

# Ecological site R040XA117AZ Sandy Loam Upland, Deep 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.

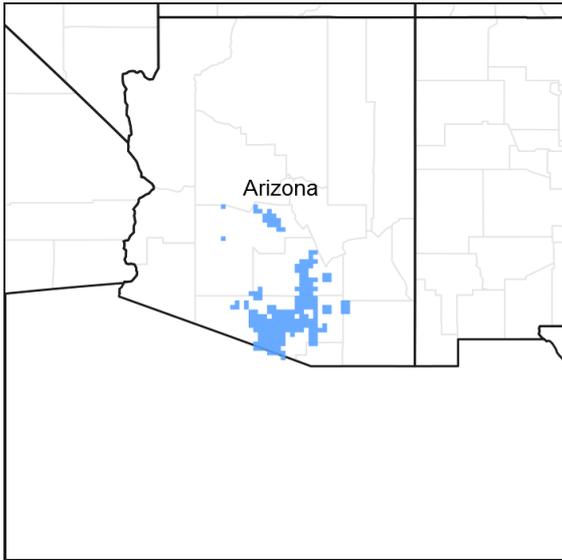


Figure 1. Mapped extent

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.

## Associated sites

|             |                                       |
|-------------|---------------------------------------|
| R040XA105AZ | <b>Shallow Hills 10"-13" p.z.</b>     |
| R040XA115AZ | <b>Sandy Wash 10"-13" p.z.</b>        |
| R040XA118AZ | <b>Sandy Loam Upland 10"-13" p.z.</b> |
| R040XA121AZ | <b>Granitic Upland 10"-13" p.z.</b>   |

## Similar sites

|             |                                     |
|-------------|-------------------------------------|
| R041XB215AZ | <b>Sandy Loam Upland 8-12" p.z.</b> |
| R041XC318AZ | <b>Sandy Loam 12-16" p.z. Deep</b>  |

**Table 1. Dominant plant species**

|            |   |
|------------|---|
| Tree       | (1) <i>Parkinsonia microphylla</i><br>(2) <i>Prosopis velutina</i>                      |
| Shrub      | (1) <i>Isocoma tenuisecta</i><br>(2) <i>Ambrosia deltoidea</i>                          |
| Herbaceous | (1) <i>Muhlenbergia porteri</i><br>(2) <i>Aristida californica</i> Var. <i>glabrata</i> |

## Physiographic features

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

**Table 2. Representative physiographic features**

|                    |  |
|--------------------|--|
| Landforms          | (1) Fan<br>(2) Terrace<br>(3) Stream terrace |
| Flooding frequency | None   |
| Ponding frequency  | None   |
| Elevation          | 1,800–3,300 ft                               |
| Slope              | 1–8%   |
| 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 deep soils which have formed in recent sandy alluvium of mixed origin. They are sandy loam throughout at least to moderate depths (30 inches). Plant-soil moisture relationships are good. They are non-calcareous in the surface ten inches.

Soils mapped on this site include:

SSA-645 Aguila-Carefree area MU Anthony-6;

SSA-659 Western Pinal County MU Paharito-35;

SSA661 Eastern Pinal-Southern Gila Counties MU's Hayhook-455 & 515;

SSA-666 Northwest Cochise County MU's Brazito-467 & Yturbide-487;

SSA-668 Tucson-Avra Valley area MU's Comoro-CnB, Cowan-Ct, Anthony-VcB, Vinton-Vt;

SSA-669 Eastern Pima County MU's Hayhook-35 & 36;

SSA-703 Tohono O'odham area MU's Hayhook-6 & 35 and Soledad-56.

**Table 4. Representative soil features**

|  |   |
|--|---|
| Surface texture  | (1) Sandy loam<br>(2) Gravelly sandy loam<br>(3) Loamy sand |
| Family particle size                                     | (1) Loamy   |
| Drainage class   | Well drained  |
| Permeability class                                       | Moderately rapid to moderate                                |
| Soil depth   | 60 in   |
| Surface fragment cover <=3"                              | 10–50%  |
| Surface fragment cover >3"                               | 0–5%  |
| Available water capacity<br>(0-40in)                     | 5.2–7.4 in  |
| Calcium carbonate equivalent<br>(0-40in)                 | 0–10%   |
| Electrical conductivity<br>(0-40in)                      | 0–2 mmhos/cm  |
| Sodium adsorption ratio<br>(0-40in)                      | 0–2   |
| Soil reaction (1:1 water)<br>(0-40in)                    | 6.6–7.8   |
| Subsurface fragment volume <=3"<br>(Depth not specified) | 5–40%   |
| Subsurface fragment volume >3"<br>(Depth not specified)  | 0–5%  |

## 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"), Sandy Loam Upland, deep

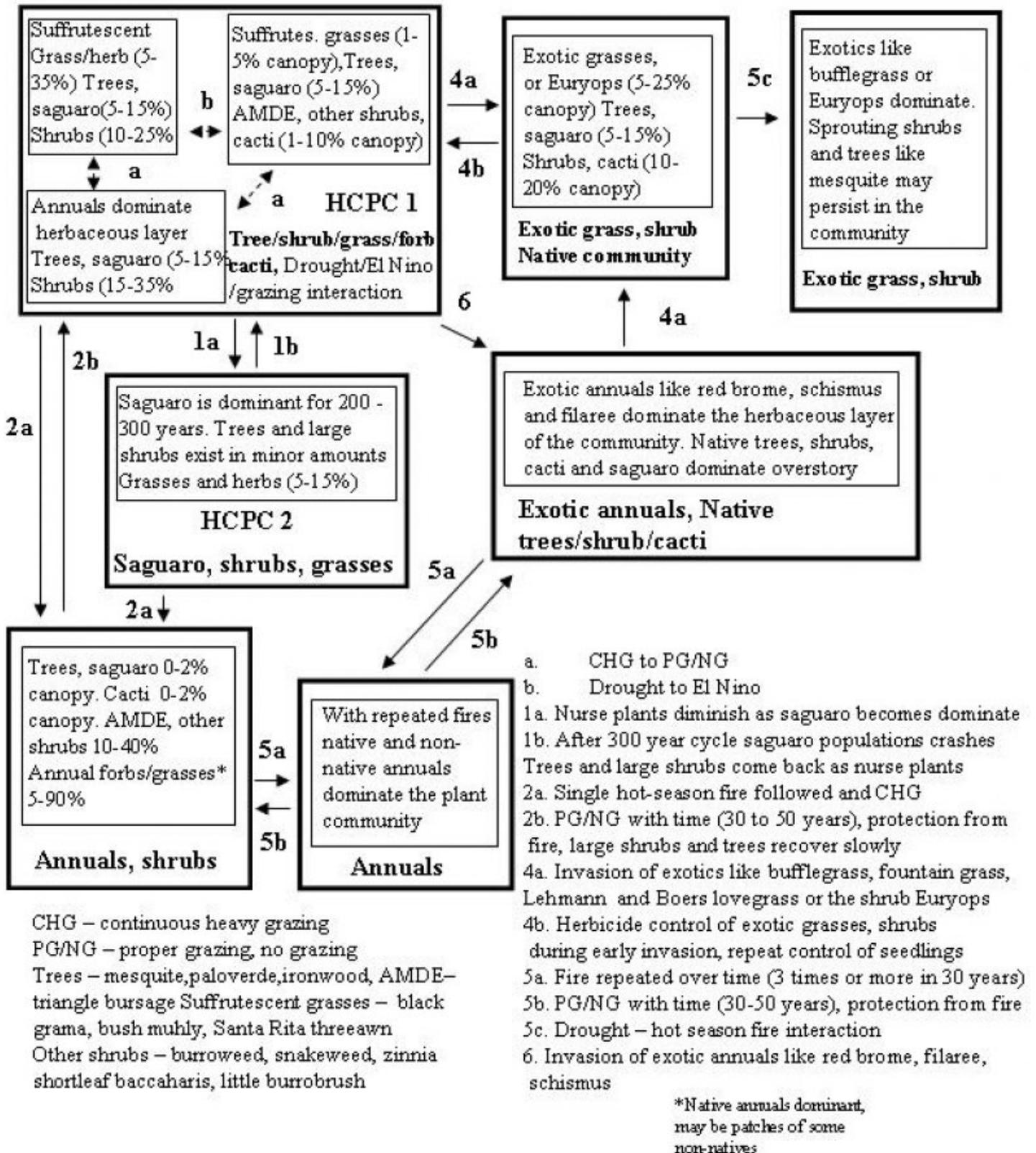


Figure 4. State and Transition, Sandyloam upland, deep 10-13

**State 1**  
**Historical Climax Plant Community**

**Community 1.1**  
**Historical Climax Plant Community**

The potential plant community is an open stand of desert trees and cacti with a grassy understory. The major perennial grass species tend to be well dispersed throughout the plant community. The aspect is savannah. With continuous grazing, perennial grasses and suffrutescent forbs are removed from the plant community and shrubs like burroweed and triangle bursage increase to dominate the understory. Trees grow to near maximum size on these deep coarse textured soils. A tree canopy of 5% to 10% 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 15%. 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. Even with poor plant cover these soils produce very little runoff and have very low erosion rates. Staghorn and jumping cholla can increase with heavy grazing or increases can be episodic due to climate. Stand life spans range from 40-60 years without reproduction.

**Table 5. Annual production by plant type**

| Plant Type      | Low (Lb/Acre) | Representative Value (Lb/Acre) | High (Lb/Acre) |
|-----------------|---------------|--------------------------------|----------------|
| Grass/Grasslike | 45            | 350                            | 650            |
| Forb            | 5             | 100                            | 275            |
| Tree            | 75            | 150                            | 200            |
| Shrub/Vine      | 20            | 120                            | 165            |
| <b>Total</b>    | <b>145</b>    | <b>720</b>                     | <b>1290</b>    |

**Table 6. Soil surface cover**

|                                   |        |
|-----------------------------------|--------|
| Tree basal cover                  | 0-1%   |
| Shrub/vine/liana basal cover      | 1-4%   |
| Grass/grasslike basal cover       | 1-6%   |
| Forb basal cover                  | 0-1%   |
| Non-vascular plants               | 0%     |
| Biological crusts                 | 1-10%  |
| Litter                            | 10-80% |
| Surface fragments >0.25" and <=3" | 0-40%  |
| Surface fragments >3"             | 0-5%   |
| Bedrock                           | 0%     |
| Water                             | 0%     |
| Bare ground                       | 10-85% |

**Table 7. Canopy structure (% cover)**

| Height Above Ground (Ft) | Tree  | Shrub/Vine | Grass/Grasslike | Forb  |
|--------------------------|-------|------------|-----------------|-------|
| <0.5                     | –     | 0-1%       | 0-35%           | 0-15% |
| >0.5 <= 1                | –     | 0-5%       | 1-20%           | 0-10% |
| >1 <= 2                  | –     | 0-10%      | 1-10%           | 0-1%  |
| >2 <= 4.5                | 0-1%  | 0-5%       | 0-5%            | 0-1%  |
| >4.5 <= 13               | 5-10% | –          | –               | –     |
| >13 <= 40                | 0-2%  | –          | –               | –     |
| >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, Lehmann lovegrass, Boer lovegrass, natal grass or fountain grass invade the native plant community. These species occupy the niches of perennial grasses like bush muhly, Santa Rita threeawn and low shrubs like burroweed 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. Perennial and annual grasses and forbs dominate the community for some time until shrubs like bursage can recover. Perennial grasses can recover rapidly if grazing pressure is low and summer rains are sufficient. 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 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 (Lb/Acre) | Foliar Cover (%) |
|------------------------|--|--------|--|-----------------------------|------------------|
| <b>Grass/Grasslike</b> |  |        |  |                             |                  |
| 1                      | <b>Dominant suffrutescent grasses</b>  |        |  | 30–150                      |                  |
|                        | bush muhly                             | MUPO2  | <i>Muhlenbergia porteri</i>                      | 15–100                      | –                |
|                        | Santa Rita threeawn                    | ARCAG  | <i>Aristida californica</i> var. <i>glabrata</i> | 5–75                        | –                |
| 2                      | <b>Dominant mid grasses</b>            |        |  | 5–100                       |                  |
|                        | spidergrass                            | ARTE3  | <i>Aristida ternipes</i>                         | 0–50                        | –                |
|                        | Arizona cottontop                      | DICA8  | <i>Digitaria californica</i>                     | 1–50                        | –                |
|                        | tanglehead                             | HECO10 | <i>Heteropogon contortus</i>                     | 0–20                        | –                |
|                        | big galleta                            | PLRI3  | <i>Pleuraphis rigida</i>                         | 0–20                        | –                |
|                        | spike dropseed                         | SPCO4  | <i>Sporobolus contractus</i>                     | 1–20                        | –                |
|                        | spidergrass                            | ARTEG  | <i>Aristida ternipes</i> var. <i>gentilis</i>    | 0–20                        | –                |
| 3                      | <b>Short lived perennial grasses</b>   |        |  | 5–100                       |                  |
|                        | Rothrock's grama                       | BORO2  | <i>Bouteloua rothrockii</i>                      | 5–100                       | –                |
|                        | Parry's grama                          | BOPA2  | <i>Bouteloua parryi</i>                          | 0–50                        | –                |
|                        | slender grama                          | BORE2  | <i>Bouteloua repens</i>                          | 0–30                        | –                |
| 4                      | <b>Miscellaneous perennial grasses</b> |        |  | 0–15                        |                  |
|                        | black grama                            | BOER4  | <i>Bouteloua eriopoda</i>                        | 0–10                        | –                |
|                        | whiplash pappusgrass                   | PAVA2  | <i>Pappophorum vaginatum</i>                     | 0–10                        | –                |
|                        | Parish's threeawn                      | ARPUP5 | <i>Aristida purpurea</i> var. <i>parishii</i>    | 0–5                         | –                |
|                        | purple threeawn                        | ARPU9  | <i>Aristida purpurea</i>                         | 0–5                         | –                |
|                        | sand dropseed                          | SPCR   | <i>Sporobolus cryptandrus</i>                    | 0–5                         | –                |
|                        | mesa dropseed                          | SPFL2  | <i>Sporobolus flexuosus</i>                      | 0–2                         | –                |

|             |                           |        |   |       |   |
|-------------|---------------------------|--------|---|-------|---|
|             | desert needlegrass        | ACSP12 | <i>Achnatherum speciosum</i>  | 0–2   | – |
|             | cane bluestem             | BOBA3  | <i>Bothriochloa barbinodis</i>  | 0–2   | – |
|             | sideoats grama            | BOCU   | <i>Bouteloua curtipendula</i>   | 0–2   | – |
|             | plains bristlegrass       | SEVU2  | <i>Setaria vulpiseta</i>  | 0–2   | – |
|             | low woollygrass           | DAPU7  | <i>Dasyochloa pulchella</i>   | 0–2   | – |
|             | squirreltail              | ELELE  | <i>Elymus elymoides</i> ssp. <i>elymoides</i>                                     | 0–1   | – |
|             | nineawn pappusgrass       | ENDE   | <i>Erneapogon desvauxii</i>   | 0–1   | – |
|             | blue threeawn             | ARPUN  | <i>Aristida purpurea</i> var. <i>nealleyi</i>                                     | 0–1   | – |
| 5           | <b>Annual grasses</b>     |        |   | 5–300 |   |
|             | needle grama              | BOAR   | <i>Bouteloua aristidoides</i>   | 2–200 | – |
|             | prairie threeawn          | AROL   | <i>Aristida oligantha</i>   | 1–50  | – |
|             | Mexican panicgrass        | PAHI5  | <i>Panicum hirticaule</i>   | 0–50  | – |
|             | sixweeks grama            | BOBA2  | <i>Bouteloua barbata</i>  | 0–25  | – |
|             | sixweeks threeawn         | ARAD   | <i>Aristida adscensionis</i>  | 0–20  | – |
|             | desert lovegrass          | ERPEM  | <i>Eragrostis pectinacea</i> var. <i>miserrima</i>                                | 0–20  | – |
|             | tufted lovegrass          | ERPEP2 | <i>Eragrostis pectinacea</i> var. <i>pectinacea</i>                               | 0–20  | – |
|             | mucronate sprangletop     | LEPAB  | <i>Leptochloa panicea</i> ssp. <i>brachiata</i>                                   | 0–20  | – |
|             | sixweeks fescue           | VUOC   | <i>Vulpia octoflora</i>   | 0–20  | – |
|             | Bigelow's bluegrass       | POBI   | <i>Poa bigelovii</i>  | 0–10  | – |
|             | witchgrass                | PACA6  | <i>Panicum capillare</i>  | 0–5   | – |
|             | feather fingergrass       | CHVI4  | <i>Chloris virgata</i>  | 0–5   | – |
|             | canyon cupgrass           | ERLE7  | <i>Eriochloa lemmonii</i>   | 0–5   | – |
|             | Arizona brome             | BRAR4  | <i>Bromus arizonicus</i>  | 0–3   | – |
|             | Mexican sprangletop       | LEFUU  | <i>Leptochloa fusca</i> ssp. <i>uninervia</i>                                     | 0–2   | – |
|             | delicate muhly            | MUFR   | <i>Muhlenbergia fragilis</i>  | 0–2   | – |
|             | littleseed muhly          | MUMI   | <i>Muhlenbergia microsperma</i>   | 0–2   | – |
|             | Madagascar dropseed       | SPPY2  | <i>Sporobolus pyramidatus</i>   | 0–2   | – |
|             | Arizona signalgrass       | URAR   | <i>Urochloa arizonica</i>   | 0–2   | – |
| <b>Forb</b> |                           |        |   |       |   |
| 6           | <b>Perennial forbs</b>    |        |   | 2–25  |   |
|             | lacy tansyaster           | MAPIP4 | <i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i> var. <i>pinnatifida</i> | 1–10  | – |
|             | desert globemallow        | SPAM2  | <i>Sphaeralcea ambigua</i>  | 1–10  | – |
|             | brownplume wirelettuce    | STPA4  | <i>Stephanomeria pauciflora</i>   | 0–5   | – |
|             | canaigre dock             | RUHY   | <i>Rumex hymenosepalus</i>  | 0–5   | – |
|             | slender poreleaf          | POGR5  | <i>Porophyllum gracile</i>  | 0–2   | – |
|             | smooth threadleaf ragwort | SEFLM  | <i>Senecio flaccidus</i> var. <i>monoensis</i>                                    | 0–2   | – |
|             | San Felipe dogweed        | ADPO   | <i>Adenophyllum porophylloides</i>  | 0–2   | – |
|             | slender janusia           | JAGR   | <i>Janusia gracilis</i>   | 0–2   | – |
|             | trailing windmills        | ALIN   | <i>Allionia incarnata</i>   | 0–1   | – |
|             | weakeaf bur ragweed       | AMCO3  | <i>Ambrosia confertiflora</i>   | 0–1   | – |
|             | New Mexico silverbush     | ARNE2  | <i>Argythamnia neomexicana</i>  | 0–1   | – |
|             | Yuma silverbush           | ARSE7  | <i>Argythamnia serrata</i>  | 0–1   | – |

|   |                            |        |  |       |   |
|---|----------------------------|--------|--|-------|---|
|   | Watson's dutchman's pipe   | ARWA   | <i>Aristolochia watsonii</i>                         | 0-1   | - |
|   | dense ayenia               | AYMI   | <i>Ayenia microphylla</i>                            | 0-1   | - |
|   | desert marigold            | BAMU   | <i>Baileya multiradiata</i>                          | 0-1   | - |
|   | scarlet spiderling         | BOCO   | <i>Boerhavia coccinea</i>                            | 0-1   | - |
|   | climbing wartclub          | BOSC   | <i>Boerhavia scandens</i>                            | 0-1   | - |
|   | whitemargin sandmat        | CHAL11 | <i>Chamaesyce albomarginata</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   | - |
|   | wild dwarf morning-glory   | EVAR   | <i>Evolvulus arizonicus</i>                          | 0-1   | - |
|   | spreading fanpetals        | SIAB   | <i>Sida abutilifolia</i>                             | 0-1   | - |
|   | silverleaf nightshade      | SOEL   | <i>Solanum elaeagnifolium</i>                        | 0-1   | - |
|   | Coulter's wrinklefruit     | TECO   | <i>Tetradlea coulteri</i>                            | 0-1   | - |
|   | shrubby purslane           | POSU3  | <i>Portulaca suffrutescens</i>                       | 0-1   | - |
|   | twingleaf senna            | SEBA3  | <i>Senna bauhinioides</i>                            | 0-1   | - |
|   | Coues' cassia              | SECO10 | <i>Senna covesii</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   | - |
|   | dwarf desertpeony          | ACNA2  | <i>Acourtia nana</i>                                 | 0-1   | - |
|   | brownfoot                  | ACWR5  | <i>Acourtia wrightii</i>                             | 0-1   | - |
| 7 | <b>Annual forbs</b>        |        |  | 1-250 |   |
|   | bristly fiddleneck         | AMTE3  | <i>Amsinckia tessellata</i>                          | 0-75  | - |
|   | California poppy           | ESCAM  | <i>Eschscholzia californica</i> ssp. <i>mexicana</i> | 0-50  | - |
|   | combseed                   | PECTO  | <i>Pectocarya</i>                                    | 0-50  | - |
|   | Coulter's spiderling       | BOCO2  | <i>Boerhavia coulteri</i>                            | 0-30  | - |
|   | Coulter's lupine           | LUSP2  | <i>Lupinus sparsiflorus</i>                          | 0-25  | - |
|   | Arizona phacelia           | PHAR13 | <i>Phacelia arizonica</i>                            | 0-25  | - |
|   | woolly tidestromia         | TILA2  | <i>Tidestromia lanuginosa</i>                        | 0-25  | - |
|   | shaggyfruit pepperweed     | LELA   | <i>Lepidium lasiocarpum</i>                          | 0-20  | - |
|   | Arizona poppy              | KAGR   | <i>Kallstroemia grandiflora</i>                      | 0-20  | - |
|   | western tansymustard       | DEPI   | <i>Descurainia pinnata</i>                           | 0-15  | - |
|   | miniature woollystar       | ERDI2  | <i>Eriastrum diffusum</i>                            | 0-15  | - |
|   | desert Indianwheat         | PLOV   | <i>Plantago ovata</i>                                | 0-15  | - |
|   | Coulter's globemallow      | SPCO2  | <i>Sphaeralcea coulteri</i>                          | 0-10  | - |
|   | buckwheat                  | ERIOG  | <i>Eriogonum</i>                                     | 0-10  | - |
|   | cryptantha                 | CRYPT  | <i>Cryptantha</i>                                    | 0-10  | - |
|   | Tucson Mountain spiderling | BOME   | <i>Boerhavia megaptera</i>                           | 0-10  | - |
|   | American wild carrot       | DAPU3  | <i>Daucus pusillus</i>                               | 0-10  | - |
|   | milkvetch                  | ASTRA  | <i>Astragalus</i>                                    | 0-10  | - |
|   | carelessweed               | AMPA   | <i>Amaranthus palmeri</i>                            | 0-10  | - |
|   | wheelscale saltbush        | ATEL   | <i>Atriplex elegans</i>                              | 0-5   | - |
|   | Garden's bladderpod        | LECO   | <i>Lesquerella gardenii</i>                          | 0-5   | - |

|  |                             |        |   |     |   |
|--|-----------------------------|--------|---|-----|---|
|  | Gordon's bladderpou         | LEGO   | <i>Lesquerella gordonii</i>                   | 0-3 | - |
|  | Arizona lupine              | LUAR4  | <i>Lupinus arizonicus</i>                     | 0-5 | - |
|  | slender goldenweed          | MAGR10 | <i>Machaeranthera gracilis</i>                | 0-5 | - |
|  | mesa tansyaster             | MATA   | <i>Machaeranthera tagetina</i>                | 0-5 | - |
|  | tansyleaf tansyaster        | MATA2  | <i>Machaeranthera tanacetifolia</i>           | 0-5 | - |
|  | pitseed goosefoot           | CHBE4  | <i>Chenopodium berlandieri</i>                | 0-5 | - |
|  | spreading fleabane          | ERDI4  | <i>Erigeron divergens</i>                     | 0-5 | - |
|  | Arizona popcornflower       | PLAR   | <i>Plagiobothrys arizonicus</i>               | 0-5 | - |
|  | hoary bowlesia              | BOIN3  | <i>Bowlesia incana</i>                        | 0-3 | - |
|  | green carpetweed            | MOVE   | <i>Mollugo verticillata</i>                   | 0-3 | - |
|  | Texas stork's bill          | ERTE13 | <i>Erodium texanum</i>                        | 0-3 | - |
|  | Mexican fireplant           | EUHE4  | <i>Euphorbia heterophylla</i>                 | 0-2 | - |
|  | hairy desertsunflower       | GECA2  | <i>Geraea canescens</i>                       | 0-2 | - |
|  | star gilia                  | GIST   | <i>Gilia stellata</i>                         | 0-2 | - |
|  | evening primrose            | OENOT  | <i>Oenothera</i>                              | 0-2 | - |
|  | Florida pellitory           | PAFL3  | <i>Parietaria floridana</i>                   | 0-2 | - |
|  | coastal bird's-foot trefoil | LOSA   | <i>Lotus salsuginosus</i>                     | 0-2 | - |
|  | New Mexico thistle          | CINE   | <i>Cirsium neomexicanum</i>                   | 0-2 | - |
|  | hyssopleaf sandmat          | CHHY3  | <i>Chamaesyce hyssopifolia</i>                | 0-2 | - |
|  | common woolly sunflower     | ERLA6  | <i>Eriophyllum lanatum</i>                    | 0-2 | - |
|  | Palmer's spectaclepod       | DICA31 | <i>Dimorphocarpa candicans</i>                | 0-2 | - |
|  | sand fringe pod             | THCU   | <i>Thysanocarpus curvipes</i>                 | 0-2 | - |
|  | purslane                    | PORTU  | <i>Portulaca</i>                              | 0-2 | - |
|  | doubleclaw                  | PRPA2  | <i>Proboscidea parviflora</i>                 | 0-2 | - |
|  | sleepy silene               | SIAN2  | <i>Silene antirrhina</i>                      | 0-2 | - |
|  | manybristle chinchweed      | PEPA2  | <i>Pectis papposa</i>                         | 0-2 | - |
|  | slimjim bean                | PHFI3  | <i>Phaseolus filiformis</i>                   | 0-1 | - |
|  | lyreleaf jewelflower        | STCAA  | <i>Streptanthus carinatus ssp. arizonicus</i> | 0-1 | - |
|  | pricklyburr                 | DAIN2  | <i>Datura inoxia</i>                          | 0-1 | - |
|  | sensitive partridge pea     | CHNI2  | <i>Chamaecrista nictitans</i>                 | 0-1 | - |
|  | prostrate sandmat           | CHPR6  | <i>Chamaesyce prostrata</i>                   | 0-1 | - |
|  | Esteve's pincushion         | CHST   | <i>Chaenactis stevioides</i>                  | 0-1 | - |
|  | Arizona cottonrose          | LOAR12 | <i>Logfia arizonica</i>                       | 0-1 | - |

**Shrub/Vine**

|   |                             |       |                              |       |   |
|---|-----------------------------|-------|------------------------------|-------|---|
| 8 | <b>Dominant half shrubs</b> |       |                              | 5-50  |   |
|   | triangle bur ragweed        | AMDE4 | <i>Ambrosia deltoidea</i>    | 1-50  | - |
|   | burweed                     | ISTE2 | <i>Isocoma tenuisecta</i>    | 1-35  | - |
| 9 | <b>Large shrubs</b>         |       |                              | 10-40 |   |
|   | spiny hackberry             | CEEH  | <i>Celtis ehrenbergiana</i>  | 5-20  | - |
|   | catclaw acacia              | ACGR  | <i>Acacia greggii</i>        | 0-5   | - |
|   | fourwing saltbush           | ATCA2 | <i>Atriplex canescens</i>    | 0-5   | - |
|   | Berlandier's wolfberry      | LYBE  | <i>Lycium berlandieri</i>    | 1-5   | - |
|   | soaptree yucca              | YUEL  | <i>Yucca elata</i>           | 0-5   | - |
|   | leafleaf icatfir            | ERTB  | <i>Eriodictyon triflorum</i> | 0-4   | - |

|    |                              |        |   |      |   |
|----|------------------------------|--------|---|------|---|
|    | longleaf juniper             | EP1R   | <i>Ephedra viruta</i>                             | 0-4  | - |
|    | sangre de cristo             | JACA2  | <i>Jatropha cardiophylla</i>                      | 0-2  | - |
|    | creosote bush                | LATR2  | <i>Larrea tridentata</i>                          | 0-2  | - |
|    | water jacket                 | LYAN   | <i>Lycium andersonii</i>                          | 0-2  | - |
|    | whitethorn acacia            | ACCO2  | <i>Acacia constricta</i>                          | 0-2  | - |
|    | lotebush                     | ZIOB   | <i>Ziziphus obtusifolia</i>                       | 0-1  | - |
| 10 | <b>Miscellaneous shrubs</b>  |        |   | 0-25 |   |
|    | desert zinnia                | ZIAC   | <i>Zinnia acerosa</i>                             | 1-15 | - |
|    | Thurber's penstemon          | PETH3  | <i>Penstemon thurberi</i>                         | 0-10 | - |
|    | shortleaf baccharis          | BABR   | <i>Baccharis brachyphylla</i>                     | 0-10 | - |
|    | brittlebush                  | ENFA   | <i>Encelia farinosa</i>                           | 0-10 | - |
|    | Parish's goldeneye           | VIPA14 | <i>Viguiera parishii</i>                          | 0-10 | - |
|    | broom snakeweed              | GUSA2  | <i>Gutierrezia sarothrae</i>                      | 0-5  | - |
|    | littleleaf ratany            | KRER   | <i>Krameria erecta</i>                            | 0-5  | - |
|    | Mexican bladdersage          | SAME   | <i>Salazaria mexicana</i>                         | 0-5  | - |
|    | American threefold           | TRCA8  | <i>Trixis californica</i>                         | 0-2  | - |
|    | whitestem paperflower        | PSCO2  | <i>Psilostrophe cooperi</i>                       | 0-2  | - |
|    | white ratany                 | KRGR   | <i>Krameria grayi</i>                             | 0-2  | - |
|    | Arizona desert-thorn         | LYEX   | <i>Lycium exsertum</i>                            | 0-2  | - |
|    | rayless goldenhead           | ACSP   | <i>Acamptopappus sphaerocephalus</i>              | 0-2  | - |
|    | sangre de cristo             | JACA2  | <i>Jatropha cardiophylla</i>                      | 0-1  | - |
|    | ocotillo                     | FOSP2  | <i>Fouquieria splendens</i>                       | 0-1  | - |
|    | Coulter's brickellbush       | BRCO   | <i>Brickellia coulteri</i>                        | 0-1  | - |
| 11 | <b>Succulents</b>            |        |   | 1-50 |   |
|    | saguaro                      | CAG10  | <i>Carnegiea gigantea</i>                         | 0-20 | - |
|    | cactus apple                 | OPEN3  | <i>Opuntia engelmannii</i>                        | 1-10 | - |
|    | tulip pricklypear            | OPPH   | <i>Opuntia phaeacantha</i>                        | 0-5  | - |
|    | soaptree yucca               | YUEL   | <i>Yucca elata</i>                                | 0-5  | - |
|    | walkingstick cactus          | CYSP8  | <i>Cylindropuntia spinosior</i>                   | 0-5  | - |
|    | staghorn cholla              | CYVE3  | <i>Cylindropuntia versicolor</i>                  | 0-5  | - |
|    | jumping cholla               | CYFU10 | <i>Cylindropuntia fulgida</i>                     | 0-5  | - |
|    | candy barrelcactus           | FEWI   | <i>Ferocactus wislizeni</i>                       | 0-5  | - |
|    | Graham's nipple cactus       | MAGR9  | <i>Mammillaria grahamii</i>                       | 0-1  | - |
|    | Christmas cactus             | CYLE8  | <i>Cylindropuntia leptocaulis</i>                 | 0-1  | - |
|    | Engelmann's hedgehog cactus  | ECEN   | <i>Echinocereus engelmannii</i>                   | 0-1  | - |
|    | pinkflower hedgehog cactus   | ECFA   | <i>Echinocereus fasciculatus</i>                  | 0-1  | - |
|    | Santa Rita pricklypear       | OPSA   | <i>Opuntia santa-rita</i>                         | 0-1  | - |
|    | nightblooming cereus         | PEGR3  | <i>Peniocereus greggii</i>                        | 0-1  | - |
|    | purple pricklypear           | OPMA8  | <i>Opuntia macrocentra</i>                        | 0-1  | - |
|    | long-tubercle beehive cactus | COROR  | <i>Coryphantha robustispina ssp. robustispina</i> | 0-1  | - |
|    | buck-horn cholla             | CYAC8  | <i>Cylindropuntia acanthocarpa</i>                | 0-1  | - |
|    | Arizona pencil cholla        | CYAR14 | <i>Cylindropuntia arbuscula</i>                   | 0-1  | - |

| Tree |                  |       |                                |        |   |
|------|------------------|-------|--------------------------------|--------|---|
| 14   | Trees            |       |                                | 70–200 |   |
|      | yellow paloverde | PAMI5 | <i>Parkinsonia microphylla</i> | 30–100 | – |
|      | velvet mesquite  | PRVE  | <i>Prosopis velutina</i>       | 20–100 | – |
|      | desert ironwood  | OLTE  | <i>Olneya tesota</i>           | 0–40   | – |
|      | blue paloverde   | PAFL6 | <i>Parkinsonia florida</i>     | 0–10   | – |

## Animal community

The plant community on this site is suitable for grazing by all classes of cattle, at any season. Forage species grow year-round with available moisture. Shallow rooted perennial grasses are severely affected by drought on this site. Management should be designed to maintain the deeper rooted suffrutescent and mid-grasses on the site. The plant community on the 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 variety of wildlife including the large mammals.

## Hydrological functions

This site has coarse textured soils and low gradient slopes and is a poor producer of runoff.

## Recreational uses

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

## 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 and mesquite beans.

## Inventory data references

Range 417s include 2 in good condition and 1 in fair condition.

## Type locality

|                             |   |
|-----------------------------|---|
| Location 1: Pima County, AZ |   |
| Township/Range/Section      | T16S R7E S3   |
| General legal description   | Sells Field Office - Tribal Herd Ranch  |
| Location 2: Pima County, AZ |   |
| Township/Range/Section      | T18S R14E S35   |
| General legal description   | Tucson Field Office - Santa Rita Exp. Range   |
| Location 3: Pima County, AZ |   |
| Township/Range/Section      | T16S R9E S31  |
| General legal description   | Kings Anvil Ranch in the northwest corner of the Cactus Pasture along Mendoza wash. |

## Contributors

Dan Robinett  
Larry D. Ellicott

## Rangeland health reference sheet

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

|   |                                    |
|---|------------------------------------|
| Author(s)/participant(s)                    | Dan Robinett                       |
| Contact for lead author                     | NRCS Tucson Plant Materials Center |
| Date  | 07/03/2003                         |
| Approved by                                 | S. Cassady                         |
| Approval date                               |                                    |
| Composition (Indicators 10 and 12) based on | Annual Production                  |

## Indicators

1. **Number and extent of rills:** None

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2. **Presence of water flow patterns:** 40-50 feet apart, continuous from 50-100 feet in length with 4-5% slope.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals on most subshrubs and bush muhly are common. None on other grasses or gravels. Terracettes are not present.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 40-45%; gravel 5%, cryptogams 5-7%, liter & herbaceous basal 40%

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5. **Number of gullies and erosion associated with gullies:** none

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6. **Extent of wind scoured, blowouts and/or depositional areas:** none

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter transported 3-5 feet in water flow paths. Woody litter does not move. Herbaceous litter on interfluves does not move.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** 60% are 4-6 ratings, 40% are 1-3 ratings

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak subangular blocky; brown SL 2-3 inches thick, light brown SL 3-60 inches thick
- 
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** 10-15% canopy of trees, 5% canopy of subshrubs and bush muhly, and 5-10% canopy of cacti & large shrubs after 4 years of drought.
- 
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None
- 
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: bush muhly = trees > succulents > annuals > large shrubs > subshrubs > cryptogams > other perennial grasses > perennial forbs (after 4 years of severe drought)
- Sub-dominant:
- Other:
- Additional:
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** 50-75% mortality on bush muhly, burroweed, triangle goldeneye & desert zinnia; 20% mortality on Opuntia species
- 
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):** 145 lbs/ac unfavorable precipitation; 720 lbs/ac normal precipitation; 1290 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:** red brome, malta starthistle, buffleggrass, fountaingrass, Sahara mustard
- 
17. **Perennial plant reproductive capability:** Not impaired for shrubs, drought impaired for perennial grasses and forbs.
-