk. Possible herbicide control of exotics and direct Seeding of SPWR or planting and watering SPWR seedlings.

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

CHG – continuous heavy grazing
PG/NG – proper grazing, no grazing
SPWR – sacaton, PRVE – mesquite
JUDE – juniper, Unk. - unknown

Figure 6. State and Transition, Loamy Bottom 16-20" p.z.

State 1
Reference

Community 1.1
Historic Climax Plant Community

Figure 7. Loamy Bottom 16-20" pz. HCPC

The historic 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 plant community represents the natural climax community that eventually re-occupies the site with proper management. The potential plant community is dominated by nearly pure stands of giant sacaton. Frequent flooding and groundwater available within the rooting depth of sacaton (20 feet) account for dense and productive stands of grass. Occasional clumps and strands of trees occur along shallow drainages. Naturally occuring fires, June thru September, were an important factor in maintaining the plant community on this site. The aspect is tall grassland. Mesquite can invade and increase in the native plant community; but high intensity fires can remove even well established mesquite trees as long as sediment accumulation around the stem bases has not occurred. Even repeated fires at these intensities will not remove established mesquite if their bud zones are buried by sediment. The interaction of drought, fire, flooding and grazing can reduce sacaton canopy to 25%. It will recover to normal levels in a short time. Annual composite forbs like ragweed, goldeneye, sunflower and xanthocephalum can make tremendous stands in wet seasons after fire or drought has opened the grass community.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	3402	4483	7229
Forb	22	84	673
Tree	11	22	168
Shrub/Vine	–	11	56
Total	**3435**	**4600**	**8126**

Table 6. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	0-1%
Grass/grasslike basal cover	20-40%
Forb basal cover	0-1%
Non-vascular plants	0-1%

Biological crusts	1-5%
Litter	25-65%
Surface fragments >0.25" and <=3"	0-5%
Surface fragments >3"	0-5%
Bedrock	0%
Water	0%
Bare ground	10-50%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	0-5%	0-5%
>0.15 <= 0.3	–	–	0-10%	0-5%
>0.3 <= 0.6	–	–	0-5%	0-5%
>0.6 <= 1.4	–	0-2%	30-70%	0-15%
>1.4 <= 4	0-3%	0-2%	0-15%	0-5%
>4 <= 12	0-2%	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 9. Plant community growth curve (percent production by month). AZ4111, 41.1 16-30. 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	0	5	10	0	15	45	20	5	0	0

Community 1.2
Scattered Mesquite

Mesquite and/or alligator juniper are sparsely scattered within the big sacaton grassland. The aspect is a savannah. This community phase rapidly returns to the reference state after summer fire.

State 2
Mesquite, Sacaton

Community 2.1
Tall Grass Savannah

Mesquite has invaded the site in the absence of fire for long periods of time. Mesquite canopy ranges from 5 to 30%. Trees are well established and the crowns are protected from the heat of surface fires due to sediment accumulation around the stem bases. Sacaton is co-dominant as the state still benefits from frequent flooding and groundwater within the reach of grass roots.

State 3
Eroded Sacaton

Community 3.1
Sacaton, eroded

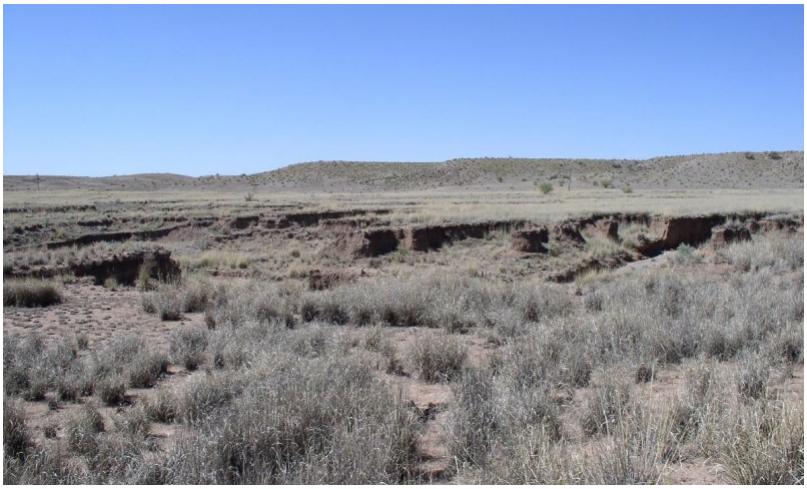


Figure 10. Loamy Bottom 16-20" pz. gullied.

Head-cutting and gully erosion have drained the site. It no longer benefits from extra water received as flooding. The cover of sacaton thins to less than 25%. Groundwater may become out of reach to sacaton roots if incision is deeper than 20 feet. Annual production becomes a function of seasonal rainfall. Annual forbs and grasses may equal sacaton in production.

State 4
Annual Forbs and Grasses

Community 4.1
Annual Forbs and Grasses

Some areas of this state have been created by cultivation for irrigated farming and subsequent abandonment. Former cultivated areas usually have been altered by the diversion of floodwaters with dikes or drainage ditches. In other areas erosion and lowering of water tables have reduced sacaton to less than 5% canopy cover and allowed annual species to dominate. Native and non-native annual forbs and grasses dominate the plant community with minor amounts of sacaton and other native and non-native perennial grasses.

State 5
Exotic Grasses

Community 5.1
Non-native grassland

This state occurs where exotic perennial grasses like Johnson grass, common and coastal bermuda, and tall fescue have invaded the native plant community or been seeded on areas of the site. These species tend to make large monotypic patches within stands of sacaton. They may also be the result of cultivation and abandonment, leaving these species as remnants of the weeds that existed.

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 tall grass**			3363–6725	
	big sacaton	SPWR2	*Sporobolus wrightii*	3363–6725	–
	alkali sacaton	SPAI	*Sporobolus airoides*	0–560	–
2	**Subdominant perennial grasses**			28–224	
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–112	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–112	–

	blue grama	BOGR2	*Bouteloua gracilis*	0–112	
	vine mesquite	PAOB	*Panicum obtusum*	0–112	–
	creeping muhly	MURE	*Muhlenbergia repens*	0–56	–
3	**Miscellaneous perennial grasses**			0–112	
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	0–56	–
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	0–28	–
	Arizona cottontop	DICA8	*Digitaria californica*	0–28	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	0–28	–
	green sprangletop	LEDU	*Leptochloa dubia*	0–28	–
	whiplash pappusgrass	PAVA2	*Pappophorum vaginatum*	0–28	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	0–28	–
	deergrass	MURI2	*Muhlenbergia rigens*	0–22	–
	spidergrass	ARTE3	*Aristida ternipes*	0–22	–
	spidergrass	ARTEG	*Aristida ternipes var. gentilis*	0–17	–
	Orcutt's threeawn	ARSCO	*Aristida schiedeana var. orcuttiana*	0–17	–
	flatsedge	CYPER	*Cyperus*	0–17	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–17	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	0–11	–
	tobosagrass	PLMU3	*Pleuraphis mutica*	0–11	–
	spike dropseed	SPCO4	*Sporobolus contractus*	0–11	–
	Texas bluestem	SCCI2	*Schizachyrium cirratum*	0–11	–
	bulrush	SCIRP	*Scirpus*	0–11	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	0–11	–
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	0–11	–
	silver bluestem	BOSA	*Bothriochloa saccharoides*	0–11	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–11	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–6	–
	burrograss	SCBR2	*Scleropogon brevifolius*	0–6	–
	purple muhly	MURI3	*Muhlenbergia rigida*	0–6	–
	bulb panicgrass	PABU	*Panicum bulbosum*	0–6	–
	bullgrass	MUEM	*Muhlenbergia emersleyi*	0–6	–
	sedge	CAREX	*Carex*	0–6	–
	poverty threeawn	ARDI5	*Aristida divaricata*	0–3	–
	densetuft hairsedge	BUCA2	*Bulbostylis capillaris*	0–1	–
	common wolfstail	LYPH	*Lycurus phleoides*	0–1	–
4	**Annual grasses**			11–168	
	feather fingergrass	CHVI4	*Chloris virgata*	0–56	–
	sticky sprangletop	LEVI5	*Leptochloa viscida*	0–56	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	0–56	–
	mucronate sprangeltop	LEPAB	*Leptochloa panicea ssp. brachiata*	0–28	–
	Mexican panicgrass	PAHI5	*Panicum hirticaule*	0–28	–
	Arizona signalgrass	URAR	*Urochloa arizonica*	0–28	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–28	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–22	–

	tapertip cupgrass	ERACA	*Eriochloa acuminata var. acuminata*	0–17	–
	Mexican lovegrass	ERME	*Eragrostis mexicana*	0–6	–
	desert lovegrass	ERPEM	*Eragrostis pectinacea var. miserrima*	0–6	–
	tufted lovegrass	ERPEP2	*Eragrostis pectinacea var. pectinacea*	0–6	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–6	–
	Arizona brome	BRAR4	*Bromus arizonicus*	0–6	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	0–6	–
	delicate muhly	MUFR	*Muhlenbergia fragilis*	0–6	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	0–6	–
	witchgrass	PACA6	*Panicum capillare*	0–6	–
	sixweeks threeawn	ARAD	*Aristida adscensionis*	0–6	–
	prairie threeawn	AROL	*Aristida oligantha*	0–6	–
	pitscale grass	HAGR3	*Hackelochloa granularis*	0–1	–
Forb					
5	**Perennial Forbs**			11–112	
	sedge	CAREX	*Carex*	56–280	–
	flatsedge	CYPER	*Cyperus*	56–280	–
	slimleaf sneezeweed	HELI	*Helenium linifolium*	56–280	–
	rush	JUNCU	*Juncus*	56–280	–
	Missouri gourd	CUFO	*Cucurbita foetidissima*	0–56	–
	coyote gourd	CUPA	*Cucurbita palmata*	0–28	–
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	1–28	–
	fingerleaf gourd	CUDI	*Cucurbita digitata*	0–28	–
	gooseberryleaf globemallow	SPGR2	*Sphaeralcea grossulariifolia*	0–22	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–17	–
	scarlet spiderling	BOCO	*Boerhavia coccinea*	0–17	–
	spreading fleabane	ERDI4	*Erigeron divergens*	0–11	–
	Indian rushpea	HOGL2	*Hoffmannseggia glauca*	0–11	–
	spear globemallow	SPHA	*Sphaeralcea hastulata*	0–11	–
	slimleaf bean	PHAN3	*Phaseolus angustissimus*	0–11	–
	canaigre dock	RUHY	*Rumex hymenosepalus*	0–11	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0–11	–
	American vetch	VIAM	*Vicia americana*	0–6	–
	Louisiana vetch	VILUL2	*Vicia ludoviciana ssp. ludoviciana*	0–6	–
	woodsorrel	OXALI	*Oxalis*	0–6	–
	Indianhemp	APCA	*Apocynum cannabinum*	0–6	–
	Wright's cudweed	PSCAC2	*Pseudognaphalium canescens ssp. canescens*	0–6	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	0–6	–
	white prairie aster	SYFAC	*Symphyotrichum falcatum var. commutatum*	0–6	–
	Lemmon's ragwort	SELE8	*Senecio lemmonii*	0–6	–
	New Mexico fanpetals	SINE	*Sida neomexicana*	0–6	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	0–6	–

	Missouri goldenrod	SOMI2	*Solidago missouriensis*	0–6	–
	Trans-Pecos thimblehead	HYWI	*Hymenothrix wislizeni*	0–6	–
	Lewis flax	LILE3	*Linum lewisii*	0–6	–
	Greene's bird's-foot trefoil	LOGR4	*Lotus greenei*	0–6	–
	Wright's deervetch	LOWR	*Lotus wrightii*	0–6	–
	beeblossom	GAURA	*Gaura*	0–6	–
	southwestern mock vervain	GLGO	*Glandularia gooddingii*	0–6	–
	small matweed	GUDED	*Guilleminea densa var. densa*	0–6	–
	leastdaisy	CHAET2	*Chaetopappa*	0–6	–
	bluedicks	DICA14	*Dichelostemma capitatum*	0–6	–
	tarragon	ARDR4	*Artemisia dracunculus*	0–6	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–6	–
	melon loco	APUN	*Apodanthera undulata*	0–2	–
	yerba mansa	ANCA10	*Anemopsis californica*	0–2	–
	whitemouth dayflower	COER	*Commelina erecta*	0–2	–
	wild dwarf morning-glory	EVAR	*Evolvulus arizonicus*	0–2	–
	ragged nettlespurge	JAMA	*Jatropha macrorhiza*	0–2	–
	jewels of Opar	TAPA2	*Talinum paniculatum*	0–2	–
	orange fameflower	PHAU13	*Phemeranthus aurantiacus*	0–2	–
	ivyleaf groundcherry	PHHE4	*Physalis hederifolia*	0–2	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	0–1	–
	buffpetal	RHPH2	*Rhynchosida physocalyx*	0–1	–
	Texas snoutbean	RHSET	*Rhynchosia senna var. texana*	0–1	–
	slimleaf plainsmustard	SCLI12	*Schoenocrambe linearifolia*	0–1	–
	narrowleaf stoneseed	LIIN2	*Lithospermum incisum*	0–1	–
	variableleaf bushbean	MAGI2	*Macroptilium gibbosifolium*	0–1	–
	lemon beebalm	MOCIA	*Monarda citriodora ssp. austromontana*	0–1	–
	tufted evening primrose	OECA10	*Oenothera caespitosa*	0–1	–
	scarlet beeblossom	GACO5	*Gaura coccinea*	0–1	–
	trailing fleabane	ERFL	*Erigeron flagellaris*	0–1	–
	New Mexico fleabane	ERNE3	*Erigeron neomexicanus*	0–1	–
	Mexican fireplant	EUHE4	*Euphorbia heterophylla*	0–1	–
	birdbill dayflower	CODI4	*Commelina dianthifolia*	0–1	–
	Texas bindweed	COEQ	*Convolvulus equitans*	0–1	–
	Arizona milkvetch	ASAR6	*Astragalus arizonicus*	0–1	–
	spider milkweed	ASAS	*Asclepias asperula*	0–1	–
	milkweed	ASCLE	*Asclepias*	0–1	–
	broadleaf milkweed	ASLA4	*Asclepias latifolia*	0–1	–
	horsetail milkweed	ASSU2	*Asclepias subverticillata*	0–1	–
6	**Annual forbs**			11–560	
	common sunflower	HEAN3	*Helianthus annuus*	1–224	–
	San Pedro matchweed	XAGY	*Xanthocephalum gymnospermoides*	1–224	–

	longleaf false goldeneye	HELOL	*Heliomeris longifolia var. longifolia*	1–168	–
	camphorweed	HESU3	*Heterotheca subaxillaris*	0–112	–
	longleaf false goldeneye	HELOA2	*Heliomeris longifolia var. annua*	1–112	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–56	–
	carelessweed	AMPA	*Amaranthus palmeri*	0–56	–
	wheelscale saltbush	ATEL	*Atriplex elegans*	0–28	–
	Coulter's spiderling	BOCO2	*Boerhavia coulteri*	0–28	–
	sensitive partridge pea	CHNI2	*Chamaecrista nictitans*	0–28	–
	New Mexico thistle	CINE	*Cirsium neomexicanum*	0–28	–
	crestrib morning-glory	IPCO2	*Ipomoea costellata*	0–17	–
	flaxflowered ipomopsis	IPLOL	*Ipomopsis longiflora ssp. longiflora*	0–17	–
	Arizona poppy	KAGR	*Kallstroemia grandiflora*	0–17	–
	intermediate pepperweed	LEVIM	*Lepidium virginicum var. medium*	0–17	–
	Nuttall's povertyweed	MONU	*Monolepis nuttalliana*	0–17	–
	Arizona popcornflower	PLAR	*Plagiobothrys arizonicus*	0–17	–
	horseweed	CONYZ	*Conyza*	0–17	–
	cryptantha	CRYPT	*Cryptantha*	0–17	–
	Wright's saltbush	ATWR	*Atriplex wrightii*	0–17	–
	New Mexico copperleaf	ACNE	*Acalypha neomexicana*	0–17	–
	woolly plantain	PLPA2	*Plantago patagonica*	0–11	–
	purslane	PORTU	*Portulaca*	0–6	–
	desert unicorn-plant	PRAL4	*Proboscidea althaeifolia*	0–6	–
	doubleclaw	PRPA2	*Proboscidea parviflora*	0–6	–
	Wright's cudweed	PSCAC2	*Pseudognaphalium canescens ssp. canescens*	0–6	–
	Florida pellitory	PAFL3	*Parietaria floridana*	0–6	–
	combseed	PECTO	*Pectocarya*	0–6	–
	Mangas Spring phacelia	PHBO4	*Phacelia bombycina*	0–6	–
	rough cocklebur	XAST	*Xanthium strumarium*	0–6	–
	golden crownbeard	VEEN	*Verbesina encelioides*	0–6	–
	sawtooth sage	SASU7	*Salvia subincisa*	0–6	–
	spreading fanpetals	SIAB	*Sida abutifolia*	0–6	–
	warty caltrop	KAPA	*Kallstroemia parviflora*	0–6	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–6	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–6	–
	coastal bird's-foot trefoil	LOSAB	*Lotus salsuginosus var. brevivexillus*	0–6	–
	shortstem lupine	LUBR2	*Lupinus brevicaulis*	0–6	–
	bajada lupine	LUCOC	*Lupinus concinnus ssp. concinnus*	0–6	–
	slender goldenweed	MAGR10	*Machaeranthera gracilis*	0–6	–
	tanseyleaf tansyaster	MATA2	*Machaeranthera tanacetifolia*	0–6	–
	whitestem blazingstar	MEAL6	*Mentzelia albicaulis*	0–6	–
	El Paso skyrocket	IPTH2	*Ipomopsis thurberi*	0–6	–
	scrambled eggs	COAU2	*Corydalis aurea*	0–6	–

	poorjoe	DITE2	*Diodia teres*	0–6	–
	Abert's buckwheat	ERAB2	*Eriogonum abertianum*	0–6	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–6	–
	sorrel buckwheat	ERPO4	*Eriogonum polycladon*	0–6	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–6	–
	Arizona blanketflower	GAAR2	*Gaillardia arizonica*	0–6	–
	southwestern pricklypoppy	ARPL3	*Argemone pleiacantha*	0–6	–
	milkvetch	ASTRA	*Astragalus*	0–6	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–6	–
	jimsonweed	DAST	*Datura stramonium*	0–6	–
	sacred thorn-apple	DAWR2	*Datura wrightii*	0–6	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–6	–
	pitseed goosefoot	CHBE4	*Chenopodium berlandieri*	0–6	–
	hyssopleaf sandmat	CHHY3	*Chamaesyce hyssopifolia*	0–6	–
	New Mexico goosefoot	CHNE3	*Chenopodium neomexicanum*	0–6	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–3	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–2	–
	Mexican passionflower	PAME2	*Passiflora mexicana*	0–2	–
	lesser yellowthroat gilia	GIFL	*Gilia flavocincta*	0–2	–
	sweet four o'clock	MILO2	*Mirabilis longiflora*	0–2	–
	Goodding's bladderpod	LEGO2	*Lesquerella gooddingii*	0–2	–
	green carpetweed	MOVE	*Mollugo verticillata*	0–2	–
	plains flax	LIPU4	*Linum puberulum*	0–2	–
	fringed redmaids	CACI2	*Calandrinia ciliata*	0–2	–
	El Paso gilia	GIME	*Gilia mexicana*	0–1	–
	Dakota mock vervain	GLBIB	*Glandularia bipinnatifida var. bipinnatifida*	0–1	–
	Abert's creeping zinnia	SAAB	*Sanvitalia abertii*	0–1	–
Shrub/Vine					
7	**Miscellaneous shrubs**			0–56	
	mule-fat	BASA4	*Baccharis salicifolia*	0–11	–
	Apache plume	FAPA	*Fallugia paradoxa*	0–11	–
	American black elderberry	SANIC4	*Sambucus nigra ssp. canadensis*	0–11	–
	canyon grape	VIAR2	*Vitis arizonica*	0–6	–
	soaptree yucca	YUEL	*Yucca elata*	0–6	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–6	–
	fringed twinevine	FUCYC	*Funastrum cynanchoides ssp. cynanchoides*	0–6	–
	Drummond's clematis	CLDR	*Clematis drummondii*	0–6	–
	pale desert-thorn	LYPA	*Lycium pallidum*	0–6	–
	catclaw mimosa	MIACB	*Mimosa aculeaticarpa var. biuncifera*	0–6	–
	Texas mulberry	MOMI	*Morus microphylla*	0–6	–
	sacahuista	NOMI	*Nolina microcarpa*	0–6	–

	Thurber's desert honeysuckle	ANTH2	*Anisacanthus thurberi*	0–6	–
	yerba de pasmo	BAPT	*Baccharis pteronioides*	0–2	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–2	–
	walkingstick cactus	CYSP8	*Cylindropuntia spinosior*	0–2	–
	singlewhorl burrobrush	HYMO	*Hymenoclea monogyra*	0–1	–
Tree					
8	**Miscellaneous trees**			11–168	
	Arizona sycamore	PLWR2	*Platanus wrightii*	1–168	–
	Fremont cottonwood	POFR2	*Populus fremontii*	0–56	–
	desert willow	CHLI2	*Chilopsis linearis*	1–34	–
	Goodding's willow	SAGO	*Salix gooddingii*	0–28	–
	Arizona walnut	JUMA	*Juglans major*	1–28	–
	velvet ash	FRVE2	*Fraxinus velutina*	1–22	–
	netleaf hackberry	CELAR	*Celtis laevigata var. reticulata*	0–11	–
	western soapberry	SASAD	*Sapindus saponaria var. drummondii*	0–11	–
	catclaw acacia	ACGR	*Acacia greggii*	0–6	–
	western honey mesquite	PRGLT	*Prosopis glandulosa var. torreyana*	0–2	–
	velvet mesquite	PRVE	*Prosopis velutina*	0–2	–

Animal community

Big sacaton begins growth in the spring from April 15 to May 1st. The green season extends into September. Grazing must be concentrated on areas of this site to achieve reasonable utilization of sacaton and keep it in a vegetative state. Heat, humidity and insects are severe enough during summer flooding in July and August, to greatly affect livestock performance. Burning or mowing can be used periodically to freshen old growth sacaton. Burning should be done in February or early March; only in years when November thru February moisture equals or exceeds 4 inches. Burning can be done in July or August, after the first summer rains, to freshen sacaton for winter grazing. Areas of this site should be fenced exclusively for best management of the forage resources. Sacaton is very coarse and unpalatable, but provides adequate nutrition for livestock when green.
Sacaton bottoms are very important habitat for a variety of ground nesting birds and small mammals. They are important cover and foraging areas for javalina, whitetail and mule deer.

Hydrological functions

Sacaton floodplains are extremely important in the hydrologic regime of southeastern Arizona stream systems. Intact sacaton floodplains retain floodwaters for 3 to 4 weeks after major flooding events. Channeled or gullied bottomlands often pass the same flood in 2 or 3 days. Water tables in healthy sacaton bottoms range from 5 to 20 feet alongside major streams and creeks and their larger tributaries.

Recreational uses

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

Wood products

Sacaton bottoms invaded by mesquite furnish large quantities of fuelwood and posts.

Other products

Sacaton seed

Inventory data references

Range 417s include 1 in excellent condition and 1 in good condition.

Type locality

Location 1: Santa Cruz County, AZ	
Township/Range/Section	T21S R18E S22
General legal description	Audubon Research Ranch, O'Donnell Canyon bottom.
Location 2: Santa Cruz County, AZ	
General legal description	San Rafael Ranch, Santa Cruz River bottom

Contributors

Dan Robinett
Larry D. Ellicott

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, Linda Kennedy
Contact for lead author	USDA-NRCS Tucson MLRA Soil Survey Office
Date	05/01/2014
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:** None present. Water movement is even sheet flow lacking energy.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals (2-4" height) common on big sacaton plants; pedestals disappear after fire and reform within 10 years after fire. No terracettes.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10% bare ground with bare areas 2-5 ft in diameter common across site. Bare ground exposed after fire

is covered with litter within 1-2 years after burning.

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5. **Number of gullies and erosion associated with gullies:** Discontinuous gullies, although infrequent, are occasionally present. When present, gullies are generally 100-200ft in length, 1-3ft wide, and 1-3 ft deep.

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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 remains in place. After fire, litte moves and deposits in debris dams.

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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):** Slake test values collected from under grass canopy were scored from 4 to 6 with 85% of the samples at 5 and 6; samples collect from outside of canopy also scored from 4 to 6 with 75% of the samples at 5 and 6.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface horizon 0-3" depth was silt loam with a weak platy structure. Color 7.5 YR 3/2 moist.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant basal cover is well-dispersed across site (5-15% basal cover; tall grasses 50-80% foliar canopy cover) and dissipates overbank flood events resulting in sheet floods on the site 1-2" deep.

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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):** No compaction. Soil penetrometer averaged 6 cm with a range of depths from 4-10 cm.

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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: Tall grasses

    Sub-dominant: Sod-forming perennial midgrasses

    Other: Perennial vining forbs

    Additional: Tall annual forbs fluctuate with rainfall

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little mortality or decadence (<5%) at 4 years after fire. Decadence increases with time post-burn.

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14. **Average percent litter cover (%) and depth (in):** Expect a marked reduction in litter cover after fire. Litter cover recovers within one year.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 3065 lbs/ac. in a below average year; 4105 lbs/ac. in an average year; 7250 lbs/ac. in an above average year.

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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:** Johnson grass, hoary cress, bermudagrass, mesquite, burrobrush

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17. **Perennial plant reproductive capability:** Not impaired.
