

Ecological site R040XB213AZ **Loamy Upland 7"-10" p.z.**

Accessed: 05/13/2025

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.

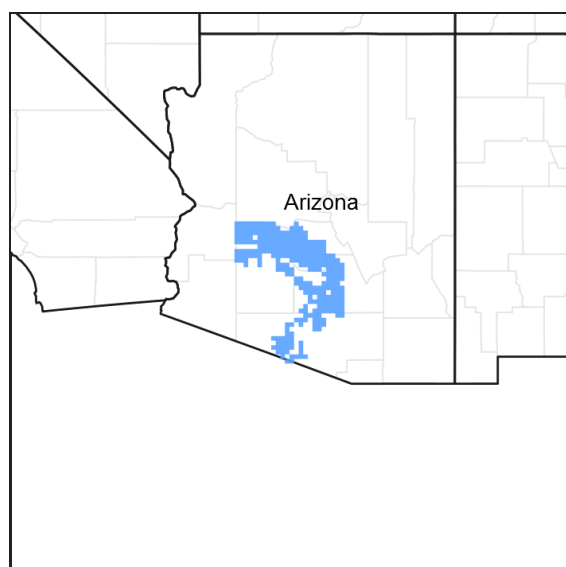


Figure 1. Mapped extent

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 typical 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	Not specified
Herbaceous	(1) <i>Muhlenbergia porteri</i> (2) <i>Digitaria californica</i>

Physiographic features

This site occurs on fan terraces and stream terraces. Slopes are from 1 to 15%. Elevations range from 1000 to 2200.

Table 2. Representative physiographic features

Landforms	(1) Fan (2) Terrace (3) Stream terrace
Elevation	305–671 m
Slope	1–15%

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 soils formed in loamy alluvium of mixed origin. Surface textures range from sandyloam (less than four inches thick) to loam. Immediately below the surface layer is an argillic or clayey cambic horizon which acts to slow water infiltration in the subsoil. Subsurface texture group includes clayey skeletal, loamy skeletal, and fine loamy. These soils are non-calcareous in the surface. Plant-soil moisture relationships are fair. This site is mapped on 6 Soil Survey areas in the D40-2 CRA in South Western Arizona.

Soils mapped on this site include: SSA-645 Aguila-Carefree Area MU's Estrella-50, Gilman-55 & 58, Glenbar-60, Mohall-75 & 80, Pinamt-48, & Tremant-80, 98, 113 & 116; SSA-651 Central Maricopa County MU's Beardsley-BE, Glenbar-Gr, Mohall-Mp, MTB & MV, Tremant-AHC, PYD, Te, TfA, TfB & TpB; SSA-659 Western Pinal County MU's Marana-29, Mohall-31 & Sasco-42; SSA-661 Eastern Pinal-Southern Gila Counties MU's Ajo-285, Beardsley-204 & 605, Contine sandy loam-570, Mohall-215 & 595, Momoli-315, & Pinamt(less than 50% gravels, non calcareous)-212; SSA-669 Eastern Pima County MU Mohall-44; SSA-

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Very gravelly fine sandy loam (3) Loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderately slow to slow
Soil depth	152 cm
Surface fragment cover <=3"	1–45%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	12.19–22.86 cm
Calcium carbonate equivalent (0-101.6cm)	5–30%
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)	0–45%
Subsurface fragment volume >3" (Depth not specified)	0–5%

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

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	286	–	370
Forb	22	–	90
Grass/Grasslike	22	–	90
Tree	6	–	11
Total	336	–	561

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				22–45	
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	11–28	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	0–11	–
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	0–6	–
2				4–22	
	Parish's threeawn	ARPUP5	<i>Aristida purpurea</i> var. <i>parishii</i>	0–6	–
	Wright's threeawn	ARPUW	<i>Aristida purpurea</i> var. <i>wrightii</i>	0–6	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	0–6	–
	spidergrass	ARTEG	<i>Aristida ternipes</i> var. <i>gentilis</i>	0–6	–
	blue threeawn	ARPUN	<i>Aristida purpurea</i> var. <i>nealleyi</i>	0–3	–
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	0–1	–
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	0–1	–
	slim tridens	TRMU	<i>Tridens muticus</i>	0–1	–
3				0–45	
	Eastwood fescue	VUMIC	<i>Vulpia microstachys</i> var. <i>ciliata</i>	0–11	–
	Pacific fescue	VUMIP	<i>Vulpia microstachys</i> var. <i>pauciflora</i>	0–11	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–11	–
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	0–6	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0–6	–
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	0–6	–
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	0–6	–
	Rothrock's grama	BORO2	<i>Bouteloua rothrockii</i>	0–6	–
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	0–1	–
	feather fingergrass	CHVI4	<i>Chloris virgata</i>	0–1	–
	canyon cupgrass	ERLE7	<i>Eriochloa lemmonii</i>	0–1	–
	desert lovegrass	ERPEM	<i>Eragrostis pectinacea</i> var. <i>miserrima</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	–
Forb					
4				22–90	
	Florida pellitory	PAFL3	<i>Parietaria floridana</i>	3–11	–
	manybristle chinchweed	PEPA2	<i>Pectis papposa</i>	3–11	–
	phacelia	PHACE	<i>Phacelia</i>	3–11	–
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	3–11	–
	doubleclaw	PRPA2	<i>Proboscidea parviflora</i>	3–11	–
	New Mexico plumeseed	RANE	<i>Rafinesquia neomexicana</i>	3–11	–
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	3–11	–
	blazingstar	MENTZ	<i>Mentzelia</i>	3–11	–
	Nuttall's povertyweed	MONU	<i>Monolepis nuttalliana</i>	3–11	–
	bristly nama	NAHI	<i>Nama hispidum</i>	3–11	–
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	0–6	–
	Coulter's globemallow	SPCO2	<i>Sphaeralcea coulteri</i>	0–6	–
	spear globemallow	SPHA	<i>Sphaeralcea hastulata</i>	3–6	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	0–6	–
	common fiddleneck	AMMEI2	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	0–6	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	0–6	–
	evening primrose	OENOT	<i>Oenothera</i>	0–3	–
	dwarf desertpeony	ACNA2	<i>Acourtia nana</i>	0–1	–
	brownfoot	ACWR5	<i>Acourtia wrightii</i>	0–1	–
	trailing windmills	ALIN	<i>Allionia incarnata</i>	0–1	–
	wealeaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	0–1	–
	fringed amaranth	AMFI	<i>Amaranthus fimbriatus</i>	0–1	–
	bluedicks	DICAC5	<i>Dichelostemma capitatum</i> ssp. <i>capitatum</i>	0–1	–
	touristplant	DIWI2	<i>Dimorphocarpa wislizeni</i>	0–1	–
	fetid marigold	DYPA	<i>Dyssodia papposa</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	–
	pygmy poppy	ESMI	<i>Eschscholzia minutiflora</i>	0–1	–
	spurge	EUPHO	<i>Euphorbia</i>	0–1	–
	hairy desertsunflower	GECA2	<i>Geraea canescens</i>	0–1	–
	gilia	GILIA	<i>Gilia</i>	0–1	–
	Indian rushpea	HOGL2	<i>Hoffmannseggia glauca</i>	0–1	–
	Arizona poppy	KAGR	<i>Kallstroemia grandiflora</i>	0–1	–
	Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	0–1	–

	broadleaved pepperweed	LELA2	<i>Lepidium latifolium</i>	0-1	-
	pepperweed	LEPID	<i>Lepidium</i>	0-1	-
	coastal bird's-foot trefoil	LOSA	<i>Lotus salsuginosus</i>	0-1	-
	Arizona lupine	LUAR4	<i>Lupinus arizonicus</i>	0-1	-
	Coulter's lupine	LUSP2	<i>Lupinus sparsiflorus</i>	0-1	-
	disc mayweed	MADI6	<i>Matricaria discoidea</i>	0-1	-
	lacy tansyaster	MAPIP4	<i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i> var. <i>pinnatifida</i>	0-1	-
	milkvetch	ASTRA	<i>Astragalus</i>	0-1	-
	wheelscale saltbush	ATEL	<i>Atriplex elegans</i>	0-1	-
	wheelscale saltbush	ATELF	<i>Atriplex elegans</i> var. <i>fasciculata</i>	0-1	-
	Wright's saltbush	ATWR	<i>Atriplex wrightii</i>	0-1	-
	Coulter's spiderling	BOCO2	<i>Boerhavia coulteri</i>	0-1	-
	spiderling	BOERH2	<i>Boerhavia</i>	0-1	-
	hoary bowlesia	BOIN3	<i>Bowlesia incana</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	-
	lambsquarters	CHAL7	<i>Chenopodium album</i>	0-1	-
	brittle spineflower	CHBR	<i>Chorizanthe brevicornu</i>	0-1	-
	aridland goosefoot	CHDE	<i>Chenopodium desiccatum</i>	0-1	-
	hyssopleaf sandmat	CHHY3	<i>Chamaesyce hyssopifolia</i>	0-1	-
	devil's spineflower	CHRI	<i>Chorizanthe rigida</i>	0-1	-
	sand pygmyweed	CRCO	<i>Crassula connata</i> var. <i>connata</i>	0-1	-
	cryptantha	CRYPT	<i>Cryptantha</i>	0-1	-
	fingerleaf gourd	CUDI	<i>Cucurbita digitata</i>	0-1	-
	pricklyburr	DAIN2	<i>Datura inoxia</i>	0-1	-
	hairy prairie clover	DAMO	<i>Dalea mollis</i>	0-1	-
	American wild carrot	DAPU3	<i>Daucus pusillus</i>	0-1	-
	woollyhead neststraw	STMI2	<i>Stylocline micropoides</i>	0-1	-
	brownplume wirelettuce	STPA4	<i>Stephanomeria pauciflora</i>	0-1	-
	sand fringe pod	THCU	<i>Thysanocarpus curvipes</i>	0-1	-
	woolly tidedromia	TILA2	<i>Tidedromia lanuginosa</i>	0-1	-
	Louisiana vetch	VILUL2	<i>Vicia ludoviciana</i> ssp. <i>ludoviciana</i>	0-1	-
5				6-22	
	Alga	2ALGA	<i>Alga</i>	6-11	-
	Lichen	2LICHN	<i>Lichen</i>	1-6	-
	Moss	2MOSS	<i>Moss</i>	1-3	-
	Fungus	2FUNGI	<i>Fungus</i>	1-2	-
Shrub/Vine					
6				135-224	
	creosote bush	LATR2	<i>Larrea tridentata</i>	135-224	-
7				67-112	
	triangle bur ragweed	AMDE4	<i>Ambrosia deltoidea</i>	67-112	-

8				0–4	
	burroweed	ISTE2	<i>Isocoma tenuisecta</i>	0–2	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–1	–
	alkali goldenbush	ISACA2	<i>Isocoma acradenia</i> var. <i>acradenia</i>	0–1	–
9				22–45	
	beavertail pricklypear	OPBA2	<i>Opuntia basilaris</i>	0–1	–
	Engelmann's hedgehog cactus	ECEN	<i>Echinocereus engelmannii</i>	0–1	–
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	0–1	–
	senita cactus	PASC14	<i>Pachycereus schottii</i>	0–1	–
	nightblooming cereus	PEGR3	<i>Peniocereus greggii</i>	0–1	–
	organpipe cactus	STTH3	<i>Stenocereus thurberi</i>	0–1	–
10				4–13	
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	0–3	–
	littleleaf ratany	KRER	<i>Krameria erecta</i>	0–1	–
	white ratany	KRGR	<i>Krameria grayi</i>	0–1	–
	water jacket	LYAN	<i>Lycium andersonii</i>	0–1	–
	Berlandier's wolfberry	LYBE	<i>Lycium berlandieri</i>	0–1	–
	Arizona desert-thorn	LYEX	<i>Lycium exsertum</i>	0–1	–
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	0–1	–
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	0–1	–
	burrobush	AMDU2	<i>Ambrosia dumosa</i>	0–1	–
	crucifixion thorn	CAEM4	<i>Castela emoryi</i>	0–1	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	0–1	–
Tree					
11				4–11	
	yellow paloverde	PAMI5	<i>Parkinsonia microphylla</i>	1–3	–
	velvet mesquite	PRVE	<i>Prosopis velutina</i>	0–2	–
	desert ironwood	OLTE	<i>Olneya tesota</i>	0–2	–

Animal community

Due to the lack of perennial, herbaceous forage species, this site is not well suited to yearlong grazing use. In wet winters the production of annual grasses and forbs can be high and provide for considerable grazing during the March-May season.

Water developments are very important to wildlife species on this site. Cover and diversity are lacking for the larger desert mammals. This site is home to several small mammals and their predators.

Other information

T&E: *Antilocapra americana sonoriensis*
(Sonoran pronghorn)
Leptonycteris curasoae yerbe buena
(Lesser long-nosed bat)

Type locality

Location 1: Pima County, AZ	
Township/Range/Section	T14S R1E S29
General legal description	Sells FO - Pisinimo Dist. - 1 mile west of old dirt road to Pisinimo from Ajo Highway
Location 2: Maricopa County, AZ	
Township/Range/Section	T1S R7E S14
General legal description	Chandler FO - General Motors Proving Grounds
Location 3: Pima County, AZ	
Township/Range/Section	T16S R5W S25
General legal description	Tucson FO - Organ Pipe Mational Monument

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, 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

- Number and extent of rills:** Rills are common and continuous in the absence of high gravel cover.

- Presence of water flow patterns:** Water flow patterns are common, continuous, and occupy 15-20% of the area.

- 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.

- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 10-60%. Expect low values in dry years.

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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:** No 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 and water. 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; 7.5-10YR5/4 dry, 7.5-10YR3/4 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 and absent in others. Large shrubs with large coppice mounds with high infiltration rates. Subshrubs with small mounds with high infiltration rates. Mounds occupy 15-30% of the surface and are evenly spaced over the area.
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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: large shrubs > subshrubs > trees > winter annuals > summer annuals > perennial grasses and forbs > succulents > cryptogams (Note: in El Nino years annual forbs and grasses are #1 in above ground weight.)
- Sub-dominant:
- Other:
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** 0-50% canopy mortality on trees and shrubs, 90-100% 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):** 250 lbs/ac unfavorable precipitation; 400 lbs/ac normal precipitation; 650 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, schismus, filaree
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17. **Perennial plant reproductive capability:** Not impaired for shrubs, drought impaired for perennial grasses and forbs.
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