

Ecological site R038XA109AZ Loamy Upland 12-16 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.

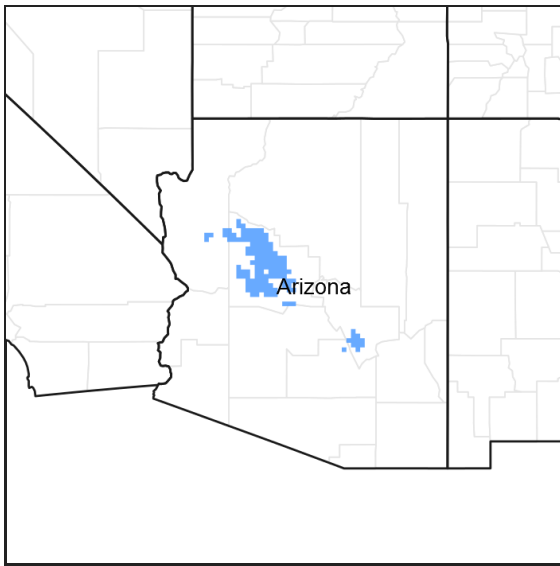


Figure 1. Mapped extent

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): 038X–Mogollon Transition South

AZ 38.1 – Lower Mogollon Transition

Elevations range from 3,000 to 4,500 feet and precipitation averages 12 to 16 inches per year. Vegetation includes canotia, one-seed juniper, mesquite, catclaw acacia, jojoba, turbinella oak, ratany, shrubby buckwheat, algerita, skunkbush, tobosa, vine mesquite, bottlebrush squirreltail, grama species, curly mesquite, desert needlegrass, and New Mexico feathergrass. The soil temperature regime is thermic and the soil moisture regime is ustic aridic. This MLRA occurs within the Transition Zone Physiographic Province and is characterized by canyons and structural troughs or valleys. Igneous, metamorphic, and sedimentary rock classes occur on rough mountainous terrain in association with less extensive sediment filled valleys exhibiting little integrated drainage.

Ecological site concept

The Loamy Upland ecological site occurs at the lowest elevations of the interior chaparral zone in the Mogollon Transition area. It occurs on uplands.

These soils are moderately deep to deep (30 to 60 inches), and dark colored in the surface (6 to 12 inches). They are clayey textured, gravelly to very gravelly, and well drained. They have formed in alluvium and colluvium from a

variety of parent materials.

Associated sites

| | |
|-------------|---------------------------|
| R038XA106AZ | Limy Upland 12-16" p.z. |
| R038XA108AZ | Clayey Slopes 12-16" p.z. |
| R038XA126AZ | Limy Slopes 12-16" p.z. |

Similar sites

| | |
|-------------|-------------------------------|
| R040XA120AZ | Clay Loam Upland 10"-13" p.z. |
| R038XB203AZ | Clay Loam Upland 16-20" p.z. |
| R041XB204AZ | Clay Loam Upland 8-12" p.z. |
| R041XC305AZ | Clay Loam Upland 12-16" p.z. |

Table 1. Dominant plant species

| | |
|------------|--|
| Tree | Not specified |
| Shrub | (1) <i>Opuntia engelmannii</i> (2) <i>Calliandra eriophylla</i> |
| Herbaceous | (1) <i>Bouteloua curtipendula</i> (2) <i>Hilaria belangeri</i> |

Physiographic features

The Loamy Upland ecological site occurs at the lowest elevations of the interior chaparral zone in the Mogollon Transition area. It occurs on uplands. It is on gentle slopes, fan terraces, ridgetops, and mesa tops.

Table 2. Representative physiographic features

| | |
|--------------------|---|
| Landforms | (1) Fan piedmont (2) Mesa (3) Lava flow |
| Flooding frequency | None |
| Elevation | 3,000–4,500 ft |
| Slope | 15–45% |
| Aspect | N, E, S |

Climatic features

Precipitation in this common resource area averages 12 to 16 inches annually. The winter/summer rainfall ratio ranges from about 60/40 percent in the northwest part of the area to 50/50 percent in the southeast part. Summer rains fall July through September; are from high-intensity, convective thunderstorms. This moisture originates primarily from the Gulf of Mexico, but can come from the remnants of Pacific hurricanes in September. Winter moisture is frontal, originates in the north Pacific, and falls as rain or snow in widespread storms of low intensity and long duration. Snowfall ranges from a trace to 10 inches per year and can occur from November through March. Snow seldom persists for more than a day except on north aspects. May and June are the driest months of the year. Humidity is generally low all year. Average annual air temperatures range from 59 to 70 degrees F (thermic temperature regime). Daytime temperatures in the summer are commonly in the high 90's. Freezing temperatures are common from October through April, usually during the night or early morning hours. The actual precipitation, available moisture, and temperature vary, depending on region, elevation, rain shadow effect, and aspect.

Table 3. Representative climatic features

| | |
|-------------------------------|----------|
| Frost-free period (average) | 205 days |
| Freeze-free period (average) | 242 days |
| Precipitation total (average) | 14 in |

Influencing water features

There are no water features associated with the Loamy Upland ecological site.

Soil features

These soils are moderately deep to deep (30 to 60 inches), and dark colored in the surface (6 to 12 inches). They are clayey textured, gravelly to very gravelly, and well drained. They have formed in alluvium and colluvium from a variety of parent materials. They do not exhibit vertic soil properties (cracking and churning). Soil surfaces can be covered by gravels, cobbles, and/or stones. The erosion hazard is moderate to high where plant or gravel covers are inadequate. Typical taxonomic units mapped on this site include: SSA-627 Mohave County Southern Part MU Whitehouse-131; SSA-637 Yavapai County Western Part MU's Lonti-AbB, LmB, LnC, LoD, LpB, LsC, LtB, LuC & LvE, Balon-AIC, LuC, Wm, Wn, Wo & Wp, Poley-AeB & Wp, Showlow-ShB, Wineg-AnC, LuC, Wm, Wn, Wo & Wp; SSA-639 Black Hills-Sedona Area MU's Altar-419 & Bewearze-422; SSA-697 Mohave County Central Part MU Hosta family-58.

Table 4. Representative soil features

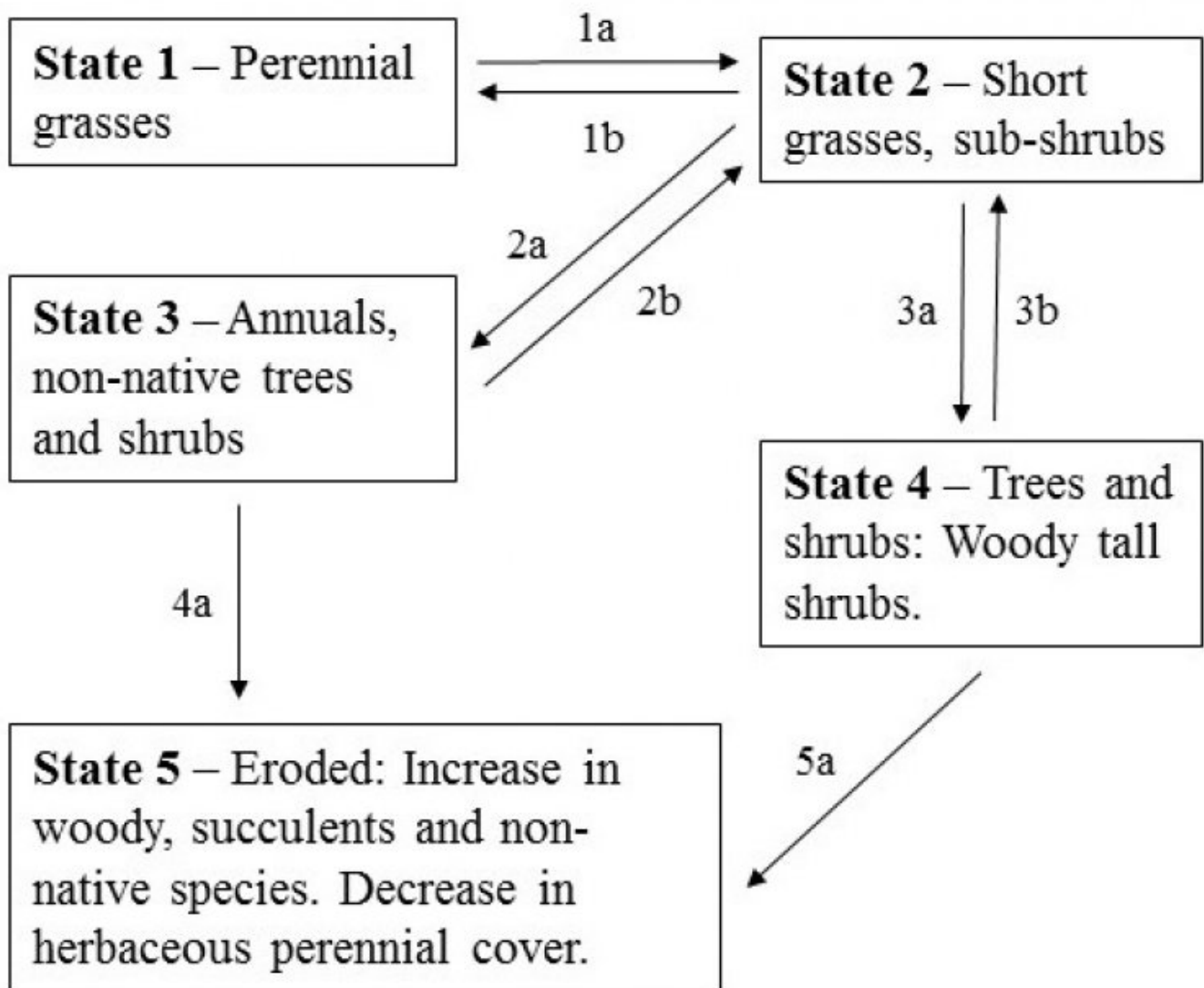
| | |
|---|---|
| Surface texture | (1) Gravelly clay loam (2) Very gravelly loam (3) Very gravelly clay loam |
| Family particle size | (1) Clayey |
| Drainage class | Well drained |
| Permeability class | Moderately slow to slow |
| Soil depth | 30–60 in |
| Surface fragment cover ≤3" | 15–60% |
| Surface fragment cover >3" | 1–10% |
| Available water capacity (0-40in) | 3–7.5 in |
| Calcium carbonate equivalent (0-40in) | 1–15% |
| Electrical conductivity (0-40in) | 0–2 mmhos/cm |
| Sodium adsorption ratio (0-40in) | 0–2 |
| Soil reaction (1:1 water) (0-40in) | 7–8.2 |
| Subsurface fragment volume ≤3" (Depth not specified) | 5–55% |
| Subsurface fragment volume >3" (Depth not specified) | 0–10% |

Ecological dynamics

The historic native plant community is dominated by tobosa and other perennial warm-season grasses with a mixture of desert shrubs, half shrubs, succulents, and forbs. This includes a diverse flora of native annual grasses and forbs of both the winter and summer seasons. Periodic wildfires occurred at moderate intervals (15 to 30 years) and helped to maintain a balance between grasses and shrubs. The interactions of drought, fire, and continuous

livestock grazing can, over time, result in the loss of perennial grasses, half shrubs, and suffrutescent forbs on the Loamy Upland ecological site. The lack of fire for very long periods can lead to increases in large shrubs/succulents like prickly pear, and whitethorn acacia. Trees like juniper, paloverde, mesquite, and canotia can increase as well. In some situations non-native annuals can dominate the site. These species can, over time, diminish the soil seed-bank of native annual species. Non-native annuals can act to increase the fire frequency of areas of the site near roads and urban areas, where the incidence of man-made fires is high.

State and transition model



1a. Fire, drought, CHG

2a. CHG, absence of fire

3a. Woody species increase due to absence of fire and CHG

4a. Accelerated soil erosion may occur where herbaceous plants are absent.

5a. Fire, drought, CHG. Loss of perennial herbaceous cover.

Figure 4. MLRA 38.1 (12-16"), Loamy Uplands

State 1
Reference State

Community 1.1

Tobosa - Warm Season Grass Community (HNPC)

The historic native plant community is dominated by tobosa and other warm season perennial grasses with a mixture of desert shrubs, half-shrubs, suffrutescent forbs and succulents. A rich flora of native annual forbs and grasses, of both the winter and summer seasons, exist in the plant community. Natural fires, which burned at moderate intervals in this region, helped to maintain a balance between perennial grasses and shrubs.

Table 5. Annual production by plant type

| Plant Type | Low (Lb/Acre) | Representative Value (Lb/Acre) | High (Lb/Acre) |
|-----------------|------------------|-----------------------------------|-------------------|
| Grass/Grasslike | 360 | 750 | 1100 |
| Forb | 7 | 50 | 240 |
| Shrub/Vine | 25 | 100 | 200 |
| Tree | 0 | 5 | 15 |
| Total | 392 | 905 | 1555 |

Table 6. Soil surface cover

| | |
|-----------------------------------|--------|
| Tree basal cover | 0% |
| Shrub/vine/liana basal cover | 1-2% |
| Grass/grasslike basal cover | 6-12% |
| Forb basal cover | 0-1% |
| Non-vascular plants | 0% |
| Biological crusts | 1-10% |
| Litter | 10-60% |
| Surface fragments >0.25" and <=3" | 15-60% |
| Surface fragments >3" | 0-15% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 10-60% |

Table 7. Canopy structure (% cover)

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

Figure 6. Plant community growth curve (percent production by month).
AZ3811, 38.1 12-16" p.z. all sites. Growth begins in the spring, most growth occurs in the summer..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 1 | 7 | 15 | 20 | 22 | 20 | 10 | 5 | 0 | 0 |

State 2 Short Grass State

Community 2.1 Short Grass Community

Tobosa is removed from the plant community over time due to the interactions of fire, continuous grazing and drought. When the canopy cover of tobosa drops below 5% and the distribution of that cover is poor (clumped) then tobosa will not be able to recover on the site. Short grasses; especially curly mesquite and including slender and hairy grama will dominate the herbaceous layer of the plant community. These species fluctuate widely from drought to wet years.

State 3 Exotic Annuals Invaded State

Community 3.1 Exotic Annual Invaded Community

Non-native annual grasses like red brome, wild oats, mediterranean grass (schismus) and cheatgrass can invade and dominate areas of the site. These species can, over time, reduce the seed-bank of native annual grasses and forbs. Their presence can increase the fire frequency (of man made fires) especially where roads and urban areas are adjacent to areas of the site. Repeated fires tend to remove the native shrub, grass and forb canopy.

State 4 Shrub Invaded State

Community 4.1 Shrub Invaded Community

In the absence of fire for long periods of time and with continuous grazing, shrubs like mesquite, paloverde and whitethorn acacia and succulents like prickly pear and banana yucca can increase to dominate the plant community. Trees including oneseed and redberry juniper and canotia can increase also. Perennial grasses and forbs cannot recover in the face of increased shrub competition.

State 5 Eroded State

Community 5.1 Woody Overstory

Shrubs like mesquite, paloverde and whitethorn acacia; trees like juniper and canotia; and succulents like prickly pear and banana yucca can increase to dominate the site. Non-native annual forbs and grasses dominate the under-story. In "El Nino" years herbaceous fuels are sufficient for burning and repeat fires are especially common in areas close to residential zones and roads. Extreme rainfall events coupled with the fire, drought and grazing interaction, can lead to rilling of steep slopes. Compaction of soils can occur with heavy trailing from continuous livestock use. Loss of plant cover after repeated fire can lead to accelerated sheet and rill erosion under these circumstances.

Additional community tables

Table 8. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (t h/Acre) | Foliar Cover (%) |
|-------|-------------|--------|-----------------|---------------------------------|---------------------|
|-------|-------------|--------|-----------------|---------------------------------|---------------------|

| Group | Common Name | Symbol | Scientific Name | (L/M/AUG) | (%) |
|------------------------|-----------------------------------|--------|--|-----------|-----|
| Grass/Grasslike | | | | | |
| 1 | Dominant perennial grasses | | | 300–600 | |
| | tobosagrass | PLMU3 | <i>Pleuraphis mutica</i> | 250–500 | – |
| | sideoats grama | BOCU | <i>Bouteloua curtipendula</i> | 50–100 | – |
| 2 | Cool season grasses | | | 1–50 | |
| | squirreltail | ELEL5 | <i>Elymus elymoides</i> | 1–50 | – |
| 3 | Misc. perennial grasses | | | 50–250 | |
| | curly-mesquite | HIBE | <i>Hilaria belangeri</i> | 35–150 | – |
| | hairy grama | BOHI2 | <i>Bouteloua hirsuta</i> | 0–50 | – |
| | slender grama | BORE2 | <i>Bouteloua repens</i> | 0–50 | – |
| | purple threeawn | ARPU9 | <i>Aristida purpurea</i> | 5–50 | – |
| | black grama | BOER4 | <i>Bouteloua eriopoda</i> | 5–50 | – |
| | Parish's threeawn | ARPUP5 | <i>Aristida purpurea var. parishii</i> | 1–50 | – |
| | spidergrass | ARTE3 | <i>Aristida ternipes</i> | 1–50 | – |
| | red grama | BOTR2 | <i>Bouteloua trifida</i> | 0–20 | – |
| | spidergrass | ARTEG | <i>Aristida ternipes var. gentilis</i> | 0–15 | – |
| | blue grama | BOGR2 | <i>Bouteloua gracilis</i> | 0–15 | – |
| | bush muhly | MUPO2 | <i>Muhlenbergia porteri</i> | 0–15 | – |
| | Hall's panicgrass | PAHA | <i>Panicum hallii</i> | 0–15 | – |
| | vine mesquite | PAOB | <i>Panicum obtusum</i> | 0–15 | – |
| | plains bristlegrass | SEVU2 | <i>Setaria vulpiseta</i> | 0–15 | – |
| | Fendler threeawn | ARPUL | <i>Aristida purpurea var. longiseta</i> | 0–10 | – |
| | sand dropseed | SPCR | <i>Sporobolus cryptandrus</i> | 0–5 | – |
| | cane bluestem | BOBA3 | <i>Bothriochloa barbinodis</i> | 0–5 | – |
| | Arizona cottontop | DICA8 | <i>Digitaria californica</i> | 0–5 | – |
| | green sprangletop | LEDU | <i>Leptochloa dubia</i> | 0–5 | – |
| | fall witchgrass | DICO6 | <i>Digitaria cognata</i> | 0–2 | – |
| | slim tridens | TRMU | <i>Tridens muticus</i> | 0–2 | – |
| | plains lovegrass | ERIN | <i>Eragrostis intermedia</i> | 0–1 | – |
| | tanglehead | HECO10 | <i>Heteropogon contortus</i> | 0–1 | – |
| 4 | Annual grasses | | | 5–200 | |
| | sixweeks fescue | VUOC | <i>Vulpia octoflora</i> | 1–50 | – |
| | mucronate sprangletop | LEPAB | <i>Leptochloa panicea ssp. brachiata</i> | 0–25 | – |
| | small fescue | VUMI | <i>Vulpia microstachys</i> | 0–20 | – |
| | sixweeks threeawn | ARAD | <i>Aristida adscensionis</i> | 1–20 | – |
| | Mexican panicgrass | PAHI5 | <i>Panicum hirticaule</i> | 0–15 | – |
| | Arizona signalgrass | URAR | <i>Urochloa arizonica</i> | 0–15 | – |
| | Rothrock's grama | BORO2 | <i>Bouteloua rothrockii</i> | 0–10 | – |
| | Eastwood fescue | VUMIC | <i>Vulpia microstachys var. ciliata</i> | 0–10 | – |
| | witchgrass | PACA6 | <i>Panicum capillare</i> | 0–5 | – |
| | prairie threeawn | AROL | <i>Aristida oligantha</i> | 0–5 | – |
| | Arizona brome | BRAR4 | <i>Bromus arizonicus</i> | 0–2 | – |
| | feather fingergrass | CHVI4 | <i>Chloris virgata</i> | 0–2 | – |

| | | | | | |
|-------------|----------------------------|--------|---|------|---|
| | delicate muhly | MUFR | <i>Muhlenbergia fragilis</i> | 0-2 | - |
| | littleseed muhly | MUMI | <i>Muhlenbergia microsperma</i> | 0-2 | - |
| | canyon cupgrass | ERLE7 | <i>Eriochloa lemmonii</i> | 0-1 | - |
| | tufted lovegrass | ERPE | <i>Eragrostis pectinacea</i> | 0-1 | - |
| | desert lovegrass | ERPEM | <i>Eragrostis pectinacea</i> var. <i>miserrima</i> | 0-1 | - |
| | little barley | HOPU | <i>Hordeum pusillum</i> | 0-1 | - |
| | Mexican sprangletop | LEFUU | <i>Leptochloa fusca</i> ssp. <i>uninervia</i> | 0-1 | - |
| | Bigelow's bluegrass | POBI | <i>Poa bigelovii</i> | 0-1 | - |
| | needle grama | BOAR | <i>Bouteloua aristidoides</i> | 0-1 | - |
| | sixweeks grama | BOBA2 | <i>Bouteloua barbata</i> | 0-1 | - |
| Forb | | | | | |
| 5 | Perennial forbs | | | 5-40 | |
| | largeflower onion | ALMA4 | <i>Allium macropetalum</i> | 0-5 | - |
| | weakleaf bur ragweed | AMCO3 | <i>Ambrosia confertiflora</i> | 1-5 | - |
| | bluedicks | DICA14 | <i>Dichelostemma capitatum</i> | 1-5 | - |
| | slender janusia | JAGR | <i>Janusia gracilis</i> | 0-5 | - |
| | desert globemallow | SPAM2 | <i>Sphaeralcea ambigua</i> | 1-5 | - |
| | brownplume wirelettuce | STPA4 | <i>Stephanomeria pauciflora</i> | 1-5 | - |
| | Coues' cassia | SECO10 | <i>Senna covesii</i> | 0-2 | - |
| | Gila manroot | MAGI | <i>Marah gilensis</i> | 0-2 | - |
| | lacy tansyaster | MAPI | <i>Machaeranthera pinnatifida</i> | 0-2 | - |
| | wishbone-bush | MILAV | <i>Mirabilis laevis</i> var. <i>villosa</i> | 0-2 | - |
| | tuber anemone | ANTU | <i>Anemone tuberosa</i> | 0-2 | - |
| | perennial rockcress | ARPE2 | <i>Arabis perennans</i> | 1-2 | - |
| | 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 | - |
| | wavyleaf Indian paintbrush | CAAPM | <i>Castilleja applegatei</i> ssp. <i>martinii</i> | 0-1 | - |
| | Arizona wrightwort | CAAR7 | <i>Carlwrightia arizonica</i> | 0-1 | - |
| | desert mariposa lily | CAKE | <i>Calochortus kennedyi</i> | 0-1 | - |
| | sego lily | CANU3 | <i>Calochortus nuttallii</i> | 0-1 | - |
| | leatherweed | CRPO5 | <i>Croton pottsii</i> | 0-1 | - |
| | narrowleaf silverbush | ARLA12 | <i>Argythamnia lanceolata</i> | 0-1 | - |
| | white sagebrush | ARLUM2 | <i>Artemisia ludoviciana</i> ssp. <i>mexicana</i> | 0-1 | - |
| | New Mexico silverbush | ARNE2 | <i>Argythamnia neomexicana</i> | 0-1 | - |
| | dwarf desertpeony | ACNA2 | <i>Acourtia nana</i> | 0-1 | - |
| | brownfoot | ACWR5 | <i>Acourtia wrightii</i> | 0-1 | - |
| | San Felipe dogweed | ADPO | <i>Adenophyllum porophylloides</i> | 0-1 | - |
| | trailing windmills | ALIN | <i>Allionia incarnata</i> | 0-1 | - |
| | desert tobacco | NIOB | <i>Nicotiana obtusifolia</i> | 0-1 | - |
| | New Mexico groundsel | PANE7 | <i>Packera neomexicana</i> | 0-1 | - |
| | Oak Creek ragwort | PAQU18 | <i>Packera quercetorum</i> | 0-1 | - |

| | | | | | |
|---|-----------------------------|--------|---|-------|---|
| | San Creek ragwort | PELI2 | <i>Penstemon linarioides</i> | 0-1 | - |
| | Parry's beardtongue | PEPA24 | <i>Penstemon parryi</i> | 0-1 | - |
| | desert penstemon | PEPS | <i>Penstemon pseudospectabilis</i> | 0-1 | - |
| | orange fameflower | PHAU13 | <i>Phemeranthus aurantiacus</i> | 0-1 | - |
| | slender poreleaf | POGR5 | <i>Porophyllum gracile</i> | 0-1 | - |
| | glandleaf milkwort | POMA7 | <i>Polygala macradenia</i> | 0-1 | - |
| | canaigre dock | RUHY | <i>Rumex hymenosepalus</i> | 0-1 | - |
| | twinleaf senna | SEBA3 | <i>Senna bauhinioides</i> | 0-1 | - |
| | ragged nettlespurge | JAMA | <i>Jatropha macrorhiza</i> | 0-1 | - |
| | longflower tube tongue | JULO3 | <i>Justicia longii</i> | 0-1 | - |
| | Wright's deervetch | LOWR | <i>Lotus wrightii</i> | 0-1 | - |
| | fleabane | ERIGE2 | <i>Erigeron</i> | 0-1 | - |
| | desert trumpet | ERIN4 | <i>Eriogonum inflatum</i> | 0-1 | - |
| | Mojave spurge | EUSC6 | <i>Euphorbia schizoloba</i> | 0-1 | - |
| | southwestern mock vervain | GLGO | <i>Glandularia gooddingii</i> | 0-1 | - |
| | desert rosemallow | HICO | <i>Hibiscus coulteri</i> | 0-1 | - |
| | Indian rushpea | HOGL2 | <i>Hoffmannseggia glauca</i> | 0-1 | - |
| | plains blackfoot | MELE2 | <i>Melampodium leucanthum</i> | 0-1 | - |
| | Lemmon's ragwort | SELE8 | <i>Senecio lemmonii</i> | 0-1 | - |
| | New Mexico fanpetals | SINE | <i>Sida neomexicana</i> | 0-1 | - |
| | silverleaf nightshade | SOEL | <i>Solanum elaeagnifolium</i> | 0-1 | - |
| | branched noseburn | TRRA5 | <i>Tragia ramosa</i> | 0-1 | - |
| | Louisiana vetch | VILUL2 | <i>Vicia ludoviciana ssp. ludoviciana</i> | 0-1 | - |
| | Gregg's prairie clover | DAGR2 | <i>Dalea greggii</i> | 0-1 | - |
| | Cooley's bundleflower | DECO2 | <i>Desmanthus cooleyi</i> | 0-1 | - |
| | desert larkspur | DEPA | <i>Delphinium parishii</i> | 0-1 | - |
| | tall mountain larkspur | DESC | <i>Delphinium scaposum</i> | 0-1 | - |
| 6 | Annual forbs | | | 2-200 | |
| | bristly fiddleneck | AMTE3 | <i>Amsinckia tessellata</i> | 0-50 | - |
| | Arizona popcornflower | PLAR | <i>Plagiobothrys arizonicus</i> | 0-50 | - |
| | California poppy | ESCAM | <i>Eschscholzia californica ssp. mexicana</i> | 0-25 | - |
| | longleaf false goldeneye | HELOA2 | <i>Heliomeris longifolia var. annua</i> | 1-25 | - |
| | Gordon's bladderpod | LEGO | <i>Lesquerella gordonii</i> | 0-15 | - |
| | Coulter's lupine | LUSP2 | <i>Lupinus sparsiflorus</i> | 0-15 | - |
| | coastal bird's-foot trefoil | LOSA | <i>Lotus salsuginosus</i> | 0-15 | - |
| | desert Indianwheat | PLOV | <i>Plantago ovata</i> | 0-15 | - |
| | Coulter's spiderling | BOCO2 | <i>Boerhavia coulteri</i> | 0-15 | - |
| | carelessweed | AMPA | <i>Amaranthus palmeri</i> | 0-10 | - |
| | exserted Indian paintbrush | CAEXE | <i>Castilleja exserta ssp. exserta</i> | 0-10 | - |
| | thelypody | THELY | <i>Thelypodium</i> | 0-10 | - |
| | Arizona poppy | KAGR | <i>Kallstroemia grandiflora</i> | 0-10 | - |
| | western tansymustard | DEPI | <i>Descurainia pinnata</i> | 0-10 | - |
| | miniature woollystar | FRDI2 | <i>Eriastrum diffusum</i> | 0-10 | - |

| miniature woollystar | LELA2 | <i>Lepidium lasiocarpum</i> | 0-5 | - |
|----------------------------|--------|---|-----|---|
| shaggyfruit pepperweed | LELA | <i>Lepidium lasiocarpum</i> | 0-5 | - |
| foothill deervetch | LOHU2 | <i>Lotus humistratus</i> | 0-5 | - |
| desertparsley | LOMAT | <i>Lomatium</i> | 0-5 | - |
| slender goldenweed | MAGR10 | <i>Machaeranthera gracilis</i> | 0-5 | - |
| tanseyleaf tansyaster | MATA2 | <i>Machaeranthera tanacetifolia</i> | 0-5 | - |
| woolly tidestromia | TILA2 | <i>Tidestromia lanuginosa</i> | 0-5 | - |
| New Mexico plumeseed | RANE | <i>Rafinesquia neomexicana</i> | 0-5 | - |
| woolly plantain | PLPA2 | <i>Plantago patagonica</i> | 0-5 | - |
| phacelia | PHACE | <i>Phacelia</i> | 0-5 | - |
| pitseed goosefoot | CHBE4 | <i>Chenopodium berlandieri</i> | 0-5 | - |
| fiwing spiderling | BOIN | <i>Boerhavia intermedia</i> | 0-5 | - |
| milkvetch | ASTRA | <i>Astragalus</i> | 0-5 | - |
| New Mexico thistle | CINE | <i>Cirsium neomexicanum</i> | 0-2 | - |
| miner's lettuce | CLPEP | <i>Claytonia perfoliata ssp. perfoliata</i> | 0-2 | - |
| hyssopleaf sandmat | CHHY3 | <i>Chamaesyce hyssopifolia</i> | 0-2 | - |
| American wild carrot | DAPU3 | <i>Daucus pusillus</i> | 0-2 | - |
| purslane | PORTU | <i>Portulaca</i> | 0-2 | - |
| sawtooth sage | SASU7 | <i>Salvia subincisa</i> | 0-2 | - |
| spreading fanpetals | SIAB | <i>Sida abutilifolia</i> | 0-2 | - |
| sleepy silene | SIAN2 | <i>Silene antirrhina</i> | 0-2 | - |
| Thurber's pepperweed | LETH2 | <i>Lepidium thurberi</i> | 0-2 | - |
| crestrib morning-glory | IPCO2 | <i>Ipomoea costellata</i> | 0-2 | - |
| wedgeleaf draba | DRCU | <i>Draba cuneifolia</i> | 0-2 | - |
| spurge | EUPHO | <i>Euphorbia</i> | 0-2 | - |
| sorrel buckwheat | ERPO4 | <i>Eriogonum polycladon</i> | 0-2 | - |
| Texas stork's bill | ERTE13 | <i>Erodium texanum</i> | 0-1 | - |
| star gilia | GIST | <i>Gilia stellata</i> | 0-1 | - |
| flatcrown buckwheat | ERDE6 | <i>Eriogonum deflexum</i> | 0-1 | - |
| spreading fleabane | ERDI4 | <i>Erigeron divergens</i> | 0-1 | - |
| redstar | IPCO3 | <i>Ipomoea coccinea</i> | 0-1 | - |
| ivyleaf morning-glory | IPHE | <i>Ipomoea hederacea</i> | 0-1 | - |
| California goldfields | LACA7 | <i>Lasthenia californica</i> | 0-1 | - |
| whitestem blazingstar | MEAL6 | <i>Mentzelia albicaulis</i> | 0-1 | - |
| green carpetweed | MOVE | <i>Mollugo verticillata</i> | 0-1 | - |
| desert evening primrose | OEPR | <i>Oenothera primiveris</i> | 0-1 | - |
| Florida pellitory | PAFL3 | <i>Parietaria floridana</i> | 0-1 | - |
| combseed | PECTO | <i>Pectocarya</i> | 0-1 | - |
| manybristle chinchweed | PEPA2 | <i>Pectis papposa</i> | 0-1 | - |
| Arizona lupine | LUAR4 | <i>Lupinus arizonicus</i> | 0-1 | - |
| miniature lupine | LUBI | <i>Lupinus bicolor</i> | 0-1 | - |
| Fendler's desertydandelion | MAFE | <i>Malacothrix fendleri</i> | 0-1 | - |
| creamcups | PLCA5 | <i>Platystemon californicus</i> | 0-1 | - |
| woollyhead neststraw | STMI2 | <i>Stylocline micropoides</i> | 0-1 | - |

| | | | | | |
|-------------------|-----------------------------------|--------|---|--------|---|
| | sand fringe-pod | THCU | <i>Thysanocarpus curvipes</i> | 0-1 | - |
| | desert unicorn-plant | PRAL4 | <i>Proboscidea althaeifolia</i> | 0-1 | - |
| | doubleclaw | PRPA2 | <i>Proboscidea parviflora</i> | 0-1 | - |
| | chia | SACO6 | <i>Salvia columbariae</i> | 0-1 | - |
| | sacred thorn-apple | DAWR2 | <i>Datura wrightii</i> | 0-1 | - |
| | Esteve's pincushion | CHST | <i>Chaenactis stevioides</i> | 0-1 | - |
| | scrambled eggs | COAU2 | <i>Corydalis aurea</i> | 0-1 | - |
| | cryptantha | CRYPT | <i>Cryptantha</i> | 0-1 | - |
| | brittle spineflower | CHBR | <i>Chorizanthe brevicornu</i> | 0-1 | - |
| | yellow tackstem | CAPA7 | <i>Calycoseris parryi</i> | 0-1 | - |
| | white tackstem | CAWR | <i>Calycoseris wrightii</i> | 0-1 | - |
| | hoary bowlesia | BOIN3 | <i>Bowlesia incana</i> | 0-1 | - |
| | annual agoseris | AGHE2 | <i>Agoseris heterophylla</i> | 0-1 | - |
| Shrub/Vine | | | | | |
| 7 | Evergreen shrubs | | | 1-50 | |
| | Sonoran scrub oak | QUTU2 | <i>Quercus turbinella</i> | 0-10 | - |
| | jojoba | SICH | <i>Simmondsia chinensis</i> | 0-10 | - |
| | redberry buckthorn | RHCR | <i>Rhamnus crocea</i> | 0-1 | - |
| | longleaf jointfir | EPTR | <i>Ephedra trifurca</i> | 0-1 | - |
| | red barberry | MAHA4 | <i>Mahonia haematocarpa</i> | 0-1 | - |
| | algerita | MATR3 | <i>Mahonia trifoliolata</i> | 0-1 | - |
| 8 | Miscellaneous large shrubs | | | 1-20 | |
| | catclaw acacia | ACGR | <i>Acacia greggii</i> | 1-5 | - |
| | blue paloverde | PAFL6 | <i>Parkinsonia florida</i> | 0-5 | - |
| | yellow paloverde | PAMI5 | <i>Parkinsonia microphylla</i> | 0-5 | - |
| | whitethorn acacia | ACCO2 | <i>Acacia constricta</i> | 0-2 | - |
| | whitethorn acacia | ACCOP9 | <i>Acacia constricta</i> var. <i>paucispina</i> | 0-1 | - |
| | littleleaf sumac | RHMI3 | <i>Rhus microphylla</i> | 0-1 | - |
| | skunkbush sumac | RHTR | <i>Rhus trilobata</i> | 0-1 | - |
| | lotebush | ZIOBC | <i>Ziziphus obtusifolia</i> var. <i>canescens</i> | 0-1 | - |
| | desert sweet | CHMI2 | <i>Chamaebatiaria millefolium</i> | 0-1 | - |
| | ocotillo | FOSP2 | <i>Fouquieria splendens</i> | 0-1 | - |
| | snapdragon penstemon | KEANM | <i>Keckiella antirrhinoides</i> ssp. <i>microphylla</i> | 0-1 | - |
| | creosote bush | LATR2 | <i>Larrea tridentata</i> | 0-1 | - |
| | water jacket | LYAN | <i>Lycium andersonii</i> | 0-1 | - |
| | Berlandier's wolfberry | LYBE | <i>Lycium berlandieri</i> | 0-1 | - |
| | Arizona desert-thorn | LYEX | <i>Lycium exsertum</i> | 0-1 | - |
| | catclaw mimosa | MIACB | <i>Mimosa aculeaticarpa</i> var. <i>biuncifera</i> | 0-1 | - |
| 9 | Dominant half shrubs | | | 15-100 | |
| | fairyduster | CAER | <i>Calliandra eriophylla</i> | 10-60 | - |
| | bastardsage | ERWR | <i>Eriogonum wrightii</i> | 1-15 | - |
| | littleleaf ratany | KRER | <i>Krameria erecta</i> | 1-10 | - |
| | rough manedora | MESC | <i>Menodora scabra</i> | 0-10 | - |

| | | | | | |
|-------------|------------------------------|--------|---|------|---|
| | rough monardella | MECO | monardella scabra | 0-10 | - |
| | desert zinnia | ZIAC | <i>Zinnia acerosa</i> | 0-5 | - |
| | Eastern Mojave buckwheat | ERFA2 | <i>Eriogonum fasciculatum</i> | 0-1 | - |
| | prairie acacia | ACAN | <i>Acacia angustissima</i> | 0-1 | - |
| | Coulter's brickellbush | BRCO | <i>Brickellia coulteri</i> | 0-1 | - |
| 10 | Succulents | | | 5-55 | |
| | cactus apple | OPEN3 | <i>Opuntia engelmannii</i> | 5-20 | - |
| | tulip pricklypear | OPPH | <i>Opuntia phaeacantha</i> | 0-10 | - |
| | banana yucca | YUBA | <i>Yucca baccata</i> | 0-5 | - |
| | saguaro | CAGI10 | <i>Carnegiea gigantea</i> | 0-2 | - |
| | devil's cholla | GRKU | <i>Grusonia kunzei</i> | 0-2 | - |
| | Christmas cactus | CYLE8 | <i>Cylindropuntia leptocaulis</i> | 0-2 | - |
| | walkingstick cactus | CYSP8 | <i>Cylindropuntia spinosior</i> | 0-2 | - |
| | common sotol | DAWH2 | <i>Dasyliion wheeleri</i> | 0-1 | - |
| | pinkflower hedgehog cactus | ECBO2 | <i>Echinocereus bonkerae</i> | 0-1 | - |
| | Arizona hedgehog cactus | ECCOA | <i>Echinocereus coccineus var. arizonicus</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 | ESVI2 | <i>Escobaria vivipara</i> | 0-1 | - |
| | candy barrelcactus | FEWI | <i>Ferocactus wislizeni</i> | 0-1 | - |
| | Graham's nipple cactus | MAGR9 | <i>Mammillaria grahamii</i> | 0-1 | - |
| | sacahuista | NOMI | <i>Nolina microcarpa</i> | 0-1 | - |
| | buck-horn cholla | CYAC8 | <i>Cylindropuntia acanthocarpa</i> | 0-1 | - |
| | jumping cholla | CYFU10 | <i>Cylindropuntia fulgida</i> | 0-1 | - |
| | goldenflower century plant | AGCH2 | <i>Agave chrysantha</i> | 0-1 | - |
| | Palmer's century plant | AGPA3 | <i>Agave palmeri</i> | 0-1 | - |
| | soaptree yucca | YUEL | <i>Yucca elata</i> | 0-1 | - |
| | purple pricklypear | OPMA8 | <i>Opuntia macrocentra</i> | 0-1 | - |
| 11 | Increaser half-shrubs | | | 2-25 | |
| | broom snakeweed | GUSA2 | <i>Gutierrezia sarothrae</i> | 1-20 | - |
| | burroweed | ISTE2 | <i>Isocoma tenuisecta</i> | 0-1 | - |
| | yerba de pasmo | BAPT | <i>Baccharis pteronioides</i> | 0-1 | - |
| | button brittlebush | ENFR | <i>Encelia frutescens</i> | 0-1 | - |
| | turpentine bush | ERLA12 | <i>Ericameria laricifolia</i> | 0-1 | - |
| | threadleaf snakeweed | GUMI | <i>Gutierrezia microcephala</i> | 0-1 | - |
| Tree | | | | | |
| 12 | Trees | | | 0-15 | |
| | redberry juniper | JUCO11 | <i>Juniperus coahuilensis</i> | 0-5 | - |
| | oneseed juniper | JUMO | <i>Juniperus monosperma</i> | 0-5 | - |
| | Utah juniper | JUOS | <i>Juniperus osteosperma</i> | 0-5 | - |
| | velvet mesquite | PRVE | <i>Prosopis velutina</i> | 0-5 | - |
| | western honey mesquite | PRGLT | <i>Prosopis glandulosa var. torreyana</i> | 0-2 | - |

| | | | | |
|-------------------|-------|---------------------------|-----|---|
| crucifixion thorn | CAHO3 | <i>Canotia holacantha</i> | 0-2 | - |
|-------------------|-------|---------------------------|-----|---|

Animal community

The Loamy Upland ecological site is suitable for grazing year-round, and is easily traversed by livestock. Tobosa is very unpalatable and will be the last perennial grass species to be used on this site. Livestock grazing use is concentrated near trails, roads, and waters. The site is susceptible to erosion in overgrazed areas like bed-grounds, livestock trails, and slopes adjacent to water. The site has good habitat diversity for a variety of desert wildlife species. It is home mainly to small mammals and birds and their associated predators. It is a foraging area for larger mammals like deer and javalina. Water developments are very important to both livestock and wildlife on this site.

Hydrological functions

The Loamy Upland ecological site has a smooth to rough surface with variable covers of gravels and stones. Due to clayey textured soils it is a good producer of runoff. It produces exceptional runoff when heavy rain falls on snow or moist soils.

Recreational uses

The Loamy Upland ecological site is used for hunting, camping, horseback riding, backpacking, rock hounding, and photography.

Wood products

Limited fuel-wood for campfires and branding fires. In areas where mesquite or juniper has increased there may be more wood available for fuel and for fence stays.

Other products

There is some harvest of food plants like prickly pear tunas, jojoba nuts, wild onions, and grass nuts. There is limited harvest of medicinal plants like Mormon tea. There is limited harvest of fibers from banana yucca. Clay is available for pot making.

Type locality

| | |
|--------------------------------|--|
| Location 1: Yavapai County, AZ | |
| Township/Range/Section | T11N R2E S8 |
| General legal description | North side of Highway 69 right-of-way, Cordes Junction to Mayer, Yavapai County. |

Other references

Similar to Community type 5 of TES Map Unit # 370 on the Prescott National Forest.

Contributors

Dan Robinett
Larry D. Ellicott

Approval

Scott Woodall, 9/05/2019

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) | Karlynn Huling |
| Contact for lead author | NRCS Flagstaff Area Office |
| Date | 05/19/2006 |
| Approved by | S. Cassady |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

1. **Number and extent of rills:** Some rills may form due to loamy surface textures, slow permeability, and medium runoff, especially on steeper slopes.

2. **Presence of water flow patterns:** Water flow patterns may be common due to slow permeability and medium runoff, especially on steeper slopes.

3. **Number and height of erosional pedestals or terracettes:** Some pedestals and terracettes may occur, but they should be very short.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground should not exceed 25 percent. The Loamy Upland ecological site has an average available water capacity of 7 inches, so it has a moderate to high potential for the production of plant cover. Sites with a cover of rock fragments will have less bare ground. Drought may cause an increase in bare ground.

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):** Herbaceous and fine woody litter will be transported in water flow pathways. Coarse woody litter will remain under shrub canopies.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Surface soil stability values average 5 both under plant canopies and in the interspaces. Surface textures are mostly sandy loam, loam, or sandy clay loam. Often the surface horizon is gravelly, but sometimes not. When well vegetated, these soils have a moderate to high resistance to both water and wind erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is either granular (weak to moderate, fine to medium) or platy (weak, medium to thick). Surface thickness is 2 to 3 inches. Color is variable depending upon parent material.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The Loamy Upland ecological site is characterized by a relatively even distribution of mostly grasses with a few shrubs and forbs. One area had 30 percent canopy cover with overlapping layers of plants (15 percent grass, 5 percent forbs, 15 percent shrubs). Basal cover was 1 percent (grass only). Both canopy and basal cover values decrease during prolonged droughts. This type of plant community is highly effective at capturing and storing precipitation.
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Due to loam and clay loam textures, these soils may be easily compacted when there are no rock fragments in the surface horizons. Some surface horizons are naturally platy.
-
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: none
- Sub-dominant: warm-season bunchgrasses = warm-season colonizing grasses shrubs cool season bunchgrasses
- Other: Minor: forbs
- Trace: cacti Agave family = annual grasses
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All plant functional groups are adapted to survival in all years except during the most severe droughts. Severe winter droughts affect shrubs and trees the most. Severe summer droughts affect grasses the most.
-
14. **Average percent litter cover (%) and depth (in):** Mostly herbaceous litter with some woody litter. Litter amounts increase during the first few years of drought, then decrease in later years.
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 500 to 575 pounds per acre (dry weight) in drought years, 575 to 750 pounds per acre in median years, 750 to 850 pounds per acre in wet years.
-
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: Broom snakeweed, prickly pear cactus (*Opuntia*), cholla cactus (*Cylindropuntia*), turbinella oak, desert ceanothus, wait-a-bit, catclaw acacia, and shrubby buckwheat are all native to the Loamy Upland ecological site, but have the potential to increase and dominate the area after heavy grazing and/or fire exclusion. Juniper (*Juniperus*) and pinyon pine (*Pinus*) species are native to neighboring sites and can invade the site after heavy grazing and/or fire exclusion. Redstem filaree, purslane (*Portulaca*), and spurge (*Euphorbia*) are exotic forbs (some species of *Portulaca* and *Euphorbia* are native) that may invade the site after heavy grazing, soil disturbance, or fire. Red brome is an exotic annual grass that may invade the site after heavy grazing, soil disturbance, or fire.

17. **Perennial plant reproductive capability:** All plants native to the Loamy Upland ecological site are adapted to the climate and are capable of producing seeds, stolons, and rhizomes in more years except during the most severe droughts.
-