

## Ecological site R040XB220AZ Granitic Upland 7"-10" p.z.

Accessed: 05/01/2024

### 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.

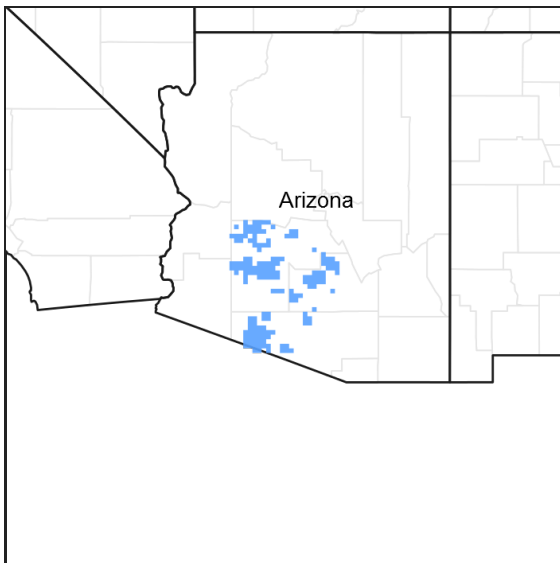


Figure 1. Mapped extent

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): 040X–Sonoran Basin and Range

AZ 40.2 – Middle Sonoran Desert

Elevations range from 1200 to 2000 feet and precipitation averages 7 to 10 inches per year. Vegetation includes saguaro, palo verde, creosotebush, triangle bursage, brittlebush, prickly pear, cholla, desert saltbush, wolfberry bush muhly, threeawns, and big galleta. The soil temperature regime is hyperthermic and the soil moisture regime is typic aridic. This unit occurs within the Basin and Range Physiographic Province and is characterized by numerous mountain ranges that rise abruptly from broad, plain-like valleys and basins. Igneous and metamorphic rock classes dominate the mountain ranges and sediments filling the basins represent combinations of fluvial, lacustrine, colluvial and alluvial deposits.

Table 1. Dominant plant species

Tree	(1) <i>Parkinsonia microphylla</i>
Shrub	(1) <i>Ambrosia deltoidea</i> (2) <i>Eriogonum fasciculatum</i>
Herbaceous	(1) <i>Pleuraphis rigida</i> (2) <i>Muhlenbergia porteri</i>

## Physiographic features

This site occurs on pediments, undulating uplands in and around the low desert mountains. Slopes range from 1% to 15%. Elevations are from 1000 to 2500 feet.

**Table 2. Representative physiographic features**

Landforms	(1) Pediment
Flooding frequency	None
Ponding frequency	None
Elevation	305–762 m
Slope	0–15%
Aspect	Aspect is not a significant factor

## Climatic features

Precipitation in the sub-resource area ranges from 7 to 10 inches. Elevations range from 900 to 2050 feet. Winter-summer rainfall ratios range from 40% to 60% in the southern part along the international boundary, to 60% to 40% in the central and northern parts of the sub-resource area. As one moves from east to west in this resource area rains become more unpredictable and variable with Coefficients of Variation of annual rainfall equal to 38% at Florence and 46% at Aguila. Summer rains fall July- September, originate in the Gulf of Mexico, and are convective, usually brief, intense thunderstorms. Summer precipitation is extremely erratic and undependable in this area. 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. This is the dependable moisture supply for vegetation in the area. Snow is very rare and usually melts on contact. May-June is the driest time of the year. Humidity is very low.

Winter temperatures are very mild with very few days recording freezing for short periods of time. Summertime temperatures are hot to very hot with many days in June-July exceeding 105 degrees F. Frost-free days range from 280 at stations in major river valleys with cold air drainage to 320 to 350 days at upland stations.

Both the spring and the summer growing seasons are equally important for perennial grass, forb and shrub growth. Cool and warm season annual forbs and grasses can be common in their respective seasons with above average rainfall. Perennial forage species can remain green throughout the year with available moisture.

**Table 3. Representative climatic features**

Frost-free period (average)	350 days
Freeze-free period (average)	0 days
Precipitation total (average)	254 mm

## Influencing water features

### Soil features

These are shallow and very shallow soils formed on acid and intermediate igneous parent materials and on sandstone, quartzite, arkose and gneiss. They are coarse textured, non-calcareous and have well developed gravel covers. Bedrock is usually slightly weathered into grus material at the soil juncture, and may be slightly calcareous. Rock outcrops make up a small percentage of soil units. Plant-soil moisture relationships are poor. This site is mapped in 7 Soil Survey areas in Southwestern Arizona on CRA D40-2.

Soils mapped on this site include: SSA-645 Aguila-Carefree area MU Vaiva-123; SSA-651 Central Maricopa county MU Gachado-GA; SSA-653 Gila Bend-Ajo area MU's Gachado XGrSL-40 and Quilotosa-53; SSA-658 Gila River Indian Reservation MU's Quilotosa-26 and Vaiva-26; SSA-659 Western Pinal county MU Vaiva-46; SSA-661 Eastern Pinal-Southern Gila counties MU's Ajolito-285 and Suncity-605; SSA-703 Tohono O'odham area Quilotosa-

50. Parent material kind includes resium also. Parent material origin includes rhyolite and gneiss.

**Table 4. Representative soil features**

Surface texture	(1) Gravelly sandy loam (2) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	10–51 cm
Surface fragment cover <=3"	35–65%
Surface fragment cover >3"	1–10%
Available water capacity (0-101.6cm)	0.51–4.06 cm
Calcium carbonate equivalent (0-101.6cm)	1–10%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	35–65%
Subsurface fragment volume >3" (Depth not specified)	1–10%

## 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 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 the 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.

## State and transition model



**State 1  
Historical Climax Plant Community**

**Community 1.1  
Historical Climax Plant Community**

The potential plant community on this site is a mixture of desert trees, shrubs, cacti and perennial forbs and grasses. Annuals are of minor importance in the plant community. The aspect is shrubland. With poorly managed grazing, perennial forage species like; desert trumpet, slender janusia, flattop buckwheat and bush muhly disappear from the plant community. Trees tend to be shrubby on this site due to soils shallow to bedrock. This site lacks the cobble and stone cover of adjacent hillslopes. Gravel size and cover may be lacking on moderate slopes to prevent water erosion. Plant populations for major species range from 40 to 100 trees per acre for paloverde and ironwood, 500 to 800 plants per acre for triangle bursage and white brittlebush, 1 to 10 saguaros per acre and 5 to 20 ocotillo plants per acre. Perennial plant basal cover on this site is very low from 1/2 to 1 percent.

**Table 5. Annual production by plant type**

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	211	—	252
Tree	211	—	252
Forb	15	—	43
Grass/Grasslike	15	—	28
<b>Total</b>	<b>452</b>	—	<b>575</b>

## Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				2–11	
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	0–3	–
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	0–1	–
	slim tridens	TRMU	<i>Tridens muticus</i>	0–1	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	0–1	–
	Wright's threeawn	ARPUW	<i>Aristida purpurea var. wrightii</i>	0–1	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	0–1	–
	spidergrass	ARTEG	<i>Aristida ternipes var. gentilis</i>	0–1	–
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	0–1	–
	nineawn pappusgrass	ENDE	<i>Enneapogon desvauxii</i>	0–1	–
2				2–11	
	Rothrock's grama	BORO2	<i>Bouteloua rothrockii</i>	0–3	–
	delicate muhly	MUFR	<i>Muhlenbergia fragilis</i>	0–1	–
	littleseed muhly	MUMI	<i>Muhlenbergia microsperma</i>	0–1	–
	Bigelow's bluegrass	POBI	<i>Poa bigelovii</i>	0–1	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–1	–
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	0–1	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0–1	–
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	0–1	–
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	0–1	–
<b>Forb</b>					
3				11–28	
	desert trumpet	ERIN4	<i>Eriogonum inflatum</i>	0–6	–
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	0–6	–
	Coues' cassia	SECO10	<i>Senna covesii</i>	0–3	–
	shrubby deervetch	LORI3	<i>Lotus rigidus</i>	0–2	–
	Parry's false prairie-clover	MAPA7	<i>Marina parryi</i>	0–2	–
	slender poreleaf	POGR5	<i>Porophyllum gracile</i>	0–1	–
	poreleaf dogweed	ADPO2	<i>Adenophyllum porophyllum</i>	0–1	–
	narrowleaf silverbush	ARLA12	<i>Argythamnia lanceolata</i>	0–1	–
	New Mexico silverbush	ARNE2	<i>Argythamnia neomexicana</i>	0–1	–
	whitemargin sandmat	CHAL11	<i>Chamaesyce albomarginata</i>	0–1	–
	brownplume wirelettuce	STPA4	<i>Stephanomeria pauciflora</i>	0–1	–
	California fagonbush	FALA	<i>Fagonia laevis</i>	0–1	–
	paleface	HIDE	<i>Hibiscus denudatus</i>	0–1	–
4				2–11	
	combseed	PECTO	<i>Pectocarya</i>	0–6	–
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	0–6	–

broadleaved pepperweed	LELA2	<i>Lepidium latifolium</i>	0-6	-
flax	LINUM	<i>Linum</i>	0-1	-
foothill deervetch	LOHU2	<i>Lotus humistratus</i>	0-1	-
desert deervetch	LOMI	<i>Lotus micranthus</i>	0-1	-
coastal bird's-foot trefoil	LOSAB	<i>Lotus salsuginosus</i> var. <i>brevivexillus</i>	0-1	-
Arizona lupine	LUAR4	<i>Lupinus arizonicus</i>	0-1	-
Coulter's lupine	LUSP2	<i>Lupinus sparsiflorus</i>	0-1	-
lacy tansyaster	MAPIP4	<i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i> var. <i>pinnatifida</i>	0-1	-
bristly nama	NAHI	<i>Nama hispidum</i>	0-1	-
glandular threadplant	NEGL	<i>Nemacladus glanduliferus</i>	0-1	-
desert tobacco	NIOBO	<i>Nicotiana obtusifolia</i> var. <i>obtusifolia</i>	0-1	-
cloak fern	NOTHO	<i>Notholaena</i>	0-1	-
Florida pellitory	PAFL3	<i>Parietaria floridana</i>	0-1	-
brownfoot	ACWR5	<i>Acourtia wrightii</i>	0-1	-
weakleaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	0-1	-
common fiddleneck	AMMEI2	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	0-1	-
bristly fiddleneck	AMTE3	<i>Amsinckia tessellata</i>	0-1	-
milkvetch	ASTRA	<i>Astragalus</i>	0-1	-
desert marigold	BAMU	<i>Baileya multiradiata</i>	0-1	-
Coulter's spiderling	BOCO2	<i>Boerhavia coulteri</i>	0-1	-
hoary bowlesia	BOIN3	<i>Bowlesia incana</i>	0-1	-
exserted Indian paintbrush	CAEXE	<i>Castilleja exserta</i> ssp. <i>exserta</i>	0-1	-
yellow tackstem	CAPA7	<i>Calycoseris parryi</i>	0-1	-
white tackstem	CAWR	<i>Calycoseris wrightii</i>	0-1	-
pincushion	CHAEN	<i>Chaenactis</i>	0-1	-
brittle spineflower	CHBR	<i>Chorizanthe brevicornu</i>	0-1	-
lipfern	CHEIL	<i>Cheilanthes</i>	0-1	-
devil's spineflower	CHRI	<i>Chorizanthe rigida</i>	0-1	-
hairy prairie clover	DAMO	<i>Dalea mollis</i>	0-1	-
American wild carrot	DAPU3	<i>Daucus pusillus</i>	0-1	-
Parish's larkspur	DEPAP3	<i>Delphinium parishii</i> ssp. <i>parishii</i>	0-1	-
western tansymustard	DEPI	<i>Descurainia pinnata</i>	0-1	-
tall mountain larkspur	DESC	<i>Delphinium scaposum</i>	0-1	-
flatcrown buckwheat	ERDE6	<i>Eriogonum deflexum</i>	0-1	-
miniature woollystar	ERDI2	<i>Eriastrum diffusum</i>	0-1	-
buckwheat	ERIOG	<i>Eriogonum</i>	0-1	-
woolly sunflower	ERIOP2	<i>Eriophyllum</i>	0-1	-
Texas stork's bill	ERTE13	<i>Erodium texanum</i>	0-1	-
California poppy	ESCAM	<i>Eschscholzia californica</i> ssp. <i>mexicana</i>	0-1	-
gilia	GILIA	<i>Gilia</i>	0-1	-
Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	0-1	-
velvet turtleback	PSRA	<i>Psathyrotes ramosissima</i>	0-1	-

	New Mexico plumeseed	RANE	<i>Rafinesquia neomexicana</i>	0-1	-
	chia	SACO6	<i>Salvia columbariae</i>	0-1	-
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	0-1	-
	Coulter's globemallow	SPCO2	<i>Sphaeralcea coulteri</i>	0-1	-
	woollyhead neststraw	STMI2	<i>Stylocline micropoides</i>	0-1	-
	woolly tidestromia	TILA2	<i>Tidestromia lanuginosa</i>	0-1	-
	cliffbrake	PELLA	<i>Pellaea</i>	0-1	-
	phacelia	PHACE	<i>Phacelia</i>	0-1	-
<b>Shrub/Vine</b>					
5				11-28	
	Eastern Mojave buckwheat	ERFA2	<i>Eriogonum fasciculatum</i>	0-11	-
	slender janusia	JAGR	<i>Janusia gracilis</i>	0-6	-
	littleleaf ratany	KRER	<i>Krameria erecta</i>	0-6	-
	fairyduster	CAER	<i>Calliandra eriophylla</i>	0-6	-
	rough menodora	MESC	<i>Menodora scabra</i>	0-2	-
	burrobush	AMDU2	<i>Ambrosia dumosa</i>	0-2	-
	American threefold	TRCA8	<i>Trixis californica</i>	0-1	-
6				84-112	
	triangle bur ragweed	AMDE4	<i>Ambrosia deltoidea</i>	34-56	-
	brittlebush	ENFA	<i>Encelia farinosa</i>	11-22	-
	white ratany	KRGR	<i>Krameria grayi</i>	2-11	-
	Tucson bur ragweed	AMCO4	<i>Ambrosia cordifolia</i>	2-11	-
7				11-28	
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	0-3	-
	water jacket	LYAN	<i>Lycium andersonii</i>	0-3	-
	Arizona desert-thorn	LYEX	<i>Lycium exsertum</i>	0-3	-
	desert wolfberry	LYMA	<i>Lycium macrodon</i>	0-3	-
	Hall's shrubby-spurge	TEHA	<i>Tetracoccus hallii</i>	0-2	-
	sangre de cristo	JACA2	<i>Jatropha cardiophylla</i>	0-2	-
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	0-2	-
	longleaf jointfir	EPTR	<i>Ephedra trifurca</i>	0-2	-
	creosote bush	LATR2	<i>Larrea tridentata</i>	0-2	-
	Arizona nettlespurge	JACI	<i>Jatropha cinerea</i>	0-1	-
	desert lavender	HYEM	<i>Hyptis emoryi</i>	0-1	-
	turpentinebroom	THMO	<i>Thamnosma montana</i>	0-1	-
	Parish's goldeneye	VIPA14	<i>Viguiera parishii</i>	0-1	-
	arrow poison plant	SEBI9	<i>Sebastiania bilocularis</i>	0-1	-
	catclaw acacia	ACGR	<i>Acacia greggii</i>	0-1	-
9	<b>Succulents</b>			11-28	
	beavertail pricklypear	OPBA2	<i>Opuntia basilaris</i>	0-2	-
	Leconte's barrel cactus	FECYL	<i>Ferocactus cylindraceus var. lecontei</i>	0-2	-
	Emory's barrel cactus	FEEM	<i>Ferocactus emoryi</i>	0-2	-

	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	0-2	-
	senita cactus	PASC14	<i>Pachycereus schottii</i>	0-1	-
	organpipe cactus	STTH3	<i>Stenocereus thurberi</i>	0-1	-
	Engelmann's hedgehog cactus	ECEN	<i>Echinocereus engelmannii</i>	0-1	-
<b>Tree</b>					
8				56-84	
	desert ironwood	OLTE	<i>Olneya tesota</i>	22-39	-
	yellow paloverde	PAMI5	<i>Parkinsonia microphylla</i>	22-39	-

## Animal community

Areas of this site are associated with steep, rough, hillsites. It will be overused unless grazing systems allow enough rest for recovery or fencing is used to isolate it from the adjacent mountains. This site produces no herbaceous forage and very little useable browse for livestock. Water will be available in bedrock canyons for short periods of time after heavy rainfall.

Water developments are very important to wildlife species on this site. Some free water may remain, after rains, for a few weeks in the rock lined drainages that bisect this site. Large mammals use the site seasonally unless permanent water supplies are available. Food, cover, diversity and some topography make this site home to a variety of desert animals. Desert tortoises den in rock crevices along drainage ways through areas of this site.

## Other information

T&E: *Antilocapra Americana sonoriensis*  
(Sonoran pronghorn)  
*Leptonycteris curasoae yerbebuena*  
(Lesser long-nosed bat)

## Type locality

Location 1: Maricopa County, AZ	
Township/Range/Section	T7S R2E S4
General legal description	Buckeye FO - AK Ranch - Paloverde Mountains
Location 2: Maricopa County, AZ	
Township/Range/Section	T5S R5E S4
General legal description	Chandler FO - Gila River Indian Community
Location 3: Maricopa County, AZ	
Township/Range/Section	T3N R4W S1
General legal description	Phoenix FO - Douglas Ranch - White Tank Mtns.
Location 4: Pima County, AZ	
Township/Range/Section	T14S R3W S23
General legal description	Sells FO - Hickiwan Dist.
Location 5: Pima County, AZ	
Township/Range/Section	T8S R3E S10
General legal description	Sells FO - Little Table Mtns., SE 1/4 sec. 10
Location 6: Pima County, AZ	
Township/Range/Section	T12S R6W S29



## Contributors

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## 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, Byron Lambeth, Dan Robinett, Emilio Carrillo
Contact for lead author	NRCS Tucson Area Office
Date	03/02/2005
Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

- 1. Number and extent of rills:** Rills are common and continuous in absence of high gravel cover. They commonly occur along bedding planes and joints in the bedrock parent material.

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- 2. Presence of water flow patterns:** Discontinuous, 10-15 feet in length. Will see shorter flow paths with high surface coarse fragments.

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- 3. Number and height of erosional pedestals or terracettes:** Shrubs have symmetrical mounds caused by the actions of splash, erosion and rodent activity. There are no pedestals on rock or gravel fragments and no terracettes are present.

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- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10-60% (low values due to high rock and gravel cover)

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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):** Most litter size classes stay in place due to high rock and gravel cover.

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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 perennial plant interspaces, 4-5 under shrub canopies.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak granular to subangular blocky; color is 7.5-10YR5/4 dry, 7.5-10YR4/4 Moist; thickness to 4 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 15-20%: 50% shrubs, 23% trees, 25% succulents and 1-2% perennial grass. 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: sub shrubs > trees > winter annuals > shrubs > summer annuals > perennial forbs > perennial grasses > succulents
- Sub-dominant:
- Other:
- Additional:
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** 2050% tree & shrub canopy mortality, 75-90% mortality on perennial grasses.
- 
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):** 150 lbs/ac unfavorable precipitation; 250 lbs/ac normal precipitation; 350 lbs/ac favorable precipitation.
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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Sahara mustard

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17. **Perennial plant reproductive capability:** Not impaired for shrubs; drought impaired for perennial grasses and forbs.

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