

Ecological site R041XA115AZ

Loamy Swale 16-20" p.z.

Last updated: 4/09/2021
 Accessed: 04/24/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

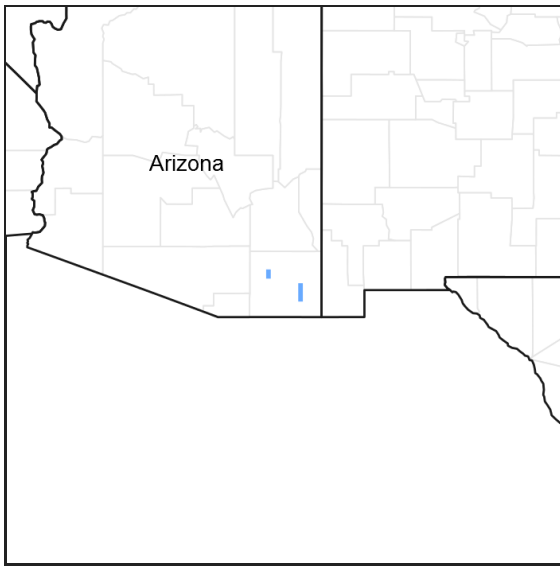


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 041X–Madrean Archipelago

AZ 41.1 – Mexican Oak-Pine Forest and Oak Savannah

Elevations range from 4500 to 10,700 feet and precipitation ranges from 16 to 30 inches. Vegetation includes Emory oak, Mexican blue oak, Arizona white oak, one-seed juniper, alligator juniper, sacahuista, California bricklebrush, skunkbush sumac, Arizona rosewood, wait-a-bit mimosa, sideoats grama, blue grama, purple grama, wooly bunchgrass, plains lovegrass, squirreltail, and pinyon ricegrass. The soil temperature regime ranges from thermic to mesic and the soil moisture regime ranges from aridic ustic to typic ustic. 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

| | |
|-------------|---------------------------------|
| R041XA108AZ | Loamy Upland 16-20" p.z. |
| R041XA114AZ | Loamy Bottom 16-20" p.z. |
| R041XA104AZ | Limy Slopes 16-20" p.z. |

| | |
|-------------|--------------------------|
| R041XA107AZ | Loamy Slopes 16-20" p.z. |
|-------------|--------------------------|

Similar sites

| | |
|-------------|--------------------------|
| R041XA114AZ | Loamy Bottom 16-20" p.z. |
| R041XC311AZ | Loamy Swale 12-16" p.z. |

Table 1. Dominant plant species

| | |
|------------|--|
| Tree | Not specified |
| Shrub | Not specified |
| Herbaceous | (1) <i>bouteloua gracilis</i> (2) <i>bouteloua curtipendula</i> |

Physiographic features

This site occurs in the middle elevations of the Madrean Basin and Range province in southeastern Arizona. It occurs in headwater areas; on floodplains of minor tributaries and in swales. It benefits on a regular basis from extra moisture received as runoff from adjacent upland sites. It does not benefit from any kind of water table.

Table 2. Representative physiographic features

| | |
|--------------------|--|
| Landforms | (1) Flood plain (2) Alluvial fan (3) Swale |
| Flooding duration | Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours) |
| Flooding frequency | Occasional to frequent |
| Ponding duration | Very brief (4 to 48 hours) |
| Ponding frequency | None to rare |
| Elevation | 4,700–5,500 ft |
| Slope | 0–3% |
| Aspect | Aspect is not a significant factor |

Climatic features

Precipitation in this zone of the common resource area ranges from 16-20 inches per year with elevations from 4700-5500 feet. Approximately 40% of this moisture comes as gentle rain or snow during the winter-spring (Oct-Apr) season; originates in the north Pacific and Gulf of California and comes as frontal storms with long duration and low intensity. The remaining 60% falls in the summer season (May-Sep); originates in the Gulf of Mexico and are convective, usually brief, intense thunderstorms. Snow is common Dec-Mar, averaging 5-15 inches per year, but rarely lasts more than a week. May and June are the driest months. Humidity is low.

Temperatures are mild. Freezing temperatures are common at night from Oct-May, but daytime temperatures are almost always over 40 F. Below 0 F temperatures can occur Dec-Feb. Daytime summer highs rarely exceed 95 F.

Species like plains lovegrass, bottlebrush squirreltail, false mesquite, shrubby buckwheat and ratany begin growth in late March to April. Warm season grasses begin growth in July or August with receipt of the first summer rains.

Table 3. Representative climatic features

| | |
|-------------------------------|----------|
| Frost-free period (average) | 200 days |
| Freeze-free period (average) | |
| Precipitation total (average) | 20 in |

Influencing water features

There are no water features associated with this site.

Soil features

These are young soils on loamy to clayey alluvium of mixed origin. They are deep and dark colored. They do not have vertic properties. Plant-soil moisture relationships are excellent.

Soils mapped on this site include: SSA-666 Cochise county Northwestern part MU 54 Lanque; SSA-671 Cochise county Douglas-Tombstone part MU 4 Stanford & 96 Stanford.

Table 4. Representative soil features

| | |
|--|---|
| Surface texture | (1) Sandy loam (2) Loam (3) Clay loam |
| Family particle size | (1) Loamy |
| Drainage class | Well drained |
| Permeability class | Moderate to moderately slow |
| Soil depth | 60 in |
| Surface fragment cover <=3" | 0–5% |
| Surface fragment cover >3" | 0–1% |
| Available water capacity (0-40in) | 9.2–12.6 in |
| Calcium carbonate equivalent (0-40in) | 0–20% |
| Electrical conductivity (0-40in) | 0–2 mmhos/cm |
| Sodium adsorption ratio (0-40in) | 0–2 |
| Soil reaction (1:1 water) (0-40in) | 7.4–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–5% |
| Subsurface fragment volume >3" (Depth not specified) | 0–1% |

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.

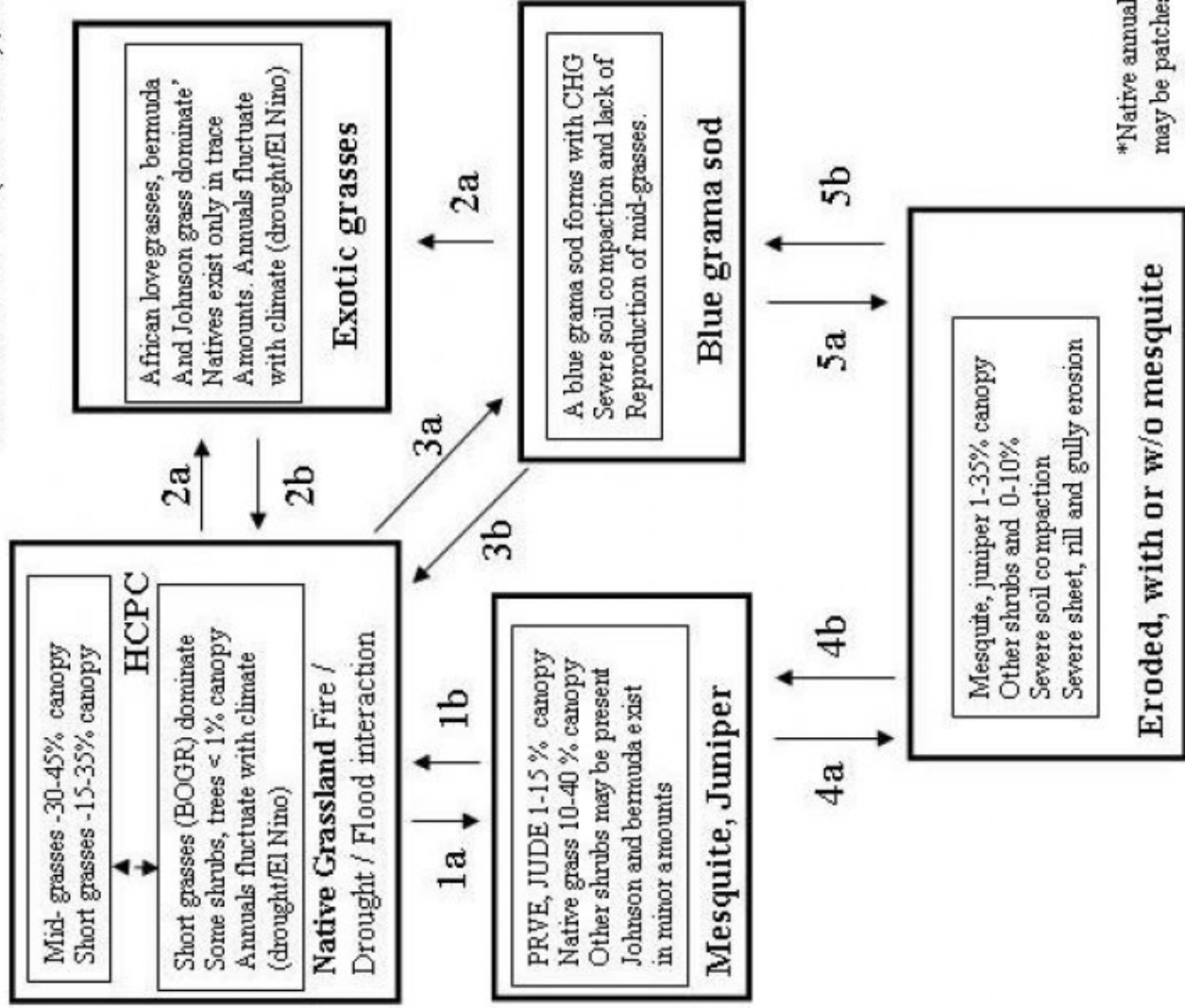
Production data provided in this site description is standardized to air dry weight at the end of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

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 each 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. The site is dominated by warm season perennial grasses. Occasional clumps of trees and shrubs occur in the plant community. Fire was very important in the development of this plant community. The site is very susceptible to gully erosion. Base level changes in large watersheds can lead to erosion of these minor tributaries over time. Woody species like mesquite and juniper can invade and increase to dominate the site in the absence of fire for long periods. Johnson grass and bermuda grass are exotic species that occur on many areas of the site and may become dominant.

State and transition model

MLRA 41-1 (16-20''), Loamy Swale



- 1 a. CHG to open up grass cover. Proximity to seed source of Mesquite, juniper. Lack of fire for long periods of time.
- 1 b. Herbicide or mechanical means to remove shrubs. PG/NG
- 2 a. CHG, introduction of a seed source, or direct seeding of exotic African lovegrasses, bermuda, yellow bluestem or Johnson grass.
- 2 b. Unk. Herbicide treatment of exotics, Seeding of native grasses
- 3 a. CHG, burning plus CHG. Hay mowing, vehicle traffic
- Reduction of A horizon OM and litter, severe soil compaction, greatly reduced infiltration, increased runoff.
- 3 b. PG/NG, seeding or planting of native perennial grasses.
- Soil ripping, contouring and / or mulching
- 4 a. CHG coupled with drought, persistent low grass cover.
- Reduction of A horizon OM and litter, compaction, sheet, rill and gully erosion. Persistent reduced infiltration, greatly increased runoff, and very limited recruitment of perennial grasses. Base level change in main stream causes down-cutting in swales.
- 4 b. Mechanical/herbicide treatment of shrubs, PG/NG, seeding planting of native grasses, maintenance treatments for shrubs, Mechanical control of sheet, rill and gully erosion.
- 5 a. CHG, interruption of overland flow, diversion of runoff, severe soil compaction from traffic (livestock or equipment)
- Base level changes in main stream causes down-cutting in swales.
- 5 b. Mechanical control of rills and gullies. PG/NG, seeding of native grasses.

CHG - continuous heavy grazing.
 PG/NG - proper grazing, no grazing
 BOGR - blue grama, PRVE - mesquite
 JUDE - juniper, Unk. - unknown

*Native annuals dominant,
 may be patches of some non-natives

Figure 4. State and Transition, Loamy Swale 16-20" pz.

State 1
Historical Climax Plant Community

Community 1.1
Historical Climax Plant Community



Figure 5. Loamy Swale 16-20" pz., HCPC



Figure 6. Loamy Swale 16-20" pz., HCPC

The historical native state includes the native plant communities that occur on the site, including the historic climax plant community. This state includes other plant communities that naturally occupy the site following fire, drought, flooding, herbivores, and other natural disturbances. The historic climax plant community represents the natural climax community that eventually reoccupies the site with proper management. The potential plant community is dominated by warm season perennial grasses. Occasional trees and shrubs occur in the plant community. The major perennial grasses like blue grama, sideoats grama, tobosa, creeping muhly and vine mesquite, occur in large patches throughout the plant community. Giant sacaton can occur at about 10% cover in the plant community. Annual forbs and grasses can produce heavy stands in wet seasons following drought and/or fire. With continuous grazing, tall and mid grasses are replaced by short grasses like blue grama and creeping muhly. With grazing management the mid to tall species can resume dominance in the plant community. The aspect is grassland.

Table 5. Annual production by plant type

| Plant Type | Low (Lb/Acre) | Representative Value (Lb/Acre) | High (Lb/Acre) |
|-----------------|---------------|--------------------------------|----------------|
| Grass/Grasslike | 1040 | 2000 | 3100 |
| Forb | 15 | 50 | 150 |
| Tree | 0 | 5 | 50 |
| Shrub/Vine | 1 | 5 | 20 |
| Total | 1056 | 2060 | 3320 |

Table 6. Soil surface cover

| | |
|-----------------------------------|--------|
| Tree basal cover | 0-1% |
| Shrub/vine/liana basal cover | 0-1% |
| Grass/grasslike basal cover | 10-25% |
| Forb basal cover | 0-1% |
| Non-vascular plants | 0-1% |
| Biological crusts | 0-5% |
| Litter | 25-65% |
| Surface fragments >0.25" and <=3" | 0-5% |
| Surface fragments >3" | 0-1% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 10-20% |

Table 7. Canopy structure (% cover)

| Height Above Ground (Ft) | Tree | Shrub/Vine | Grass/Grasslike | Forb |
|--------------------------|------|------------|-----------------|-------|
| <0.5 | – | – | 1-10% | 0-2% |
| >0.5 <= 1 | – | 0-1% | 10-20% | 1-5% |
| >1 <= 2 | – | 0-5% | 20-40% | 1-10% |
| >2 <= 4.5 | – | 0-1% | 10-20% | 0-10% |
| >4.5 <= 13 | 0-1% | 0-1% | 0-10% | – |
| >13 <= 40 | 0-5% | – | – | – |
| >40 <= 80 | – | – | – | – |
| >80 <= 120 | – | – | – | – |
| >120 | – | – | – | – |

Figure 8. Plant community growth curve (percent production by month). AZ4111, 41.1 16-30. Growth begins in the spring, semi-dormancy occurs during the June drought, most growth occurs during the summer rainy season..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 0 | 5 | 10 | 0 | 15 | 45 | 20 | 5 | 0 | 0 |

State 2 Exotic grasses

Community 2.1

Exotic grasses

This state occurs where the native plant community has been replaced by non-native warm season perennial grasses like Lehmann, Boer, Weeping and Cochise lovegrass; and / or Johnson grass, yellow bluestem and bermuda grass. These species either were directly seeded or invaded areas of this site. In areas the natural flooding regime has been altered by diversions, ROWs, and drainage ditches, leaving the native plant community open to invasion by exotics.

State 3

Blue grama sod

Community 3.1

Blue grama sod

In some areas the interaction of continuous heavy grazing with drought, flood and fire has removed native perennial mid-grass species from the plant community. Blue grama persists as a low growing sod with good basal cover but low production compared to the Native plant community. Native and non-native annual forbs and grasses are common in this state the site. Other perennial grasses are limited to threeawns and short lived natives like Rothrock grama.

State 4

Mesquite, juniper invaded

Community 4.1

Mesquite, juniper invaded



Figure 9. Loamy Swales 16-20" pz. Mesquite

Mesquite and / or juniper has invaded the site in the absence of fire for long periods of time. Shrub canopy ranges from 2 to 15%. Native perennial grasses dominate the under-story. Annuals fluctuate with climate (drought / El Nino). Sediment accumulation around the base of trees protects them from the heat of fires. Non-native perennial grasses like bermuda and Johnson grass can exist in minor amounts.

State 5

Eroded with or w/o mesquite

Community 5.1

Eroded with or w/o mesquite



Figure 10. Loamy Swale 16-20" pz., gullied

The interaction of continuous heavy grazing with drought, flood and fire; with or without shrub invasion, can lead to gully formation. Other areas of this state are caused by head-ward gully erosion coming from the down-cutting of major stream systems. The site no longer holds the flood water it receives from adjacent upland areas. The under-story deteriorates to annual forbs and grasses. Other shrubs and cacti can grow in the under-story. Mesquite, juniper canopy ranges from 1 to 35%.

Additional community tables

Table 8. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Lb/Acre) | Foliar Cover (%) |
|------------------------|--------------------------------|--------|---|-----------------------------|------------------|
| Grass/Grasslike | | | | | |
| 1 | Dominant mid grasses | | | 500–1500 | |
| | sideoats grama | BOCU | <i>Bouteloua curtipendula</i> | 300–600 | – |
| | big sacaton | SPWR2 | <i>Sporobolus wrightii</i> | 0–400 | – |
| | cane bluestem | BOBA3 | <i>Bothriochloa barbinodis</i> | 50–300 | – |
| | Arizona cottontop | DICA8 | <i>Digitaria californica</i> | 50–300 | – |
| | green sprangletop | LEDU | <i>Leptochloa dubia</i> | 10–200 | – |
| | silver bluestem | BOSA | <i>Bothriochloa saccharoides</i> | 0–100 | – |
| 2 | Dominant short grasses | | | 500–1000 | |
| | blue grama | BOGR2 | <i>Bouteloua gracilis</i> | 400–800 | – |
| | creeping muhly | MURE | <i>Muhlenbergia repens</i> | 10–300 | – |
| | mat muhly | MURI | <i>Muhlenbergia richardsonis</i> | 0–200 | – |
| | vine mesquite | PAOB | <i>Panicum obtusum</i> | 50–200 | – |
| | tobosagrass | PLMU3 | <i>Pleuraphis mutica</i> | 0–100 | – |
| 3 | Misc. perennial grasses | | | 20–200 | |
| | Orcutt's threeawn | ARSCO | <i>Aristida schiedeana</i> var. <i>orcuttiana</i> | 1–50 | – |
| | spidergrass | ARTE3 | <i>Aristida ternipes</i> | 10–50 | – |
| | spidergrass | ARTEG | <i>Aristida ternipes</i> var. <i>gentilis</i> | 0–50 | – |
| | squirreltail | ELEL5 | <i>Elymus elymoides</i> | 0–50 | – |
| | hairy grama | BOHI2 | <i>Bouteloua hirsuta</i> | 0–50 | – |
| | plains bristlegrass | SEVU2 | <i>Setaria vulpiseta</i> | 0–50 | – |
| | plains lovegrass | ERIN | <i>Eragrostis intermedia</i> | 0–25 | – |
| | tanglehead | HECO10 | <i>Heteropogon contortus</i> | 0–25 | – |
| | curly mesquite | LIFE | <i>Hilaria belandieri</i> | 0–20 | – |

| | | | | | |
|---|------------------------|--------|--|--------|---|
| | chury-mesquite | PIBC | <i>Panicum berangeri</i> | 0-20 | - |
| | common wolfstail | LYPH | <i>Lycurus phleoides</i> | 0-20 | - |
| | bullgrass | MUEM | <i>Muhlenbergia emersleyi</i> | 0-20 | - |
| | deergrass | MURI2 | <i>Muhlenbergia rigens</i> | 0-20 | - |
| | purple muhly | MURI3 | <i>Muhlenbergia rigida</i> | 0-20 | - |
| | sprucetop grama | BOCH | <i>Bouteloua chondrosioides</i> | 0-20 | - |
| | Rothrock's grama | BORO2 | <i>Bouteloua rothrockii</i> | 0-20 | - |
| | flatsedge | CYPER | <i>Cyperus</i> | 0-20 | - |
| | fall witchgrass | DICO6 | <i>Digitaria cognata</i> | 0-20 | - |
| | woolyspike balsamscale | ELBA | <i>Elionurus barbiculmis</i> | 0-20 | - |
| | Texas bluestem | SCCI2 | <i>Schizachyrium cirratum</i> | 0-20 | - |
| | spike dropseed | SPCO4 | <i>Sporobolus contractus</i> | 0-20 | - |
| | sand dropseed | SPCR | <i>Sporobolus cryptandrus</i> | 0-20 | - |
| | spiked crinkleawn | TRSP12 | <i>Trachypogon spicatus</i> | 0-20 | - |
| | alkali sacaton | SPAI | <i>Sporobolus airoides</i> | 0-15 | - |
| | Parish's threeawn | ARPUP5 | <i>Aristida purpurea var. parishii</i> | 0-10 | - |
| | sedge | CAREX | <i>Carex</i> | 0-10 | - |
| | slender grama | BORE2 | <i>Bouteloua repens</i> | 0-10 | - |
| | poverty threeawn | ARDI5 | <i>Aristida divaricata</i> | 0-10 | - |
| | Fendler threeawn | ARPUL | <i>Aristida purpurea var. longiseta</i> | 0-5 | - |
| | Hall's panicgrass | PAHA | <i>Panicum hallii</i> | 0-5 | - |
| 4 | Annual grasses | | | 10-400 | |
| | prairie threeawn | AROL | <i>Aristida oligantha</i> | 1-100 | - |
| | feather fingergrass | CHVI4 | <i>Chloris virgata</i> | 1-100 | - |
| | tapertip cupgrass | ERACA | <i>Eriochloa acuminata var. acuminata</i> | 0-100 | - |
| | bearded sprangletop | LEFUF | <i>Leptochloa fusca ssp. fascicularis</i> | 1-100 | - |
| | Mexican sprangletop | LEFUU | <i>Leptochloa fusca ssp. uninervia</i> | 0-100 | - |
| | mucronate sprangletop | LEPAB | <i>Leptochloa panicea ssp. brachiata</i> | 0-100 | - |
| | sixweeks fescue | VUOC | <i>Vulpia octoflora</i> | 0-100 | - |
| | sticky sprangletop | LEVI5 | <i>Leptochloa viscida</i> | 0-50 | - |
| | Mexican panicgrass | PAHI5 | <i>Panicum hirticaule</i> | 0-50 | - |
| | Arizona signalgrass | URAR | <i>Urochloa arizonica</i> | 0-50 | - |
| | needle grama | BOAR | <i>Bouteloua aristidoides</i> | 0-50 | - |
| | sixweeks grama | BOBA2 | <i>Bouteloua barbata</i> | 0-25 | - |
| | sixweeks threeawn | ARAD | <i>Aristida adscensionis</i> | 0-25 | - |
| | Bigelow's bluegrass | POBI | <i>Poa bigelovii</i> | 0-25 | - |
| | witchgrass | PACA6 | <i>Panicum capillare</i> | 0-25 | - |
| | Arizona brome | BRAR4 | <i>Bromus arizonicus</i> | 0-20 | - |
| | Mexican lovegrass | ERME | <i>Eragrostis mexicana</i> | 0-20 | - |
| | desert lovegrass | ERPEM | <i>Eragrostis pectinacea var. miserrima</i> | 0-20 | - |
| | tufted lovegrass | ERPEP2 | <i>Eragrostis pectinacea var. pectinacea</i> | 0-20 | - |
| | delicate muhly | MUFR | <i>Muhlenbergia fragilis</i> | 0-10 | - |
| | littleseed muhly | MUMI | <i>Muhlenbergia microsperma</i> | 0-10 | - |
| | matted grama | BOSI2 | <i>Bouteloua simplex</i> | 0-10 | - |

| | | | | | |
|-------------|----------------------------|--------|---|-------|---|
| | pitscale grass | HAGR3 | <i>Hackelochloa granularis</i> | 0–5 | – |
| | poverty dropseed | SPVA | <i>Sporobolus vaginiflorus</i> | 0–1 | – |
| | prairie false oat | TRIN5 | <i>Trisetum interruptum</i> | 0–1 | – |
| | Eastwood fescue | VUMIC | <i>Vulpia microstachys</i> var. <i>ciliata</i> | 0–1 | – |
| | desert fescue | VUMIM | <i>Vulpia microstachys</i> var. <i>microstachys</i> | 0–1 | – |
| Forb | | | | | |
| 5 | Perennial forbs | | | 10–50 | |
| | fingerleaf gourd | CUDI | <i>Cucurbita digitata</i> | 0–25 | – |
| | Missouri gourd | CUFO | <i>Cucurbita foetidissima</i> | 0–25 | – |
| | coyote gourd | CUPA | <i>Cucurbita palmata</i> | 0–25 | – |
| | Cooley's bundleflower | DECO2 | <i>Desmanthus cooleyi</i> | 0–25 | – |
| | gooseberryleaf globemallow | SPGR2 | <i>Sphaeralcea grossulariifolia</i> | 1–25 | – |
| | white prairie aster | SYFAC | <i>Symphotrichum falcatum</i> var. <i>commutatum</i> | 1–25 | – |
| | wealeaf bur ragweed | AMCO3 | <i>Ambrosia confertiflora</i> | 1–20 | – |
| | Texas bindweed | COEQ | <i>Convolvulus equitans</i> | 1–15 | – |
| | spreading fleabane | ERDI4 | <i>Erigeron divergens</i> | 0–15 | – |
| | spear globemallow | SPHA | <i>Sphaeralcea hastulata</i> | 0–15 | – |
| | brownplume wirelettuce | STPA4 | <i>Stephanomeria pauciflora</i> | 0–15 | – |
| | silverleaf nightshade | SOEL | <i>Solanum elaeagnifolium</i> | 1–10 | – |
| | Wright's cudweed | PSCAC2 | <i>Pseudognaphalium canescens</i> ssp. <i>canescens</i> | 0–10 | – |
| | canaigre dock | RUHY | <i>Rumex hymenosepalus</i> | 0–10 | – |
| | whitemargin sandmat | CHAL11 | <i>Chamaesyce albomarginata</i> | 0–10 | – |
| | Cuman ragweed | AMPS | <i>Ambrosia psilostachya</i> | 0–10 | – |
| | melon loco | APUN | <i>Apodanthera undulata</i> | 0–10 | – |
| | white sagebrush | ARLU | <i>Artemisia ludoviciana</i> | 0–10 | – |
| | southwestern pricklypoppy | ARPL3 | <i>Argemone pleiacantha</i> | 0–5 | – |
| | tarragon | ARDR4 | <i>Artemisia dracuncululus</i> | 0–5 | – |
| | desert marigold | BAMU | <i>Baileya multiradiata</i> | 0–5 | – |
| | lyreleaf greeneyes | BELY | <i>Berlandiera lyrata</i> | 0–5 | – |
| | scarlet spiderling | BOCO | <i>Boerhavia coccinea</i> | 0–5 | – |
| | dwarf stickpea | CAHUR | <i>Calliandra humilis</i> var. <i>reticulata</i> | 0–5 | – |
| | whitemouth dayflower | COER | <i>Commelina erecta</i> | 0–5 | – |
| | bluedicks | DICA14 | <i>Dichelostemma capitatum</i> | 0–5 | – |
| | spreading snakeherb | DYSCD | <i>Dyschoriste schiedeana</i> var. <i>decumbens</i> | 0–5 | – |
| | whiteflower prairie clover | DAAL | <i>Dalea albiflora</i> | 0–5 | – |
| | velvet leaf senna | SELI4 | <i>Senna lindheimeriana</i> | 0–5 | – |
| | New Mexico fanpetals | SINE | <i>Sida neomexicana</i> | 0–5 | – |
| | shrubby purslane | POSU3 | <i>Portulaca suffrutescens</i> | 0–5 | – |
| | lemon beebalm | MOCIA | <i>Monarda citriodora</i> ssp. <i>austromontana</i> | 0–5 | – |
| | tufted evening primrose | OECA10 | <i>Oenothera caespitosa</i> | 0–5 | – |
| | woodsorrel | OXAI 1 | <i>Oxalis</i> | 0–5 | – |

| | | | | |
|------------------------------|--------|--|-----|---|
| slimleaf bean | PHAN3 | <i>Phaseolus angustissimus</i> | 0-5 | - |
| wild dwarf morning-glory | EVAR | <i>Evolvulus arizonicus</i> | 0-5 | - |
| ivyleaf groundcherry | PHHE4 | <i>Physalis hederifolia</i> | 0-5 | - |
| scarlet beeblossom | GACO5 | <i>Gaura coccinea</i> | 0-5 | - |
| Indian rushpea | HOGL2 | <i>Hoffmannseggia glauca</i> | 0-5 | - |
| Trans-Pecos thimblehead | HYWI | <i>Hymenothrix wislizeni</i> | 0-5 | - |
| Lewis flax | LILE3 | <i>Linum lewisii</i> | 0-5 | - |
| Greene's bird's-foot trefoil | LOGR4 | <i>Lotus greenei</i> | 0-5 | - |
| Wright's deervetch | LOWR | <i>Lotus wrightii</i> | 0-5 | - |
| Sonoita noseburn | TRLA | <i>Tragia laciniata</i> | 0-5 | - |
| American vetch | VIAM | <i>Vicia americana</i> | 0-5 | - |
| Louisiana vetch | VILUL2 | <i>Vicia ludoviciana ssp. ludoviciana</i> | 0-5 | - |
| desert globemallow | SPAM2 | <i>Sphaeralcea ambigua</i> | 0-5 | - |
| Missouri goldenrod | SOMI2 | <i>Solidago missouriensis</i> | 0-2 | - |
| jewels of Opar | TAPA2 | <i>Talinum paniculatum</i> | 0-2 | - |
| Coulter's wrinklefruit | TECO | <i>Tetradlea coulteri</i> | 0-2 | - |
| ragged nettlespurge | JAMA | <i>Jatropha macrorhiza</i> | 0-2 | - |
| southwestern mock vervain | GLGO | <i>Glandularia gooddingii</i> | 0-2 | - |
| trailing fleabane | ERFL | <i>Erigeron flagellaris</i> | 0-2 | - |
| New Mexico fleabane | ERNE3 | <i>Erigeron neomexicanus</i> | 0-2 | - |
| velvetseed milkwort | POOB | <i>Polygala obscura</i> | 0-2 | - |
| Arizona snakecotton | FRAR2 | <i>Froelichia arizonica</i> | 0-2 | - |
| orange fameflower | PHAU13 | <i>Phemeranthus aurantiacus</i> | 0-2 | - |
| birdbill dayflower | CODI4 | <i>Commelina dianthifolia</i> | 0-2 | - |
| desert mariposa lily | CAKE | <i>Calochortus kennedyi</i> | 0-2 | - |
| sego lily | CANU3 | <i>Calochortus nuttallii</i> | 0-2 | - |
| brownfoot | ACWR5 | <i>Acourtia wrightii</i> | 0-2 | - |
| trailing windmills | ALIN | <i>Allionia incarnata</i> | 0-2 | - |
| largeflower onion | ALMA4 | <i>Allium macropetalum</i> | 0-2 | - |
| tuber anemone | ANTU | <i>Anemone tuberosa</i> | 0-2 | - |
| Watson's dutchman's pipe | ARWA | <i>Aristolochia watsonii</i> | 0-2 | - |
| Arizona milkvetch | ASAR6 | <i>Astragalus arizonicus</i> | 0-1 | - |
| spider milkweed | ASAS | <i>Asclepias asperula</i> | 0-1 | - |
| chaparral asphead | ASHI3 | <i>Aspicarpa hirtella</i> | 0-1 | - |
| broadleaf milkweed | ASLA4 | <i>Asclepias latifolia</i> | 0-1 | - |
| woolly locoweed | ASMOB | <i>Astragalus mollissimus var. bigelovii</i> | 0-1 | - |
| sheep milkvetch | ASNO3 | <i>Astragalus nothoxys</i> | 0-1 | - |
| horsetail milkweed | ASSU2 | <i>Asclepias subverticillata</i> | 0-1 | - |
| Indianhemp | APCA | <i>Apocynum cannabinum</i> | 0-1 | - |
| rose heath | CHER2 | <i>Chaetopappa ericoides</i> | 0-1 | - |
| wholeleaf Indian | CAIN14 | <i>Castilleja integra</i> | 0-1 | - |

| | | | | | |
|---|-----------------------------|--------|---|-------|---|
| | paintbrush | | | | |
| | slimflower scurfpea | PSTE5 | <i>Psoralidium tenuiflorum</i> | 0–1 | – |
| | slimleaf plainsmustard | SCLI12 | <i>Schoenocrambe linearifolia</i> | 0–1 | – |
| | Lemmon's ragwort | SELE8 | <i>Senecio lemmonii</i> | 0–1 | – |
| | Mexican fireplant | EUHE4 | <i>Euphorbia heterophylla</i> | 0–1 | – |
| | pearly globe amaranth | GONI | <i>Gomphrena nitida</i> | 0–1 | – |
| | small matweed | GUDED | <i>Guilleminea densa var. densa</i> | 0–1 | – |
| | San Pedro daisy | LAPO4 | <i>Lasianthaea podocephala</i> | 0–1 | – |
| | narrowleaf stoneseed | LIIN2 | <i>Lithospermum incisum</i> | 0–1 | – |
| | variableleaf bushbean | MAGI2 | <i>Macroptilium gibbosifolium</i> | 0–1 | – |
| | lacy tansyaster | MAPI | <i>Machaeranthera pinnatifida</i> | 0–1 | – |
| | Mexican star | MIBI2 | <i>Milla biflora</i> | 0–1 | – |
| | longstalk greenthread | THLO | <i>Thelesperma longipes</i> | 0–1 | – |
| | Hopi tea greenthread | THME | <i>Thelesperma megapotamicum</i> | 0–1 | – |
| 6 | Annual forbs | | | 5–100 | |
| | sensitive partridge pea | CHNI2 | <i>Chamaecrista nictitans</i> | 1–50 | – |
| | common sunflower | HEAN3 | <i>Helianthus annuus</i> | 1–50 | – |
| | longleaf false goldeneye | HELOA2 | <i>Helimeris longifolia var. annua</i> | 1–50 | – |
| | camphorweed | HESU3 | <i>Heterotheca subaxillaris</i> | 1–50 | – |
| | San Pedro matchweed | XAGY | <i>Xanthocephalum gymnospermoides</i> | 1–50 | – |
| | longleaf false goldeneye | HELOL | <i>Helimeris longifolia var. longifolia</i> | 0–25 | – |
| | sorrel buckwheat | ERPO4 | <i>Eriogonum polycladon</i> | 1–25 | – |
| | fewflower beggarticks | BILE | <i>Bidens leptocephala</i> | 1–25 | – |
| | New Mexico copperleaf | ACNE | <i>Acalypha neomexicana</i> | 0–25 | – |
| | redstar | IPCO3 | <i>Ipomoea coccinea</i> | 0–20 | – |
| | crestrub morning-glory | IPCO2 | <i>Ipomoea costellata</i> | 0–15 | – |
| | coastal bird's-foot trefoil | LOSAB | <i>Lotus salsuginosus var. brevivexillus</i> | 0–15 | – |
| | California poppy | ESCAM | <i>Eschscholzia californica ssp. mexicana</i> | 0–15 | – |
| | Arizona gumweed | GRAR2 | <i>Grindelia arizonica</i> | 0–15 | – |
| | New Mexico goosefoot | CHNE3 | <i>Chenopodium neomexicanum</i> | 0–15 | – |
| | wheelscale saltbush | ATEL | <i>Atriplex elegans</i> | 0–15 | – |
| | Coulter's spiderling | BOCO2 | <i>Boerhavia coulteri</i> | 0–15 | – |
| | scrambled eggs | COAU2 | <i>Corydalis aurea</i> | 0–15 | – |
| | horseweed | CONYZ | <i>Conyza</i> | 0–15 | – |
| | spreading fanpetals | SIAB | <i>Sida abutifolia</i> | 0–15 | – |
| | Arizona popcornflower | PLAR | <i>Plagiobothrys arizonicus</i> | 0–15 | – |
| | woolly plantain | PLPA2 | <i>Plantago patagonica</i> | 0–15 | – |
| | purslane | PORTU | <i>Portulaca</i> | 0–10 | – |
| | Arizona poppy | KAGR | <i>Kallstroemia grandiflora</i> | 0–10 | – |
| | foothill deervetch | LOHU2 | <i>Lotus humistratus</i> | 0–10 | – |
| | doubleclaw | PRPA2 | <i>Proboscidea parviflora</i> | 0–10 | – |
| | New Mexico thistle | CINE | <i>Cirsium neomexicanum</i> | 1–10 | – |
| | carelessweed | AMPA | <i>Amaranthus palmeri</i> | 1–10 | – |
| | sacred thorn-apple | DAWR2 | <i>Datura wrightii</i> | 0–10 | – |

| | | | | | |
|--|-------------------------|--------|--|------|---|
| | western tansymustard | DEPI | <i>Descurainia pinnata</i> | 1–10 | – |
| | Thurber's morning-glory | IPTH | <i>Ipomoea thurberi</i> | 0–10 | – |
| | Gordon's bladderpod | LEGO | <i>Lesquerella gordonii</i> | 0–10 | – |
| | shaggyfruit pepperweed | LELA | <i>Lepidium lasiocarpum</i> | 0–5 | – |
| | intermediate pepperweed | LEVIM | <i>Lepidium virginicum</i> var. <i>medium</i> | 0–5 | – |
| | shortstem lupine | LUBR2 | <i>Lupinus brevicaulis</i> | 0–5 | – |
| | bajada lupine | LUCOC | <i>Lupinus concinnus</i> ssp. <i>concinnus</i> | 0–5 | – |
| | slender goldenweed | MAGR10 | <i>Machaeranthera gracilis</i> | 0–5 | – |
| | mesa tansyaster | MATA | <i>Machaeranthera tagetina</i> | 0–5 | – |
| | tanseyleaf tansyaster | MATA2 | <i>Machaeranthera tanacetifolia</i> | 0–5 | – |
| | whitestem blazingstar | MEAL6 | <i>Mentzelia albicaulis</i> | 0–5 | – |
| | poorjoe | DITE2 | <i>Diodia teres</i> | 0–5 | – |
| | wedgeleaf draba | DRCU | <i>Draba cuneifolia</i> | 0–5 | – |
| | blanketflower | GAILL | <i>Gaillardia</i> | 0–5 | – |
| | miniature woollystar | ERDI2 | <i>Eriastrum diffusum</i> | 0–5 | – |
| | star gilia | GIST | <i>Gilia stellata</i> | 0–5 | – |
| | pearly globe amaranth | GONI | <i>Gomphrena nitida</i> | 0–5 | – |
| | halfmoon milkvetch | ASAL6 | <i>Astragalus allochrous</i> | 0–5 | – |
| | smallflowered milkvetch | ASNU4 | <i>Astragalus nuttallianus</i> | 0–5 | – |
| | Thurber's milkvetch | ASTH | <i>Astragalus thurberi</i> | 0–5 | – |
| | fringed redmaids | CACI2 | <i>Calandrinia ciliata</i> | 0–5 | – |
| | pitseed goosefoot | CHBE4 | <i>Chenopodium berlandieri</i> | 0–5 | – |
| | hyssopleaf sandmat | CHHY3 | <i>Chamaesyce hyssopifolia</i> | 0–5 | – |
| | cryptantha | CRYPT | <i>Cryptantha</i> | 0–5 | – |
| | sawtooth sage | SASU7 | <i>Salvia subincisa</i> | 0–5 | – |
| | desert unicorn-plant | PRAL4 | <i>Proboscidea althaeifolia</i> | 0–5 | – |
| | warty caltrop | KAPA | <i>Kallstroemia parviflora</i> | 0–5 | – |
| | green carpetweed | MOVE | <i>Mollugo verticillata</i> | 0–5 | – |
| | desert evening primrose | OEPR | <i>Oenothera primiveris</i> | 0–5 | – |
| | Florida pellitory | PAFL3 | <i>Parietaria floridana</i> | 0–5 | – |
| | Mexican passionflower | PAME2 | <i>Passiflora mexicana</i> | 0–5 | – |
| | phacelia | PHACE | <i>Phacelia</i> | 0–2 | – |
| | rough cocklebur | XAST | <i>Xanthium strumarium</i> | 0–2 | – |
| | sleepy silene | SIAN2 | <i>Silene antirrhina</i> | 0–2 | – |
| | golden crownbeard | VEEN | <i>Verbesina encelioides</i> | 0–2 | – |
| | American wild carrot | DAPU3 | <i>Daucus pusillus</i> | 0–2 | – |
| | erect spiderling | BOER | <i>Boerhavia erecta</i> | 0–2 | – |
| | purple spiderling | BOPU | <i>Boerhavia purpurascens</i> | 0–2 | – |
| | crested anoda | ANCR2 | <i>Anoda cristata</i> | 0–2 | – |
| | Abert's buckwheat | ERAB2 | <i>Eriogonum abertianum</i> | 0–2 | – |
| | plains flax | LIPU4 | <i>Linum puberulum</i> | 0–2 | – |
| | El Paso skyrocket | IPTH2 | <i>Ipomopsis thurberi</i> | 0–1 | – |
| | sweet four o'clock | MILO2 | <i>Mirabilis longiflora</i> | 0–1 | – |

| | | | | | |
|--|---------------------------|--------|--|-----|---|
| | Fendler's desertdandelion | MAFE | <i>Malacothrix fendleri</i> | 0-1 | - |
| | lesser yellowthroat gilia | GIFL | <i>Gilia flavocincta</i> | 0-1 | - |
| | El Paso gilia | GIME | <i>Gilia mexicana</i> | 0-1 | - |
| | Dakota mock vervain | GLBIB | <i>Glandularia bipinnatifida</i> var. <i>bipinnatifida</i> | 0-1 | - |
| | threadstem sandmat | CHRE4 | <i>Chamaesyce revoluta</i> | 0-1 | - |
| | thymeleaf sandmat | CHSE6 | <i>Chamaesyce serpyllifolia</i> | 0-1 | - |
| | slimseed sandmat | CHST8 | <i>Chamaesyce stictospora</i> | 0-1 | - |
| | miner's lettuce | CLPEP | <i>Claytonia perfoliata</i> ssp. <i>perfoliata</i> | 0-1 | - |
| | Abert's creeping zinnia | SAAB | <i>Sanvitalia abertii</i> | 0-1 | - |
| | Arizona phacelia | PHAR13 | <i>Phacelia arizonica</i> | 0-1 | - |
| | Mangas Spring phacelia | PHBO4 | <i>Phacelia bombycina</i> | 0-1 | - |
| | yerba porosa | PORU6 | <i>Porophyllum ruderale</i> | 0-1 | - |

Shrub/Vine

| | | | | | |
|---|------------------------------|-------|--|------|---|
| 7 | Miscellaneous shrubs | | | 1-20 | |
| | yerba de pasmo | BAPT | <i>Baccharis pteronioides</i> | 0-10 | - |
| | bastardsage | ERWR | <i>Eriogonum wrightii</i> | 0-10 | - |
| | Apache plume | FAPA | <i>Fallugia paradoxa</i> | 0-10 | - |
| | catclaw mimosa | MIACB | <i>Mimosa aculeaticarpa</i> var. <i>biuncifera</i> | 0-5 | - |
| | skunkbush sumac | RHTR | <i>Rhus trilobata</i> | 0-5 | - |
| | soaptree yucca | YUEL | <i>Yucca elata</i> | 0-2 | - |
| | threadleaf ragwort | SEFLF | <i>Senecio flaccidus</i> var. <i>flaccidus</i> | 0-1 | - |
| | velvetpod mimosa | MIDY | <i>Mimosa dysocarpa</i> | 0-1 | - |
| | sacahuista | NOMI | <i>Nolina microcarpa</i> | 0-1 | - |
| | cactus apple | OPEN3 | <i>Opuntia engelmannii</i> | 0-1 | - |
| | twistspine pricklypear | OPMA2 | <i>Opuntia macrorhiza</i> | 0-1 | - |
| | fringed twinevine | FUCYC | <i>Funastrum cynanchoides</i> ssp. <i>cynanchoides</i> | 0-1 | - |
| | broom snakeweed | GUSA2 | <i>Gutierrezia sarothrae</i> | 0-1 | - |
| | burroweed | ISTE2 | <i>Isocoma tenuisecta</i> | 0-1 | - |
| | trailing krameria | KRLA | <i>Krameria lanceolata</i> | 0-1 | - |
| | pale desert-thorn | LYPA | <i>Lycium pallidum</i> | 0-1 | - |
| | Drummond's clematis | CLDR | <i>Clematis drummondii</i> | 0-1 | - |
| | walkingstick cactus | CYSP8 | <i>Cylindropuntia spinosior</i> | 0-1 | - |
| | longleaf jointfir | EPTR | <i>Ephedra trifurca</i> | 0-1 | - |
| | prairie acacia | ACAN | <i>Acacia angustissima</i> | 0-1 | - |
| | catclaw acacia | ACGR | <i>Acacia greggii</i> | 0-1 | - |
| | Thurber's desert honeysuckle | ANTH2 | <i>Anisacanthus thurberi</i> | 0-1 | - |
| | pointleaf manzanita | ARPU5 | <i>Arctostaphylos pungens</i> | 0-1 | - |
| | fourwing saltbush | ATCA2 | <i>Atriplex canescens</i> | 0-1 | - |

Tree

| | | | | | |
|---|-------------------|------|--------------------------|------|---|
| 8 | Trees | | | 0-50 | |
| | Arizona white oak | QUAR | <i>Quercus arizonica</i> | 0-10 | - |
| | Emery oak | QUEM | <i>Quercus emeryi</i> | 0-10 | - |

| | | | | | |
|--|-------------------|-------|---|------|---|
| | Emory oak | QOEM | <i>Quercus emoryi</i> | 0-10 | - |
| | western soapberry | SASAD | <i>Sapindus saponaria var. drummondii</i> | 0-5 | - |
| | Arizona walnut | JUMA | <i>Juglans major</i> | 0-5 | - |
| | velvet mesquite | PRVE | <i>Prosopis velutina</i> | 0-5 | - |
| | netleaf hackberry | CELAR | <i>Celtis laevigata var. reticulata</i> | 0-5 | - |
| | desert willow | CHLI2 | <i>Chilopsis linearis</i> | 0-5 | - |
| | velvet ash | FRVE2 | <i>Fraxinus velutina</i> | 0-5 | - |
| | alligator juniper | JUDE2 | <i>Juniperus deppeana</i> | 0-1 | - |

Animal community

This site is suitable for grazing by domestic livestock at any time of the year. This site has a long green season, during and after the summer rainy season, has occasional free water in potholes and will often be overused before proper use is made of adjacent upland areas. Shade is lacking unless mesquite has increased on the site. The plant community is excellent habitat for a wide variety of native wildlife species of desert grasslands. Nesting cover for ground nesting birds is usually very good.

Hydrological functions

These small floodplains receive and hold flood water from adjacent upland areas for short periods of time (1-2 days). They are important in the hydrology of major streams by trapping sediment eroding from uplands and retaining flood waters for slower release to the larger stream system. Gullied swales pass large flood events in less than one day.

Recreational uses

Hunting, hiking, horseback riding, bird-watching, photography.

Wood products

Swales that are invaded by mesquite or juniper furnish good quantities of fuel-wood and limited quantities of posts.

Other products

Grass seed, medicinal plants like yerba de pasmo and herbs like wild oregano (monarda).

Inventory data references

Range 417s include 1 in excellent condition and 1 in good condition.

Type locality

| | |
|-----------------------------------|--|
| Location 1: Santa Cruz County, AZ | |
| Township/Range/Section | T21S R18E S23 |
| General legal description | Research Ranch |
| Location 2: Pima County, AZ | |
| Township/Range/Section | T20S R17E S15 |
| General legal description | Empire ranch at KA 14 in the Davis Pasture. |
| Location 3: Santa Cruz County, AZ | |
| Township/Range/Section | T20S R17E S33 |
| General legal description | Babocomari Ranch, Encinos pasture, headwaters swale of Cienega Creek, KA #7. |

Contributors

Dan Robinett
Larry D. Ellicott

Approval

Curtis Talbot, 4/09/2021

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) | Wilma Renken, Dan Robinett, Larry Humphrey, Linda Kennedy |
| Contact for lead author | USDA-NRCS Tucson MLRA Soil Survey Office |
| Date | 05/01/2014 |
| Approved by | Curtis Talbot |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

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

2. **Presence of water flow patterns:** Shallow channels 2-3 ft wide, 50-100 ft in length are present.
-

3. **Number and height of erosional pedestals or terracettes:** Pedestals common on perennial grasses (1/2" height). No terracettes.
-

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 10-50%, with higher values following fire. Bare ground diminishes to low values within 5 years. Non-vegetated areas are very small (<1 ft diam).
-

5. **Number of gullies and erosion associated with gullies:** Infrequent gullies, short (<100 ft in length) with active headcuts showing little movement.
-

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

7. **Amount of litter movement (describe size and distance expected to travel):** All litter size classes stay in place.

-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Slake test values taken from under perennial grass and shrub cover were "5" and "6"; values from outside canopy ranged from "4" to "6".
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface horizon was gravelly sandy loam, 0-6" depth, with granular structure. Color 10YR 3/4 moist.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial grass basal cover (15%) was evenly dispersed across site. Post-burn values for basal cover were lower (8%), recovering within five years.
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction. Soil penetrometer depth averaged 11.4 cm. No underlying soil feature that can be mistaken for compaction.
-
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: Mid-grasses
- Sub-dominant: perennial forbs > short-grasses
- Other: annual grasses and annual forbs
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little decadence or mortality.
-
14. **Average percent litter cover (%) and depth (in):** Litter cover ranges from 40-75%, increasing with time after burning.
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1056 lbs/ac. in a below average year; 2060 lbs/ac. in an average year; 3320 lbs/ac. in an above average year.
-
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: Lehmann lovegrass, Boer lovegrass, yellow bluestem, coastal bermudagrass, Johnsongrass, velvet mesquite, cocklebur

17. **Perennial plant reproductive capability:** Not impaired.
