

## Ecological site R040XB208AZ Limy Upland, Deep 7"-10" p.z.

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### 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.

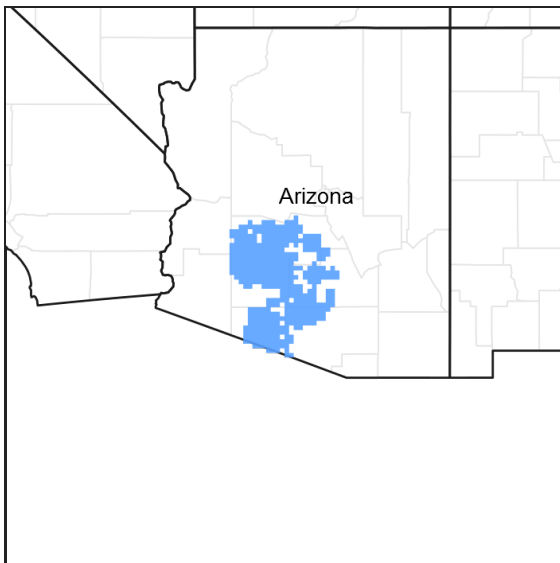


Figure 1. Mapped extent

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.

### Ecological site concept

Limy Upland, deep, 7"-10" p.z., is found on gently sloping terrain; it is often intermingled with Desert Pavement and Sandy Loam Swale ecological sites. Soils are deep, skeletal, and calcareous throughout.

Table 1. Dominant plant species

Tree	Not specified
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Shrub	(1) <i>Larrea tridentata</i> (2) <i>Ambrosia dumosa</i>
Herbaceous	Not specified

## Physiographic features

This site occurs on fan terraces. Slopes are from 1 to 15%. Elevations range from 1000 to 2100 feet.

**Table 2. Representative physiographic features**

Landforms	(1) Fan (2) Terrace
Elevation	305–640 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 very gravelly alluvium of various ages and from mixed origins. They are calcareous and have over 35% gravels in the soil profile. Plant-soil moisture relationships are poor.

Soil series most characteristic of this ecological site is Gunsight; it is correlated to several other series including Momoli and Pinamt.



**Figure 4. Gunsight**

**Table 4. Representative soil features**

Surface texture	(1) Very gravelly sandy loam (2) Extremely gravelly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to rapid
Soil depth	152 cm
Surface fragment cover <=3"	10–60%
Surface fragment cover >3"	1–10%
Available water capacity (0-101.6cm)	6.1–12.19 cm
Calcium carbonate equivalent (0-101.6cm)	5–35%
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)	10–60%
Subsurface fragment volume >3" (Depth not specified)	1–10%

## Ecological dynamics

Limy Upland, deep, 7"-10" p.z., is found on gently sloping terrain; it is often intermingled with Desert Pavement and Sandy Loam Swale ecological sites. Rainfall infiltration is low. Soil is moderately deep to deep and skeletal, lending to poor plant-soil relationships. The potential plant community is dominated by creosote with an understory of white bursage; other shrubs present are range ratany and ocotillo. A variety of succulents are scattered across this site. Annual forbs and grasses flourish under the canopy of shrubs after rainfall events. Percentage canopy cover (line-point intercept) ranges from 3% - 9%. Percentage ground cover (line-point intercept) is rock 29-85%, bare soil 11%-66%, litter 1%-7%, lichen crust <1%-4%, live basal cover <1%. Aspect is open desert shrubland.

## State and transition model



**State 1  
Desert Shrubland**

**Community 1.1  
Creosote-Bursage Community**



Figure 5. Limy Upland, deep

The potential plant community is dominated by scattered creosotebush with a few other shrub and cacti species. Annual grasses and forbs make up a small percentage of the plant community. The aspect is shrubland. Due to the unpalatable nature of creosotebush and associated shrubby species in the potential community, there is little change in species composition even with heavy grazing pressure. A few cool season, introduced annuals like; red

brome, mediterranean grass and london rocket mustard occur on the site and may compete with native annual grasses and forbs. The surface of these soils usually have well developed covers of gravels and caliche fragments. Cryptogam cover is usually very low. Plant populations for creosotebush range from 300 to 800 plants per acre, from 20 to 100 plants per acre for the ratany group and from 10 to 100 plants per acre for cholla species.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	224	–	252
Forb	15	–	28
Grass/Grasslike	6	–	28
Tree	–	–	1
<b>Total</b>	<b>245</b>	–	<b>309</b>

## Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Perennial Grasses</b>			1–7	
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	0–2	–
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	0–2	–
	slim tridens	TRMU	<i>Tridens muticus</i>	0–1	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	0–1	–
	blue threeawn	ARPUN	<i>Aristida purpurea var. nealleyi</i>	0–1	–
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	0–1	–
	nineawn pappusgrass	ENDE	<i>Enneapogon desvauxii</i>	0–1	–
2	<b>Annual Grasses</b>			0–4	
	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 var. miserrima</i>	0–1	–
	tufted lovegrass	ERPEP2	<i>Eragrostis pectinacea var. pectinacea</i>	0–1	–
	Mexican sprangletop	LEFUU	<i>Leptochloa fusca ssp. 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	–
	Eastwood fescue	VUMIC	<i>Vulpia microstachys var. ciliata</i>	0–1	–

	Lastwood fescue	VUMIP	<i>Vulpia microstachys</i> var. <i>virata</i>	0-1	-
	Pacific fescue	VUMIP	<i>Vulpia microstachys</i> var. <i>pauciflora</i>	0-1	-
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0-1	-
<b>Microbiotic Crusts</b>					
3	<b>Biotic Crusts</b>			0-1	
	Alga	2ALGA	<i>Alga</i>	0-1	-
	Fungus	2FUNGI	<i>Fungus</i>	0-1	-
	Lichen	2LICHN	<i>Lichen</i>	0-1	-
	Moss	2MOSS	<i>Moss</i>	0-1	-
<b>Forb</b>					
4	<b>Annual and Perennial Forbs</b>			0-13	
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	0-6	-
	common fiddleneck	AMMEI2	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	0-6	-
	cryptantha	CRYPT	<i>Cryptantha</i>	0-3	-
	bristly fiddleneck	AMTE3	<i>Amsinckia tessellata</i>	0-3	-
	combseed	PECTO	<i>Pectocarya</i>	0-3	-
	evening primrose	OENOT	<i>Oenothera</i>	0-3	-
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	0-3	-
	Coulter's globemallow	SPCO2	<i>Sphaeralcea coulteri</i>	0-3	-
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	1-2	-
	touristplant	DIWI2	<i>Dimorphocarpa wislizeni</i>	1-2	-
	sleepy silene	SIAN2	<i>Silene antirrhina</i>	1-2	-
	weakleaf bur ragweed	AMCO3	<i>Ambrosia confertiflora</i>	0-2	-
	carelessweed	AMPA	<i>Amaranthus palmeri</i>	0-1	-
	hairy prairie clover	DAMO	<i>Dalea mollis</i>	0-1	-
	American wild carrot	DAPU3	<i>Daucus pusillus</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	-
	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	-
	hyssopleaf sandmat	CHHY3	<i>Chamaesyce hyssopifolia</i>	0-1	-
	devil's spineflower	CHRI	<i>Chorizanthe rigida</i>	0-1	-
	Esteve's pincushion	CHST	<i>Chaenactis stevioides</i>	0-1	-
	sand pygmyweed	CRCO34	<i>Crassula connata</i>	0-1	-
	flatcrown buckwheat	ERDE6	<i>Eriogonum deflexum</i>	0-1	-
	miniature woollystar	ERDI2	<i>Eriastrum diffusum</i>	0-1	-
	fleabane	ERIGE2	<i>Erigeron</i>	0-1	-
	buckwheat	ERIOG	<i>Eriogonum</i>	0-1	-
	common woolly sunflower	ERLA6	<i>Eriophyllum lanatum</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	–
	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	–
	shrubby deervetch	LORI3	<i>Lotus rigidus</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	–
	woollyhead neststraw	STMI2	<i>Stylocline micropoides</i>	0–1	–
	pricklyleaf dogweed	THAC	<i>Thymophylla acerosa</i>	0–1	–
	sand fringe pod	THCU	<i>Thysanocarpus curvipes</i>	0–1	–
	woolly tidestromia	TILA2	<i>Tidestromia lanuginosa</i>	0–1	–
	lineleaf whitepuff	OLLI	<i>Oligomeris linifolia</i>	0–1	–
	blazingstar	MENTZ	<i>Mentzelia</i>	0–1	–
	bristly nama	NAHI	<i>Nama hispidum</i>	0–1	–
	glandular threadplant	NEGL	<i>Nemacladus glanduliferus</i>	0–1	–
	manybristle chinchweed	PEPA2	<i>Pectis papposa</i>	0–1	–
	phacelia	PHACE	<i>Phacelia</i>	0–1	–
	New Mexico plumeseed	RANE	<i>Rafinesquia neomexicana</i>	0–1	–
	chia	SACO6	<i>Salvia columbariae</i>	0–1	–
<b>Shrub/Vine</b>					
5				196–235	
	creosote bush	LATR2	<i>Larrea tridentata</i>	196–235	–
6				13–56	
	triangle bur ragweed	AMDE4	<i>Ambrosia deltoidea</i>	6–17	–
	burrobush	AMDU2	<i>Ambrosia dumosa</i>	6–17	–
	white ratany	KRGR	<i>Krameria grayi</i>	6–17	–
	littleleaf ratany	KRER	<i>Krameria erecta</i>	0–11	–
7				0–2	
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	0–1	–
	brittlebush	ENFA	<i>Encelia farinosa</i>	0–1	–
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	0–1	–
	crown of thorns	KOSP	<i>Koeberlinia spinosa</i>	0–1	–
	water jacket	LYAN	<i>Lycium andersonii</i>	0–1	–
	Arizona desert-thorn	LYEX	<i>Lycium exsertum</i>	0–1	–
8				2–6	
	Engelmann's hedgehog cactus	ECEN	<i>Echinocereus engelmannii</i>	0–1	–

	Leconte's barrel cactus	FECYL	<i>Ferocactus cylindraceus</i> var. <i>lecontei</i>	0-1	-
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	0-1	-
	beavertail pricklypear	OPBA2	<i>Opuntia basilaris</i>	0-1	-
<b>Tree</b>					
9				0-1	
	desert ironwood	OLTE	<i>Olneya tesota</i>	0-1	-
	yellow paloverde	PAMI5	<i>Parkinsonia microphylla</i>	0-1	-
	velvet mesquite	PRVE	<i>Prosopis velutina</i>	0-1	-

## Animal community

This site produces no herbaceous forage for year round use by livestock. Shrubby species on the site are not palatable. Even in wet winters the production of cool season annual species is low and provides for little additional carrying capacity.

Cover, forage and diversity are lacking for most desert mammals on this site. It is home mainly to a few small burrowing mammals, reptiles and their predators.

## Type locality

Location 1: Pima County, AZ	
Township/Range/Section	T185S R6W S2
General legal description	Tucson FO - Organ Pipe National Monument, LaAbra Plain
Location 2: Pima County, AZ	
Township/Range/Section	T11S R5E S20
General legal description	Sells FO - Tat Momoli Wash
Location 3: Maricopa County, AZ	
Township/Range/Section	T3N R5E S34
General legal description	Chandler FO - Salt River Res.

## 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, Byron Lambeth, Dan Robinett, Emilio Carrillo
Contact for lead author	NRCS Tucson Area Office
Date	03/02/2005
Approved by	S. Cassady



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

## Indicators

1. **Number and extent of rills:** Rills are common and continuous in absence of high gravel cover.  
\_\_\_\_\_
2. **Presence of water flow patterns:** Water flow patterns are common, continuous and occupy 15-20% of area.  
\_\_\_\_\_
3. **Number and height of erosional pedestals or terracettes:** Accumulated pedestals on most perennial plants, not so much so in high gravel cover areas, 2-5 inches high. Erosional pedestals not present on most perennial plants.  
\_\_\_\_\_
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10-60% (low values in high gravel cover areas and/or El Nino years)  
\_\_\_\_\_
5. **Number of gullies and erosion associated with gullies:** none  
\_\_\_\_\_
6. **Extent of wind scoured, blowouts and/or depositional areas:** none  
\_\_\_\_\_
7. **Amount of litter movement (describe size and distance expected to travel):** Woody litter mostly stays under plant canopy, herbaceous litter can travel long distances.  
\_\_\_\_\_
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.  
\_\_\_\_\_
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** single grain; color is 7.5-10YR6/4 dry, 7.5-10YR5/4 moist; Entisol - no A horizon  
\_\_\_\_\_
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Cover estimated as: canopy 20-25%, basal 1-2%; 50% canopy cover is shrubs, 20% trees and 30% 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 > subshrubs > trees > succulents > forbs = perennial grasses (Note: in El Nino years annual forbs and grasses are #1 in above ground weight.)

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.
- 

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):** 150 lbs/ac unfavorable precipitation; 250 lbs/ac normal precipitation; 350 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, schismus, filaree
- 

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