

## Ecological site R040XB212AZ Loamy Slopes 7"-10" p.z.

Accessed: 11/02/2024

### 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.

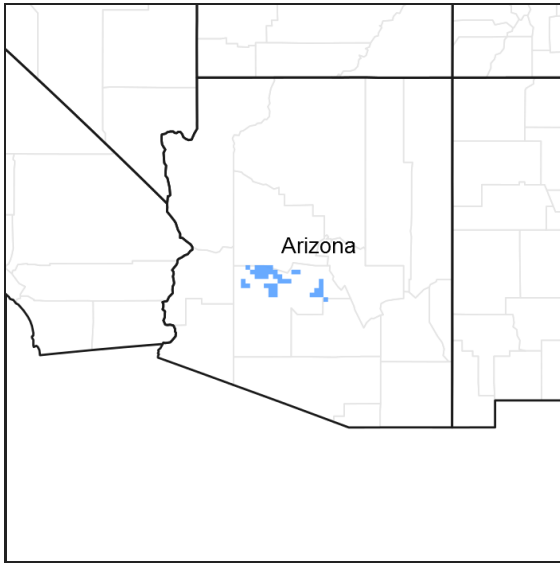


Figure 1. Mapped extent

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	Not specified
Shrub	(1) <i>Ambrosia deltoidea</i>
Herbaceous	(1) <i>Muhlenbergia porteri</i> (2) <i>Pleuraphis rigida</i>

## Physiographic features

This site occurs on hillslopes and ridgetops. Slopes are from 15 to 45%. Elevations range from 1200 to 2600 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge
Elevation	1,200–2,600 ft
Slope	15–45%

## 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)	10 in

## Influencing water features

### Soil features

These are deep and moderately deep soils formed in old alluvium from mixed origins. They are loamy and non-calcareous to moderate (20 inches) depths. Soil surfaces are well protected with gravel and rock covers. Plant-soil moisture relationships are fair to good.

Soils mapped on this site include: SSA-645 Aguila-Carefree area MU's Ebon > 15% slope-49 & Pinamt-49.

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam (2) Extremely gravelly clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Slow

Soil depth	60 in
Surface fragment cover <=3"	35–65%
Surface fragment cover >3"	1–10%
Available water capacity (0-40in)	3–6 in
Calcium carbonate equivalent (0-40in)	1–15%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	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 diverse mixture of perennial and annual grasses and forbs, shrubs, desert trees and cacti. The aspect is shrubland. With continuous, heavy grazing and/or drought, perennial grasses and forbs quickly disappear from the plant community. Trees are shrubby in nature on this site and canopy cover does not exceed 5%. Soils are well protected by covers of gravels, cobbles and rocks. Cryptogam cover is low due to the small percentage of bare soil areas. Red brome, a cool season, introduced, annual grass is well entrenched on areas of this site. It competes with native annual species and acts to increase the frequency of fires on this site which can remove the native trees, shrubs and cacti. Plant populations for major species are; 5 to 20 trees per acre, 500 to 1000 triangle bursage per acre and 100 to 200 cholla per acre.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	203	—	293
Grass/Grasslike	45	—	113
Forb	45	—	90
<b>Total</b>	<b>293</b>	—	<b>496</b>

## Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				20–45	
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	5–15	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	0–5	–
	Parish's threeawn	ARPUP5	<i>Aristida purpurea</i> var. <i>parishii</i>	0–3	–
	Wright's threeawn	ARPUW	<i>Aristida purpurea</i> var. <i>wrightii</i>	0–3	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	0–3	–
	spidergrass	ARTEG	<i>Aristida ternipes</i> var. <i>gentilis</i>	0–3	–
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	0–3	–
	slender grama	BORE2	<i>Bouteloua repens</i>	0–2	–
	tanglehead	HECO10	<i>Heteropogon contortus</i>	0–2	–
	slim tridens	TRMU	<i>Tridens muticus</i>	0–2	–
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	0–1	–
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	0–1	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	0–1	–
	nineawn pappusgrass	ENDE	<i>Enneapogon desvauxii</i>	0–1	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	0–1	–
2				5–65	
	Eastwood fescue	VUMIC	<i>Vulpia microstachys</i> var. <i>ciliata</i>	0–10	–
	Pacific fescue	VUMIP	<i>Vulpia microstachys</i> var. <i>pauciflora</i>	0–10	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–10	–
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	0–5	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0–5	–
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	0–5	–
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	0–5	–
	Rothrock's grama	BORO2	<i>Bouteloua rothrockii</i>	0–5	–
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	0–1	–
	tufted lovegrass	ERPEP2	<i>Eragrostis pectinacea</i> var. <i>pectinacea</i>	0–1	–
	Mexican sprangletop	LEFUU	<i>Leptochloa fusca</i> ssp. <i>uninervia</i>	0–1	–
	mucronate sprangletop	LEPA6	<i>Leptochloa panicea</i>	0–1	–
	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	–
	Arizona signalgrass	URAR	<i>Urochloa arizonica</i>	0–1	–
3				0–10	
	mesquite mistletoe	PHCA8	<i>Phoradendron californicum</i>	0–8	–
	bigseed alfalfa dodder	CUIN	<i>Cuscuta indecora</i>	0–2	–
4				5–10	
	Alga	2ALGA	<i>Alga</i>	1–5	–
	Lichen	2LICHN	<i>Lichen</i>	1–3	–

	Moss	2MOSS	Moss	1–2	–
	Fungus	2FUNGI	Fungus	1–2	–
<b>Forb</b>					
5				20–45	
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	0–5	–
	Emory's globemallow	SPEM	<i>Sphaeralcea emoryi</i>	0–5	–
	Louisiana vetch	VILUL2	<i>Vicia ludoviciana ssp. ludoviciana</i>	0–2	–
	woollyhead neststraw	STMI2	<i>Stylocline micropoides</i>	0–1	–
	Coulter's globemallow	SPCO2	<i>Sphaeralcea coulteri</i>	0–1	–
	Nuttall's povertyweed	MONU	<i>Monolepis nuttalliana</i>	0–1	–
	evening primrose	OENOT	<i>Oenothera</i>	0–1	–
	Florida pellitory	PAFL3	<i>Parietaria floridana</i>	0–1	–
	beardtongue	PENST	<i>Penstemon</i>	0–1	–
	phacelia	PHACE	<i>Phacelia</i>	0–1	–
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	0–1	–
	slender poreleaf	POGR5	<i>Porophyllum gracile</i>	0–1	–
	chia	SACO6	<i>Salvia columbariae</i>	0–1	–
	poreleaf dogweed	ADPO2	<i>Adenophyllum porophyllum</i>	0–1	–
	trailing windmills	ALIN	<i>Allionia incarnata</i>	0–1	–
	carelessweed	AMPA	<i>Amaranthus palmeri</i>	0–1	–
	bluestar	AMSON	<i>Amsonia</i>	0–1	–
	tuber anemone	ANTU	<i>Anemone tuberosa</i>	0–1	–
	narrowleaf silverbush	ARLA12	<i>Argythamnia lanceolata</i>	0–1	–
	New Mexico silverbush	ARNE2	<i>Argythamnia neomexicana</i>	0–1	–
	smallflowered milkvetch	ASNU4	<i>Astragalus nuttallianus</i>	0–1	–
	desert marigold	BAMU	<i>Baileya multiradiata</i>	0–1	–
	spiderling	BOERH2	<i>Boerhavia</i>	0–1	–
	hoary bowlesia	BOIN3	<i>Bowlesia incana</i>	0–1	–
	exserted Indian paintbrush	CAEXE	<i>Castilleja exserta ssp. exserta</i>	0–1	–
	yellow tackstem	CAPA7	<i>Calycoseris parryi</i>	0–1	–
	white tackstem	CAWR	<i>Calycoseris wrightii</i>	0–1	–
	whitemargin sandmat	CHAL11	<i>Chamaesyce albomarginata</i>	0–1	–
	hyssopleaf sandmat	CHHY3	<i>Chamaesyce hyssopifolia</i>	0–1	–
	New Mexico thistle	CINE	<i>Cirsium neomexicanum</i>	0–1	–
	American wild carrot	DAPU3	<i>Daucus pusillus</i>	0–1	–
	wedgeleaf draba	DRCU	<i>Draba cuneifolia</i>	0–1	–
	whisperingbells	EMPE	<i>Emmenanthe penduliflora</i>	0–1	–
	spreading fleabane	ERDI4	<i>Erigeron divergens</i>	0–1	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–1	–
	Texas stork's bill	ERTE13	<i>Erodium texanum</i>	0–1	–
	dainty desert hideseed	EUMI2	<i>Eucrypta micrantha</i>	0–1	–
	California fagonbush	FALA	<i>Fagonia laevis</i>	0–1	–
	gilia	GILIA	<i>Gilia</i>	0–1	–

	Arizona poppy	KAGR	<i>Kallstroemia grandiflora</i>	0-1	-
	Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	0-1	-
	Bigelow's linanthus	LIBI2	<i>Linanthus bigelovii</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	LOSA	<i>Lotus salsuginosus</i>	0-1	-
	slender goldenweed	MAGR10	<i>Machaeranthera gracilis</i>	0-1	-
	desertdandelion	MALAC3	<i>Malacothrix</i>	0-1	-
	Parry's false prairie-clover	MAPA7	<i>Marina parryi</i>	0-1	-
	lacy tansyaster	MAPIP4	<i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i> var. <i>pinnatifida</i>	0-1	-
	rough menodora	MESC	<i>Menodora scabra</i>	0-1	-
<b>Shrub/Vine</b>					
6				90-150	
	triangle bur ragweed	AMDE4	<i>Ambrosia deltoidea</i>	90-150	-
7				20-65	
	water jacket	LYAN	<i>Lycium andersonii</i>	0-5	-
	Berlandier's wolfberry	LYBE	<i>Lycium berlandieri</i>	0-5	-
	Arizona desert-thorn	LYEX	<i>Lycium exsertum</i>	0-5	-
	desert wolfberry	LYMA	<i>Lycium macrodon</i>	0-5	-
	yellow paloverde	PAMI5	<i>Parkinsonia microphylla</i>	0-5	-
	desert ironwood	OLTE	<i>Olneya tesota</i>	0-3	-
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	0-3	-
	sangre de cristo	JACA2	<i>Jatropha cardiophylla</i>	0-3	-
	creosote bush	LATR2	<i>Larrea tridentata</i>	0-2	-
	starry bedstraw	GAST	<i>Galium stellatum</i>	0-2	-
	velvet mesquite	PRVE	<i>Prosopis velutina</i>	0-2	-
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	0-1	-
	catclaw acacia	ACGR	<i>Acacia greggii</i>	0-1	-
	Tucson bur ragweed	AMCO4	<i>Ambrosia cordifolia</i>	0-1	-
	burrobush	AMDU2	<i>Ambrosia dumosa</i>	0-1	-
	Coulter's brickellbush	BRCO	<i>Brickellia coulteri</i>	0-1	-
8				20-45	
	jojoba	SICH	<i>Simmondsia chinensis</i>	0-10	-
	spiny hackberry	CEEH	<i>Celtis ehrenbergiana</i>	0-3	-
	littleleaf ratany	KRER	<i>Krameria erecta</i>	0-3	-
	white ratany	KRGR	<i>Krameria grayi</i>	0-2	-
	Mexican bladdersage	SAME	<i>Salazaria mexicana</i>	0-2	-
	fairyduster	CAER	<i>Calliandra eriophylla</i>	0-2	-
	brittlebush	ENFA	<i>Encelia farinosa</i>	0-2	-
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	0-1	-
	Eastern Mojave buckwheat	ERFA2	<i>Eriogonum fasciculatum</i>	0-1	-
	American threefold	TBCA8	<i>Trixis californica</i>	0-1	-

	American threestoed	TRCAB	<i>Vitis californica</i>	0-1	-
	Parish's goldeneye	VIPA14	<i>Viguiera parishii</i>	0-1	-
	Indian mallow	ABUTI	<i>Abutilon</i>	0-1	-
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	0-1	-
9				45-90	
	beavertail pricklypear	OPBA2	<i>Opuntia basilaris</i>	0-10	-
	woollyjoint pricklypear	OPTO2	<i>Opuntia tomentosa</i>	0-5	-
	Leconte's barrel cactus	FECYL	<i>Ferocactus cylindraceus var. lecontei</i>	0-2	-
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	0-2	-
	globe cactus	MAMMI	<i>Mammillaria</i>	0-1	-
	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	-
	rainbow cactus	ECPE	<i>Echinocereus pectinatus</i>	0-1	-

## Animal community

Steep slopes and very gravelly to cobbly surfaces limit grazing distribution especially during the hot summer months. Stocker cattle will use areas of this site fairly well during the fall, winter and spring. In years with above average winter rainfall the production of annual forbs and grasses can be significant and will allow for additional carrying capacity in the March-May growing season. The plant community may be deficient in energy in the summer through winter seasons.

Water developments can be very important to wildlife species on this site. Cover and diversity are somewhat lacking for the larger desert mammals but the diverse topography makes up for that. The site is also home to a variety of small mammal, reptile and bird species.

## Other information

T&E: *Leptonycteris curasoae* yerbe beuna  
(Lesser long-nosed bat)

## Type locality

Location 1: Maricopa County, AZ	
Township/Range/Section	T6N R2W S33
General legal description	Phoenix FO - Desert Hills Cattle Co.
Location 2: Maricopa County, AZ	
Township/Range/Section	T3N R6E S21
General legal description	Chandler FO - McDowell Mountains

## 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.

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Contact for lead author	NRCS Tucson Area Office
Date	12/14/2005
Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** Fairly common, 8-10 feet apart well vegetated by annuals in El Nino years, all rills have gently sloping banks.  

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2. **Presence of water flow patterns:** Uncommon; verland flow location difficult to determine due to high gravel cover.  

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are uncommon only observed near naturally eroding rills; terracettes only formed by high densities of rock fragments.  

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 5-10%, gravel cover 85-90%  

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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. Fine classes may move 5-10 feet before being intercepted by plants of rock fragments.  

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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):** Expect values of 1-3 in canopy interspaces, and 4-6 under plant canopies.  

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thir platy to weak granular; thickness to 1 inch.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy 20-25%: 50% shrubs (40% jojoba), 35-40% trees, 3-5% half shrubs, and 0-1% succulents. 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: shrubs > trees = half shrubs > succulents. In El Nino years, annual forbs and grasses can be greater than all groups.

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):** 10% of perennial grass plants have been lost in recent prolonged drought; 18, 68, 23, 10, 39 and 24% canopy cover mortality of creosote, mormon tea, paloverde, flattertop buckwheat, range ratany and triangle bursage, respectively.

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 300 lbs/ac unfavorable precipitation, 450 lbs/ac normal precipitation, 600 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, filaree, Mediterranean grass, red brome(at higher elevations of MLRA).

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

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