USDA Natural Resources
Conservation Service

Ecological site R038XA109AZ
Loamy 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.

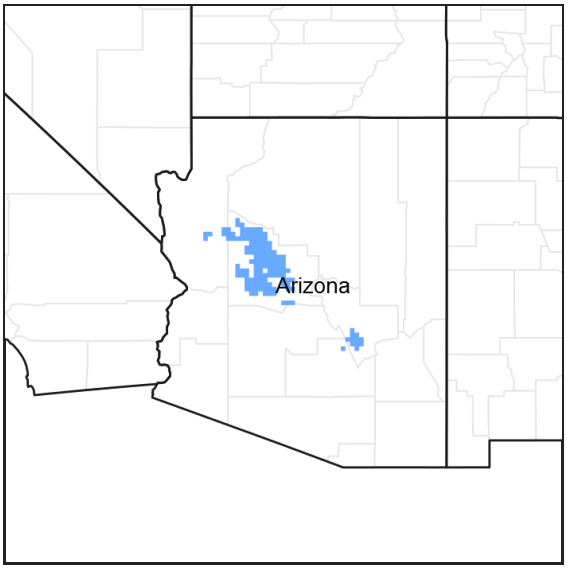


Figure 1. Mapped extent

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): 038X–Mogollon Transition South

AZ 38.1 – Lower Mogollon Transition

Elevations range from 3,000 to 4,500 feet and precipitation averages 12 to 16 inches per year. Vegetation includes canotia, one-seed juniper, mesquite, catclaw acacia, jojoba, turbinella oak, ratany, shrubby buckwheat, algerita, skunkbush, tobosa, vine mesquite, bottlebrush squirreltail, grama species, curly mesquite, desert needlegrass, and New Mexico feathergrass. The soil temperature regime is thermic and the soil moisture regime is ustic aridic. This MLRA occurs within the Transition Zone Physiographic Province and is characterized by canyons and structural troughs or valleys. Igneous, metamorphic, and sedimentary rock classes occur on rough mountainous terrain in association with less extensive sediment filled valleys exhibiting little integrated drainage.

Ecological site concept

The Loamy Upland ecological site occurs at the lowest elevations of the interior chaparral zone in the Mogollon Transition area. It occurs on uplands.

These soils are moderately deep to deep (30 to 60 inches), and dark colored in the surface (6 to 12 inches). They are clayey textured, gravelly to very gravelly, and well drained. They have formed in alluvium and colluvium from a

variety of parent materials.

Associated sites

R038XA106AZ	**Limy Upland 12-16" p.z.**
R038XA108AZ	**Clayey Slopes 12-16" p.z.**
R038XA126AZ	**Limy Slopes 12-16" p.z.**

Similar sites

R040XA120AZ	**Clay Loam Upland 10"-13" p.z.**
R038XB203AZ	**Clay Loam Upland 16-20" p.z.**
R041XB204AZ	**Clay Loam Upland 8-12" p.z.**
R041XC305AZ	**Clay Loam Upland 12-16" p.z.**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Opuntia engelmannii* (2) *Calliandra eriophylla*
Herbaceous	(1) *Bouteloua curtipendula* (2) *Hilaria belangeri*

Physiographic features

The Loamy Upland ecological site occurs at the lowest elevations of the interior chaparral zone in the Mogollon Transition area. It occurs on uplands. It is on gentle slopes, fan terraces, ridgetops, and mesa tops.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Mesa (3) Lava flow
Flooding frequency	None
Elevation	914–1,372 m
Slope	15–45%
Aspect	N, E, S

Climatic features

Precipitation in this common resource area averages 12 to 16 inches annually. The winter/summer rainfall ratio ranges from about 60/40 percent in the northwest part of the area to 50/50 percent in the southeast part. Summer rains fall July through September; are from high-intensity, convective thunderstorms. This moisture originates primarily from the Gulf of Mexico, but can come from the remnants of Pacific hurricanes in September. Winter moisture is frontal, originates in the north Pacific, and falls as rain or snow in widespread storms of low intensity and long duration. Snowfall ranges from a trace to 10 inches per year and can occur from November through March. Snow seldom persists for more than a day except on north aspects. May and June are the driest months of the year. Humidity is generally low all year. Average annual air temperatures range from 59 to 70 degrees F (thermic temperature regime). Daytime temperatures in the summer are commonly in the high 90’s. Freezing temperatures are common from October through April, usually during the night or early morning hours. The actual precipitation, available moisture, and temperature vary, depending on region, elevation, rain shadow effect, and aspect.

Table 3. Representative climatic features

Frost-free period (average)	205 days
Freeze-free period (average)	242 days
Precipitation total (average)	356 mm

Influencing water features

There are no water features associated with the Loamy Upland ecological site.

Soil features

These soils are moderately deep to deep (30 to 60 inches), and dark colored in the surface (6 to 12 inches). They are clayey textured, gravelly to very gravelly, and well drained. They have formed in alluvium and colluvium from a variety of parent materials. They do not exhibit vertic soil properties (cracking and churning). Soil surfaces can be covered by gravels, cobbles, and/or stones. The erosion hazard is moderate to high where plant or gravel covers are inadequate. Typical taxonomic units mapped on this site include: SSA-627 Mohave County Southern Part MU Whitehouse-131; SSA-637 Yavapai County Western Part MU's Lonti-AbB, LmB, LnC, LoD, LpB, LsC, LtB, LuC & LvE, Balon-AlC, LuC, Wm, Wn, Wo & Wp, Poley-AeB & Wp, Showlow-ShB, Wineg-AnC, LuC, Wm, Wn, Wo & Wp; SSA-639 Black Hills-Sedona Area MU's Altar-419 & Bewearze-422; SSA-697 Mohave County Central Part MU Hosta family-58.

Table 4. Representative soil features

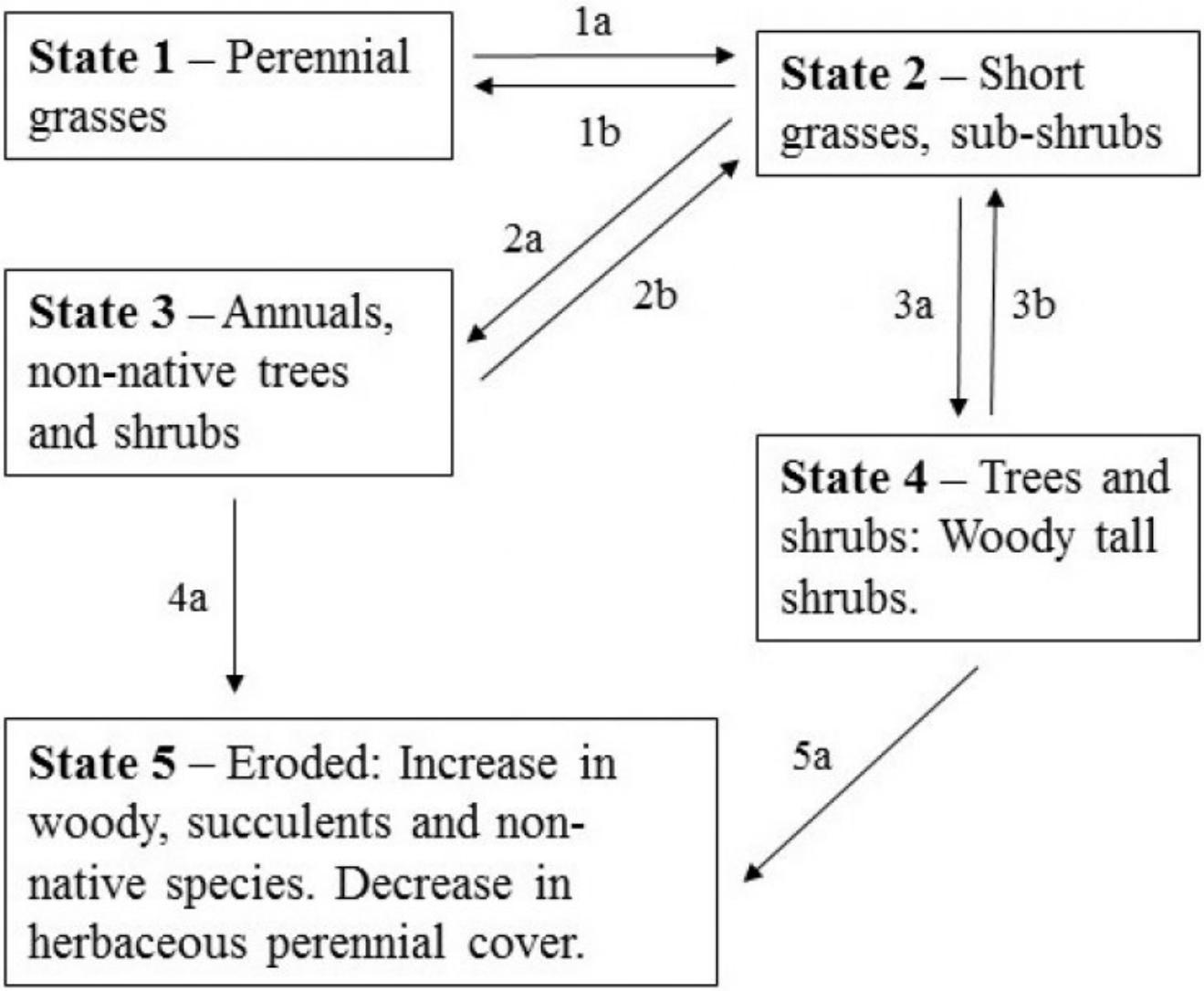
Surface texture	(1) Gravelly clay loam (2) Very gravelly loam (3) Very gravelly clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderately slow to slow
Soil depth	76–152 cm
Surface fragment cover <=3"	15–60%
Surface fragment cover >3"	1–10%
Available water capacity (0-101.6cm)	7.62–19.05 cm
Calcium carbonate equivalent (0-101.6cm)	1–15%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	7–8.2
Subsurface fragment volume <=3" (Depth not specified)	5–55%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

The historic native plant community is dominated by tobosa and other perennial warm-season grasses with a mixture of desert shrubs, half shrubs, succulents, and forbs. This includes a diverse flora of native annual grasses and forbs of both the winter and summer seasons. Periodic wildfires occurred at moderate intervals (15 to 30 years) and helped to maintain a balance between grasses and shrubs. The interactions of drought, fire, and continuous

livestock grazing can, over time, result in the loss of perennial grasses, half shrubs, and suffrutescent forbs on the Loamy Upland ecological site. The lack of fire for very long periods can lead to increases in large shrubs/succulents like prickly pear, and whitethorn acacia. Trees like juniper, paloverde, mesquite, and canotia can increase as well. In some situations non-native annuals can dominate the site. These species can, over time, diminish the soil seed-bank of native annual species. Non-native annuals can act to increase the fire frequency of areas of the site near roads and urban areas, where the incidence of man-made fires is high.

State and transition model



1a. Fire, drought, CHG

2a. CHG, absence of fire

3a. Woody species increase due to absence of fire and CHG

4a. Accelerated soil erosion may occur where herbaceous plants are absent.

5a. Fire, drought, CHG. Loss of perennial herbaceous cover.

Figure 4. MLRA 38.1 (12-16"), Loamy Uplands

State 1
Reference State

Community 1.1

Tobosa - Warm Season Grass Community (HNPC)

The historic native plant community is dominated by tobosa and other warm season perennial grasses with a mixture of desert shrubs, half-shrubs, suffrutescent forbs and succulents. A rich flora of native annual forbs and grasses, of both the winter and summer seasons, exist in the plant community. Natural fires, which burned at moderate intervals in this region, helped to maintain a balance between perennial grasses and shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	404	841	1233
Forb	8	56	269
Shrub/Vine	28	112	224
Tree	–	6	17
Total	**440**	**1015**	**1743**

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	1-2%
Grass/grasslike basal cover	6-12%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	1-10%
Litter	10-60%
Surface fragments >0.25" and <=3"	15-60%
Surface fragments >3"	0-15%
Bedrock	0%
Water	0%
Bare ground	10-60%

Table 7. Canopy structure (% cover)

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

Figure 6. Plant community growth curve (percent production by month). AZ3811, 38.1 12-16" p.z. all sites. Growth begins in the spring, most growth occurs in the summer..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	1	7	15	20	22	20	10	5	0	0

State 2
Short Grass State

Community 2.1
Short Grass Community

Tobosa is removed from the plant community over time due to the interactions of fire, continuous grazing and drought. When the canopy cover of tobosa drops below 5% and the distribution of that cover is poor (clumped) then tobosa will not be able to recover on the site. Short grasses; especially curly mesquite and including slender and hairy grama will dominate the herbaceous layer of the plant community. These species fluctuate widely from drought to wet years.

State 3
Exotic Annuals Invaded State

Community 3.1
Exotic Annual Invaded Community

Non-native annual grasses like red brome, wild oats, mediterranean grass (schismus) and cheatgrass can invade and dominate areas of the site. These species can, over time, reduce the seed-bank of native annual grasses and forbs. Their presence can increase the fire frequency (of man made fires) especially where roads and urban areas are adjacent to areas of the site. Repeated fires tend to remove the native shrub, grass and forb canopy.

State 4
Shrub Invaded State

Community 4.1
Shrub Invaded Community

In the absence of fire for long periods of time and with continuous grazing, shrubs like mesquite, paloverde and whitethorn acacia and succulents like prickly pear and banana yucca can increase to dominate the plant community. Trees including oneseed and redberry juniper and canotia can increase also. Perennial grasses and forbs cannot recover in the face of increased shrub competition.

State 5
Eroded State

Community 5.1
Woody Overstory

Shrubs like mesquite, paloverde and whitethorn acacia; trees like juniper and canotia; and succulents like prickly pear and banana yucca can increase to dominate the site. Non-native annual forbs and grasses dominate the under-story. In "El Nino" years herbaceous fuels are sufficient for burning and repeat fires are especially common in areas close to residential zones and roads. Extreme rainfall events coupled with the fire, drought and grazing interaction, can lead to rilling of steep slopes. Compaction of soils can occur with heavy trailing from continuous livestock use. Loss of plant cover after repeated fire can lead to accelerated sheet and rill erosion under these circumstances.

Additional community tables

Table 8. Community 1.1 plant community composition

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

Group	Common Name	Symbol	Scientific Name	(Kg/Hectare)	(%)
Grass/Grasslike					
1	**Dominant perennial grasses**			336–673	
	tobosagrass	PLMU3	*Pleuraphis mutica*	280–560	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	56–112	–
2	**Cool season grasses**			1–56	
	squirreltail	ELEL5	*Elymus elymoides*	1–56	–
3	**Misc. perennial grasses**			56–280	
	curly-mesquite	HIBE	*Hilaria belangeri*	39–168	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–56	–
	slender grama	BORE2	*Bouteloua repens*	0–56	–
	purple threeawn	ARPU9	*Aristida purpurea*	6–56	–
	black grama	BOER4	*Bouteloua eriopoda*	6–56	–
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	1–56	–
	spidergrass	ARTE3	*Aristida ternipes*	1–56	–
	red grama	BOTR2	*Bouteloua trifida*	0–22	–
	spidergrass	ARTEG	*Aristida ternipes var. gentilis*	0–17	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–17	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	0–17	–
	Hall's panicgrass	PAHA	*Panicum hallii*	0–17	–
	vine mesquite	PAOB	*Panicum obtusum*	0–17	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	0–17	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–11	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–6	–
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	0–6	–
	Arizona cottontop	DICA8	*Digitaria californica*	0–6	–
	green sprangletop	LEDU	*Leptochloa dubia*	0–6	–
	fall witchgrass	DICO6	*Digitaria cognata*	0–2	–
	slim tridens	TRMU	*Tridens muticus*	0–2	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	0–1	–
	tanglehead	HECO10	*Heteropogon contortus*	0–1	–
4	**Annual grasses**			6–224	
	sixweeks fescue	VUOC	*Vulpia octoflora*	1–56	–
	mucronate sprangeltop	LEPAB	*Leptochloa panicea ssp. brachiata*	0–28	–
	small fescue	VUMI	*Vulpia microstachys*	0–22	–
	sixweeks threeawn	ARAD	*Aristida adscensionis*	1–22	–
	Mexican panicgrass	PAHI5	*Panicum hirticaule*	0–17	–
	Arizona signalgrass	URAR	*Urochloa arizonica*	0–17	–
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	0–11	–
	Eastwood fescue	VUMIC	*Vulpia microstachys var. ciliata*	0–11	–
	witchgrass	PACA6	*Panicum capillare*	0–6	–
	prairie threeawn	AROL	*Aristida oligantha*	0–6	–
	Arizona brome	BRAR4	*Bromus arizonicus*	0–2	–
	feather fingergrass	CHVI4	*Chloris virgata*	0–2	–

	delicate muhly	MUFR	*Muhlenbergia fragilis*	0–2	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	0–2	–
	canyon cupgrass	ERLE7	*Eriochloa lemmonii*	0–1	–
	tufted lovegrass	ERPE	*Eragrostis pectinacea*	0–1	–
	desert lovegrass	ERPEM	*Eragrostis pectinacea var. miserrima*	0–1	–
	little barley	HOPU	*Hordeum pusillum*	0–1	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	0–1	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	0–1	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–1	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–1	–
Forb					
5	**Perennial forbs**			6–45	
	largeflower onion	ALMA4	*Allium macropetalum*	0–6	–
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	1–6	–
	bluedicks	DICA14	*Dichelostemma capitatum*	1–6	–
	slender janusia	JAGR	*Janusia gracilis*	0–6	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1–6	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	1–6	–
	Coues' cassia	SECO10	*Senna covesii*	0–2	–
	Gila manroot	MAGI	*Marah gilensis*	0–2	–
	lacy tansyaster	MAPI	*Machaeranthera pinnatifida*	0–2	–
	wishbone-bush	MILAV	*Mirabilis laevis var. villosa*	0–2	–
	tuber anemone	ANTU	*Anemone tuberosa*	0–2	–
	perennial rockcress	ARPE2	*Arabis perennans*	1–2	–
	dense ayenia	AYMI	*Ayenia microphylla*	0–1	–
	desert marigold	BAMU	*Baileya multiradiata*	0–1	–
	scarlet spiderling	BOCO	*Boerhavia coccinea*	0–1	–
	climbing wartclub	BOSC	*Boerhavia scandens*	0–1	–
	wavyleaf Indian paintbrush	CAAPM	*Castilleja applegatei ssp. martinii*	0–1	–
	Arizona wrightwort	CAAR7	*Carlowrightia arizonica*	0–1	–
	desert mariposa lily	CAKE	*Calochortus kennedyi*	0–1	–
	sego lily	CANU3	*Calochortus nuttallii*	0–1	–
	leatherweed	CRPO5	*Croton pottsii*	0–1	–
	narrowleaf silverbush	ARLA12	*Argythamnia lanceolata*	0–1	–
	white sagebrush	ARLUM2	*Artemisia ludoviciana ssp. mexicana*	0–1	–
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	0–1	–
	dwarf desertpeony	ACNA2	*Acourtia nana*	0–1	–
	brownfoot	ACWR5	*Acourtia wrightii*	0–1	–
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	0–1	–
	trailing windmills	ALIN	*Allionia incarnata*	0–1	–
	desert tobacco	NIOB	*Nicotiana obtusifolia*	0–1	–
	New Mexico groundsel	PANE7	*Packera neomexicana*	0–1	–
	Oak Creek ragwort	PAQU8	*Packera quercetorum*	0–1	–

	Oak Creek ragwort	PAQU6	*Packera quercetorum*	0–1	
	toadflax penstemon	PELI2	*Penstemon linarioides*	0–1	–
	Parry's beardtongue	PEPA24	*Penstemon parryi*	0–1	–
	desert penstemon	PEPS	*Penstemon pseudospectabilis*	0–1	–
	orange fameflower	PHAU13	*Phemeranthus aurantiacus*	0–1	–
	slender poreleaf	POGR5	*Porophyllum gracile*	0–1	–
	glandleaf milkwort	POMA7	*Polygala macradenia*	0–1	–
	canaigre dock	RUHY	*Rumex hymenosepalus*	0–1	–
	twinleaf senna	SEBA3	*Senna bauhinioides*	0–1	–
	ragged nettlespurge	JAMA	*Jatropha macrorhiza*	0–1	–
	longflower tube tongue	JULO3	*Justicia longii*	0–1	–
	Wright's deervetch	LOWR	*Lotus wrightii*	0–1	–
	fleabane	ERIGE2	*Erigeron*	0–1	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	0–1	–
	Mojave spurge	EUSC6	*Euphorbia schizoloba*	0–1	–
	southwestern mock vervain	GLGO	*Glandularia gooddingii*	0–1	–
	desert rosemallow	HICO	*Hibiscus coulteri*	0–1	–
	Indian rushpea	HOGL2	*Hoffmannseggia glauca*	0–1	–
	plains blackfoot	MELE2	*Melampodium leucanthum*	0–1	–
	Lemmon's ragwort	SELE8	*Senecio lemmonii*	0–1	–
	New Mexico fanpetals	SINE	*Sida neomexicana*	0–1	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	0–1	–
	branched noseburn	TRRA5	*Tragia ramosa*	0–1	–
	Louisiana vetch	VILUL2	*Vicia ludoviciana ssp. ludoviciana*	0–1	–
	Gregg's prairie clover	DAGR2	*Dalea greggii*	0–1	–
	Cooley's bundleflower	DECO2	*Desmanthus cooleyi*	0–1	–
	desert larkspur	DEPA	*Delphinium parishii*	0–1	–
	tall mountain larkspur	DESC	*Delphinium scaposum*	0–1	–
6	**Annual forbs**			2–224	
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–56	–
	Arizona popcornflower	PLAR	*Plagiobothrys arizonicus*	0–56	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–28	–
	longleaf false goldeneye	HELOA2	*Heliomeris longifolia var. annua*	1–28	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	0–17	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–17	–
	coastal bird's-foot trefoil	LOSA	*Lotus salsuginosus*	0–17	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–17	–
	Coulter's spiderling	BOCO2	*Boerhavia coulteri*	0–17	–
	carelessweed	AMPA	*Amaranthus palmeri*	0–11	–
	exserted Indian paintbrush	CAEXE	*Castilleja exserta ssp. exserta*	0–11	–
	thelypody	THELY	*Thelypodium*	0–11	–
	Arizona poppy	KAGR	*Kallstroemia grandiflora*	0–11	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–11	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–11	–

	miniature woollystar	ERDI2	*Eriastrum dilatum*	0–1	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–6	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–6	–
	desertparsley	LOMAT	*Lomatium*	0–6	–
	slender goldenweed	MAGR10	*Machaeranthera gracilis*	0–6	–
	tanseyleaf tansyaster	MATA2	*Machaeranthera tanacetifolia*	0–6	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–6	–
	New Mexico plumeseed	RANE	*Rafinesquia neomexicana*	0–6	–
	woolly plantain	PLPA2	*Plantago patagonica*	0–6	–
	phacelia	PHACE	*Phacelia*	0–6	–
	pitseed goosefoot	CHBE4	*Chenopodium berlandieri*	0–6	–
	fivewing spiderling	BOIN	*Boerhavia intermedia*	0–6	–
	milkvetch	ASTRA	*Astragalus*	0–6	–
	New Mexico thistle	CINE	*Cirsium neomexicanum*	0–2	–
	miner's lettuce	CLPEP	*Claytonia perfoliata ssp. perfoliata*	0–2	–
	hyssopleaf sandmat	CHHY3	*Chamaesyce hyssopifolia*	0–2	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–2	–
	purslane	PORTU	*Portulaca*	0–2	–
	sawtooth sage	SASU7	*Salvia subincisa*	0–2	–
	spreading fanpetals	SIAB	*Sida abutifolia*	0–2	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–2	–
	Thurber's pepperweed	LETH2	*Lepidium thurberi*	0–2	–
	crestrib morning-glory	IPCO2	*Ipomoea costellata*	0–2	–
	wedgeleaf draba	DRCU	*Draba cuneifolia*	0–2	–
	spurge	EUPHO	*Euphorbia*	0–2	–
	sorrel buckwheat	ERPO4	*Eriogonum polycladon*	0–2	–
	Texas stork's bill	ERTE13	*Erodium texanum*	0–1	–
	star gilia	GIST	*Gilia stellata*	0–1	–
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	0–1	–
	spreading fleabane	ERDI4	*Erigeron divergens*	0–1	–
	redstar	IPCO3	*Ipomoea coccinea*	0–1	–
	ivyleaf morning-glory	IPHE	*Ipomoea hederacea*	0–1	–
	California goldfields	LACA7	*Lasthenia californica*	0–1	–
	whitestem blazingstar	MEAL6	*Mentzelia albicaulis*	0–1	–
	green carpetweed	MOVE	*Mollugo verticillata*	0–1	–
	desert evening primrose	OEPR	*Oenothera primiveris*	0–1	–
	Florida pellitory	PAFL3	*Parietaria floridana*	0–1	–
	combseed	PECTO	*Pectocarya*	0–1	–
	manybristle chinchweed	PEPA2	*Pectis papposa*	0–1	–
	Arizona lupine	LUAR4	*Lupinus arizonicus*	0–1	–
	miniature lupine	LUBI	*Lupinus bicolor*	0–1	–
	Fendler's desertdandelion	MAFE	*Malacothrix fendleri*	0–1	–
	creamcups	PLCA5	*Platystemon californicus*	0–1	–
	woollyhead neststraw	STMI2	*Stylocline micropoides*	0–1	–

	sand fringepod	THCU	*Thysanocarpus curvipes*	0–1	–
	desert unicorn-plant	PRAL4	*Proboscidea althaeifolia*	0–1	–
	doubleclaw	PRPA2	*Proboscidea parviflora*	0–1	–
	chia	SACO6	*Salvia columbariae*	0–1	–
	sacred thorn-apple	DAWR2	*Datura wrightii*	0–1	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–1	–
	scrambled eggs	COAU2	*Corydalis aurea*	0–1	–
	cryptantha	CRYPT	*Cryptantha*	0–1	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	0–1	–
	yellow tackstem	CAPA7	*Calycoseris parryi*	0–1	–
	white tackstem	CAWR	*Calycoseris wrightii*	0–1	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–1	–
	annual agoseris	AGHE2	*Agoseris heterophylla*	0–1	–
Shrub/Vine					
7	**Evergreen shrubs**			1–56	
	Sonoran scrub oak	QUTU2	*Quercus turbinella*	0–11	–
	jojoba	SICH	*Simmondsia chinensis*	0–11	–
	redberry buckthorn	RHCR	*Rhamnus crocea*	0–1	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	0–1	–
	red barberry	MAHA4	*Mahonia haematocarpa*	0–1	–
	algerita	MATR3	*Mahonia trifoliolata*	0–1	–
8	**Miscellaneous large shrubs**			1–22	
	catclaw acacia	ACGR	*Acacia greggii*	1–6	–
	blue paloverde	PAFL6	*Parkinsonia florida*	0–6	–
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	0–6	–
	whitethorn acacia	ACCO2	*Acacia constricta*	0–2	–
	whitethorn acacia	ACCOP9	*Acacia constricta var. paucispina*	0–1	–
	littleleaf sumac	RHMI3	*Rhus microphylla*	0–1	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–1	–
	lotebush	ZIOBC	*Ziziphus obtusifolia var. canescens*	0–1	–
	desert sweet	CHMI2	*Chamaebatiaria millefolium*	0–1	–
	ocotillo	FOSP2	*Fouquieria splendens*	0–1	–
	snapdragon penstemon	KEANM	*Keckiella antirrhinoides ssp. microphylla*	0–1	–
	creosote bush	LATR2	*Larrea tridentata*	0–1	–
	water jacket	LYAN	*Lycium andersonii*	0–1	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	0–1	–
	Arizona desert-thorn	LYEX	*Lycium exsertum*	0–1	–
	catclaw mimosa	MIACB	*Mimosa aculeaticarpa var. biuncifera*	0–1	–
9	**Dominant half shrubs**			17–112	
	fairyduster	CAER	*Calliandra eriophylla*	11–67	–
	bastardsage	ERWR	*Eriogonum wrightii*	1–17	–
	littleleaf ratany	KRER	*Krameria erecta*	1–11	–
	rough menodora	MESC	*Menodora scabra*	0–11	–

	rough menodora	MERO	*Menodora scabra*	0–11	
	desert zinnia	ZIAC	*Zinnia acerosa*	0–6	–
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	0–1	–
	prairie acacia	ACAN	*Acacia angustissima*	0–1	–
	Coulter's brickellbush	BRCO	*Brickellia coulteri*	0–1	–
10	**Succulents**			6–62	
	cactus apple	OPEN3	*Opuntia engelmannii*	6–22	–
	tulip pricklypear	OPPH	*Opuntia phaeacantha*	0–11	–
	banana yucca	YUBA	*Yucca baccata*	0–6	–
	saguaro	CAGI10	*Carnegiea gigantea*	0–2	–
	devil's cholla	GRKU	*Grusonia kunzei*	0–2	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	0–2	–
	walkingstick cactus	CYSP8	*Cylindropuntia spinosior*	0–2	–
	common sotol	DAWH2	*Dasylirion wheeleri*	0–1	–
	pinkflower hedgehog cactus	ECBO2	*Echinocereus bonkerae*	0–1	–
	Arizona hedgehog cactus	ECCOA	*Echinocereus coccineus var. arizonicus*	0–1	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–1	–
	redspine fishhook cactus	ECER2	*Echinomastus erectocentrus*	0–1	–
	pinkflower hedgehog cactus	ECFA	*Echinocereus fasciculatus*	0–1	–
	spinystar	ESVI2	*Escobaria vivipara*	0–1	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	0–1	–
	Graham's nipple cactus	MAGR9	*Mammillaria grahamii*	0–1	–
	sacahuista	NOMI	*Nolina microcarpa*	0–1	–
	buck-horn cholla	CYAC8	*Cylindropuntia acanthocarpa*	0–1	–
	jumping cholla	CYFU10	*Cylindropuntia fulgida*	0–1	–
	goldenflower century plant	AGCH2	*Agave chrysantha*	0–1	–
	Palmer's century plant	AGPA3	*Agave palmeri*	0–1	–
	soaptree yucca	YUEL	*Yucca elata*	0–1	–
	purple pricklypear	OPMA8	*Opuntia macrocentra*	0–1	–
11	**Increaser half-shrubs**			2–28	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	1–22	–
	burroweed	ISTE2	*Isocoma tenuisecta*	0–1	–
	yerba de pasmo	BAPT	*Baccharis pteronioides*	0–1	–
	button brittlebush	ENFR	*Encelia frutescens*	0–1	–
	turpentine bush	ERLA12	*Ericameria laricifolia*	0–1	–
	threadleaf snakeweed	GUMI	*Gutierrezia microcephala*	0–1	–
Tree					
12	**Trees**			0–17	
	redberry juniper	JUCO11	*Juniperus coahuilensis*	0–6	–
	oneseed juniper	JUMO	*Juniperus monosperma*	0–6	–
	Utah juniper	JUOS	*Juniperus osteosperma*	0–6	–
	velvet mesquite	PRVE	*Prosopis velutina*	0–6	–

	western honey mesquite	PRGLT	*Prosopis glandulosa var. torreyana*	0–2	–
	crucifixion thorn	CAHO3	*Canotia holacantha*	0–2	–

Animal community

The Loamy Upland ecological site is suitable for grazing year-round, and is easily traversed by livestock. Tobosa is very unpalatable and will be the last perennial grass species to be used on this site. Livestock grazing use is concentrated near trails, roads, and waters. The site is susceptible to erosion in overgrazed areas like bed-grounds, livestock trails, and slopes adjacent to water. The site has good habitat diversity for a variety of desert wildlife species. It is home mainly to small mammals and birds and their associated predators. It is a foraging area for larger mammals like deer and javalina. Water developments are very important to both livestock and wildlife on this site.

Hydrological functions

The Loamy Upland ecological site has a smooth to rough surface with variable covers of gravels and stones. Due to clayey textured soils it is a good producer of runoff. It produces exceptional runoff when heavy rain falls on snow or moist soils.

Recreational uses

The Loamy Upland ecological site is used for hunting, camping, horseback riding, backpacking, rock hounding, and photography.

Wood products

Limited fuel-wood for campfires and branding fires. In areas where mesquite or juniper has increased there may be more wood available for fuel and for fence stays.

Other products

There is some harvest of food plants like prickly pear tunas, jojoba nuts, wild onions, and grass nuts. There is limited harvest of medicinal plants like Mormon tea. There is limited harvest of fibers from banana yucca. Clay is available for pot making.

Type locality

Location 1: Yavapai County, AZ	
Township/Range/Section	T11N R2E S8
General legal description	North side of Highway 69 right-of-way, Cordes Junction to Mayer, Yavapai County.

Other references

Similar to Community type 5 of TES Map Unit # 370 on the Prescott National Forest.

Contributors

Dan Robinett
Larry D. Ellicott

Approval

Scott Woodall, 9/05/2019

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)	Karlynn Huling
Contact for lead author	NRCS Flagstaff Area Office
Date	05/19/2006
Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Some rills may form due to loamy surface textures, slow permeability, and medium runoff, especially on steeper slopes.

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2. **Presence of water flow patterns:** Water flow patterns may be common due to slow permeability and medium runoff, especially on steeper slopes.

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3. **Number and height of erosional pedestals or terracettes:** Some pedestals and terracettes may occur, but they should be very short.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground should not exceed 25 percent. The Loamy Upland ecological site has an average available water capacity of 7 inches, so it has a moderate to high potential for the production of plant cover. Sites with a cover of rock fragments will have less bare ground. Drought may cause an increase in bare ground.

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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):** Herbaceous and fine woody litter will be transported in water flow pathways. Coarse woody litter will remain under shrub canopies.

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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):** Surface soil stability values average 5 both under plant canopies and in the interspaces. Surface textures are mostly sandy loam, loam, or sandy clay loam. Often the surface horizon is gravelly, but sometimes not. When well vegetated, these soils have a moderate to high resistance to both water and wind erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is either granular (weak to moderate, fine to medium) or platy (weak, medium to thick). Surface thickness is 2 to 3 inches. Color is variable depending upon parent material.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The Loamy Upland ecological site is characterized by a relatively even distribution of mostly grasses with a few shrubs and forbs. One area had 30 percent canopy cover with overlapping layers of plants (15 percent grass, 5 percent forbs,15 percent shrubs). Basal cover was 1 percent (grass only). Both canopy and basal cover values decrease during prolonged droughts. This type of plant community is highly effective at capturing and storing precipitation.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Due to loam and clay loam textures, these soils may be easily compacted when there are no rock fragments in the surface horizons. Some surface horizons are naturally platy.

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: none

    Sub-dominant: warm-season bunchgrasses = warm-season colonizing grasses shrubs cool season bunchgrasses

    Other: Minor: forbs
    Trace: cacti Agave family = annual grasses

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All plant functional groups are adapted to survival in all years except during the most severe droughts. Severe winter droughts affect shrubs and trees the most. Severe summer droughts affect grasses the most.

14. **Average percent litter cover (%) and depth (in):** Mostly herbaceous litter with some woody litter. Litter amounts increase during the first few years of drought, then decrease in later years.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 500 to 575 pounds per acre (dry weight) in drought years, 575 to 750 pounds per acre in median years, 750 to 850 pounds per acre in wet years.

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: Broom snakeweed, prickly pear cactus (Opuntia), cholla cactus (Cylindropuntia), turbinella oak, desert ceanothus, wait-a-bit, catclaw acacia, and shrubby buckwheat are all native to the Loamy Upland ecological site, but have the potential to increase and dominate the area after heavy grazing and/or fire exclusion. Juniper (Juniperus) and pinyon pine (Pinus) species are native to neighboring sites and can invade the site after heavy grazing and/or fire exclusion. Redstem filaree, purslane (Portulaca), and spurge (Euphorbia) are exotic forbs (some species of Portulaca and Euphorbia are native) that may invade the site after heavy grazing, soil disturbance, or fire. Red brome is an exotic annual grass that may invade the site after heavy grazing, soil disturbance, or fire.

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17. **Perennial plant reproductive capability:** All plants native to the Loamy Upland ecological site are adapted to the climate and are capable of producing seeds, stolons, and rhizomes in more years except during the most severe droughts.
