USDA Natural Resources
Conservation Service

# Ecological site R035XC342AZ
# Gypsum Hills 10-14" p.z.

Accessed: 05/06/2024

## 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.

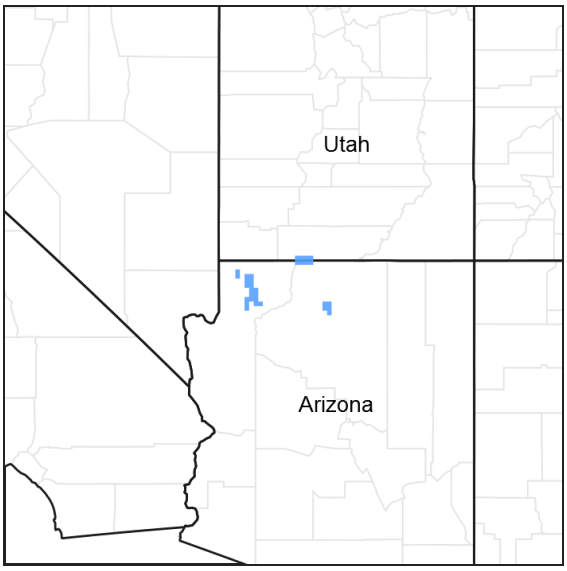



**Figure 1. Mapped extent**

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): 035X–Colorado Plateau

AZ CRA 35.3 – Colorado Plateau Sagebrush – Grasslands

Elevations range from 4500 to 6000 feet and precipitation averages 10 to 14 inches. Vegetation includes Wyoming big sagebrush, Utah juniper, Colorado pinyon - cliffrose, Mormon tea, fourwing saltbush, blackbrush Indian ricegrass, needle and thread, western wheatgrass Galleta, black grama, blue grama, and sand dropseed. The soil temperature regime is mesic and the soil moisture regime is ustic aridic. This unit occurs within the Colorado Plateau Physiographic Province and is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin.

## Associated sites

| | |
|---|---|
| R035XC308AZ | **Limestone/Sandstone Hills 10-14" p.z.** |
| R035XC341AZ | **Gypsum Hills 10-14" p.z. Calcareous** |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | (1) *Juniperus osteosperma*<br>(2) *Pinus edulis* |
| Shrub | (1) *Ephedra nevadensis*<br>(2) *Ephedra viridis* |
| Herbaceous | (1) *Sporobolus nealleyi*<br>(2) *Pleuraphis jamesii* |

## Physiographic features

This desert shrub site occurs in an upland position. It does not benefit from run-on moisture, but excessive run-off can occur because of steep slopes.

Site is located on summits and blackslopes of eroded plateaus, mesas and hills.

Cooler north and east slopes are slightly more productive, expecially the grasses and forbs. At the lower elevation end, this site will more closely resemble D35-4 Gypsum Hills on the warmer south and west aspects.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Plateau<br>(2) Mesa<br>(3) Hill |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 1,463–1,829 m |
| Slope | 15–75% |
| Aspect | N, E |

## Climatic features

Winter summer moisture ratios range from 70:30 to 60:40. Late spring is usually the driest period, and early fall moisture can be sporadic. Summer rains fall from June through September; moisture originates in the Gulf of Mexico and creates convective, usually brief, intense thunderstorms. Cool season moisture from October through May tends to be frontal; it originates in the Pacific and the Gulf of California and falls in widespread storms with longer duration and lower intensity. Precipitation generally comes as snow from December through February. Accumulations above 12 inches are not common but can occur. Snow usually lasts for 3-4 days, but can persist much longer. Summer daytime temperatures are commonly 95 - 100 F and on occasion exceed 105 F. Winter air temperatures can regularly go below 10 F and have been recorded below - 20 F.

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (average) | 168 days |
| Freeze-free period (average) | 193 days |
| Precipitation total (average) | 356 mm |

## Influencing water features

## Soil features

Soil moisture regime is ustic aridic; temperature regime is mesic. Surface textures are loam, sandy loam and crystalline gypsum. Subsoil textures are crystalline gypsum & gypsite. Soils are non-sodic and slightly to moderately

alkaline. pH range is 7.4-8.0. Geologic parent material is old lacustrine deposits with a cap of colluvial deposition. Other geologic influences include plate tectonics that have shaped the landscape and exposed gypsum.
Water erosion hazard is very severe, particularly on slopes. Wind erosion hazard is moderate due to surface texture. Shallow depths and gypsum content make the Plant-soil moisture relationship poor.

Typical taxonomic unit includes:

SSA 623 Shivwits Area MU's 48 & 49 Tanbark;
SSA-701 Grand Canyon Area MU 154 Ustic Torriorthents.

**Table 4. Representative soil features**

| | |
|---|---|
| Parent material | (1) Alluvium–rock gypsum |
| Surface texture | (1) Loam<br>(2) Sandy loam |
| Drainage class | Moderately well drained to well drained |
| Permeability class | Moderately slow to moderate |
| Soil depth | 3–43 cm |
| Surface fragment cover <=3" | 0–5% |
| Surface fragment cover >3" | 0–5% |
| Available water capacity (0-101.6cm) | 0.25–4.32 cm |
| Calcium carbonate equivalent (0-101.6cm) | 1–5% |
| Electrical conductivity (0-101.6cm) | 2–4 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0–5 |
| Soil reaction (1:1 water) (0-101.6cm) | 7.4–8 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–5% |
| Subsurface fragment volume >3" (Depth not specified) | 0–5% |

## Ecological dynamics

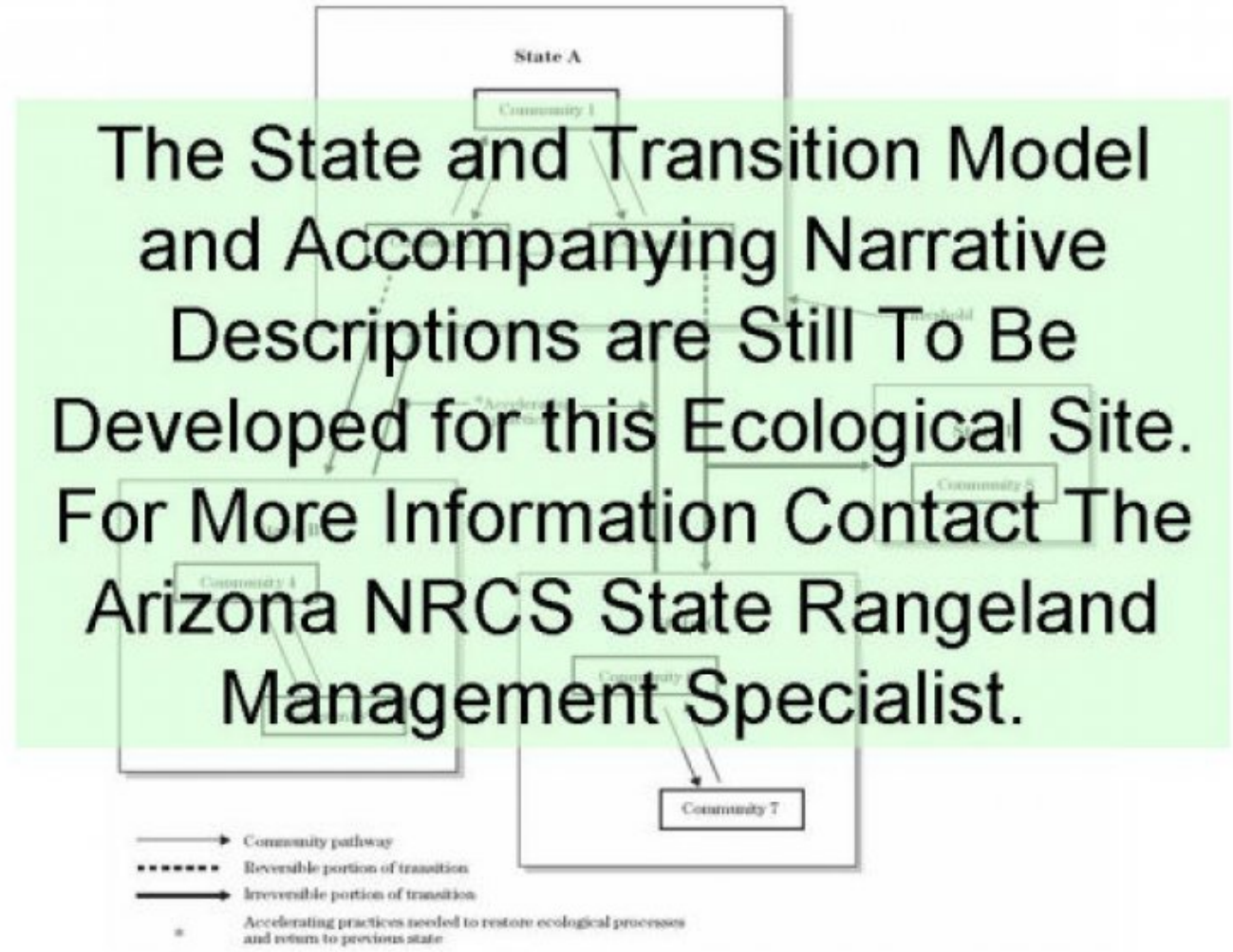
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The Historical Climax Plant Community represents the natural potential plant communities found on relict or 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 each group. Divide the resulting total by the total normal year production shown in the plant community description. If the rainfall has ben 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




The State and Transition Model and Accompanying Narrative Descriptions are Still To Be Developed for this Ecological Site. For More Information Contact The Arizona NRCS State Rangeland Management Specialist.

### State 1
### Historic Climax Plant Community

### Community 1.1
### Historic Climax Plant Community

This site is characterized by widely scattered desert shrubs (Bigelow sagebrush, ephedra, rubber rabbitbrush) and very scattered pockets of perennial grasses (gyp dropseed, galleta, Indian ricegrass) and forbs. Annuals can be a large component if spring moisture is favorable. Shallow soils and high gypsum content prevent significant herbage production-typical perennial plant spacing is 2-3 feet. Cryptogamic crust development can be extensive in the absence of repeated disturbance. This site, because of the wide plant spacing and low production, does not have a history of regular disturbance by fire. It is an undeveloped soil of the Entisol order where erosion, primarily by water, roughly equals soil formation. The established native plant community is relatively stable - however, it will be very slow to re-establish if removed or severely disturbed. A significant increase of cheatgrass brome and broom snakeweed will be likely. The well-developed cryptogam community adds some measure of soil stability and protection against erosion.

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

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---|---|---|
| Shrub/Vine | 207 | 254 | 325 |
| Grass/Grasslike | 28 | 34 | 39 |
| Forb | 10 | 12 | 16 |
| Tree | 3 | 4 | 9 |
| **Total** | **248** | **304** | **389** |

**Table 6. Ground cover**

| | |
|---|---|
| Tree foliar cover | 0-1% |
| Shrub/vine/liana foliar cover | 5-15% |
| Grass/grasslike foliar cover | 0-1% |
| Forb foliar cover | 0% |
| Non-vascular plants | 0% |
| Biological crusts | 0-10% |
| Litter | 10-20% |
| Surface fragments >0.25" and <=3" | 0-5% |
| Surface fragments >3" | 0% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 55-75% |

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

| Height Above Ground (M) | Tree | Shrub/Vine | Grass/ Grasslike | Forb |
|---|---|---|---|---|
| <0.15 | – | – | – | – |
| >0.15 <= 0.3 | – | – | 0-1% | – |
| >0.3 <= 0.6 | – | 2-5% | – | – |
| >0.6 <= 1.4 | – | 5-15% | – | – |
| >1.4 <= 4 | 0-1% | – | – | – |
| >4 <= 12 | – | – | – | – |
| >12 <= 24 | – | – | – | – |
| >24 <= 37 | – | – | – | – |
| >37 | – | – | – | – |

**Figure 5. Plant community growth curve (percent production by month). AZ3503, 35.3 10-14" p.z. galleta. Growth begins in spring, most growth occurs during summer and early fall rainy season. Plants will green up again in the fall..**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 5 | 20 | 15 | 20 | 30 | 10 | 0 | 0 |

**Figure 6. Plant community growth curve (percent production by month). AZ3505, 35.3 10-14" p.z. Indian ricegrass. Growth begins in spring, with semi-dormancy occurring during July through August. Plants will green up again in the fall..**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 10 | 20 | 25 | 20 | 5 | 5 | 10 | 5 | 0 | 0 |

**Figure 7. Plant community growth curve (percent production by month). AZ3531, 35.3 10-14" p.z. all sites. Growth begins in the spring and continues through the summer..**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 3 | 17 | 18 | 10 | 19 | 20 | 10 | 1 | 1 | 0 |

**Figure 8. Plant community growth curve (percent production by month). AZ3533, Nevada mormon tea. Grows mainly in spring and early summer..**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 5 | 25 | 25 | 20 | 15 | 10 | 0 | 0 | 0 | 0 |

**Figure 9. Plant community growth curve (percent production by month). AZ3534, 35.3 10-14" p.z. Bigelow sagebrush. Growth occurs mostly in spring and summer. Seed set occurs in later summer to fall..**

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

**Figure 10. Plant community growth curve (percent production by month). AZ3535, 35.3 10-14" p.z. gyp dropseed. Growth occurs mostly during the summer rainy season..**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 5 | 5 | 30 | 50 | 10 | 0 | 0 | 0 |

## Additional community tables

**Table 8. Community 1.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|---|---|---|---|---|---|
| **Tree** | | | | | |
| 0 | | | | 0–9 | |
| | Utah juniper | JUOS | *Juniperus osteosperma* | 0–9 | – |
| | twoneedle pinyon | PIED | *Pinus edulis* | 0–9 | – |
| **Shrub/Vine** | | | | | |
| 0 | | | | 123–280 | |
| | Bigelow sage | ARBI3 | *Artemisia bigelovii* | 31–62 | – |
| | Nevada jointfir | EPNE | *Ephedra nevadensis* | 31–62 | – |
| | Torrey's jointfir | EPTO | *Ephedra torreyana* | 31–62 | – |
| | mormon tea | EPVI | *Ephedra viridis* | 31–62 | – |
| | buckwheat | ERIOG | *Eriogonum* | 16–46 | – |
| | Fremont's mahonia | MAFR3 | *Mahonia fremontii* | 16–46 | – |
| | rubber rabbitbrush | ERNAG | *Ericameria nauseosa ssp. nauseosa var. glabrata* | 9–28 | – |
| | yellow rabbitbrush | CHVI8 | *Chrysothamnus viscidiflorus* | 7–18 | – |
| | water jacket | LYAN | *Lycium andersonii* | 3–16 | – |
| | broom snakeweed | GUSA2 | *Gutierrezia sarothrae* | 3–16 | – |
| | fourwing saltbush | ATCA2 | *Atriplex canescens* | 2–11 | – |

| | | | | | |
|---|---|---|---|---|---|
| | James' galleta | PLJA | *Pleuraphis jamesii* | 3–9 | – |
| | winterfat | KRLA2 | *Krascheninnikovia lanata* | 1–4 | – |
| 2 | | | | 3–9 | |
| | kingcup cactus | ECTR | *Echinocereus triglochidiatus* | 3–9 | – |
| | plains pricklypear | OPPO | *Opuntia polyacantha* | 3–9 | – |
| | banana yucca | YUBA | *Yucca baccata* | 3–9 | – |
| 3 | | | | 0–7 | |
| | buckwheat | ERIOG | *Eriogonum* | 16–46 | – |
| | Shrub (>.5m) | 2SHRUB | *Shrub (>.5m)* | 0–7 | – |
| | Wyoming big sagebrush | ARTRW8 | *Artemisia tridentata ssp. wyomingensis* | 0–7 | – |
| | blackbrush | CORA | *Coleogyne ramosissima* | 0–7 | – |
| | Eastern Mojave buckwheat | ERFAP | *Eriogonum fasciculatum var. polifolium* | 0–7 | – |
| **Grass/Grasslike** | | | | | |
| 0 | | | | 9–21 | |
| | gyp dropseed | SPNE | *Sporobolus nealleyi* | 9–21 | – |
| | Indian ricegrass | ACHY | *Achnatherum hymenoides* | 7–16 | – |
| | needle and thread | HECOC8 | *Hesperostipa comata ssp. comata* | 7–16 | – |
| | James' galleta | PLJA | *Pleuraphis jamesii* | 3–9 | – |
| | needle and thread | HECOC8 | *Hesperostipa comata ssp. comata* | 3–8 | – |
| | Indian ricegrass | ACHY | *Achnatherum hymenoides* | 3–8 | – |
| | threeawn | ARIST | *Aristida* | 0–3 | – |
| | squirreltail | ELELE | *Elymus elymoides ssp. elymoides* | 0–3 | – |
| 1 | | | | 0–3 | |
| | Grass, annual | 2GA | *Grass, annual* | 0–3 | – |
| | Grass, perennial | 2GP | *Grass, perennial* | 0–3 | – |
| | black grama | BOER4 | *Bouteloua eriopoda* | 0–3 | – |
| | blue grama | BOGR2 | *Bouteloua gracilis* | 0–3 | – |
| | sand dropseed | SPCR | *Sporobolus cryptandrus* | 0–3 | – |
| **Forb** | | | | | |
| 0 | | | | 3–16 | |
| | Forb, annual | 2FA | *Forb, annual* | 0–16 | – |
| | Forb, perennial | 2FP | *Forb, perennial* | 3–16 | – |
| | Brenda's yellow cryptantha | CRFL5 | *Cryptantha flava* | 3–16 | – |
| | desert trumpet | ERIN4 | *Eriogonum inflatum* | 3–16 | – |
| | globemallow | SPHAE | *Sphaeralcea* | 3–16 | – |
| | desert princesplume | STPI | *Stanleya pinnata* | 3–16 | – |

## Animal community

Steep slopes, lack of water and low palatable forage production limit livestock use on this site. It is rearely found as an extensive area of land; more commonly, small areas are intermixed with other ecological sites.

Management should be concentrated on prescribed livestock grazing and restricting off-road vehicle use. This site has limited potential for wildlife species, but is used some by mule deer.

Potential species present include: great horned owl, black-throated sparrow, Western rattlesnake, coyote, western pipistrelle, black-tailed jackrabbit, red-tailed hawk, common raven, collared lizard, fringed myotis, mule deer, white-throated antelope squirrel, golden eagle, gopher snake, leopard lizard, deer mouse and pronghorn antelope. Other species may be present as well, to include migratory birds.

## Recreational uses

Recreation includes hiking, hunting, photography and wildlife observation. This type of site is also attractive to off-road vehicle use and is easily eroded and degraded.

## Other products

T&E species: None observed, however, the Siler pincushion cactus is found on a similar site with a different parent material.

## Other information

Aspect Differences Near MLRA Boundaries:
Cooler north and east slopes are slightly more productive, especially the grasses and forbs. At the lower elevation end, this site will more closely resemble D35-4 Gypsum Hills on the warmer south and west aspects.

## Type locality

| Location 1: Mohave County, AZ | |
|---|---|
| Township/Range/Section | T38N R11W S14 |
| General legal description | Dutchman Draw 7.5 minute quad, about 1 mile west of Mainstreet Valley and 1/2 mile north of Navajo Trail |

## Other references

Sampling Technique EC GC FC PC

NRCS Range 417
NRCS AZ Range-1
NRCS Dry-Weight Rank 3 2

## Contributors

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Unknown

## Rangeland health reference sheet

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

| | |
|---|---|
| Author(s)/participant(s) | |
| Contact for lead author | |
| Date | |

| | |
|---|---|
| Approved by | |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

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

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

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

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

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

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

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

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

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

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

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

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

Sub-dominant:

Other:

Additional:

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

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14. **Average percent litter cover (%) and depth ( in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**

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17. **Perennial plant reproductive capability:**

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