

Ecological site R040XB203AZ Clayey Swale 7"-10" p.z.

Accessed: 05/07/2024

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.

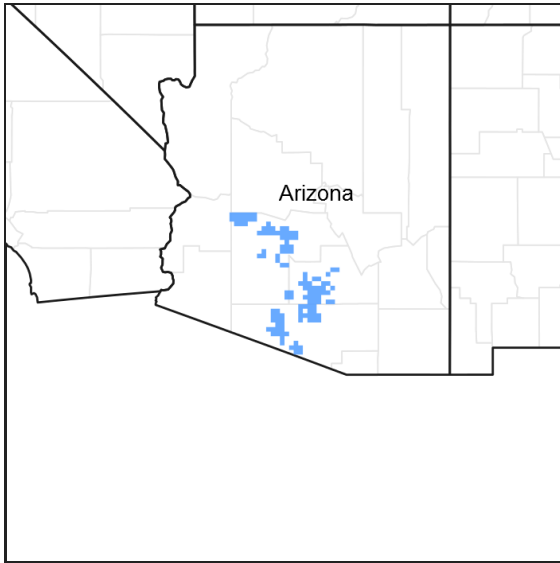


Figure 1. Mapped extent

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 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	(1) <i>Parkinsonia florida</i>
Shrub	(1) <i>Prosopis velutina</i> (2) <i>Lycium berlandieri</i>
Herbaceous	(1) <i>Pleuraphis mutica</i> (2) <i>Pleuraphis rigida</i>

Physiographic features

This site occurs on floodplains and alluvial fans. Slopes are from 0 to 2%. This site benefits on a regular basis from extra moisture received as runoff from adjacent uplands. Elevations range from 1100 to 2200 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Alluvial fan
Elevation	335–671 m
Slope	0–2%

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 on clayey alluvium of mixed origin. They are dark colored and have high shrink-swell potentials. Cracking and churning cause very rough surfaces. Plant-soil moisture relationships are very good.

Soils mapped on this site include: in

SSA-645 Aguila-Carefree area MU Gadsden-53;

SSA-651 Central Maricopa County MU's Gadsden-Gc & Vecont-Vf;

SSA-653 Gila Bend-Ajo area MU Gadsden-24;

SSA-659 Western Pinal County MU's Cashion-5, Gadsden-20, Ginland-23 & Pirner-36;

SSA-661 Eastern Pinal-Southern Gila Counties MU's Gadsden-355, Cashion-370 & Contine-830;

SSA-669 Eastern Pima County MU Vecont-83;

SSA-703 Gadsden-24, Ginland-26 & Vecont-61.

Table 4. Representative soil features

Surface texture	(1) Clay loam (2) Silty clay loam (3) Clay
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	21.34–27.43 cm
Calcium carbonate equivalent (0-101.6cm)	1–10%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	7.9–8.4
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 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 dominated by tobosa grass. Annual forbs and grasses are common. Shrubs are not common. This aspect is open grassland. With continuous, heavy grazing the cover of tobosa grass is depleted. The site is very susceptible to gully erosion once the perennial grass cover has been removed. Gully formation acts to rapidly drain flood waters from the site. This reduces potential productivity and allows shrubs like; mesquite, whitethorn, jimmyweed and goldenweed to invade and increase.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	717	-	807
Forb	45	-	90
Shrub/Vine	18	-	45
Tree	18	-	45
Total	798	-	987

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				534–610	
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	534–610	–
2				8–38	
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	8–38	–
	Parish's threeawn	ARPUP5	<i>Aristida purpurea</i> var. <i>parishii</i>	8–38	–
	Wright's threeawn	ARPUW	<i>Aristida purpurea</i> var. <i>wrightii</i>	8–38	–
	spidergrass	ARTE3	<i>Aristida ternipes</i>	8–38	–
	spidergrass	ARTEG	<i>Aristida ternipes</i> var. <i>gentilis</i>	8–38	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	8–38	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	8–38	–
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	8–38	–
3				38–76	
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	38–76	–
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	38–76	–
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	38–76	–
	Rothrock's grama	BORO2	<i>Bouteloua rothrockii</i>	38–76	–
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	38–76	–
	feather fingergrass	CHVI4	<i>Chloris virgata</i>	38–76	–
	canyon cupgrass	ERLE7	<i>Eriochloa lemmonii</i>	38–76	–
	Arizona barley	HOAR	<i>Hordeum arizonicum</i>	38–76	–
	little barley	HOPU	<i>Hordeum pusillum</i>	38–76	–
	bearded sprangletop	LEFUF	<i>Leptochloa fusca</i> ssp. <i>fascicularis</i>	38–76	–
	mucronate sprangletop	LEPA6	<i>Leptochloa panicea</i>	38–76	–
	sticky sprangletop	LEVI5	<i>Leptochloa viscida</i>	38–76	–
	delicate muhly	MUFR	<i>Muhlenbergia fragilis</i>	38–76	–
	littleseed muhly	MUMI	<i>Muhlenbergia microsperma</i>	38–76	–
	Bigelow's bluegrass	POBI	<i>Poa bigelovii</i>	38–76	–
	Arizona signalgrass	URAR	<i>Urochloa arizonica</i>	38–76	–
	Eastwood fescue	VUMIC	<i>Vulpia microstachys</i> var. <i>ciliata</i>	38–76	–
	Pacific fescue	VUMIP	<i>Vulpia microstachys</i> var. <i>pauciflora</i>	38–76	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	38–76	–
4				0–1	
	Alga	2ALGA	<i>Alga</i>	0–1	–
	Fungus	2FUNGI	<i>Fungus</i>	0–1	–
	Moss	2MOSS	<i>Moss</i>	0–1	–
Forb					
5				45–90	
	dwarf desertpeony	ACNA2	<i>Acourtia nana</i>	0–1	–
	weakleaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	0–1	–

common fiddleneck	AMME12	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	0-1	-
carelessweed	AMPA	<i>Amaranthus palmeri</i>	0-1	-
bristly fiddleneck	AMTE3	<i>Amsinckia tessellata</i>	0-1	-
tuber anemone	ANTU	<i>Anemone tuberosa</i>	0-1	-
milkweed	ASCLE	<i>Asclepias</i>	0-1	-
milkvetch	ASTRA	<i>Astragalus</i>	0-1	-
Coulter's spiderling	BOCO2	<i>Boerhavia coulteri</i>	0-1	-
hoary bowlesia	BOIN3	<i>Bowlesia incana</i>	0-1	-
fringed redmaids	CACI2	<i>Calandrinia ciliata</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	-
whitemargin sandmat	CHAL11	<i>Chamaesyce albomarginata</i>	0-1	-
brittle spineflower	CHBR	<i>Chorizanthe brevicornu</i>	0-1	-
New Mexico thistle	CINE	<i>Cirsium neomexicanum</i>	0-1	-
sand pygmyweed	CRCO34	<i>Crassula connata</i>	0-1	-
cryptantha	CRYPT	<i>Cryptantha</i>	0-1	-
fingerleaf gourd	CUDI	<i>Cucurbita digitata</i>	0-1	-
Missouri gourd	CUFO	<i>Cucurbita foetidissima</i>	0-1	-
coyote gourd	CUPA	<i>Cucurbita palmata</i>	0-1	-
hairy prairie clover	DAMO	<i>Dalea mollis</i>	0-1	-
American wild carrot	DAPU3	<i>Daucus pusillus</i>	0-1	-
western tansymustard	DEPI	<i>Descurainia pinnata</i>	0-1	-
bluedicks	DICA14	<i>Dichelostemma capitatum</i>	0-1	-
touristplant	DIWI2	<i>Dimorphocarpa wislizeni</i>	0-1	-
flatcrown buckwheat	ERDE6	<i>Eriogonum deflexum</i>	0-1	-
miniature woollystar	ERDI2	<i>Eriastrum diffusum</i>	0-1	-
erigenia	ERIGE	<i>Erigenia</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	-
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	-
California goldfields	LACA7	<i>Lasthenia californica</i>	0-1	-
Gordon's bladderpod	LEGO	<i>Lesquerella gordonii</i>	0-1	-
shaggyfruit pepperweed	LELA	<i>Lepidium lasiocarpum</i>	0-1	-
pepperweed	LEPID	<i>Lepidium</i>	0-1	-
Bigelow's linanthus	LIBI2	<i>Linanthus bigelovii</i>	0-1	-
flax	LINUM	<i>Linum</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	-
	Texas bluebonnet	LUSU	<i>Lupinus subcarneus</i>	0-1	-
	disc mayweed	MADI6	<i>Matricaria discoidea</i>	0-1	-
	Nuttall's povertyweed	MONU	<i>Monolepis nuttalliana</i>	0-1	-
	bristly nama	NAHI	<i>Nama hispidum</i>	0-1	-
	evening primrose	OENOT	<i>Oenothera</i>	0-1	-
	lineleaf whitepuff	OLLI	<i>Oligomeris linifolia</i>	0-1	-
	Florida pellitory	PAFL3	<i>Parietaria floridana</i>	0-1	-
	combseed	PECTO	<i>Pectocarya</i>	0-1	-
	manybristle chinchweed	PEPA2	<i>Pectis papposa</i>	0-1	-
	phacelia	PHACE	<i>Phacelia</i>	0-1	-
	Arizona popcornflower	PLAR	<i>Plagiobothrys arizonicus</i>	0-1	-
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	0-1	-
	redseed plantain	PLRH	<i>Plantago rhodosperma</i>	0-1	-
	desert unicorn-plant	PRAL4	<i>Proboscidea althaeifolia</i>	0-1	-
	New Mexico plumeseed	RANE	<i>Rafinesquia neomexicana</i>	0-1	-
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	0-1	-
	tube tongue	SIPHO	<i>Siphonoglossa</i>	0-1	-
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	0-1	-
	Coulter's globemallow	SPCO2	<i>Sphaeralcea coulteri</i>	0-1	-
	woollyhead neststraw	STMI2	<i>Stylocline micropoides</i>	0-1	-
	cutleaf thelypody	THLA	<i>Thelypodium laciniatum</i>	0-1	-
	woolly tidestromia	TILA2	<i>Tidestromia lanuginosa</i>	0-1	-
	Louisiana vetch	VILU	<i>Vicia ludoviciana</i>	0-1	-
Shrub/Vine					
6				0-1	
	whitemargin sandmat	CHAL11	<i>Chamaesyce albomarginata</i>	3-7	-
	brittle spineflower	CHBR	<i>Chorizanthe brevicornu</i>	3-7	-
	hairy prairie clover	DAMO	<i>Dalea mollis</i>	3-7	-
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	3-7	-
	touristplant	DIWI2	<i>Dimorphocarpa wislizeni</i>	3-7	-
	flatcrown buckwheat	ERDE6	<i>Eriogonum deflexum</i>	3-7	-
	common woolly sunflower	ERLA6	<i>Eriophyllum lanatum</i>	3-7	-
	California poppy	ESCAM	<i>Eschscholzia californica</i> ssp. <i>mexicana</i>	3-7	-
	pygmy poppy	ESMI	<i>Eschscholzia minutiflora</i>	3-7	-
	flax	LINUM	<i>Linum</i>	3-7	-
	Arizona lupine	LUAR4	<i>Lupinus arizonicus</i>	3-7	-
	Coulter's lupine	LUSP2	<i>Lupinus sparsiflorus</i>	3-7	-
	Texas bluebonnet	LUSU	<i>Lupinus subcarneus</i>	3-7	-
	lineleaf whitepuff	OLLI	<i>Oligomeris linifolia</i>	3-7	-
	Florida pellitory	PAFL3	<i>Parietaria floridana</i>	3-7	-
	Engelmann's hedgehog	ECEN	<i>Echinocereus engelmannii</i>	0-1	-

	cactus				
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	0–1	–
	dollarjoint pricklypear	OPCH	<i>Opuntia chlorotica</i>	0–1	–
	limestone adderstongue	OPEN	<i>Ophioglossum engelmannii</i>	0–1	–

Animal community

Due to seasonal availability of free water in natural charcos and discontinuous gullies, a long green season and easy accessibility, areas of this site are often overused. Tobosa, the dominant grass, is unpalatable when dry and should be grazed in the spring and summer growing season. Prescribed burning to freshen tobosa should not be used in this MLRA. The plant community is deficient in digestible protein in the fall and winter. Stock ponds constructed on this site should be carefully designed to avoid drying up downstream areas and altering base levels allowing gully formation to occur.

This site is mainly a foraging area for the larger desert mammals. Free water is available in the rainy seasons in natural charcos and discontinuous gullies. Water developments to provide water throughout the year will help some species of wildlife on the site. Being a grassland site, it is home to mainly a variety of small mammals and their predators.

Other information

T&E: *Antilocapra Americana sonoriensis*
(Sonoran pronghorn)

Type locality

Location 1: Maricopa County, AZ	
Township/Range/Section	T5N R2E S4
General legal description	Phoenix FO - Black Canyon Shooting Range
Location 2: Pima County, AZ	
Township/Range/Section	T9S R2E S16
General legal description	Sells FO - Headwaters of Vekol Wash

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

1. **Number and extent of rills:** Uncommon.

2. **Presence of water flow patterns:** Water flow patterns are uncommon, highly variable and a function of upland runoff. Vertic soil properties (high shrink-swell) continually reshape the surface.

3. **Number and height of erosional pedestals or terracettes:** None.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20-60%. Lower values expected in El Nino years.

5. **Number of gullies and erosion associated with gullies:** None.

6. **Extent of wind scoured, blowouts and/or depositional areas:** No evidence of soil movement by wind.

7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter can move by water when high flows are received.

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. Expect values of 1-3 in plant interspaces; 4-6 in plant canopies.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** weak thin platy to granular to subgranular blocky with depth; 7.5-10YR5/2 dry, 7.5-10YR3/2 moist, to 20+ inches thick.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy 20-30%; 85-90% perennial grasses, 5-10% annual forbs and grasses, and <2-3% trees and shrubs. Cover is well dispersed throughout the site.

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

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 grasses > winter annuals > summer annuals > trees & shrubs > perennial forbs > cryptogams

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
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14. **Average percent litter cover (%) and depth (in):** Herbaceous litter is not persistent on the site and may be 35-60% 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):** 400 lbs/ac unfavorable precipitation; 800 lbs/ac normal precipitation; 1500 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), London Rocket, Cheeseweed, mesquite
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17. **Perennial plant reproductive capability:** Not impaired for shrubs, drought impaired for perennial grasses and forbs.
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