

Ecological site R040XB229AZ Sandy Loam Drainage 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.

MLRA notes

Major Land Resource Area (MLRA): 040X–Sonoran Basin and Range

Major Land Resource Area (MLRA) 40 is the portion of Sonoran Desert that extends from northwest Mexico into southwestern Arizona and southeastern California. This MLRA is hot desert characterized by bimodal precipitation coupled with hot summers and mild winters. These conditions give rise to a rich biological diversity visually dominated by columnar cactus (saguaro) and leguminous trees (palo verde). 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 basin sediments are combinations of fluvial, lacustrine, colluvial and alluvial deposits.

LRU notes

Land Resource Unit (LRU) 40-2, Middle Sonoran Desert, is characterized by desert scrub vegetation on relict fan remnants with a moderate amount of desert pavement. Trees are common in washes, bottoms and hillslopes. 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.

Classification relationships

USDA-NRCS Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin: Western Range and Irrigated Region D Major Land Resource Area 40 - Sonoran Basin and Range Land Resource Unit 2 - Middle Sonoran Desert Ecological Site Sandy Loam Drainage, 7"-10" p.z.

U.S. Environmental Protection Agency, Ecological Regions of North America: Level I, Region 10 North American Deserts Level II, 10.2 Warm Deserts Level III, Ecoregion 81, Sonoran Basin and Range Level IV, 81l, 81n, 81o

USDA-USFS Ecological Subregions: Sections of the Conterminous United States Section 322 American Semidesert and Desert Province Section 322B, Sonoran Desert

Ecological site concept

Sandy Loam Drainage, 7"-10" p.z., is a bottom position ecological site threading throughout Limy Upland, Deep, 7"-10" p.z., and Desert Pavement, 7"-10" p.z., ecological sites. Terrain is flat to very gently sloping, and active water flow paths are less than 4' wide. Water flows are ephemeral, but run-on water from surrounding landscapes support a productive shrubland community. Soil is sandy to sandy loam in texture. Aspect is desert shrubland.

Associated sites

| | |
|-------------|---|
| R040XB208AZ | Limy Upland, Deep 7"-10" p.z. surrounding uplands |
| R040XB230AZ | Desert Pavement 7"-10" p.z. surrounding uplands |
| R040XB207AZ | Limy Fan 7"-10" p.z. surrounding uplands |

Similar sites

| | |
|-------------|---|
| R040XC330AZ | Sandy Loam Drainage 3"-7" p.z. Elevations 300' - 1,200' |
|-------------|---|

Table 1. Dominant plant species

| | |
|------------|--|
| Tree | (1) <i>Parkinsonia microphylla</i> (2) <i>Olneya tesota</i> |
| Shrub | (1) <i>Ambrosia dumosa</i> (2) <i>Salazaria mexicana</i> |
| Herbaceous | (1) <i>Pleuraphis rigida</i> |

Physiographic features

This site occurs on floodplains and alluvial fans and receives extra moisture from overbank flooding or run-on from adjacent sites on a regular basis. Slopes range from 0%–3% and elevations range from 1200 to 2000 feet.

Table 2. Representative physiographic features

| | |
|-----------|-------------------------------------|
| Landforms | (1) Alluvial fan (2) Flood plain |
| Slope | 0–3% |

Climatic features

Annual precipitation ranges from 7 to 10 inches. Annual rainfall is bimodal, with distinct rainy seasons occurring from December to March (winter) and July to September (summer). Rainfall ratios range from 40:60 (winter:summer) in the southern part, and 60:40 in the central and northern parts. Rainfall intensity differs between rainfall seasons. Winter frontal storms develop in the Pacific Ocean and Gulf of California, producing widespread, low-intensity and long duration precipitation events. Winter precipitation is the most dependable water source for vegetation, and snowfall is very rare. During summer months, atmospheric activity in the Gulf of Mexico produces convective thunderstorms when crossing over the mountains in the afternoon. These storms travel across the plains and valleys, producing precipitation of short duration, usually less than 30 minutes, but of moderate to heavy intensity. Between these two seasons, little to no effective precipitation can occur for several months at a time. May and June are the driest months, and overall humidity is very low.

Overall, average annual rainfall is variable, but increases in variability from east to west across the region. For long-term precipitation data, the coefficient of variation, the ratio of the standard deviation to the mean expressed as a percentage, increases from 38% at Florence (east) to 46% at Aguila (west).

Winter temperatures are very mild, with very few days having short periods of freezing temperatures. Summertime temperatures are hot to very hot, with many days in June and July exceeding 105°F. The number of frost-free days ranges from 280 in major river valleys with cold air drainage to between 320 and 350 in upland areas.

Spring and the summer growing seasons are equally important for perennial grass, forb and shrub growth. With above average precipitation, cool and warm season annual forbs and grasses can be common in their respective seasons. Perennial forage species can remain green throughout the year with sufficient available moisture.

Table 3. Representative climatic features

| | |
|-------------------------------|----------|
| Frost-free period (average) | 291 days |
| Freeze-free period (average) | 344 days |
| Precipitation total (average) | 229 mm |

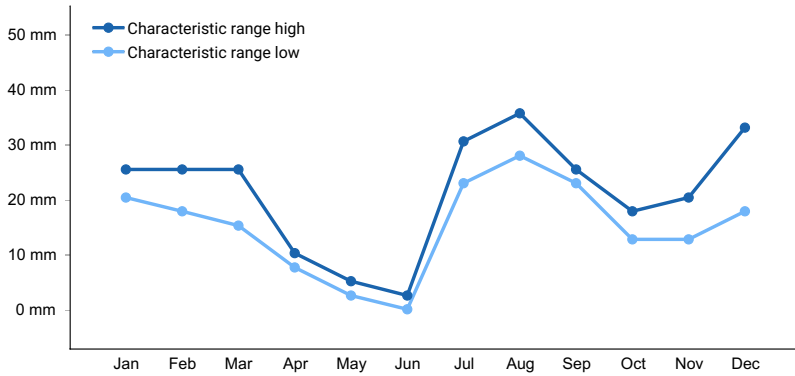


Figure 1. Monthly precipitation range

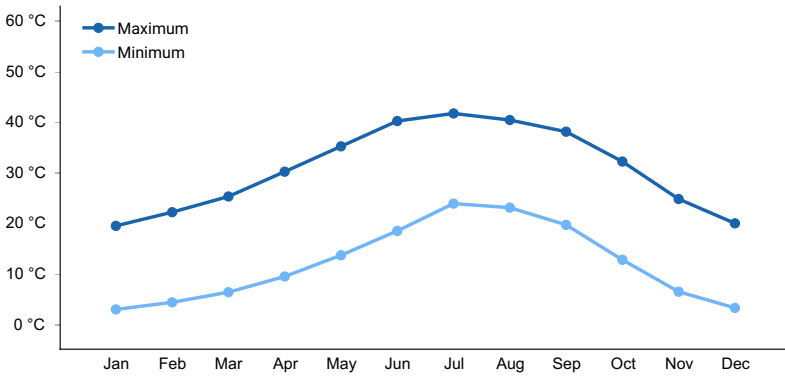


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

These very young soils develop in gravelly and sandy alluvium of mixed origin. Textures range from sandy loam to very cobbly sand, and coarse loamy textures can occur in subsurface layers. They are deep, excessively well drained, and have very good plant-soil moisture relationships due to the extra water from run-on and flooding events. Soils may or may not be calcareous.

Table 4. Representative soil features

| | |
|--------------------------------------|---|
| Surface texture | (1) Gravelly loam (2) Very gravelly loamy sand (3) Sandy loam |
| Family particle size | (1) Sandy |
| Drainage class | Well drained to excessively drained |
| Permeability class | Moderately rapid to very rapid |
| Soil depth | 152 cm |
| Surface fragment cover <=3" | 5–45% |
| Surface fragment cover >3" | 0% |
| Available water capacity (0-101.6cm) | 6.1–18.29 cm |

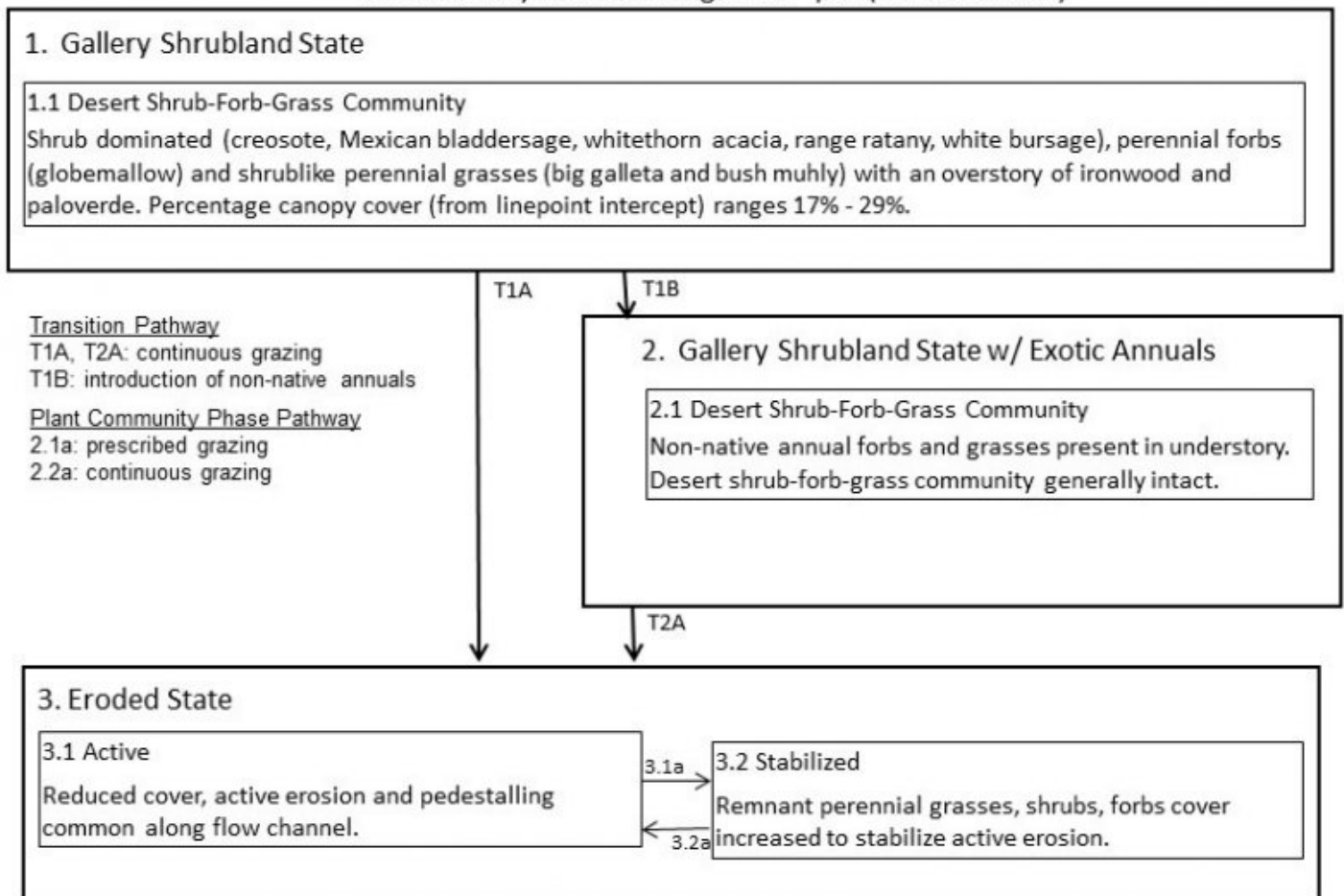
| | |
|---|------------|
| Calcium carbonate equivalent (0-101.6cm) | 1–10% |
| Electrical conductivity (0-101.6cm) | 0 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0 |
| Soil reaction (1:1 water) (0-101.6cm) | 7.4–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 5–45% |
| Subsurface fragment volume >3" (Depth not specified) | 0% |

Ecological dynamics

Sandy Loam Drainage, 7"-10" p.z., supports a highly diverse and productive shrubland with additions of run-on rainfall from adjacent landscapes. The site has three states: State 1 - Gallery Shrubland (Reference); State 2 - Gallery Shrubland with Exotic Annuals; and State 3 - Eroded. i. Transition from Gallery Shrubland to Gallery Shrubland with Exotic Annuals is driven by introducing non-native annual forbs and grasses. Transitions from Gallery Shrubland or Gallery Shrubland with Exotic Annuals to Eroded are driven by long-term, unmanaged livestock grazing. Aspect is gallery shrubland.

State and transition model

40-2AZ Sandy Loam Drainage 7-10" p.z. (R040XB229AZ)



**State 1
Gallery Shrubland (Reference)**

**Community 1.1
Mixed Desert Shrub**



Figure 3. Sandy Loam Drainage, 7"-10" p.z. photo

The Gallery Shrubland community typically has a diverse mixture of desert trees, shrubs, vines and perennial and annual grasses and forbs. Annual production values and community composition change in relation to the quantity of run-on water present in different sections of the drainage system. In the upper portion of a drainage, with less run-on water contribution, the plant community is open and simple. Toward the end of the drainage, a larger run-off source area contributes more water, which supports a denser and more complex plant community.

Table 5. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 38 | 82 | 353 |
| Tree | 8 | 90 | 212 |
| Shrub/Vine | 1 | 27 | 101 |
| Forb | 1 | 3 | 6 |
| Total | 48 | 202 | 672 |

Table 6. Soil surface cover

| | |
|------------------------------|-------|
| Tree basal cover | 0-7% |
| Shrub/vine/liana basal cover | 0-8% |
| Grass/grasslike basal cover | 1-10% |

| | |
|-----------------------------------|--------|
| Forb basal cover | 0-1% |
| Non-vascular plants | 0-1% |
| Biological crusts | 0-10% |
| Litter | 7-34% |
| Surface fragments >0.25" and <=3" | 11-48% |
| Surface fragments >3" | 0-1% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 30-55% |

Table 7. Canopy structure (% cover)

| Height Above Ground (M) | Tree | Shrub/Vine | Grass/ Grasslike | Forb |
|-------------------------|------|------------|---------------------|------|
| <0.15 | – | – | – | – |
| >0.15 <= 0.3 | – | – | 0-6% | – |
| >0.3 <= 0.6 | – | 0-8% | 0-4% | – |
| >0.6 <= 1.4 | – | 0-3% | – | – |
| >1.4 <= 4 | 0-7% | 0-6% | – | – |
| >4 <= 12 | – | – | – | – |
| >12 <= 24 | – | – | – | – |
| >24 <= 37 | – | – | – | – |
| >37 | – | – | – | – |

State 2

Gallery Shrubland State w/ Exotic Annuals

Community 2.1

Desert Shrub-Forb-Grass w/ Non-Native Annuals

Non-native annual forbs and grasses are present in the understory. The desert shrub, forb and grass community remains relatively intact.

State 3

Eroded

Community 3.1

Active



The Sandy Loam Drainage site supports a relatively lush plant community in an otherwise relatively sparse resource zone. The lush vegetation attracts and concentrates livestock activity. Long-term, unmanaged grazing reduces plant community diversity. Perennial grass and subshrub cover is deeply reduced, with remnant perennial grasses persisting only within the protective canopy of cactus or shrubs. Soils exhibit active pedestaling. Water flow channels can become entrenched, resulting in increased discharge rates, low infiltration rates, and impaired plant-soil relationships.

Community 3.2 Stabilized

When grazing pressure is removed the plant community will begin to recover. With continued reduced grazing, remnant perennial grasses may expand into open areas. Flood waters will slow with increased woody litter and rock cover, stabilizing the active flow channel.

Pathway P3.1a Community 3.1 to 3.2

Prescribed grazing, removal of yearlong grazing pressure.

Pathway P3.2a Community 3.2 to 3.1

Yearlong grazing/unmanaged grazing.

Transition T1A State 1 to 2

Introduction of non-native annual forbs and grasses.

Transition T1B State 1 to 3

Yearlong grazing.

Transition T2A State 2 to 3

Yearlong grazing.

Additional community tables

Table 8. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|------------------------|-----------------------------------|--------|---|--------------------------------|------------------|
| Grass/Grasslike | | | | | |
| 1 | Dominant Perennial Grasses | | | 38–353 | |
| | big galleta | PLRI3 | <i>Pleuraphis rigida</i> | 9–353 | – |
| | bush muhly | MUPO2 | <i>Muhlenbergia porteri</i> | 0–82 | – |
| 2 | Perennial Three-awns | | | 0–6 | |
| 3 | Annual Grasses | | | 1–55 | |
| | sixweeks fescue | VUOC | <i>Vulpia octoflora</i> | 1–10 | – |
| | Arizona brome | BRAR4 | <i>Bromus arizonicus</i> | 1–10 | – |
| | sixweeks grama | BOBA2 | <i>Bouteloua barbata</i> | 1–8 | – |
| | sixweeks threeawn | ARAD | <i>Aristida adscensionis</i> | 1–6 | – |
| | needle grama | BOAR | <i>Bouteloua aristidoides</i> | 1–6 | – |
| | mucronate sprangletop | LEPA6 | <i>Leptochloa panicea</i> | 0–1 | – |
| Forb | | | | | |
| 4 | Perennial Forbs | | | 1–6 | |
| | brownfoot | ACWR5 | <i>Acourtia wrightii</i> | 0–3 | – |
| | Parry's beardtongue | PEPA24 | <i>Penstemon parryi</i> | 0–3 | – |
| | brownplume wirelettuce | STPA4 | <i>Stephanomeria pauciflora</i> | 0–3 | – |
| | Coulter's lyrepod | LYCO4 | <i>Lyrocarpa coulteri</i> | 0–3 | – |
| | trailing windmills | ALIN | <i>Allionia incarnata</i> | 0–3 | – |
| | narrowleaf silverbush | ARLA12 | <i>Argythamnia lanceolata</i> | 0–3 | – |
| | desert marigold | BAMU | <i>Baileya multiradiata</i> | 0–3 | – |
| | climbing wartclub | BOSC | <i>Boerhavia scandens</i> | 0–3 | – |
| | whitemargin sandmat | CHAL11 | <i>Chamaesyce albomarginata</i> | 0–3 | – |
| | desert trumpet | ERIN4 | <i>Eriogonum inflatum</i> | 0–3 | – |
| | Parry's false prairie-clover | MAPA7 | <i>Marina parryi</i> | 0–3 | – |
| | lacy tansyaster | MAPIP4 | <i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i> var. <i>pinnatifida</i> | 0–3 | – |
| | desert tobacco | NIOB | <i>Nicotiana obtusifolia</i> | 0–3 | – |
| | desert evening primrose | OEPR | <i>Oenothera primiveris</i> | 0–3 | – |
| | desert globemallow | SPAM2 | <i>Sphaeralcea ambigua</i> | 0–3 | – |

| | | | | | |
|---|--------------------------------|--------|---|--------|---|
| | slender poreleaf | POGR5 | <i>Porophyllum gracile</i> | 0-3 | - |
| 5 | Annual Forbs | | | 84-168 | |
| | woolly tidestromia | TILA2 | <i>Tidestromia lanuginosa</i> | 0-1 | - |
| | coastal bird's-foot trefoil | LOSAB | <i>Lotus salsuginosus</i> var. <i>brevivexillus</i> | 0-1 | - |
| | devil's spineflower | CHRI | <i>Chorizanthe rigida</i> | 0-1 | - |
| | brittle spineflower | CHBR | <i>Chorizanthe brevicornu</i> | 0-1 | - |
| | aridland goosefoot | CHDE | <i>Chenopodium desiccatum</i> | 0-1 | - |
| | common fiddleneck | AMMEI2 | <i>Amsinckia menziesii</i> var. <i>intermedia</i> | 0-1 | - |
| | bristly nama | NAHI | <i>Nama hispidum</i> | 0-1 | - |
| | Gila manroot | MAGI | <i>Marah gilensis</i> | 0-1 | - |
| | blazingstar | MENTZ | <i>Mentzelia</i> | 0-1 | - |
| | glandular threadplant | NEGL | <i>Nemacladus glanduliferus</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 | - |
| | hideseed | EUCRY | <i>Eucrypta</i> | 0-1 | - |
| | phacelia | PHACE | <i>Phacelia</i> | 0-1 | - |
| | chia | SACO6 | <i>Salvia columbariae</i> | 0-1 | - |
| | sleepy silene | SIAN2 | <i>Silene antirrhina</i> | 0-1 | - |
| | Coulter's globemallow | SPCO2 | <i>Sphaeralcea coulteri</i> | 0-1 | - |
| | woollyhead neststraw | STMI2 | <i>Stylocline micropoides</i> | 0-1 | - |
| | spurge | EUPHO | <i>Euphorbia</i> | 0-1 | - |
| | fringed twinevine | FUCY | <i>Funastrum cynanchoides</i> | 0-1 | - |
| | hairy desertsunflower | GECA2 | <i>Geraea canescens</i> | 0-1 | - |
| | gilia | GILIA | <i>Gilia</i> | 0-1 | - |
| | shaggyfruit pepperweed | LELA | <i>Lepidium lasiocarpum</i> | 0-1 | - |
| | smallflowered milkvetch | ASNU4 | <i>Astragalus nuttallianus</i> | 0-1 | - |
| | catnip noseburn | TRNE | <i>Tragia nepetifolia</i> | 0-1 | - |
| | Arizona poppy | KAGR | <i>Kallstroemia grandiflora</i> | 0-1 | - |
| | Gordon's bladderpod | LEGO | <i>Lesquerella gordonii</i> | 0-1 | - |
| | pygmy poppy | ESMI | <i>Eschscholzia minutiflora</i> | 0-1 | - |
| | weakeaf bur ragweed | AMCO3 | <i>Ambrosia confertiflora</i> | 0-1 | - |
| | fringed amaranth | AMFI | <i>Amaranthus fimbriatus</i> | 0-1 | - |
| | Arizona lupine | LUAR4 | <i>Lupinus arizonicus</i> | 0-1 | - |
| | carelessweed | AMPA | <i>Amaranthus palmeri</i> | 0-1 | - |
| | bristly fiddleneck | AMTE3 | <i>Amsinckia tessellata</i> | 0-1 | - |
| | scarlet spiderling | BOCO | <i>Boerhavia coccinea</i> | 0-1 | - |
| | yellow tackstem | CAPA7 | <i>Calycoseris parryi</i> | 0-1 | - |
| | hoary bowlesia | BOIN3 | <i>Bowlesia incana</i> | 0-1 | - |
| | New Mexico thistle | CINE | <i>Cirsium neomexicanum</i> | 0-1 | - |
| | sand burweed | CBOCO | <i>Cercaria coccinea</i> var. <i>coccinea</i> | 0-1 | - |

| | | | | | |
|--|----------------------------|--------|--|-----|---|
| | sand pygmyweed | CRCC0 | <i>Crassula cornata</i> var. <i>cornata</i> | 0-1 | - |
| | hairy prairie clover | DAMO | <i>Dalea mollis</i> | 0-1 | - |
| | manybristle chinchweed | PEPA2 | <i>Pectis papposa</i> | 0-1 | - |
| | desert Indianwheat | PLOV | <i>Plantago ovata</i> | 0-1 | - |
| | doubleclaw | PRPA2 | <i>Proboscidea parviflora</i> | 0-1 | - |
| | New Mexico plumeseed | RANE | <i>Rafinesquia neomexicana</i> | 0-1 | - |
| | white tackstem | CAWR | <i>Calycoseris wrightii</i> | 0-1 | - |
| | Coulter's spiderling | BOCO2 | <i>Boerhavia coulteri</i> | 0-1 | - |
| | flax | LINUM | <i>Linum</i> | 0-1 | - |
| | cryptantha | CRYPT | <i>Cryptantha</i> | 0-1 | - |
| | fingerleaf gourd | CUDI | <i>Cucurbita digitata</i> | 0-1 | - |
| | exserted Indian paintbrush | CAEXE | <i>Castilleja exserta</i> ssp. <i>exserta</i> | 0-1 | - |
| | desert thorn-apple | DADI2 | <i>Datura discolor</i> | 0-1 | - |
| | pricklyburr | DAIN2 | <i>Datura inoxia</i> | 0-1 | - |
| | American wild carrot | DAPU3 | <i>Daucus pusillus</i> | 0-1 | - |
| | western tansymustard | DEPI | <i>Descurainia pinnata</i> | 0-1 | - |
| | touristplant | DIWI2 | <i>Dimorphocarpa wislizeni</i> | 0-1 | - |
| | whisperingbells | EMPE | <i>Emmenanthe penduliflora</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 | - |
| | Coulter's lupine | LUSP2 | <i>Lupinus sparsiflorus</i> | 0-1 | - |

Tree

| | | | | | |
|---|-----------------------|-------|--------------------------------|--------|---|
| 6 | Dominant Trees | | | 8-212 | |
| | desert ironwood | OLTE | <i>Olneya tesota</i> | 27-212 | - |
| | yellow paloverde | PAMI5 | <i>Parkinsonia microphylla</i> | 29-159 | - |
| | blue paloverde | PAFL6 | <i>Parkinsonia florida</i> | 29-159 | - |
| | catclaw acacia | ACGR | <i>Acacia greggii</i> | 3-31 | - |
| | velvet mesquite | PRVE | <i>Prosopis velutina</i> | 3-31 | - |

Shrub/Vine

| | | | | | |
|---|------------------------|-------|-----------------------------|------|---|
| 7 | Large Shrubs | | | 1-74 | |
| | creosote bush | LATR2 | <i>Larrea tridentata</i> | 1-73 | - |
| | whitethorn acacia | VACO9 | <i>Vachellia constricta</i> | 3-31 | - |
| | water jacket | LYAN | <i>Lycium andersonii</i> | 1-6 | - |
| | Arizona desert-thorn | LYEX | <i>Lycium exsertum</i> | 1-6 | - |
| | desert wolfberry | LYMA | <i>Lycium macrodon</i> | 1-6 | - |
| | Fremont's desert-thorn | LYFR | <i>Lycium fremontii</i> | 1-6 | - |
| | Berlandier's wolfberry | LYBE | <i>Lycium berlandieri</i> | 1-6 | - |

| | | | | | |
|----|------------------------------|--------|--|-------|---|
| | lotebush | ZIOB | <i>Ziziphus obtusifolia</i> | 0–6 | – |
| | ocotillo | FOSP2 | <i>Fouquieria splendens</i> | 0–2 | – |
| | longleaf jointfir | EPTR | <i>Ephedra trifurca</i> | 0–2 | – |
| | fringed twinevine | FUCY | <i>Funastrum cynanchoides</i> | 0–2 | – |
| 8 | Sub-Shrubs | | | 8–16 | |
| | burrobush | AMDU2 | <i>Ambrosia dumosa</i> | 6–50 | – |
| | white ratany | KRGR | <i>Krameria grayi</i> | 6–50 | – |
| | littleleaf ratany | KRER | <i>Krameria erecta</i> | 6–50 | – |
| | triangle bur ragweed | AMDE4 | <i>Ambrosia deltoidea</i> | 0–8 | – |
| | hollywood | GUSA | <i>Guaiacum sanctum</i> | 0–8 | – |
| | alkali goldenbush | ISACA2 | <i>Isocoma acradenia</i> var. <i>acradenia</i> | 0–8 | – |
| | burroweed | ISTE2 | <i>Isocoma tenuisecta</i> | 0–8 | – |
| | whitestem paperflower | PSCO2 | <i>Psilostrophe cooperi</i> | 0–2 | – |
| | brittlebush | ENFA | <i>Encelia farinosa</i> | 0–2 | – |
| | beloperone | JUCA8 | <i>Justicia californica</i> | 0–2 | – |
| | Arizona water-willow | JUCA9 | <i>Justicia candidans</i> | 0–2 | – |
| 9 | Cactus and Succulents | | | 40–80 | |
| | Christmas cactus | CYLE8 | <i>Cylindropuntia leptocaulis</i> | 1–43 | – |
| | branched pencil cholla | CYRA9 | <i>Cylindropuntia ramosissima</i> | 1–43 | – |
| | Arizona pencil cholla | CYAR14 | <i>Cylindropuntia arbuscula</i> | 0–6 | – |
| | teddybear cholla | CYBI9 | <i>Cylindropuntia bigelovii</i> | 0–6 | – |
| | jumping cholla | CYFU10 | <i>Cylindropuntia fulgida</i> | 0–6 | – |
| | walkingstick cactus | CYSP8 | <i>Cylindropuntia spinosior</i> | 0–6 | – |
| | staghorn cholla | CYVE3 | <i>Cylindropuntia versicolor</i> | 0–6 | – |
| | nightblooming cereus | PEGR3 | <i>Peniocereus greggii</i> | 0–6 | – |
| | candy barrelcactus | FEWI | <i>Ferocactus wislizeni</i> | 0–3 | – |
| | buck-horn cholla | CYAC8 | <i>Cylindropuntia acanthocarpa</i> | 0–3 | – |
| 10 | Misc. Shrubs | | | 8–40 | |
| | rayless goldenhead | ACSP | <i>Acamptopappus sphaerocephalus</i> | 0–8 | – |
| | poreleaf dogweed | ADPO2 | <i>Adenophyllum porophyllum</i> | 0–8 | – |
| | ambrosia leaf bur ragweed | AMAM2 | <i>Ambrosia ambrosioides</i> | 0–8 | – |
| | Tucson bur ragweed | AMCO4 | <i>Ambrosia cordifolia</i> | 0–8 | – |
| | woolly fruit bur ragweed | AMER | <i>Ambrosia eriocentra</i> | 0–8 | – |
| | horsetail milkweed | ASSU2 | <i>Asclepias subverticillata</i> | 0–8 | – |
| | fourwing saltbush | ATCA2 | <i>Atriplex canescens</i> | 0–8 | – |
| | Nevada jointfir | EPNE | <i>Ephedra nevadensis</i> | 0–8 | – |
| | Eastern Mojave buckwheat | ERFA2 | <i>Eriogonum fasciculatum</i> | 0–8 | – |
| | desert lavender | HYEM | <i>Hyptis emoryi</i> | 0–8 | – |
| | sangre de cristo | JACA2 | <i>Jatropha cardiophylla</i> | 0–8 | – |
| | Arizona nettlespurge | JACI | <i>Jatropha cinerea</i> | 0–8 | – |
| | slender ironweed | JACB | <i>Jatropha gracilis</i> | 0–8 | – |

| | | | | | |
|--|---------------------------|--------|--------------------------------|-----|---|
| | slender jarvisia | JAGR | <i>Jarvisia gracilis</i> | 0-8 | - |
| | rough menodora | MESC | <i>Menodora scabra</i> | 0-8 | - |
| | desertbroom | BASA2 | <i>Baccharis sarothroides</i> | 0-8 | - |
| | sweetbush | BEJU | <i>Bebbia juncea</i> | 0-8 | - |
| | Coulter's brickellbush | BRCO | <i>Brickellia coulteri</i> | 0-8 | - |
| | crucifixion thorn | CAEM4 | <i>Castela emoryi</i> | 0-8 | - |
| | fairyduster | CAER | <i>Calliandra eriophylla</i> | 0-8 | - |
| | slender poreleaf | POGR5 | <i>Porophyllum gracile</i> | 0-8 | - |
| | Thurber's sandpaper plant | PETH4 | <i>Petalonyx thurberi</i> | 0-8 | - |
| | arrow poison plant | SEBI9 | <i>Sebastiania bilocularis</i> | 0-8 | - |
| | jojoba | SICH | <i>Simmondsia chinensis</i> | 0-8 | - |
| | Hall's shrubby-spurge | TEHA | <i>Tetracoccus hallii</i> | 0-8 | - |
| | American threefold | TRCA8 | <i>Trixis californica</i> | 0-8 | - |
| | Parish's goldeneye | VIPA14 | <i>Viguiera parishii</i> | 0-8 | - |
| | cattle saltbush | ATPO | <i>Atriplex polycarpa</i> | 0-8 | - |
| | shortleaf baccharis | BABR | <i>Baccharis brachyphylla</i> | 0-8 | - |

Other references

Griffith, G.E., Omernik, J.M., Johnson, C.B., and Turner, D.S., 2014, Ecoregions of Arizona (poster): U.S. Geological Survey Open-File Report 2014-1141, with map, scale 1:1,325,000, <https://dx.doi.org/10.3133/ofr20141141>. ISSN 2331-1258 (online)

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Contributors

Wilma Renken

Approval

Kendra Moseley, 10/17/2024

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) | |
| Contact for lead author | |
| Date | 11/24/2024 |
| Approved by | Kendra Moseley |
| Approval date | |

Indicators

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

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

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

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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:

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
-

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):**
-

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:**
-

17. **Perennial plant reproductive capability:**
-