USDA Natural Resources Conservation Service

Ecological site R040XB224AZ
Sandy Upland, Saline 7"-10" p.z.

Accessed: 05/21/2025

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.

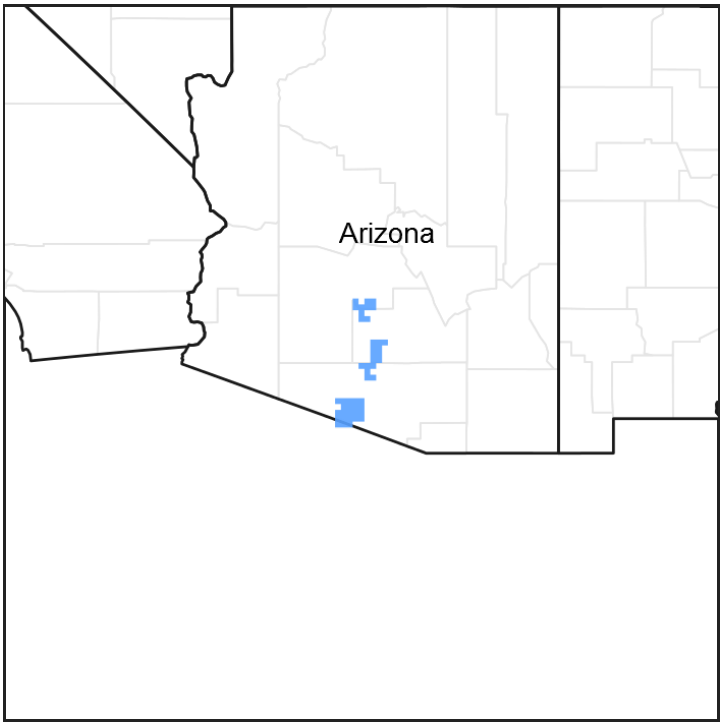


Figure 1. Mapped extent

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	Not specified
Shrub	(1) *Atriplex polycarpa* (2) *Lycium andersonii*
Herbaceous	(1) *Sporobolus contractus* (2) *Pleuraphis rigida*

Physiographic features

This site occurs on nearly level to moderately steep dunes.

Table 2. Representative physiographic features

Landforms	(1) Dune
Elevation	305–610 m
Slope	1–30%

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 deep, somewhat excessively drained, saline sandy soils. Parent material kind may include stream alluvium. The plant-soil moisture relationships are good. These soils have high infiltration rates, but the sodic conditions somewhat limit the availability of water for plant growth.

Soils mapped on this site include: SSA-658 Gila River Indian Reservation MU's Rositas (sodic)-30 & 31 and SSA-703 Tohono O'odham area MU Rositas (sodic)-9.

Table 4. Representative soil features

Surface texture	(1) Sand (2) Loamy sand
Family particle size	(1) Sandy
Drainage class	Excessively drained to somewhat excessively drained
Permeability class	Rapid to very rapid
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	9.14–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	1–5%

Electrical conductivity (0-101.6cm)	0–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–13
Soil reaction (1:1 water) (0-101.6cm)	8.5–9
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

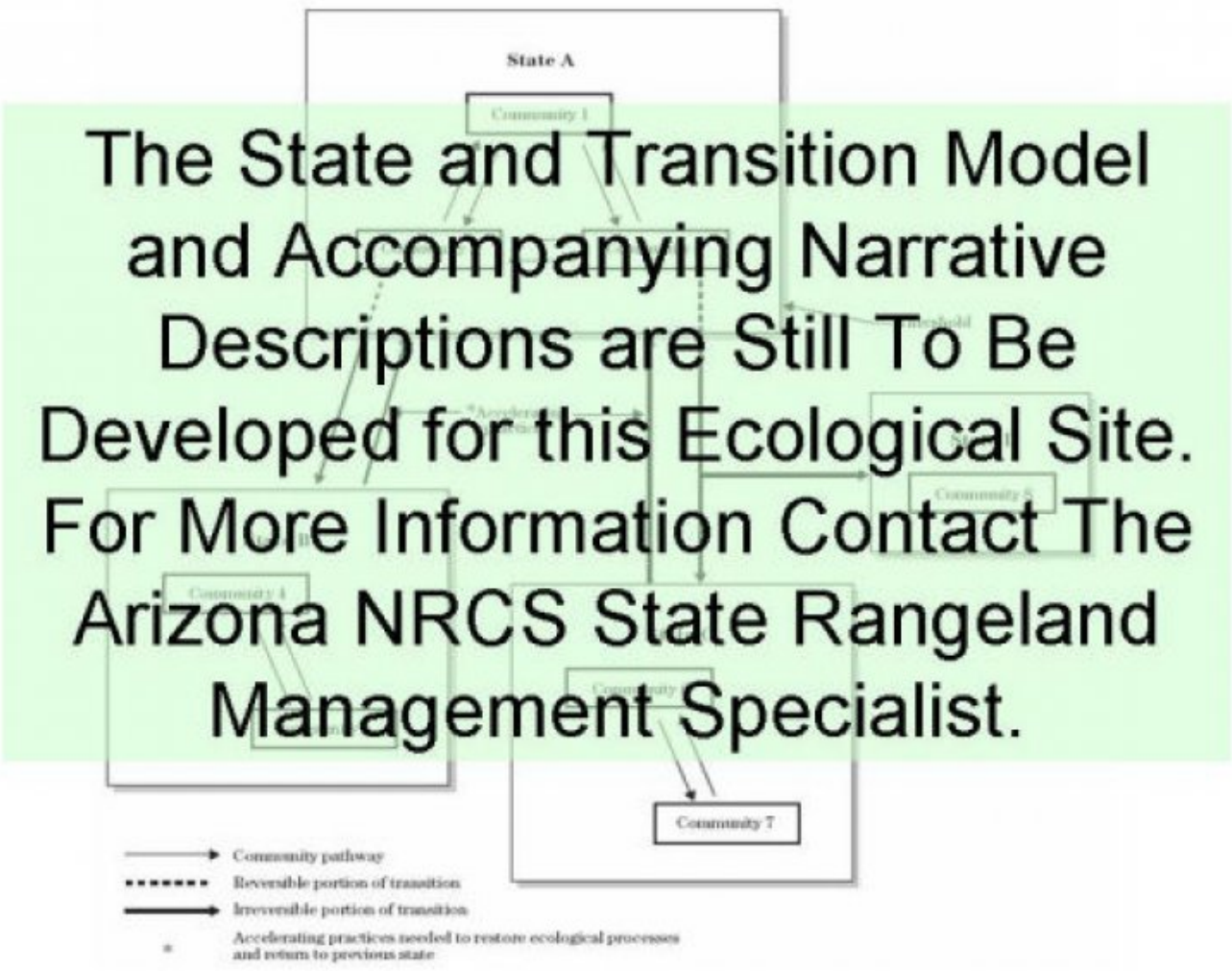
Ecological dynamics

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 grazing, fire, 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 shown for the group. Divide the resulting total by the total normal year production shown in the plant community description. If rainfall has been significantly above or below normal, use the total production shown for above or below normal years. If field data is not collected at the end of the summer growing season, then the field data must be corrected to the end of the year production before comparing it to the site description. The growth curve can be used as a guide for estimating production at the end of the summer growing season.

State and transition model



The State and Transition Model and Accompanying Narrative Descriptions are Still To Be Developed for this Ecological Site. For More Information Contact The Arizona NRCS State Rangeland Management Specialist.

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

The native plant community on this site is a mixture of perennial and annual grasses and forbs and salt desert shrubs. Winter and summer annual forbs are very well represented on thesite. With severe disturbance, such as heavy continuous grazing, species like big galleta, fourwing saltbush and desert saltbush are replaced by greasewood, mesquite and annuals. Loss of shrub and grass cover on this site can result in severely accelerated wind erosion. The Atriplex species are very sensitive to summer fires on this site.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	202	252	303
Shrub/Vine	90	252	303
Forb	67	90	135
Total	**359**	**594**	**741**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				168–235	
	big galleta	PLRI3	*Pleuraphis rigida*	63–89	–
	spike dropseed	SPCO4	*Sporobolus contractus*	63–89	–
2				34–67	
	California threeawn	ARCA9	*Aristida californica*	12–26	–
	Santa Rita threeawn	ARCAG	*Aristida californica var. glabrata*	12–26	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	12–26	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	12–26	–
3				6–101	
	sixweeks threeawn	ARAD	*Aristida adscensionis*	2–44	–
	prairie threeawn	AROL	*Aristida oligantha*	2–44	–
	needle grama	BOAR	*Bouteloua aristidoides*	2–44	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	2–44	–
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	2–44	–
	Arizona brome	BRAR4	*Bromus arizonicus*	2–44	–
	feather fingergrass	CHVI4	*Chloris virgata*	2–44	–
	tufted lovegrass	ERPEP2	*Eragrostis pectinacea var. pectinacea*	2–44	–
	little barley	HOPU	*Hordeum pusillum*	2–44	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	2–44	–
	mucronate sprangeltop	LEPAB	*Leptochloa panicea ssp. brachiata*	2–44	–

	littleseed muhly	MUMI	*Muhlenbergia microsperma*	2–44	–
	witchgrass	PACA6	*Panicum capillare*	2–44	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	2–44	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	2–44	–
Forb					
4				6–34	
	desert sand verbena	ABVI	*Abronia villosa*	1–4	–
	goldenhead	ACAMP	*Acamptopappus*	1–4	–
	desert marigold	BAMU	*Baileya multiradiata*	1–4	–
	whitemargin sandmat	CHAL11	*Chamaesyce albomarginata*	1–4	–
	desert lily	HEUN2	*Hesperocallis undulata*	1–4	–
	birdcage evening primrose	OEDE2	*Oenothera deltoides*	1–4	–
	canaigre dock	RUHY	*Rumex hymenosepalus*	1–4	–
	smooth threadleaf ragwort	SEFLM	*Senecio flaccidus var. monoensis*	1–4	–
5				34–67	
	desert Indianwheat	PLOV	*Plantago ovata*	0–6	–
	desert unicorn-plant	PRAL4	*Proboscidea althaeifolia*	0–1	–
	New Mexico plumeseed	RANE	*Rafinesquia neomexicana*	0–1	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0–1	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	0–1	–
	small wirelettuce	STEX	*Stephanomeria exigua*	0–1	–
	longbeak streptanthella	STLO4	*Streptanthella longirostris*	0–1	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–1	–
	onyxflower	ACCO3	*Achyronychia cooperi*	0–1	–
	common fiddleneck	AMMEI2	*Amsinckia menziesii var. intermedia*	0–1	–
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–1	–
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	0–1	–
	Cedros milkvetch	ASIN6	*Astragalus insularis*	0–1	–

	spiderling	BOERH2	*Boerhavia*	0–1	–
	Booth's suncup	CABOB	*Camissonia boothii ssp. boothii*	0–1	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	0–1	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–1	–
	Panamint cryptantha	CRAN4	*Cryptantha angustifolia*	0–1	–
	redroot cryptantha	CRMI	*Cryptantha micrantha*	0–1	–
	wingnut cryptantha	CRPT	*Cryptantha pterocarya*	0–1	–
	hairy prairie clover	DAMO	*Dalea mollis*	0–1	–
	soft prairie clover	DAMO2	*Dalea mollissima*	0–1	–
	California shieldpod	DICA7	*Dithyrea californica*	0–1	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–1	–
	kidneyleaf buckwheat	ERRE3	*Eriogonum reniforme*	0–1	–
	Thomas' buckwheat	ERTH	*Eriogonum thomasii*	0–1	–
	little deserttrumpet	ERTR8	*Eriogonum trichopes*	0–1	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–1	–
	spurge	EUPHO	*Euphorbia*	0–1	–
	Arizona poppy	KAGR	*Kallstroemia grandiflora*	0–1	–
	Great Basin langloisia	LASE3	*Langloisia setosissima*	0–1	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–1	–
	Bigelow's linanthus	LIBI2	*Linanthus bigelovii*	0–1	–
	Cusick's biscuitroot	LOCU	*Lomatium cusickii*	0–1	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–1	–
	desert deervetch	LOMI	*Lotus micranthus*	0–1	–
	bajada lupine	LUCO	*Lupinus concinnus*	0–1	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–1	–
	California desertdandelion	MACA6	*Malacothrix californica*	0–1	–
	yellowcomet	MEAF2	*Mentzelia affinis*	0–1	–
	whitestem blazingstar	MEAL6	*Mentzelia albicaulis*	0–1	–
	cottonheads	NEDE	*Nemacaulis denudata*	0–1	–
	glandular	NEGL	*Nemacladus*	0–1	–

	threadplant		*glandulifera*		
	desert evening primrose	OEPR	*Oenothera primiveris*	0–1	–
	giant Spanish needle	PAARG	*Palafoxia arida var. gigantea*	0–1	–
	chuckwalla combseed	PEHE	*Pectocarya heterocarpa*	0–1	–
	manybristle chinchweed	PEPA2	*Pectis papposa*	0–1	–
	broadfruit combseed	PEPL	*Pectocarya platycarpa*	0–1	–
Shrub/Vine					
6				135–202	
	fourwing saltbush	ATCA2	*Atriplex canescens*	50–76	–
	cattle saltbush	ATPO	*Atriplex polycarpa*	50–76	–
7				34–67	
	water jacket	LYAN	*Lycium andersonii*	12–26	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	12–26	–
8				6–34	
	triangle bur ragweed	AMDE4	*Ambrosia deltoidea*	1–12	–
	burrobush	AMDU2	*Ambrosia dumosa*	1–12	–
	fourwing saltbush	ATCAL2	*Atriplex canescens var. laciniata*	1–12	–
	California croton	CRCA5	*Croton californicus*	1–12	–
	wedgeleaf prairie clover	DAEM2	*Dalea emarginata*	1–12	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	1–12	–
	burroweed	ISTE2	*Isocoma tenuisecta*	1–12	–
	littleleaf ratany	KRER	*Krameria erecta*	1–12	–
	white ratany	KRGR	*Krameria grayi*	1–12	–
	creosote bush	LATRT	*Larrea tridentata var. tridentata*	1–12	–
	Arizona desert-thorn	LYEX	*Lycium exsertum*	1–12	–
	Torrey wolfberry	LYTO	*Lycium torreyi*	1–12	–
	honey mesquite	PRGLG	*Prosopis glandulosa var. glandulosa*	1–12	–
	seepweed	SUAED	*Suaeda*	1–12	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	1–12	–
9	**Succulents**			34	

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	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–12	–
	erect pricklypear	OPST2	*Opuntia stricta*	0–12	–

Animal community

This site produces forage for year-round use by livestock. Adequate protein and energy levels are available throughout the year, however, very hot summer temperatures and very sandy soils with moderate slopes will preclude summer use. Spring is the main season for shrub growth and annual and perennial grass and forb production. Proper use of the shrub species and big galleta should be no more than 50% of the spring production of leaves and stems. Water developments are very important on the site and grazing can be controlled by controlling livestock access to water.

Due to sandy soils and good diversity of forage plants, this site is host to a variety of small burrowing mammals and is an important forage site for the predators of these species (i.e., kit fox, badger, burrowing owl, sidewinder rattlesnake and Gila monster).

Other information

T&E Species: Sonoran pronghorn

Contributors

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Unknown

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	Dave Womack, Dan Robinett, Emilio Carrillo
Contact for lead author	NRCS Tucson Area Office
Date	03/07/2005
Approved by	S. Cassady

Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None present on this site due to high infiltration rates.

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2. **Presence of water flow patterns:** Water flow patterns are uncommon due to high infiltration rates.

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3. **Number and height of erosional pedestals or terracettes:** All shrubs have symmetrical mounds 2-5 inches tall formed by combined action of splash, erosion and rodents. There are no pedestals on rock or gravel fragments and no terracettes are pesent

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 60-70%

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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:** Minor evidence of soil movement by wind.

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter can move by wind. Woody litter remains 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):** Soil surface resistance to erosion is good under shrub canopies to moderate in interspaces due to crusts formed by raindrop impact.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thin platy to granular; 7.5-10YR6/4 dry, 7.5-10YR4/4 moist, to 2 inches thick

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy 15-25%. Herbaceous litter is present in some years, absent in others. Large shrubs with large coppice mounds with high infiltration rates. Subshrubs with small mounds with high infiltration rates.

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

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: perennial grass = salt bush shrubs > winter annuals > trees & shrubs > summer annuals > succulents = perennial forbs > crytogams

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** 0-50% canopy mortality; 90-100% perennial grass mortality.

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14. **Average percent litter cover (%) and depth (in):** Herbaceous litter is not persistent on the site.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production,**

not just forage annual-production): 400 lbs/ac unfavorable precipitation, 600 lbs/ac normal precipitation, 800 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 (potential), mesquite

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