

Ecological site R040XA111AZ

Limy Upland 10"-13" p.z.

Accessed: 11/13/2024

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.

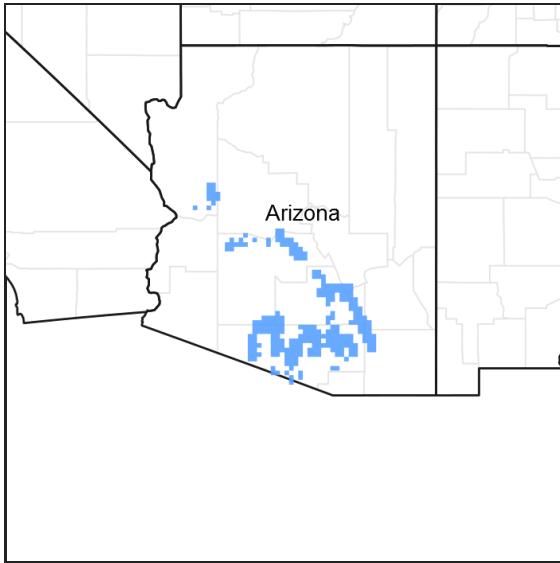


Figure 1. Mapped extent

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 40.1 – Upper Sonoran Desert

Elevations range from 2000 to 3200 feet and precipitation averages 10 to 13 inches per year. Vegetation includes saguaro, palo verde, mesquite, creosotebush, triangle bursage, prickly pear, cholla, limberbush, wolfberry, bush muhly, threeawns, ocotillo, and globe mallow. The soil temperature regime is thermic 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.

Associated sites

| | |
|-------------|---------------------------------------|
| R040XA101AZ | Basalt Hills 10"-13" p.z. |
| R040XA106AZ | Limy Upland, Deep 10"-13" p.z. |
| R040XA110AZ | Limy Slopes 10"-13" p.z. |

Similar sites

| | |
|-------------|-------------------------|
| R040XB210AZ | Limy Upland 7"-10" p.z. |
| R041XB208AZ | Limy Upland 8-12" p.z. |
| R041XC309AZ | Limy Upland 12-16" p.z. |

Table 1. Dominant plant species

| | |
|------------|---|
| Tree | (1) <i>Parkinsonia microphylla</i> |
| Shrub | (1) <i>Larrea tridentata</i> (2) <i>Zinnia acerosa</i> |
| Herbaceous | (1) <i>Dasyochloa pulchella</i> |

Physiographic features

This site occurs in the upper elevations of the Sonoran Desert in southern Arizona. It occurs on fan terraces, old stream terraces and ridge-tops.

Table 2. Representative physiographic features

| | |
|--------------------|------------------------------------|
| Landforms | (1) Fan piedmont (2) Terrace |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 2,200–3,600 ft |
| Slope | 1–15% |
| Aspect | Aspect is not a significant factor |

Climatic features

Precipitation in the sub resource area ranges from 10 to 13 inches in the southern part, along the Mexican border with elevations from about 1900 to 3200 feet. Precipitation in the northern part of the resource area ranges from 11 to 14 inches with elevations from about 1700 to 3500 feet. Winter-summer rainfall ratios range from 40%-60% in the southern portions of the land resource unit, to 50%-50% in the central portions, to 60%-40% in the northern part of the land resource unit. As one moves from east to west in this resource area rains become slightly more unpredictable and variable with Coefficients of Variation of annual rainfall equal to 29% at Tucson and 36% at Carefree. Summer rains fall July through Sept., originate in the Gulf of Mexico, and are convective, usually brief, intense thunderstorms. Cool season moisture tends to be frontal, originating in the Pacific and Gulf of California. This winter precipitation falls in widespread storms with long duration and low intensity. Snow is rare and seldom lasts more than an hour or two. May and June are the driest months of the year. Humidity is generally very low.

Winter temperatures are mild, with very few days recording freezing temperatures in the morning. Summer temperatures are warm to hot, with several days in June and July exceeding 105 degrees F.

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) | 265 days |
| Freeze-free period (average) | 0 days |
| Precipitation total (average) | 13 in |

Influencing water features

There are no water features associated with this site.

Soil features

These are shallow soils formed in limy and gravelly loamy alluvium or colluvium of mixed origin. They are calcareous throughout. They have lime cemented layers at shallow depths (10-20 inches). Soil surfaces are well covered with rocks and gravels. Plant-soil moisture relationships are fair. Soils mapped on this site include: SSA-627 Southern Mohave County MU's Cave-23, 24, Cline-32, Stagecoach-113; SSA-645 Aguila-Carefree area MU's Cave-37, 38, 93 & 94, Greyeagle-65 & 66, Suncity varient-66; SSA-661 Eastern Pinal-Southern Gila Counties MU's Cave-840, Delnorte-490, 650, Haplogypsids-490; SSA-666 Northwest Cochise County MU Delnorte-423; SSA-668 Tucson-Avra Valley area MU's Cave-CaB & CIC; SSA-669 Eastern Pima County MU's Cave-11, Delnorte-22, Jaynes-54, Pantano-58; SSA-703 Tohono O'odham area MU's Delnorte-16 & Pantano-48.

Table 4. Representative soil features

| | |
|--|--|
| Surface texture | (1) Gravelly sandy loam (2) Very gravelly sandy loam (3) Cobbly sandy loam |
| Family particle size | (1) Loamy |
| Drainage class | Somewhat excessively drained to well drained |
| Permeability class | Rapid to moderately rapid |
| Soil depth | 5–20 in |
| Surface fragment cover <=3" | 20–85% |
| Surface fragment cover >3" | 0–15% |
| Available water capacity (0-40in) | 0.5–2 in |
| Calcium carbonate equivalent (0-40in) | 10–30% |
| Electrical conductivity (0-40in) | 0–2 mmhos/cm |
| Sodium adsorption ratio (0-40in) | 0–2 |
| Soil reaction (1:1 water) (0-40in) | 7.8–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 15–65% |
| Subsurface fragment volume >3" (Depth not specified) | 0–20% |

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

MLRA 40-1 (10-13"), Limy Upland

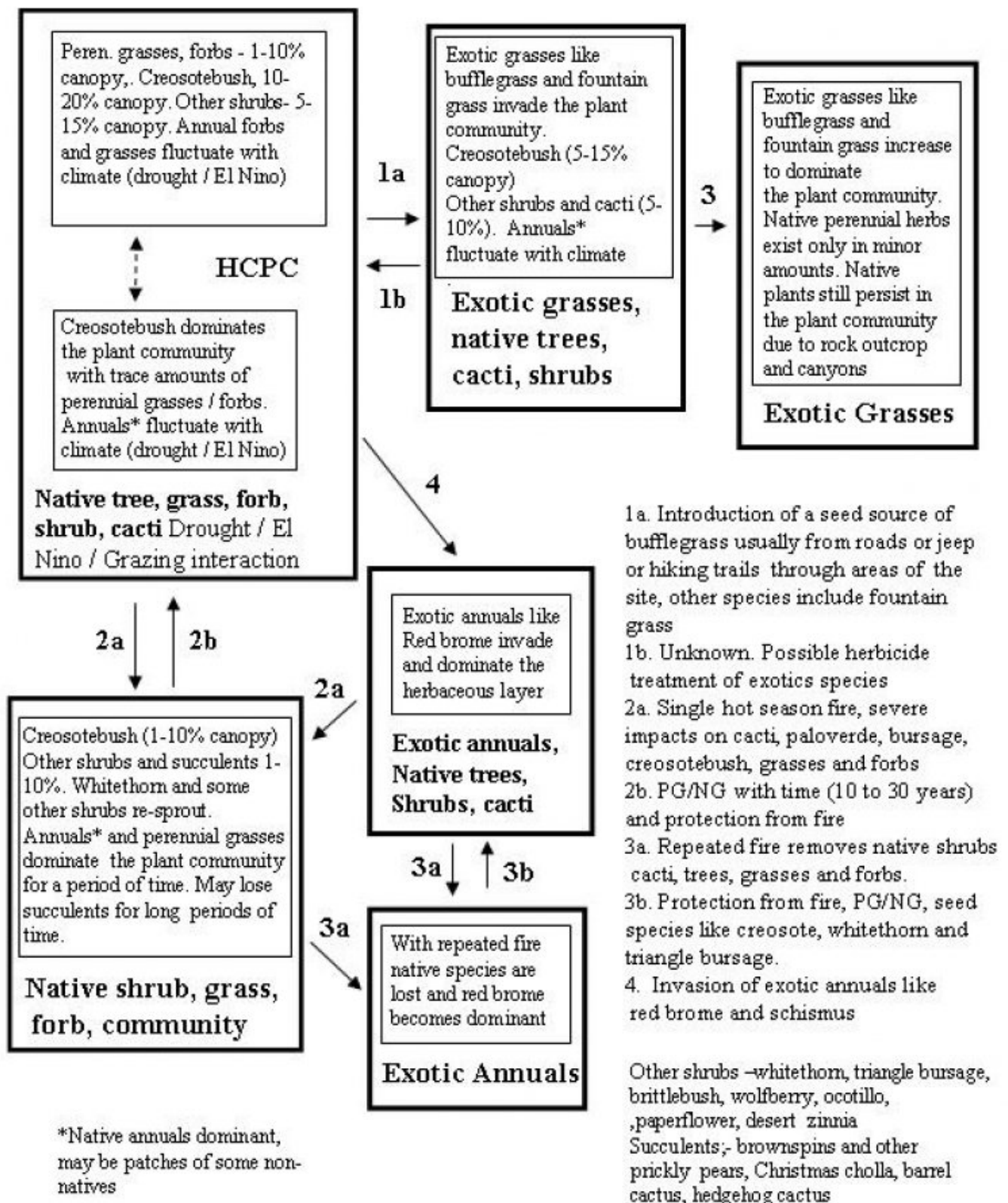


Figure 4. State and Transition model, Limy Upland 10-13" pz.

State 1
Historical Climax Plant Community

Community 1.1
Historical Climax Plant Community

The potential plant community is a diverse community of desert trees, shrubs, cacti, and perennial forbs and grasses. With continuous heavy grazing, herbaceous and suffrutescent forage species are replaced by increases in shrubs, cacti and trees. Well developed gravel covers help protect the soil from erosion. This site has a cycle of dominance by saguaro, alternating with large shrubs and trees that act as nurse plants for the giant cacti. This cycle takes approximately 300 years and starts from exceptionally wet years (El Nino) where saguaro establishes in large numbers.

Table 5. Annual production by plant type

| Plant Type | Low (Lb/Acre) | Representative Value (Lb/Acre) | High (Lb/Acre) |
|-----------------|---------------|--------------------------------|----------------|
| Shrub/Vine | 60 | 200 | 285 |
| Grass/Grasslike | 11 | 50 | 160 |
| Forb | 2 | 25 | 65 |
| Tree | 0 | 10 | 50 |
| Total | 73 | 285 | 560 |

Table 6. Soil surface cover

| | |
|-----------------------------------|--------|
| Tree basal cover | 0-1% |
| Shrub/vine/liana basal cover | 1-3% |
| Grass/grasslike basal cover | 0-1% |
| Forb basal cover | 0-1% |
| Non-vascular plants | 0% |
| Biological crusts | 5-25% |
| Litter | 5-45% |
| Surface fragments >0.25" and <=3" | 20-85% |
| Surface fragments >3" | 0-15% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 5-45% |

Table 7. Canopy structure (% cover)

| Height Above Ground (Ft) | Tree | Shrub/Vine | Grass/Grasslike | Forb |
|--------------------------|-------|------------|-----------------|-------|
| <0.5 | – | 0-1% | 0-10% | 0-10% |
| >0.5 <= 1 | – | 0-2% | 1-10% | 1-10% |
| >1 <= 2 | – | 1-5% | 0-2% | 0-5% |
| >2 <= 4.5 | 0-1% | 1-15% | 0-1% | 0-1% |
| >4.5 <= 13 | 1-10% | 0-2% | – | – |
| >13 <= 40 | 0-1% | – | – | – |
| >40 <= 80 | – | – | – | – |
| >80 <= 120 | – | – | – | – |
| >120 | – | – | – | – |

Figure 6. Plant community growth curve (percent production by month).
AZ4013, 40.1 10-13" p.z. other sites. Growth begins in the late winter, goes semi-dormant in the drought period of late May through early July, growth continues in the summer through early fall..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 5 | 10 | 20 | 15 | 0 | 5 | 20 | 15 | 5 | 5 | 0 |

State 2

Exotic perennial grasses with natives

Community 2.1

Exotic perennial grasses with natives

This community occurs where buffleggrass and / or fountain grass invade the native plant community. These species occupy the niches of low shrubs like desert zinnia, brittlebush, mariola and grasses like bush muhly, fluffgrass and slim tridens.

State 3

Exotic perennial grasses and fire

Community 3.1

Exotic perennial grasses and fire

This community occurs where a native plant community that has been invaded by buffleggrass or fountain grass has burned one or more times. Increasing amounts of buffleggrass leads to more uniform fine fuels. In areas adjacent to roads and urban areas the risk of repeated fires will increase. As fire frequency increases the dominance of the exotic grasses increase.

State 4

Native trees, cacti, shrubs and fire

Community 4.1

Native trees, cacti, shrubs and fire

This plant community occurs as a result of a single hot season fire. Creosotebush, whitethorn, paloverde and cacti can be severely impacted and may take long periods of time (30-50 years) to recover to pre-fire levels. Perennial and annual grasses and forbs dominate the community for some time until shrubs like ocotillo, whitethorn and creosote can recover. This plant community can produce enough herbaceous fuel from native species of grasses and / or forbs to carry fire in El Nino years or after unusually wet summers. The natural incidence of fire in this MLRA is very low and fires are much more common from man-made ignitions. Areas of the site close to urban zones or along heavily travelled roads and highways will experience a higher rate of fires.

State 5

Native plant community with exotic annuals

Community 5.1

Native plant community with exotic annuals

This plant community occurs where the native community has been invaded by species like filaree, red brome and schismus. Red brome and schismus occupy the niche of the native winter annual forbs and grasses. These exotic annual grasses will fluctuate from nearly nothing in a dry winter to dominance of the understory plant community in a El Nino winter.

State 6

Exotic annuals and fire

Community 6.1

Exotic annuals and fire

This plant community occurs where a native plant community which has been invaded by red brome and / or schismus, and has burned repeatedly. As fires become more frequent the native trees, shrubs and succulents are removed from the plant community and annuals like red brome become dominant. In areas of the site near urban areas and along heavily travelled roads this will be a more common occurrence due to an increased source of ignitions.

Additional community tables

Table 8. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Lb/Acre) | Foliar Cover (%) |
|------------------------|--------------------------------------|--------|---|-----------------------------|------------------|
| Grass/Grasslike | | | | | |
| 1 | Suffrutescent grasses | | | 5–50 | |
| | bush muhly | MUPO2 | <i>Muhlenbergia porteri</i> | 5–50 | – |
| | black grama | BOER4 | <i>Bouteloua eriopoda</i> | 0–15 | – |
| 2 | Subdominant perennial grasses | | | 5–50 | |
| | low woollygrass | DAPU7 | <i>Dasyochloa pulchella</i> | 1–50 | – |
| | nineawn pappusgrass | ENDE | <i>Erneapogon desvauxii</i> | 0–25 | – |
| | blue threeawn | ARPUN | <i>Aristida purpurea</i> var. <i>nealleyi</i> | 0–10 | – |
| | red grama | BOTR2 | <i>Bouteloua trifida</i> | 0–10 | – |
| | slim tridens | TRMU | <i>Tridens muticus</i> | 0–10 | – |
| | desert needlegrass | ACSP12 | <i>Achnatherum speciosum</i> | 0–7 | – |
| | purple threeawn | ARPU9 | <i>Aristida purpurea</i> | 0–5 | – |
| | cotta grass | COPA13 | <i>Cottea pappophoroides</i> | 0–5 | – |
| | Hall's panicgrass | PAHA | <i>Panicum hallii</i> | 0–5 | – |
| | big galleta | PLRI3 | <i>Pleuraphis rigida</i> | 0–5 | – |
| 3 | Misc. perennial grasses | | | 0–10 | |
| | Indian ricegrass | ACHY | <i>Achnatherum hymenoides</i> | 0–5 | – |
| | spidergrass | ARTE3 | <i>Aristida ternipes</i> | 0–5 | – |
| | spidergrass | ARTEG | <i>Aristida ternipes</i> var. <i>gentilis</i> | 0–5 | – |
| | New Mexico feathergrass | HENE5 | <i>Hesperostipa neomexicana</i> | 0–5 | – |
| | hairy woollygrass | ERPI5 | <i>Erioneuron pilosum</i> | 0–3 | – |
| | sideoats grama | BOCU | <i>Bouteloua curtipendula</i> | 0–1 | – |
| | Arizona cottontop | DICA8 | <i>Digitaria californica</i> | 0–1 | – |
| | Parish's threeawn | ARPUP5 | <i>Aristida purpurea</i> var. <i>parishii</i> | 0–1 | – |
| | plains bristlegrass | SEVU2 | <i>Setaria vulpiseta</i> | 0–1 | – |
| | spike dropseed | SPCO4 | <i>Sporobolus contractus</i> | 0–1 | – |
| | sand dropseed | SPCR | <i>Sporobolus cryptandrus</i> | 0–1 | – |
| | mesa dropseed | SPFL2 | <i>Sporobolus flexuosus</i> | 0–1 | – |
| | tanglehead | HECO10 | <i>Heteropogon contortus</i> | 0–1 | – |
| 4 | Annual grasses | | | 1–50 | |
| | sixweeks grama | BOBA2 | <i>Bouteloua barbata</i> | 1–50 | – |
| | Rothrock's grama | BORO2 | <i>Bouteloua rothrockii</i> | 0–5 | – |
| | 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 | - |
| | mucronate sprangeltop | LEPAB | <i>Leptochloa panicea ssp. brachiata</i> | 0-5 | - |
| | Mexican panicgrass | PAHI5 | <i>Panicum hirticaule</i> | 0-5 | - |
| | sixweeks fescue | VUOC | <i>Vulpia octoflora</i> | 0-5 | - |
| | Bigelow's bluegrass | POBI | <i>Poa bigelovii</i> | 0-1 | - |
| | Arizona signalgrass | URAR | <i>Urochloa arizonica</i> | 0-1 | - |
| | delicate muhly | MUFR | <i>Muhlenbergia fragilis</i> | 0-1 | - |
| | littleseed muhly | MUMI | <i>Muhlenbergia microsperma</i> | 0-1 | - |
| | Arizona brome | BRAR4 | <i>Bromus arizonicus</i> | 0-1 | - |
| | feather fingergrass | CHVI4 | <i>Chloris virgata</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 | - |

Forb

| | | | | | |
|---|------------------------------|--------|---|------|---|
| 5 | Perennial forbs | | | 1-15 | |
| | paleface | HIDE | <i>Hibiscus denudatus</i> | 0-5 | - |
| | trailing windmills | ALIN | <i>Allionia incarnata</i> | 1-5 | - |
| | hairyseed bahia | BAAB | <i>Bahia absinthifolia</i> | 0-5 | - |
| | leatherweed | CRPOP | <i>Croton pottsii var. pottsii</i> | 0-5 | - |
| | lacy tansyaster | MAPIP4 | <i>Machaeranthera pinnatifida ssp. pinnatifida</i> <i>var. pinnatifida</i> | 1-5 | - |
| | Coues' cassia | SECO10 | <i>Senna covesii</i> | 0-5 | - |
| | California fagonbush | FALA | <i>Fagonia laevis</i> | 0-2 | - |
| | slender janusia | JAGR | <i>Janusia gracilis</i> | 0-2 | - |
| | Parry's false prairie-clover | MAPA7 | <i>Marina parryi</i> | 0-2 | - |
| | dwarf desertpeony | ACNA2 | <i>Acourtia nana</i> | 0-2 | - |
| | hairy five eyes | CHSO | <i>Chamaesaracha sordida</i> | 0-2 | - |
| | brownfoot | ACWR5 | <i>Acourtia wrightii</i> | 0-1 | - |
| | San Felipe dogweed | ADPO | <i>Adenophyllum porophylloides</i> | 0-1 | - |
| | spearleaf | MAPA9 | <i>Matelea parvifolia</i> | 0-1 | - |
| | fringed twinevine | FUCYC | <i>Funastrum cynanchoides ssp. cynanchoides</i> | 0-1 | - |
| | Davis Mountain mock vervain | GLBIC | <i>Glandularia bipinnatifida var. ciliata</i> | 0-1 | - |
| | desert rosemallow | HICO | <i>Hibiscus coulteri</i> | 0-1 | - |
| | desert larkspur | DEPA | <i>Delphinium parishii</i> | 0-1 | - |
| | tall mountain larkspur | DESC | <i>Delphinium scaposum</i> | 0-1 | - |
| | bluedicks | DICA14 | <i>Dichelostemma capitatum</i> | 0-1 | - |
| | spreading fleabane | ERDI4 | <i>Erigeron divergens</i> | 0-1 | - |
| | desert trumpet | ERIN4 | <i>Eriogonum inflatum</i> | 0-1 | - |
| | wild dwarf morning-glory | EVAR | <i>Evolvulus arizonicus</i> | 0-1 | - |
| | desert marigold | BAMU | <i>Baileya multiradiata</i> | 0-1 | - |
| | climbing wartclub | BOSC | <i>Boerhavia scandens</i> | 0-1 | - |
| | desert mariposa lily | CAKE | <i>Calochortus kennedyi</i> | 0-1 | - |
| | naked mariposa lily | CANU2 | <i>Calochortus nudus</i> | 0-1 | - |
| | red-gland spurge | CHME5 | <i>Chamaesyce melanadenia</i> | 0-1 | - |

| | | | | | |
|---|----------------------------|--------|---|------|---|
| | weakleaf bur ragweed | AMCO3 | <i>Ambrosia confertiflora</i> | 0-1 | - |
| | narrowleaf silverbush | ARLA12 | <i>Argythamnia lanceolata</i> | 0-1 | - |
| | dense ayenia | AYMI | <i>Ayenia microphylla</i> | 0-1 | - |
| | spreading fanpetals | SIAB | <i>Sida abutifolia</i> | 0-1 | - |
| | desert globemallow | SPAM2 | <i>Sphaeralcea ambigua</i> | 0-1 | - |
| | caliche globemallow | SPLA | <i>Sphaeralcea laxa</i> | 0-1 | - |
| | brownplume wirelettuce | STPA4 | <i>Stephanomeria pauciflora</i> | 0-1 | - |
| | Coulter's wrinklefruit | TECO | <i>Tetradlea coulteri</i> | 0-1 | - |
| | rue of the mountains | THTE2 | <i>Thamnosma texana</i> | 0-1 | - |
| | plains blackfoot | MELE2 | <i>Melampodium leucanthum</i> | 0-1 | - |
| | wishbone-bush | MILAV | <i>Mirabilis laevis var. villosa</i> | 0-1 | - |
| | desert tobacco | NIOBO | <i>Nicotiana obtusifolia var. obtusifolia</i> | 0-1 | - |
| | Parry's beardtongue | PEPA24 | <i>Penstemon parryi</i> | 0-1 | - |
| | orange fameflower | PHAU13 | <i>Phemeranthus aurantiacus</i> | 0-1 | - |
| | mesquite mistletoe | PHCA8 | <i>Phoradendron californicum</i> | 0-1 | - |
| | slender poreleaf | POGR5 | <i>Porophyllum gracile</i> | 0-1 | - |
| | glandleaf milkwort | POMA7 | <i>Polygala macradenia</i> | 0-1 | - |
| 6 | Annual forbs | | | 1-50 | |
| | desert Indianwheat | PLOV | <i>Plantago ovata</i> | 1-15 | - |
| | woolly plantain | PLPA2 | <i>Plantago patagonica</i> | 0-15 | - |
| | flatcrown buckwheat | ERDE6 | <i>Eriogonum deflexum</i> | 0-15 | - |
| | western tansymustard | DEPI | <i>Descurainia pinnata</i> | 0-15 | - |
| | Gordon's bladderpod | LEGO | <i>Lesquerella gordonii</i> | 0-10 | - |
| | shaggyfruit pepperweed | LELA | <i>Lepidium lasiocarpum</i> | 0-10 | - |
| | chia | SACO6 | <i>Salvia columbariae</i> | 0-10 | - |
| | lyreleaf jewelflower | STCAA | <i>Streptanthus carinatus ssp. arizonicus</i> | 0-10 | - |
| | thelypody | THELY | <i>Thelypodium</i> | 0-5 | - |
| | woolly tidestromia | TILA2 | <i>Tidestromia lanuginosa</i> | 0-5 | - |
| | American wild carrot | DAPU3 | <i>Daucus pusillus</i> | 0-5 | - |
| | combseed | PECTO | <i>Pectocarya</i> | 0-5 | - |
| | manybristle chinchweed | PEPA2 | <i>Pectis papposa</i> | 0-5 | - |
| | Arizona phacelia | PHAR13 | <i>Phacelia arizonica</i> | 0-5 | - |
| | cleftleaf wildheliotrope | PHCR | <i>Phacelia crenulata</i> | 0-5 | - |
| | slender goldenweed | MAGR10 | <i>Machaeranthera gracilis</i> | 0-5 | - |
| | mesa tansyaster | MATA | <i>Machaeranthera tagetina</i> | 0-5 | - |
| | miniature woollystar | ERDI2 | <i>Eriastrum diffusum</i> | 0-5 | - |
| | Sonoran sandmat | CHMI7 | <i>Chamaesyce micromera</i> | 0-5 | - |
| | California poppy | ESCAM | <i>Eschscholzia californica ssp. mexicana</i> | 0-5 | - |
| | bristly fiddleneck | AMTE3 | <i>Amsinckia tessellata</i> | 0-5 | - |
| | wheelscale saltbush | ATEL | <i>Atriplex elegans</i> | 0-5 | - |
| | Coulter's spiderling | BOCO2 | <i>Boerhavia coulteri</i> | 0-5 | - |
| | exserted Indian paintbrush | CAEXE | <i>Castilleja exserta ssp. exserta</i> | 0-5 | - |
| | brittle spineflower | CHBR | <i>Chorizanthe brevicornu</i> | 0-5 | - |

| | | | | | |
|--|-----------------------------|--------|--|-----|---|
| | pincushion flower | CHFR | <i>Chaenactis fremontii</i> | 0-5 | - |
| | hyssopleaf sandmat | CHHY3 | <i>Chamaesyce hyssopifolia</i> | 0-2 | - |
| | buckwheat | ERIOG | <i>Eriogonum</i> | 0-2 | - |
| | Coulter's lupine | LUSP2 | <i>Lupinus sparsiflorus</i> | 0-2 | - |
| | glandular threadplant | NEGL | <i>Nemacladus glanduliferus</i> | 0-2 | - |
| | Arizona popcornflower | PLAR | <i>Plagiobothrys arizonicus</i> | 0-2 | - |
| | sleepy silene | SIAN2 | <i>Silene antirrhina</i> | 0-2 | - |
| | bristly scaleseed | SPEC2 | <i>Spermolepis echinata</i> | 0-1 | - |
| | Lemmon's ragwort | SELE8 | <i>Senecio lemmonii</i> | 0-1 | - |
| | New Mexico plumeseed | RANE | <i>Rafinesquia neomexicana</i> | 0-1 | - |
| | desert evening primrose | OEPR | <i>Oenothera primiveris</i> | 0-1 | - |
| | Florida pellitory | PAFL3 | <i>Parietaria floridana</i> | 0-1 | - |
| | distant phacelia | PHDI | <i>Phacelia distans</i> | 0-1 | - |
| | slimjim bean | PHFI3 | <i>Phaseolus filiformis</i> | 0-1 | - |
| | mesquite mistletoe | PHCA8 | <i>Phoradendron californicum</i> | 0-1 | - |
| | Louisiana vetch | VILU | <i>Vicia ludoviciana</i> | 0-1 | - |
| | false carrot | YAMI | <i>Yabea microcarpa</i> | 0-1 | - |
| | woollyhead neststraw | STMI2 | <i>Stylocline micropoides</i> | 0-1 | - |
| | sand fringe pod | THCU | <i>Thysanocarpus curvipes</i> | 0-1 | - |
| | California desertdandelion | MACA6 | <i>Malacothrix californica</i> | 0-1 | - |
| | wedgeleaf draba | DRCU | <i>Draba cuneifolia</i> | 0-1 | - |
| | Abert's buckwheat | ERAB2 | <i>Eriogonum abertianum</i> | 0-1 | - |
| | Arizona cottonrose | LOAR12 | <i>Logfia arizonica</i> | 0-1 | - |
| | foothill deervetch | LOHU2 | <i>Lotus humistratus</i> | 0-1 | - |
| | coastal bird's-foot trefoil | LOSAB | <i>Lotus salsuginosus var. brevivexillus</i> | 0-1 | - |
| | Arizona lupine | LUAR4 | <i>Lupinus arizonicus</i> | 0-1 | - |
| | tanseyleaf tansyaster | MATA2 | <i>Machaeranthera tanacetifolia</i> | 0-1 | - |
| | whitestem blazingstar | MEAL6 | <i>Mentzelia albicaulis</i> | 0-1 | - |
| | Lindley's silverpuffs | MILI5 | <i>Microseris lindleyi</i> | 0-1 | - |
| | Mojave desertstar | MOBE2 | <i>Monoptilon bellioides</i> | 0-1 | - |
| | Nuttall's povertyweed | MONU | <i>Monolepis nuttalliana</i> | 0-1 | - |
| | bristly nama | NAHI | <i>Nama hispidum</i> | 0-1 | - |
| | Texas stork's bill | ERTE13 | <i>Erodium texanum</i> | 0-1 | - |
| | Thurber's buckwheat | ERTH3 | <i>Eriogonum thurberi</i> | 0-1 | - |
| | devil's spineflower | CHRI | <i>Chorizanthe rigida</i> | 0-1 | - |
| | Esteve's pincushion | CHST | <i>Chaenactis stevioides</i> | 0-1 | - |
| | New Mexico thistle | CINE | <i>Cirsium neomexicanum</i> | 0-1 | - |
| | sand pygmyweed | CRCOC | <i>Crassula connata var. connata</i> | 0-1 | - |
| | cryptantha | CRYPT | <i>Cryptantha</i> | 0-1 | - |
| | hairy prairie clover | DAMO | <i>Dalea mollis</i> | 0-1 | - |
| | Mexican fireplant | EUHE4 | <i>Euphorbia heterophylla</i> | 0-1 | - |
| | dainty desert hideseed | EUMI2 | <i>Eucrypta micrantha</i> | 0-1 | - |
| | spring pygmy cudweed | EVVE | <i>Evax verna</i> | 0-1 | - |

| | | | | | |
|-------------------|------------------------------|--------|--|---------|---|
| | hairy desertsunflower | GECA2 | <i>Geraea canescens</i> | 0–1 | – |
| | star gilia | GIST | <i>Gilia stellata</i> | 0–1 | – |
| | California mustard | GULA4 | <i>Guillenia lasiophylla</i> | 0–1 | – |
| | Palmer's grapplinghook | HAPA7 | <i>Harpagonella palmeri</i> | 0–1 | – |
| | Arizona poppy | KAGR | <i>Kallstroemia grandiflora</i> | 0–1 | – |
| | California goldfields | LACAC2 | <i>Lasthenia californica</i> ssp. <i>californica</i> | 0–1 | – |
| | flatspine stickseed | LAOCO | <i>Lappula occidentalis</i> var. <i>occidentalis</i> | 0–1 | – |
| | lipfern | CHEIL | <i>Cheilanthes</i> | 0–1 | – |
| | Chiricahua Mountain sandmat | CHFL3 | <i>Chamaesyce florida</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 | – |
| | pitseed goosefoot | CHBE4 | <i>Chenopodium berlandieri</i> | 0–1 | – |
| | hoary bowlesia | BOIN3 | <i>Bowlesia incana</i> | 0–1 | – |
| | California suncup | CACA32 | <i>Camissonia californica</i> | 0–1 | – |
| | browneyes | CACL4 | <i>Camissonia claviformis</i> | 0–1 | – |
| | white easterbonnets | ANLA7 | <i>Antheropeas lanosum</i> | 0–1 | – |
| | smallflowered milkvetch | ASNU4 | <i>Astragalus nuttallianus</i> | 0–1 | – |
| | fringed amaranth | AMFI | <i>Amaranthus fimbriatus</i> | 0–1 | – |
| | carelessweed | AMPA | <i>Amaranthus palmeri</i> | 0–1 | – |
| Shrub/Vine | | | | | |
| 7 | Dominant large shrubs | | | 50–200 | |
| | creosote bush | LATRT | <i>Larrea tridentata</i> var. <i>tridentata</i> | 100–200 | – |
| | whitethorn acacia | ACCO2 | <i>Acacia constricta</i> | 0–50 | – |
| | ocotillo | FOSP2 | <i>Fouquieria splendens</i> | 0–25 | – |
| 8 | Dominant half shrubs | | | 5–50 | |
| | littleleaf ratany | KRER | <i>Krameria erecta</i> | 1–20 | – |
| | white ratany | KRGR | <i>Krameria grayi</i> | 1–20 | – |
| | desert zinnia | ZIAC | <i>Zinnia acerosa</i> | 1–20 | – |
| | rough menodora | MESC | <i>Menodora scabra</i> | 0–10 | – |
| | whitestem paperflower | PSCO2 | <i>Psilostrophe cooperi</i> | 0–10 | – |
| | triangle bur ragweed | AMDE4 | <i>Ambrosia deltoidea</i> | 0–10 | – |
| | brittlebush | ENFA | <i>Encelia farinosa</i> | 0–10 | – |
| | pricklyleaf dogweed | THAC | <i>Thymophylla acerosa</i> | 0–5 | – |
| | desert yellow fleabane | ERLI | <i>Erigeron linearis</i> | 0–2 | – |
| | toothleaf goldeneye | VIDE3 | <i>Viguiera dentata</i> | 0–2 | – |
| | threadleaf snakeweed | GUMI | <i>Gutierrezia microcephala</i> | 0–1 | – |
| | broom snakeweed | GUSA2 | <i>Gutierrezia sarothrae</i> | 0–1 | – |
| | woody crinkleemat | TICAC | <i>Tiquilia canescens</i> var. <i>canescens</i> | 0–1 | – |
| | button brittlebush | ENFR | <i>Encelia frutescens</i> | 0–1 | – |
| 9 | Miscellaneous shrubs | | | 0–10 | |
| | Warnock's snakewood | COWA | <i>Condalia warnockii</i> | 0–5 | – |
| | mariola | PAIN2 | <i>Parthenium incanum</i> | 0–5 | – |

| | | | | | |
|----|--------------------------|--------|--------------------------------------|------|---|
| | jojoba | SICH | <i>Simmondsia chinensis</i> | 0–5 | – |
| | Nevada jointfir | EPNE | <i>Ephedra nevadensis</i> | 0–3 | – |
| | winterfat | KRLA2 | <i>Krascheninnikovia lanata</i> | 0–3 | – |
| | crucifixion thorn | CAHO3 | <i>Canotia holacantha</i> | 0–3 | – |
| | triangle bur ragweed | AMDE4 | <i>Ambrosia deltoidea</i> | 0–3 | – |
| | burrobush | AMDU2 | <i>Ambrosia dumosa</i> | 0–3 | – |
| | San Felipe dogweed | ADPO | <i>Adenophyllum porophylloides</i> | 0–2 | – |
| | turpentinebroom | THMO | <i>Thamnosma montana</i> | 0–2 | – |
| | Mexican bladdersage | SAME | <i>Salazaria mexicana</i> | 0–2 | – |
| | slender janusia | JAGR | <i>Janusia gracilis</i> | 0–2 | – |
| | banana yucca | YUBA | <i>Yucca baccata</i> | 0–2 | – |
| | Joshua tree | YUBR | <i>Yucca brevifolia</i> | 0–2 | – |
| | Mojave yucca | YUSC2 | <i>Yucca schidigera</i> | 0–2 | – |
| | plains blackfoot | MELE2 | <i>Melampodium leucanthum</i> | 0–2 | – |
| | lotebush | ZIOB | <i>Ziziphus obtusifolia</i> | 0–1 | – |
| | soaptree yucca | YUEL | <i>Yucca elata</i> | 0–1 | – |
| | American threefold | TRCA8 | <i>Trixis californica</i> | 0–1 | – |
| | Parish's goldeneye | VIPA14 | <i>Viguiera parishii</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 | – |
| | longleaf jointfir | EPTR | <i>Ephedra trifurca</i> | 0–1 | – |
| | Eastern Mojave buckwheat | ERFA2 | <i>Eriogonum fasciculatum</i> | 0–1 | – |
| | sangre de cristo | JACA2 | <i>Jatropha cardiophylla</i> | 0–1 | – |
| | Wright's beebrush | ALWR | <i>Aloysia wrightii</i> | 0–1 | – |
| | pelotazo | ABIN | <i>Abutilon incanum</i> | 0–1 | – |
| | catclaw acacia | ACGR | <i>Acacia greggii</i> | 0–1 | – |
| | rayless goldenhead | ACSP | <i>Acamptopappus sphaerocephalus</i> | 0–1 | – |
| | fourwing saltbush | ATCA2 | <i>Atriplex canescens</i> | 0–1 | – |
| | Coulter's brickellbush | BRCO | <i>Brickellia coulteri</i> | 0–1 | – |
| | fairyduster | CAER | <i>Calliandra eriophylla</i> | 0–1 | – |
| | knifeleaf condalia | COSP3 | <i>Condalia spathulata</i> | 0–1 | – |
| | common sotol | DAWH2 | <i>Dasyilirion wheeleri</i> | 0–1 | – |
| 10 | Succulents | | | 2–25 | |
| | saguaro | CAG10 | <i>Carnegiea gigantea</i> | 0–10 | – |
| | cactus apple | OPEN3 | <i>Opuntia engelmannii</i> | 0–10 | – |
| | purple pricklypear | OPMA8 | <i>Opuntia macrocentra</i> | 0–5 | – |
| | tulip pricklypear | OPPH | <i>Opuntia phaeacantha</i> | 1–5 | – |
| | teddybear cholla | CYBI9 | <i>Cylindropuntia bigelovii</i> | 0–5 | – |
| | walkingstick cactus | CYSP8 | <i>Cylindropuntia spinosior</i> | 0–5 | – |
| | staghorn cholla | CYVE3 | <i>Cylindropuntia versicolor</i> | 1–5 | – |
| | jumping cholla | CYFU10 | <i>Cylindropuntia fulgida</i> | 0–3 | – |
| | Christmas cactus | CYLE8 | <i>Cylindropuntia leptocaulis</i> | 0–3 | – |

| | | | | | |
|-------------|-----------------------------|--------|--|------|---|
| | buck-horn cholla | CYAC8 | <i>Cylindropuntia acanthocarpa</i> | 0–2 | – |
| | Arizona pencil cholla | CYAR14 | <i>Cylindropuntia arbuscula</i> | 0–2 | – |
| | candy barrelcactus | FEWI | <i>Ferocactus wislizeni</i> | 0–2 | – |
| | devil's cholla | GRKU | <i>Grusonia kunzei</i> | 0–1 | – |
| | Graham's nipple cactus | MAGR9 | <i>Mammillaria grahamii</i> | 0–1 | – |
| | Thornber's nipple cactus | MATH | <i>Mammillaria thornberi</i> | 0–1 | – |
| | beavertail pricklypear | OPBA2 | <i>Opuntia basilaris</i> | 0–1 | – |
| | pinkflower hedgehog cactus | ECFA | <i>Echinocereus fasciculatus</i> | 0–1 | – |
| | Nichol's echinocactus | ECHON | <i>Echinocactus horizonthalonius var. nicholii</i> | 0–1 | – |
| | spiny star | ESVIV | <i>Escobaria vivipara var. vivipara</i> | 0–1 | – |
| | Scheer's beehive cactus | COROS | <i>Coryphantha robustispina ssp. scheeri</i> | 0–1 | – |
| | desert agave | AGDE | <i>Agave deserti</i> | 0–1 | – |
| | candle cholla | CYKL | <i>Cylindropuntia kleiniae</i> | 0–1 | – |
| | Engelmann's hedgehog cactus | ECEN | <i>Echinocereus engelmannii</i> | 0–1 | – |
| | redspine fishhook cactus | ECER2 | <i>Echinomastus erectocentrus</i> | 0–1 | – |
| Tree | | | | | |
| 11 | Trees | | | 0–50 | |
| | yellow paloverde | PAMI5 | <i>Parkinsonia microphylla</i> | 0–50 | – |
| | velvet mesquite | PRVE | <i>Prosopis velutina</i> | 0–5 | – |
| | desert ironwood | OLTE | <i>Olneya tesota</i> | 0–5 | – |

Animal community

The plant community on this site is suitable for grazing by cattle primarily in the spring and / or summer growing seasons when annual forbs and grasses are available. Forage species can grow year-round with available moisture. High pH due to lime may tie up soil nutrients and influence forage species palatability.

Water developments are very important to wildlife species on this site. Vegetative cover and forage diversity are suitable for a variety of small desert mammals and birds and their predators.

Hydrological functions

This site has coarse textured soils and moderate to gentle slopes making it a poor producer of runoff.

Recreational uses

Hunting, hiking, horseback riding, camping, photography, birdwatching

Wood products

Limited firewood from whitethorn, mesquite and paloverde for camp fires and branding fires.

Other products

Cactus fruits from prickly pear and cholla. Ocotillo canes and creosote used medicinally.

Inventory data references

Range 417s include 1 in good condition.

Type locality

| | |
|-----------------------------|---|
| Location 1: Pima County, AZ | |
| Township/Range/Section | T15S R9E S9 |
| General legal description | La Tortuga Ranch, Tortuga Pasture at transect # 23. One and a half mile south of Tortuga well. Was ungrazed for 20 years. |
| Location 2: Pima County, AZ | |
| Township/Range/Section | T14S R13E S15 |
| General legal description | Tumamoc Hill Reserve, Desert Laboratory UA, North side of Tumamoc hill on footslope just south of Anklam Road. |

Other references

The Changing Mile - Revisited. Ray Turner, Robert Webb, University of Arizona Press, Tucson, Arizona, 2003. Photo Station 81 and 82.

Contributors

Dan Robinett
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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) | Dan Robinett, Jeff Herrick, Dave Pyke, Josh Garcia |
| Contact for lead author | NRCS/ARS Tucson, AZ |
| Date | 08/02/2002 |
| Approved by | S. Cassady |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

- 1. Number and extent of rills:** Waterflow patterns will often generate weakly-defined rills due to low cover on the site. May be continuous from top to bottom of slope.

- 2. Presence of water flow patterns:** Common and widespread, covering up to 35% of bare ground on the site. Gravel armoring helps protect site and limit evidence of waterflow patterns.

- 3. Number and height of erosional pedestals or terracettes:** Pedestals will be common at the base of long-lived perennial grasses and shrubs. Exposed roots should be very rare, and the root-shoot interface should still be protected by

the soil.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 30-40%. Will be lower on sites with high rock cover (needs to be verified). Most areas that have low rock cover on this site will have corresponding higher lichen cover.
-
5. **Number of gullies and erosion associated with gullies:** none
-
6. **Extent of wind scoured, blowouts and/or depositional areas:** none due to high gravel content
-
7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous and fine woody material may move 1 meter downslope in rills and waterflow patterns. Coarser woody material (>1 cm in diameter) should move little if at all, and only in concentrated waterflow patterns and rills.
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Average 5-6 under shrub and grass canopies, and 4.5-5.5 in plant interspaces due to high microbial crust cover (including cyanobacteria) on these sandy loam - fine sandy loam surface textured soils with high carbonate content.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak, fine granular structure in interspaces and weak to moderate fine granular under perennial canopies. Very limited evidence of A horizon development except under perennial canopies.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Limited perennial grass basal cover and litter/soil accumulation under shrubs should increase flow path length and infiltration. Higher plant density and cover often associated with the rills, allowing greater retention of water than would otherwise occur on this site.
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Will see approximately 1-2 cm. surface crusting in interspaces.
-
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: Long-lived large shrubs (creosote, bursage) > [short-lived subshrubs < > succulents <> shrub-like perennial grasses with above-ground growing points (e.g. bush muhly and black grama) <> long-lived perennial bunchgrasses (e.g. *Aristida* sp.)] >> (annual and perennial forbs, short-lived perennial grasses (fluffgrass) , annual grasses, trees, and tree-like shrubs.

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Would normally expect to see some mortality in all functional groups in response to drought, especially short-lived perennial grasses and some of the bunchgrasses. Creosote and bursage will lose some branches during drought, and there may be limited die-back of subshrubs, however, there should not be widespread mortality, even during drought, on this drought-adapted site, except for short-lived perennial grasses (fluffgrass).
-
14. **Average percent litter cover (%) and depth (in):** Near 0% in interspaces, and 10-90% under canopies, depending on time since significant production on the site. This site is extremely dynamic due to high rates of removal in runoff, and high decomposition rates associated with favorable conditions and termite activity.
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 73 lbs/ac unfavorable precipitation; 285 lbs/ac normal precipitation; 560 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:** None. May want to watch malta starthistle and bluffgrass, but unlikely to move onto this droughty site.
-
17. **Perennial plant reproductive capability:** Will only see reproduction during favorable years. Significant reproduction will only occur for most perennial species during 10-15 of every 50 years.
-