USDA Natural Resources
Conservation Service

Ecological site R040XB226AZ
Sandy Loam Upland, Saline 7"-10" p.z.

Accessed: 05/12/2025

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.

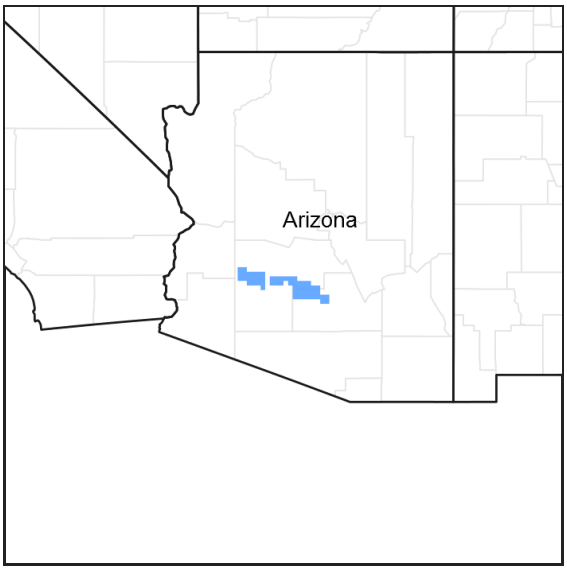

Figure 1. Mapped extent

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*
Herbaceous	(1) *Trichloris crinita* (2) *Pleuraphis rigida*

Physiographic features

This site occurs as nearly level to gently sloping fan terraces, stream terraces and relict basin floors.

Table 2. Representative physiographic features

Landforms	(1) Fan (2) Stream terrace (3) Basin floor
Elevation	274–625 m
Slope	0–5%

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

Soils are deep, well to somewhat excessively drained, saline and sodic soils. They are sandy to loamy with a surface cap of loamy fine sand to sandy loam. Surface textures can range to fine sandy loam, but in these instances, textural change to a heavier horizon must be greater than 20". Subsurface texture may also be coarse or fine loamy. The plant-soil moisture relationship is fair. These soils take water readily, but water available for plant growth is limited by the saline, sodic conditions. pH ranges from 8.0-9.6.

Soils mapped on this site include: SSA-651 Central Maricopa county MU's Antho-Ac & Lf, Valencia-Vb; SSA-658 Gila River Indian Reservation MU's Lagunita (saline)-22, Redun-28 & 32, Shontik-28 & 32, Vint-19 & 35.

Table 4. Representative soil features

Surface texture	(1) Sandy loam (2) Loamy sand

Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to rapid
Soil depth	152 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	12.19–30.48 cm
Calcium carbonate equivalent (0-101.6cm)	1–10%
Electrical conductivity (0-101.6cm)	2–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	13–30
Soil reaction (1:1 water) (0-101.6cm)	7.9–11
Subsurface fragment volume <=3" (Depth not specified)	0–5%
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 each group. Divide the resulting total by the total normal year production shown in the plant community description. If the rainfall has ben 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 dominated by salt tolerant shrubs. Winter and summer annual forbs and grasses are well represented on this site. Perennial grasses and forbs were present in minor amounts in the potential vegetative community. With severe disturbance (such as fire or heavy, continuous grazing) the saltbush species are replaced by annual grasses and forbs. Loss of shrub cover can result in accelerated water and wind erosion. The Atriplex spp. are very sensitibe to summer fires on this range site.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	314	347	381
Forb	22	56	90
Grass/Grasslike	22	34	45
Total	**358**	**437**	**516**

Additional community tables

Table 6. Community 1.1 plant community composition

				Annual Production	Foliar Cover

Group	Common Name	Symbol	Scientific Name	(Kg/Hectare)	(%)
Grass/Grasslike					
1				0–2	
	Havard's threeawn	ARHA3	*Aristida havardii*	0–2	–
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	0–2	–
	spidergrass	ARTE3	*Aristida ternipes*	0–2	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	0–2	–
	big galleta	PLRI3	*Pleuraphis rigida*	0–2	–
	spike dropseed	SPCO4	*Sporobolus contractus*	0–2	–
2				0–2	
	sixweeks threeawn	ARAD	*Aristida adscensionis*	0–2	–
	prairie threeawn	AROL	*Aristida oligantha*	0–2	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–2	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–2	–
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	0–2	–
	Arizona brome	BRAR4	*Bromus arizonicus*	0–2	–
	feather fingergrass	CHVI4	*Chloris virgata*	0–2	–
	spreading fleabane	ERDI4	*Erigeron divergens*	0–2	–
	little barley	HOPU	*Hordeum pusillum*	0–2	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	0–2	–
	mucronate sprangeltop	LEPAB	*Leptochloa panicea ssp. brachiata*	0–2	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	0–2	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–2	–
Forb					
3				6–22	
	desert Indianwheat	PLOV	*Plantago ovata*	6–22	–
4				6–67	
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	0–1	–
	fringed amaranth	AMFI	*Amaranthus fimbriatus*	0–1	–
	common fiddleneck	AMMEI2	*Amsinckia menziesii var. intermedia*	0–1	–
	wheelscale saltbush	ATEL	*Atriplex elegans*	0–1	–
	wheelscale saltbush	ATELF	*Atriplex elegans var. fasciculata*	0–1	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–1	–
	yellow tackstem	CAPA7	*Calycoseris parryi*	0–1	–
	white tackstem	CAWR	*Calycoseris wrightii*	0–1	–
	whitemargin sandmat	CHAL11	*Chamaesyce albomarginata*	0–1	–
	aridland goosefoot	CHDE	*Chenopodium desiccatum*	0–1	–
	cryptantha	CRYPT	*Cryptantha*	0–1	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–1	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–1	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	0–1	–
	pepperweed	LEPID	*Lepidium*	0–1	–
	coastal bird's-foot trefoil	LOSA	*Lotus salsuginosus*	0–1	

	coastal bird's-foot trefoil	LOSA	*Lotus salsuginosus*	0–1	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–1	–
	Nuttall's povertyweed	MONU	*Monolepis nuttalliana*	0–1	–
	bristly nama	NAHI	*Nama hispidum*	0–1	–
	combseed	PECTO	*Pectocarya*	0–1	–
	phacelia	PHACE	*Phacelia*	0–1	–
	New Mexico plumeseed	RANE	*Rafinesquia neomexicana*	0–1	–
	canaigre dock	RUHY	*Rumex hymenosepalus*	0–1	–
	smooth threadleaf ragwort	SEFLM	*Senecio flaccidus var. monoensis*	0–1	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–1	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	0–1	–
	woollyhead neststraw	STMI2	*Stylocline micropoides*	0–1	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–1	–
Shrub/Vine					
5				224–269	
	cattle saltbush	ATPO	*Atriplex polycarpa*	224–269	–
6				22–67	
	fourwing saltbush	ATCA2	*Atriplex canescens*	18–53	–
	water jacket	LYAN	*Lycium andersonii*	18–53	–
	velvet mesquite	PRVE	*Prosopis velutina*	18–53	–
7				22–45	
	burrobush	AMDU2	*Ambrosia dumosa*	18–35	–
	thinleaf fourwing saltbush	ATCAL4	*Atriplex canescens var. linearis*	18–35	–
	creosote bush	LATRT	*Larrea tridentata var. tridentata*	18–35	–
	Arizona desert-thorn	LYEX	*Lycium exsertum*	18–35	–
	Torrey wolfberry	LYTO	*Lycium torreyi*	18–35	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	18–35	–
	seepweed	SUAED	*Suaeda*	18–35	–
8	**Succulents**			6–22	
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	3–18	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	3–18	–

Animal community

This site produces forage for year-round use by livestock. Salt desert shrub species will provide adequate protein throughout the year, however, energy will usually be lacking from Jun-Jan (except when summer rains are sufficient to produce a crop of summer annual grasses and forbs). Spring is the main season for plant growth and production of annual species. Proper use of the shrub species should be no more than 50% of the spring production of twigs and leaves. Water developments are very important. Grazing can be controlled by controlling livestock access to water.

Lack of natural water and poor cover limits the value of this site as wildlife habitat. Large areas of this site have no inclusions of washes or bottom sites to provide the needed cover for larger desert animals. Forage diversity is fair. The site is mainly home to small desert animals and a forage area for birds.

Other information

T&E Species: Tumamoc globe berry (Tumamoca macdougalii) and Sonoran pronghorn (Antilocapra Americana sonoriensis)

Contributors

Dan Robinett
DGR
Larry D. Ellicott

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 due to low slopes.

---

2. **Presence of water flow patterns:** Water flow patterns are uncommon due to low slopes.

---

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 present.

---

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

---

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 wind and water. Woody litter remains under shrub canopies.

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 mdoerate in interspaces due to crusts formed by raindrop impact.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thir platy to granular; 7.5-10YR6/4 dry, 7.5-10YR4/4 moist, to 5 inches thick.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy 10-15%: 70-80% shrubs, 5% trees and 10-15% succulents. 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: shrubs > winter annuals > trees > summer annuals > succulents = perennial grasses and forbs > crytogams (in El Nino years, the production of winter annuals can exceed all other plants.

    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. 90-100% mortality of perennial grasses.

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

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 200 lbs/ac unfavorable precipitation; 300 lbs/ac normal precipitation; 400 lbs/ac favorable precipitation.

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

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