

Ecological site R040XA114AZ Loamy Upland 10"-13" 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.

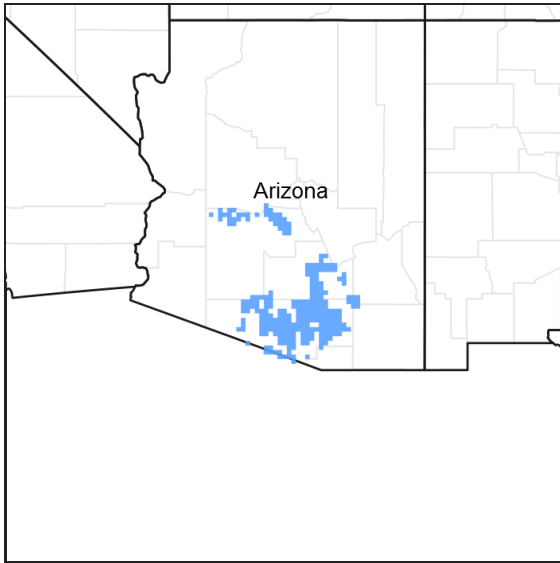


Figure 1. Mapped extent

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 40.1 – 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.

Classification relationships

Similar to TES mapping units 290 and 291 on the Tonto National Forest. Tonto Basin

Associated sites

| | |
|-------------|--------------------------|
| R040XA110AZ | Limy Slopes 10"-13" p.z. |
|-------------|--------------------------|

| | |
|-------------|---------------------------------------|
| R040XA118AZ | Sandy Loam Upland 10"-13" p.z. |
|-------------|---------------------------------------|

Similar sites

| | |
|-------------|----------------------------------|
| R041XC313AZ | Loamy Upland 12"-16" p.z. |
| R041XB210AZ | Loamy Upland 8-12" p.z. |

Table 1. Dominant plant species

| | |
|------------|--|
| Tree | (1) <i>Parkinsonia microphylla</i> (2) <i>Prosopis velutina</i> |
| Shrub | (1) <i>Zinnia acerosa</i> (2) <i>Ambrosia deltoidea</i> |
| Herbaceous | (1) <i>Janusia gracilis</i> (2) <i>Bouteloua eriopoda</i> |

Physiographic features

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

Table 2. Representative physiographic features

| | |
|--------------------|---|
| Landforms | (1) Fan (2) Stream terrace (3) Mesa |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 579–1,036 m |
| 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) | 330 mm |

Influencing water features

There are no water features associated with this site.

Soil features

These are deep soils which have formed in loamy alluvium of mixed origin. Surface textures range from very gravelly sandy loam to loam. Sandy loam surfaces can be no thicker than four inches (eight inches for GRV-SL). These soils all have argillic horizons near the surface. Plant-soil moisture relationships are fairly good. Soils on this site are the thin surfaced versions of Continental, Mohave, Pinaleno, and Topowa.

Soils mapped on this site include: in

SSA-627 Southern Mohave County MU's Vekol family-125; in

SSA-645 Aguilla-Carefree MU's Eba-25, 36, 38 & 42, Mohave-27, 82, 83, 87, 88 & 89, Ohaco-28 & 95, Tres Hermanos-121, 89, 96, 97, 120;

SSA-661 Eastern Pinal Southern Gila counties MU's Bucklebar-515 & Ohaco-840;

SSA-668 Tucson Avra Valley MU's Anway-Au, Estrella-Es, Grabe-GkB, Mohave-MdA, MdB, MhA, MhB, MtB & TmB, Palo Verdes-PaB & RxD, Pinaleno-PnB, Sonoita-Sn, So & Sr, Tubac-TwB; SSA-669 Eastern Pima county MU's Mohave-47 & 72, Nahda-49, Palos Verdes-54, 55 & 61, Pinaleno-48, 60 & 62, Tubac-81;

SSA-703 Tohono O'odham MU's Nahda-45 & Topawa-56.

Table 4. Representative soil features

| | |
|--|---|
| Surface texture | (1) Gravelly sandy loam (2) Very gravelly sandy loam (3) Sandy loam |
| Family particle size | (1) Loamy |
| Drainage class | Well drained |
| Permeability class | Moderately slow to slow |
| Soil depth | 152 cm |
| Surface fragment cover <=3" | 5–75% |
| Surface fragment cover >3" | 0–10% |
| Available water capacity (0-101.6cm) | 12.7–27.43 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0–30% |
| Electrical conductivity (0-101.6cm) | 0–2 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0–2 |
| Soil reaction (1:1 water) (0-101.6cm) | 7.4–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–65% |
| Subsurface fragment volume >3" (Depth not specified) | 0–10% |

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"), Loamy Upland

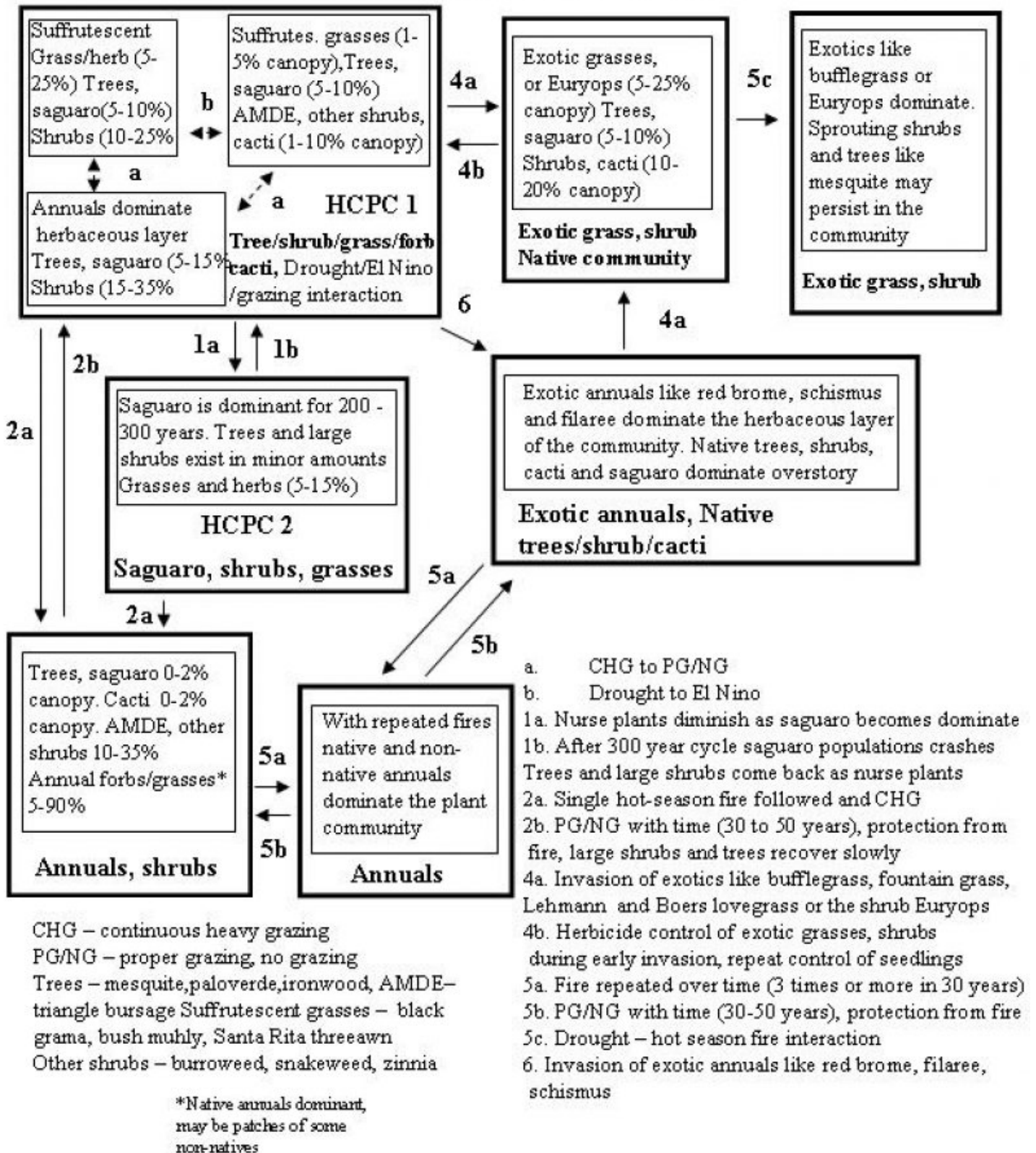


Figure 4. State and Transition model, Loamy Upland 10-13" pz

State 1
Historical Climax Plant Community
Community 1.1
Historical Climax Plant Community

The potential plant community is an open stand of desert trees with an understory of low shrubs, cacti and perennial grasses and forbs. The aspect is shrubby. With continuous, heavy grazing, perennial grass species are removed from the plant community and shrubs like triangle bursage and snakeweed can increase to dominate the understory. Mesquite tends to be shrubby on this site due to the thin surfaces over clayey horizons. Paloverde and ironwood reach moderate size on the site. With thin soil surfaces this site can be a very ineffective user of intense summer rainfall if the herbaceous cover has been depleted. A 5 to 10% tree canopy is important on the site to keep diversity in the plant community. The potential of the site to produce grass is reduced as tree cover exceeds these amounts. Triangle bursage understories are long lived, persistent, and will not easily be replaced by perennial grass, as will snakeweed or burroweed understories with good grazing management. In severe drought the cover of perennial grasses and herbs as well as bursage and burroweed can be greatly reduced in the plant community. Recovery can go back to perennial grasses and herbs if good summer rains follow drought. Recovery can go back to the half shrubs if good cool season rains follow the drought. Prickly pear can increase under heavy grazing pressure. Jumping cholla can increase due to poor grazing management or such increases can be episodic due to climate. Stand lifespans range from 50-70 years without reproduction.

Table 5. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 50 | 112 | 336 |
| Shrub/Vine | 73 | 168 | 336 |
| Tree | 118 | 224 | 308 |
| Forb | 15 | 112 | 252 |
| Total | 256 | 616 | 1232 |

Table 6. Soil surface cover

| | |
|-----------------------------------|--------|
| Tree basal cover | 0-1% |
| Shrub/vine/liana basal cover | 1-4% |
| Grass/grasslike basal cover | 0-4% |
| Forb basal cover | 0-2% |
| Non-vascular plants | 0% |
| Biological crusts | 15-30% |
| Litter | 10-70% |
| Surface fragments >0.25" and <=3" | 1-65% |
| Surface fragments >3" | 0-10% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 25-75% |

Table 7. Canopy structure (% cover)

| Height Above Ground (M) | Tree | Shrub/Vine | Grass/ Grasslike | Forb |
|-------------------------|-------|------------|---------------------|-------|
| <0.15 | – | 0-2% | 0-5% | 0-10% |
| >0.15 <= 0.3 | – | 1-5% | 1-10% | 0-10% |
| >0.3 <= 0.6 | – | 1-10% | 2-10% | 1-5% |
| >0.6 <= 1.4 | 0-2% | 0-2% | 0-2% | 0-1% |
| >1.4 <= 4 | 5-10% | – | – | – |
| >4 <= 12 | – | – | – | – |
| >12 <= 24 | – | – | – | – |
| >24 <= 37 | – | – | – | – |
| >37 | – | – | – | – |

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 or Euryops with natives

Community 2.1

Exotic perennial grasses or Euryops with natives

This community occurs where buffleggrass, Lehmann lovegrass, Boer lovegrass, natal grass, fountain grass or the African shrubs, *Euryops multifidus* and *Pentzia incana*, invade the native plant community. These species occupy the niches of perennial grasses like bush muhly and black grama, slender janusia, ayenia and low shrubs like snakeweed, false mesquite and triangle bursage.

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, Lovegrasses or fountain grass has burned one or more times. Increasing amounts of exotic perennial grasses 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

Exotic annuals

Community 4.1

Exotic annuals

This plant community occurs where the native plant community has been invaded by annuals like schismus, red brome and filaree. These species occupy the niche of the native winter annual forbs and grasses. The 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 5 Annuals, half shrubs and fire

Community 5.1 Annuals, half shrubs and fire

This plant community occurs as a result of a single hot season fire. Paloverde, ironwood, cacti and saguaro can be severely impacted and may take long periods of time (30-50 years) to recover to pre-fire levels. Mesquite (except the very old trees and the very young) will sprout after fire. Perennial and annual grasses and forbs dominate the community for some time until shrubs like bursage recover. Some perennials like black grama, desert zinnia and slender janusia make take very long times to recover.

State 6 Annuals and fire

Community 6.1 Annuals and fire

This plant community occurs where a native plant community has burned repeatedly. As fires become more frequent the native trees, shrubs and succulents are removed from the plant community and annuals becomes 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. This can occur both in areas with only native annuals species present as well as those which have been invaded by schismus and red brome.

State 7 HCPC - 2 - Saguaro state

Community 7.1 HCPC - 2 - Saguaro state

There is a 300 year cycle on this site that swings between dominance of native trees and large shrubs (that serve as nurse plants) and mature saguaro forest. Saguaros establish wholesale in very favorable years (El Nino years like 1983) only in the presence of plentiful nurse plants like paloverde, ironwood, mesquite, wolfberry, creosote and jojoba. As saguaro plants top their nurse plants (40-60 years) the trees and shrubs begin to die. Saguaro stands reach maturity at 150 to 200 years and begin to diminish over the next 100 years as the large shrubs and trees come back into the plant community.

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 | Suffrutescent grasses | | | 22-112 | |
| | black grama | BOER4 | <i>Bouteloua eriopoda</i> | 11-56 | - |
| | bush muhly | MUPO2 | <i>Muhlenbergia porteri</i> | 11-56 | - |
| 2 | Short lived perennial grasses | | | 2-67 | |
| | curly-mesquite | HIBE | <i>Hilaria belangeri</i> | 0-28 | - |
| | Rothrock's grama | BORO2 | <i>Bouteloua rothrockii</i> | 1-22 | - |
| | red grama | BOTR2 | <i>Bouteloua trifida</i> | 0-22 | - |
| | low woollygrass | DAPU7 | <i>Dasyochloa pulchella</i> | 1-17 | - |
| | Parry's grama | BOPA2 | <i>Bouteloua parryi</i> | 0-11 | - |
| | slender grama | BORE2 | <i>Bouteloua repens</i> | 0-11 | - |

| | | | | | |
|---|--|--------|---|-------|---|
| | nineawn pappusgrass | ENDE | <i>Enneapogon desvauxii</i> | 0-6 | - |
| 3 | Perennial threeawns | | | 22-67 | |
| | purple threeawn | ARPU9 | <i>Aristida purpurea</i> | 17-56 | - |
| | Santa Rita threeawn | ARCAG | <i>Aristida californica</i> var. <i>glabrata</i> | 6-22 | - |
| | spidergrass | ARTE3 | <i>Aristida ternipes</i> | 1-17 | - |
| | spidergrass | ARTEG | <i>Aristida ternipes</i> var. <i>gentilis</i> | 0-6 | - |
| | Parish's threeawn | ARPUP5 | <i>Aristida purpurea</i> var. <i>parishii</i> | 0-6 | - |
| 4 | Miscellaneous perennial grasses | | | 0-34 | |
| | whiplash pappusgrass | PAVA2 | <i>Pappophorum vaginatum</i> | 0-28 | - |
| | tobosagrass | PLMU3 | <i>Pleuraphis mutica</i> | 0-17 | - |
| | Arizona cottontop | DICA8 | <i>Digitaria californica</i> | 0-11 | - |
| | tanglehead | HECO10 | <i>Heteropogon contortus</i> | 0-11 | - |
| | big galleta | PLRI3 | <i>Pleuraphis rigida</i> | 0-6 | - |
| | Fendler threeawn | ARPUL | <i>Aristida purpurea</i> var. <i>longiseta</i> | 0-6 | - |
| | blue threeawn | ARPUN | <i>Aristida purpurea</i> var. <i>nealleyi</i> | 0-6 | - |
| | cane bluestem | BOBA3 | <i>Bothriochloa barbinodis</i> | 0-6 | - |
| | sideoats grama | BOCU | <i>Bouteloua curtipendula</i> | 0-2 | - |
| | desert needlegrass | ACSP12 | <i>Achnatherum speciosum</i> | 0-2 | - |
| | plains bristlegrass | SEVU2 | <i>Setaria vulpiseta</i> | 0-2 | - |
| | spike dropseed | SPCO4 | <i>Sporobolus contractus</i> | 0-2 | - |
| | slim tridens | TRMU | <i>Tridens muticus</i> | 0-2 | - |
| | squirreltail | ELELE | <i>Elymus elymoides</i> ssp. <i>elymoides</i> | 0-2 | - |
| | buryseed umbrellagrass | ENCH | <i>Enteropogon chlorideus</i> | 0-2 | - |
| 5 | Annual grasses | | | 2-112 | |
| | needle grama | BOAR | <i>Bouteloua aristidoides</i> | 0-28 | - |
| | sixweeks threeawn | ARAD | <i>Aristida adscensionis</i> | 1-28 | - |
| | Mexican panicgrass | PAHI5 | <i>Panicum hirticaule</i> | 0-28 | - |
| | mucronate sprangletop | LEPAB | <i>Leptochloa panicea</i> ssp. <i>brachiata</i> | 0-28 | - |
| | sixweeks fescue | VUOC | <i>Vulpia octoflora</i> | 1-28 | - |
| | sixweeks grama | BOBA2 | <i>Bouteloua barbata</i> | 0-17 | - |
| | feather fingergrass | CHVI4 | <i>Chloris virgata</i> | 0-6 | - |
| | prairie threeawn | AROL | <i>Aristida oligantha</i> | 0-6 | - |
| | delicate muhly | MUFR | <i>Muhlenbergia fragilis</i> | 0-6 | - |
| | littleseed muhly | MUMI | <i>Muhlenbergia microsperma</i> | 0-6 | - |
| | witchgrass | PACA6 | <i>Panicum capillare</i> | 0-6 | - |
| | Bigelow's bluegrass | POBI | <i>Poa bigelovii</i> | 0-2 | - |
| | Arizona signalgrass | URAR | <i>Urochloa arizonica</i> | 0-2 | - |
| | bearded cupgrass | ERAR5 | <i>Eriochloa aristata</i> | 0-2 | - |
| | canyon cupgrass | ERLE7 | <i>Eriochloa lemmonii</i> | 0-2 | - |
| | desert lovegrass | ERPEM | <i>Eragrostis pectinacea</i> var. <i>miserrima</i> | 0-2 | - |
| | tufted lovegrass | ERPEP2 | <i>Eragrostis pectinacea</i> var. <i>pectinacea</i> | 0-2 | - |
| | Mexican sprangletop | LEFUU | <i>Leptochloa fusca</i> ssp. <i>uninervia</i> | 0-1 | - |
| | Arizona brome | BRAR4 | <i>Bromus arizonicus</i> | 0-1 | - |

| | | | | | |
|-------------|------------------------------|--------|---|--------|---|
| | Madagascar dropseed | SPPY2 | <i>Sporobolus pyramidatus</i> | 0-1 | - |
| Forb | | | | | |
| 6 | Suffrutescent forbs | | | 11-112 | |
| | slender janusia | JAGR | <i>Janusia gracilis</i> | 6-28 | - |
| | rough menodora | MESC | <i>Menodora scabra</i> | 0-17 | - |
| | desert globemallow | SPAM2 | <i>Sphaeralcea ambigua</i> | 1-17 | - |
| | San Felipe dogweed | ADPO | <i>Adenophyllum porophylloides</i> | 1-17 | - |
| | dense ayenia | AYMI | <i>Ayenia microphylla</i> | 1-17 | - |
| | slender poreleaf | POGR5 | <i>Porophyllum gracile</i> | 1-11 | - |
| | Coues' cassia | SECO10 | <i>Senna covesii</i> | 0-11 | - |
| | brownplume wirelettuce | STPA4 | <i>Stephanomeria pauciflora</i> | 0-6 | - |
| 7 | Perennial forbs | | | 2-17 | |
| | weakleaf bur ragweed | AMCO3 | <i>Ambrosia confertiflora</i> | 1-6 | - |
| | whitemargin sandmat | CHAL11 | <i>Chamaesyce albomarginata</i> | 0-6 | - |
| | lacy tansyaster | MAPIP4 | <i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i> var. <i>pinnatifida</i> | 1-6 | - |
| | bluedicks | DICAP | <i>Dichelostemma capitatum</i> ssp. <i>pauciflorum</i> | 0-6 | - |
| | desert marigold | BAMU | <i>Baileya multiradiata</i> | 0-2 | - |
| | dwarf desertpeony | ACNA2 | <i>Acourtia nana</i> | 0-2 | - |
| | Parry's false prairie-clover | MAPA7 | <i>Marina parryi</i> | 0-2 | - |
| | brownfoot | ACWR5 | <i>Acourtia wrightii</i> | 0-1 | - |
| | whitemouth dayflower | COER | <i>Commelina erecta</i> | 0-1 | - |
| | leatherweed | CRPOP | <i>Croton pottsii</i> var. <i>pottsii</i> | 0-1 | - |
| | fingerleaf gourd | CUDI | <i>Cucurbita digitata</i> | 0-1 | - |
| | coyote gourd | CUPA | <i>Cucurbita palmata</i> | 0-1 | - |
| | New Mexico silverbush | ARNE2 | <i>Argythamnia neomexicana</i> | 0-1 | - |
| | scarlet spiderling | BOCO | <i>Boerhavia coccinea</i> | 0-1 | - |
| | climbing wartclub | BOSC | <i>Boerhavia scandens</i> | 0-1 | - |
| | wild dwarf morning-glory | EVAR | <i>Evolvulus arizonicus</i> | 0-1 | - |
| | ragged nettlespurge | JAMA | <i>Jatropha macrorhiza</i> | 0-1 | - |
| | wishbone-bush | MILAV | <i>Mirabilis laevis</i> var. <i>villosa</i> | 0-1 | - |
| | orange fameflower | PHAU13 | <i>Phemeranthus aurantiacus</i> | 0-1 | - |
| | shrubby purslane | POSU3 | <i>Portulaca suffrutescens</i> | 0-1 | - |
| | twinleaf senna | SEBA3 | <i>Senna bauhinioides</i> | 0-1 | - |
| | spreading fanpetals | SIAB | <i>Sida abutifolia</i> | 0-1 | - |
| | silverleaf nightshade | SOEL | <i>Solanum elaeagnifolium</i> | 0-1 | - |
| | Coulter's wrinklefruit | TECO | <i>Tetradlea coulteri</i> | 0-1 | - |
| 8 | Annual forbs | | | 1-123 | |
| | California poppy | ESCAM | <i>Eschscholzia californica</i> ssp. <i>mexicana</i> | 0-56 | - |
| | Gordon's bladderpod | LEGO | <i>Lesquerella gordonii</i> | 0-28 | - |
| | mesa tansyaster | MATA | <i>Machaeranthera tagetina</i> | 0-28 | - |
| | combseed | PECTO | <i>Pectocarya</i> | 1-28 | - |
| | Coulter's lupine | LUSP2 | <i>Lupinus sparsiflorus</i> | 0-22 | - |

| | | | | | |
|--|-----------------------------|--------|---|------|---|
| | bristly fiddleneck | AMTE3 | <i>Amsinckia tessellata</i> | 0-22 | - |
| | milkvetch | ASTRA | <i>Astragalus</i> | 0-11 | - |
| | Coulter's spiderling | BOCO2 | <i>Boerhavia coulteri</i> | 0-11 | - |
| | buckwheat | ERIOG | <i>Eriogonum</i> | 0-11 | - |
| | western tansymustard | DEPI | <i>Descurainia pinnata</i> | 0-11 | - |
| | miniature woollystar | ERDI2 | <i>Eriastrum diffusum</i> | 0-11 | - |
| | yellow tackstem | CAPA7 | <i>Calycoseris parryi</i> | 0-11 | - |
| | white tackstem | CAWR | <i>Calycoseris wrightii</i> | 0-11 | - |
| | prostrate sandmat | CHPR6 | <i>Chamaesyce prostrata</i> | 0-11 | - |
| | Esteve's pincushion | CHST | <i>Chaenactis stevioides</i> | 0-11 | - |
| | Arizona phacelia | PHAR13 | <i>Phacelia arizonica</i> | 0-11 | - |
| | Arizona popcornflower | PLAR | <i>Plagiobothrys arizonicus</i> | 0-11 | - |
| | desert Indianwheat | PLOV | <i>Plantago ovata</i> | 0-11 | - |
| | woolly tidestromia | TILA2 | <i>Tidestromia lanuginosa</i> | 0-11 | - |
| | coastal bird's-foot trefoil | LOSA | <i>Lotus salsuginosus</i> | 0-6 | - |
| | purslane | PORTU | <i>Portulaca</i> | 0-6 | - |
| | Tucson Mountain spiderling | BOME | <i>Boerhavia megaptera</i> | 0-6 | - |
| | fringed redmaids | CACI2 | <i>Calandrinia ciliata</i> | 0-6 | - |
| | pitseed goosefoot | CHBE4 | <i>Chenopodium berlandieri</i> | 0-6 | - |
| | American wild carrot | DAPU3 | <i>Daucus pusillus</i> | 0-6 | - |
| | cryptantha | CRYPT | <i>Cryptantha</i> | 0-6 | - |
| | common woolly sunflower | ERLA6 | <i>Eriophyllum lanatum</i> | 0-6 | - |
| | Texas stork's bill | ERTE13 | <i>Erodium texanum</i> | 0-6 | - |
| | shaggyfruit pepperweed | LELA | <i>Lepidium lasiocarpum</i> | 0-6 | - |
| | Arizona poppy | KAGR | <i>Kallstroemia grandiflora</i> | 0-6 | - |
| | Nuttall's povertyweed | MONU | <i>Monolepis nuttalliana</i> | 0-6 | - |
| | green carpetweed | MOVE | <i>Mollugo verticillata</i> | 0-6 | - |
| | wheelscale saltbush | ATEL | <i>Atriplex elegans</i> | 0-6 | - |
| | carelessweed | AMPA | <i>Amaranthus palmeri</i> | 0-3 | - |
| | slender goldenweed | MAGR10 | <i>Machaeranthera gracilis</i> | 0-2 | - |
| | tanseyleaf tansyaster | MATA2 | <i>Machaeranthera tanacetifolia</i> | 0-2 | - |
| | star gilia | GIST | <i>Gilia stellata</i> | 0-2 | - |
| | New Mexico plumeseed | RANE | <i>Rafinesquia neomexicana</i> | 0-2 | - |
| | sleepy silene | SIAN2 | <i>Silene antirrhina</i> | 0-2 | - |
| | lyreleaf jewelflower | STCAA | <i>Streptanthus carinatus ssp. arizonicus</i> | 0-2 | - |
| | woollyhead neststraw | STMI2 | <i>Stylocline micropoides</i> | 0-1 | - |
| | Coulter's globemallow | SPCO2 | <i>Sphaeralcea coulteri</i> | 0-1 | - |
| | doubleclaw | PRPA2 | <i>Proboscidea parviflora</i> | 0-1 | - |
| | slimjim bean | PHFI3 | <i>Phaseolus filiformis</i> | 0-1 | - |
| | manybristle chinchweed | PEPA2 | <i>Pectis papposa</i> | 0-1 | - |
| | Arizona cottonrose | LOAP12 | <i>Loefia arizonica</i> | 0-1 | - |

| | | | | | |
|-------------------|------------------------------|--------|--------------------------------------|--------|---|
| | ARIZONIA COLUTEIFLORA | LOAN12 | <i>Logfia arizonica</i> | 0-1 | - |
| | hairy desert sunflower | GECA2 | <i>Geraea canescens</i> | 0-1 | - |
| | Lindley's silverpuffs | MILI5 | <i>Microseris lindleyi</i> | 0-1 | - |
| | bristly nama | NAHI | <i>Nama hispidum</i> | 0-1 | - |
| | evening primrose | OENOT | <i>Oenothera</i> | 0-1 | - |
| | Florida pellitory | PAFL3 | <i>Parietaria floridana</i> | 0-1 | - |
| | prickly burr | DAIN2 | <i>Datura inoxia</i> | 0-1 | - |
| | spreading fleabane | ERDI4 | <i>Erigeron divergens</i> | 0-1 | - |
| | Palmer's spectaclepod | DICA31 | <i>Dimorphocarpa candicans</i> | 0-1 | - |
| | hyssop leaf sandmat | CHHY3 | <i>Chamaesyce hyssopifolia</i> | 0-1 | - |
| | sensitive partridge pea | CHNI2 | <i>Chamaecrista nictitans</i> | 0-1 | - |
| | New Mexico thistle | CINE | <i>Cirsium neomexicanum</i> | 0-1 | - |
| | hoary bowlesia | BOIN3 | <i>Bowlesia incana</i> | 0-1 | - |
| Shrub/Vine | | | | | |
| 9 | Dominant half shrubs | | | 45-112 | |
| | triangle bur ragweed | AMDE4 | <i>Ambrosia deltoidea</i> | 34-62 | - |
| | desert zinnia | ZIAC | <i>Zinnia acerosa</i> | 11-45 | - |
| | fairyduster | CAER | <i>Calliandra eriophylla</i> | 1-17 | - |
| | burweed | ISTE2 | <i>Isocoma tenuisecta</i> | 0-11 | - |
| | sangre de cristo | JACA2 | <i>Jatropha cardiophylla</i> | 0-6 | - |
| | little leaf ratany | KRER | <i>Krameria erecta</i> | 1-6 | - |
| | white ratany | KRGR | <i>Krameria grayi</i> | 0-6 | - |
| | broom snakeweed | GUSA2 | <i>Gutierrezia sarothrae</i> | 0-6 | - |
| | brittlebush | ENFA | <i>Encelia farinosa</i> | 0-6 | - |
| | narrow leaf silverbush | ARLA12 | <i>Argythamnia lanceolata</i> | 0-6 | - |
| | Coulter's brickellbush | BRCO | <i>Brickellia coulteri</i> | 0-2 | - |
| | thread leaf snakeweed | GUMI | <i>Gutierrezia microcephala</i> | 0-2 | - |
| | burrobush | AMDU2 | <i>Ambrosia dumosa</i> | 0-1 | - |
| | rayless goldenhead | ACSP | <i>Acamptopappus sphaerocephalus</i> | 0-1 | - |
| | whitestem paperflower | PSCO2 | <i>Psilostrophe cooperi</i> | 0-1 | - |
| | American threefold | TRCA8 | <i>Trixis californica</i> | 0-1 | - |
| 10 | Dominant large shrubs | | | 6-112 | |
| | jojoba | SICH | <i>Simmondsia chinensis</i> | 1-84 | - |
| | ocotillo | FOSP2 | <i>Fouquieria splendens</i> | 1-22 | - |
| | whitethorn acacia | ACCO2 | <i>Acacia constricta</i> | 0-17 | - |
| | creosote bush | LATR2 | <i>Larrea tridentata</i> | 0-11 | - |
| | Berlandier's wolfberry | LYBE | <i>Lycium berlandieri</i> | 1-11 | - |
| | catclaw acacia | ACGR | <i>Acacia greggii</i> | 0-6 | - |
| | fourwing saltbush | ATCA2 | <i>Atriplex canescens</i> | 0-6 | - |
| | Eastern Mojave buckwheat | ERFA2 | <i>Eriogonum fasciculatum</i> | 0-2 | - |
| | Arizona desert-thorn | LYEX | <i>Lycium exsertum</i> | 0-2 | - |
| | water jacket | LYAN | <i>Lycium andersonii</i> | 0-2 | - |
| | Mexican bladdersage | SAME | <i>Salazaria mexicana</i> | 0-1 | - |
| | turpentine bush | EDLA12 | <i>Eriocoma laricifolia</i> | 0-1 | - |

| | | | | | |
|----|------------------------------|--------|---|--------|---|
| | terpentine bush | LNLA12 | <i>Lycium latifolium</i> | 0-1 | - |
| | Nevada jointfir | EPNE | <i>Ephedra nevadensis</i> | 0-1 | - |
| | cattle saltbush | ATPO | <i>Atriplex polycarpa</i> | 0-1 | - |
| | Warnock's snakewood | COWA | <i>Condalia warnockii</i> | 0-1 | - |
| | lotebush | ZIOB | <i>Ziziphus obtusifolia</i> | 0-1 | - |
| 11 | Succulents | | | 22-112 | |
| | saguaro | CAG10 | <i>Carnegiea gigantea</i> | 6-28 | - |
| | cactus apple | OPEN3 | <i>Opuntia engelmannii</i> | 11-28 | - |
| | jumping cholla | CYFU10 | <i>Cylindropuntia fulgida</i> | 0-11 | - |
| | walkingstick cactus | CYSP8 | <i>Cylindropuntia spinosior</i> | 0-11 | - |
| | staghorn cholla | CYVE3 | <i>Cylindropuntia versicolor</i> | 0-11 | - |
| | tulip pricklypear | OPPH | <i>Opuntia phaeacantha</i> | 0-11 | - |
| | Eastern Mojave buckwheat | ERFA2 | <i>Eriogonum fasciculatum</i> | 0-6 | - |
| | ocotillo | FOSP2 | <i>Fouquieria splendens</i> | 0-6 | - |
| | creosote bush | LATRT | <i>Larrea tridentata var. tridentata</i> | 0-6 | - |
| | fourwing saltbush | ATCA2 | <i>Atriplex canescens</i> | 0-6 | - |
| | candy barrelcactus | FEWI | <i>Ferocactus wislizeni</i> | 1-6 | - |
| | cattle saltbush | ATPO | <i>Atriplex polycarpa</i> | 0-3 | - |
| | Nevada jointfir | EPNE | <i>Ephedra nevadensis</i> | 0-2 | - |
| | water jacket | LYAN | <i>Lycium andersonii</i> | 0-2 | - |
| | desert-thorn | LYCIU | <i>Lycium</i> | 0-2 | - |
| | Arizona desert-thorn | LYEX | <i>Lycium exsertum</i> | 0-2 | - |
| | Mexican bladdersage | SAME | <i>Salazaria mexicana</i> | 0-2 | - |
| | banana yucca | YUBA | <i>Yucca baccata</i> | 0-2 | - |
| | whitethorn acacia | ACCO2 | <i>Acacia constricta</i> | 0-2 | - |
| | catclaw acacia | ACGR | <i>Acacia greggii</i> | 0-2 | - |
| | candle cholla | CYKL | <i>Cylindropuntia kleiniae</i> | 0-2 | - |
| | Christmas cactus | CYLE8 | <i>Cylindropuntia leptocaulis</i> | 0-2 | - |
| | purple pricklypear | OPMA8 | <i>Opuntia macrocentra</i> | 0-2 | - |
| | long-tubercle beehive cactus | COROR | <i>Coryphantha robustispina ssp. robustispina</i> | 0-2 | - |
| | buck-horn cholla | CYAC8 | <i>Cylindropuntia acanthocarpa</i> | 0-2 | - |
| | Arizona pencil cholla | CYAR14 | <i>Cylindropuntia arbuscula</i> | 0-1 | - |
| | Engelmann's hedgehog cactus | ECEN | <i>Echinocereus engelmannii</i> | 0-1 | - |
| | redspine fishhook cactus | ECER2 | <i>Echinomastus erectocentrus</i> | 0-1 | - |
| | pinkflower hedgehog cactus | ECFA | <i>Echinocereus fasciculatus</i> | 0-1 | - |
| | spiny star | ESVIV | <i>Escobaria vivipara var. vivipara</i> | 0-1 | - |
| | devil's cholla | GRKU | <i>Grusonia kunzei</i> | 0-1 | - |
| | Thornber's nipple cactus | MATH | <i>Mammillaria thornberi</i> | 0-1 | - |
| | soaptree yucca | YUEL | <i>Yucca elata</i> | 0-1 | - |
| | Santa Rita pricklypear | OPSA | <i>Opuntia santa-rita</i> | 0-1 | - |

| | | | | | |
|-------------|----------------------|-------|--------------------------------|---------|---|
| | nightblooming cereus | PEGR3 | <i>Peniocereus greggii</i> | 0-1 | - |
| | organpipe cactus | STTH3 | <i>Stenocereus thurberi</i> | 0-1 | - |
| | lotebush | ZIOB | <i>Ziziphus obtusifolia</i> | 0-1 | - |
| Tree | | | | | |
| 12 | Trees | | | 118-308 | |
| | yellow paloverde | PAMI5 | <i>Parkinsonia microphylla</i> | 112-168 | - |
| | desert ironwood | OLTE | <i>Olneya tesota</i> | 0-112 | - |
| | velvet mesquite | PRVE | <i>Prosopis velutina</i> | 6-56 | - |
| | oneseed juniper | JUMO | <i>Juniperus monosperma</i> | 0-11 | - |

Animal community

The plant community on this site is suitable for grazing by all classes of cattle. Forage species grow year-round with available moisture. Clayey horizons near the soil surface limit infiltration of summer rainfall making this site more productive of cool season forage species than warm season forage species. The plant community on this site provides adequate nutrition for livestock throughout the year.

Water developments are very important to wildlife species on this site. Vegetative cover and forage diversity are good enough for a great variety of wildlife including the large mammals.

Hydrological functions

This site has thin coarse textured soil surfaces over clayey subsoils and low gradient slopes and is a fair producer of runoff.

Recreational uses

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

Wood products

Mesquite furnishes limited firewood. In freeze free areas dead ironwood trees furnish wood for hobby uses and firewood.

Other products

Saguaro ribs, cholla skeletons, prickly pear tunas and pads, cholla buds, jojoba nuts and mesquite beans.

Inventory data references

Range 417s include 2 in good condition.

Type locality

| | |
|-----------------------------|---|
| Location 1: Pima County, AZ | |
| Township/Range/Section | T185 R14E S30 |
| General legal description | Tucson Field Office - Santa Rita Exp. Range Enclosure #32, 36 |
| Location 2: Pima County, AZ | |
| Township/Range/Section | T16S R7E S3 |
| General legal description | Sells Field Office - Tribal Herd Ranch |
| Location 3: Pima County, AZ | |
| Township/Range/Section | T16S R9E S32 |

| | |
|-----------------------------|---|
| General legal description | Kings Anvil Ranch, Cactus pasture, along jeep trail to Ironwood tank. |
| Location 4: Gila County, AZ | |
| Township/Range/Section | T4N R12E S35 |
| General legal description | Tonto National Monument, ungrazed 50 years. Soil map unit no.8, Topawa soil series. |

Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

| | |
|---|-------------------------------------|
| Author(s)/participant(s) | Dave Womack, Dan Robinett, Tom Reis |
| Contact for lead author | NRCS Tucson Area Office |
| Date | 02/09/2005 |
| Approved by | S. Cassady |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

1. **Number and extent of rills:** none present on this site.

2. **Presence of water flow patterns:** Occupy approximately 10% of the area; discontinuous & long; ranging in length from 15-50 feet where gravel cover is less than 5%; flow appears to be strictly sheet flow where gravel cover is high.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are common on half shrubs and suffrutescent forbs, ranging in height from 1-2 inches; terracettes are infrequent, 40-80 feet apart with a 1-3 inch elevation difference from above to below the terracette. CCC rock spreader structures in the enclosure have created terracettes with a 2-4 inch elevation difference from above to below the terracette.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20-70%; on moist areas with higher slopes the gravel cover is higher and bare ground cover lower.

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):** Litter is trapped and stays in place where gravel and vegetative cover levels are high. Litter moves in flow paths where gravel and vegetative cover levels are low.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** No slake test done. Expect ratings of 1-3 in bare ground areas and 4-5 under shrub canopies.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Thin platy compacted structure from rain drop impact, weak angular to subangular blocky structure from 1/8 to 4 inches; reference site has thickness to 2 inches.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy cover estimated at 18% (3% trees & shrubs, 7% subshrubs & suffrutescent forbs, 6% succulents, 2% perennial grasses), basal cover 1% is irregular patches with approximately 50% cover occupy 5-10% of area.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer present. Shallow argillic horizon on this site feels like a compacted layer, but is not.

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: Half shrubs & suffrutescent forbs > large shrubs > succulents > annual forbs & grasses > perennial grasses > cryptogams.

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Basal cover reduced 50%, primarily for perennial grass plants; canopy cover reduced 50% on half shrubs and suffrutescent forbs; canopy cover reduced > 50% on large shrubs and trees.

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): 228 lbs/ac unfavorable precipitation; 550 lbs/ac normal precipitation; 1100 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: Euryops, Lehmann lovegrass, buffelgrass, fountaingrass, malta star-thistle, snakeweed & burroweed can increase to dominate with heavy livestock grazing. Introduced cool season annuals (red brome, filaree, Mediterranean grass).
-

17. **Perennial plant reproductive capability:** Not affected. Good size class distribution of subshrubs.
-