

Ecological site R035XD411AZ

Sandstone Upland

7-11" 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.

MLRA notes

Major Land Resource Area (MLRA): 035X–Colorado Plateau

AZ CRA 35.4 – Colorado Plateau Cold Sagebrush – Grasslands Elevations range from 4200 to 5100 feet and precipitation averages 7 to 11 inches. Vegetation includes winterfat, fourwing saltbush, buckwheat species, needlegrass, bottlebrush squirreltail, Indian ricegrass, black grama, blue grama, sideoats grama, gyp dropseed, and galleta. The soil temperature regime is mesic and the soil moisture regime is typic 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.

Table 1. Dominant plant species

| | |
|------------|---|
| Tree | Not specified |
| Shrub | (1) <i>Atriplex canescens</i> (2) <i>Mahonia trifoliolata</i> |
| Herbaceous | (1) <i>Achnatherum hymenoides</i> (2) <i>Hesperostipa comata</i> |

Physiographic features

This range site occurs in an upland position and does not benefit from run-in moisture. It often suffers from excess runoff because of soil conditions and slope. It typically occurs as broken or undulating sandstone mesas and plateaus, particularly near washes and breaks.

Table 2. Representative physiographic features

| | |
|--------------------|------------------------------------|
| Landforms | (1) Mesa (2) Plateau (3) Fan |
| Flooding frequency | None to rare |
| Ponding frequency | None to rare |

| | |
|-----------|------------------------------------|
| Elevation | 1,160 – 1,620 m |
| Slope | 0 – 30 % |
| Aspect | Aspect is not a significant factor |

Climatic features

Winter-Summer moisture ratios are typically 70:30 on the west side of this LRU and shift to 60:40 on the east side. Late spring is usually the driest period, and early fall moisture can be sporadic. Summer rains fall June-September; moisture originates in the Gulf of Mexico and creates convective, usually brief, intense thunderstorms. Cool season moisture October-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 December-February. Accumulations above 10 inches are not common, but can occur. Snow usually lasts 3-4 days, but can persist much longer. Summer daytime temperatures are commonly 95-100 F and, on occasion, exceed 105F. Winter air temperatures can regularly go below 15 F and have been recorded below -15 F.

Table 3 Representative climatic features

| | |
|-------------------------------|----------|
| Frost-free period (average) | 220 days |
| Freeze-free period (average) | 150 days |
| Precipitation total (average) | 280 mm |

Influencing water features

Soil features

Soils on this site are shallow to moderately deep to any plant-root restricting bedrock. Moderately deep phases are skeletal. These soils occur on highly fractured sandstone and shale. The surface consists of layered broken fragments interspersed with sandy loam to loam pockets. The layered nature of these coarse fragments greatly contributes to runoff. Available water capacity is low. The subsurface consists of skeletal loams. pH range is 7.4-8.6.

Soil taxonomic unit on this site:

SSA629 Coconino County North Kaibab part MU 11 Curob.

Table 4. Representative soil features

| | |
|----------------------|--|
| Parent material | (1) Alluvium – limestone |
| Surface texture | (1) Sandy loam (2) Loam |
| Family particle size | (1) Loamy |
| Drainage class | Well drained to somewhat excessively drained |

| | |
|--|-----------------------------|
| Permeability class | Moderately slow to moderate |
| Soil depth | 10 – 50 cm |
| Surface fragment cover <=3" | 0 – 40 % |
| Available water capacity (0-101.6cm) | 6.35 – 12.7 cm |
| Calcium carbonate equivalent (0-101.6cm) | 20 – 40 % |
| Electrical conductivity (0-101.6cm) | Not specified |
| Sodium adsorption ratio (0-101.6cm) | 0 – 10 |
| Soil reaction (1:1 water) (0-101.6cm) | 7.4 – 8.6 |
| Subsurface fragment volume <=3" (Depth not specified) | 30 – 40 % |

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.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|------------------------|--------------------|--------|--|----------------------|------------------|
| Shrub/Vine | | | | | |
| 0 | | | | 191-252 | |
| | fourwing saltbush | ATCA2 | <i>Atriplex canescens</i> | 95-123 | – |
| | jointfir | EPHED | <i>Ephedra</i> | 90-118 | – |
| | algerita | MATR3 | <i>Mahonia trifoliolata</i> | 17-34 | – |
| 3 | | | | 0-7 | |
| | threeawn | ARIST | <i>Aristida</i> | 3-10 | – |
| | big sagebrush | ARTR2 | <i>Artemisia tridentata</i> | 0-7 | – |
| | Mexican cliffrose | PUME | <i>Purshia mexicana</i> | 0-7 | – |
| 4 | | | | 50-135 | |
| | fourwing saltbush | ATCA2 | <i>Atriplex canescens</i> | 94-126 | – |
| | Bigelow sage | ARBI3 | <i>Artemisia bigelovii</i> | 9-39 | – |
| | bastardsage | ERWR | <i>Eriogonum wrightii</i> | 6-34 | – |
| | broom snakeweed | GUSA2 | <i>Gutierrezia sarothrae</i> | 16-31 | – |
| | slender goldenweed | MAGR10 | <i>Machaeranthera gracilis</i> | 16-31 | – |
| | plains pricklypear | OPPO | <i>Opuntia polyacantha</i> | 7-19 | – |
| Grass/Grasslike | | | | | |
| 0 | | | | 22-90 | |
| | spike dropseed | SPCO4 | <i>Sporobolus contractus</i> | 17-34 | – |
| | wildrye | ELYMU | <i>Elymus</i> | 0-31 | – |
| | threeawn | ARIST | <i>Aristida</i> | 7-19 | – |
| | squirreltail | ELELE | <i>Elymus elymoides ssp. elymoides</i> | 3-17 | – |
| 1 | | | | 123-185 | |
| | Indian ricegrass | ACHY | <i>Achnatherum hymenoides</i> | 66-99 | – |
| | desert needlegrass | ACSP12 | <i>Achnatherum speciosum</i> | 66-99 | – |
| | needle and thread | HECOC8 | <i>Hesperostipa comata ssp. comata</i> | 66-99 | – |
| 2 | | | | 101-168 | |
| | sideoats grama | BOCU | <i>Bouteloua curtipendula</i> | 49-83 | – |
| | black grama | BOER4 | <i>Bouteloua eriopoda</i> | 49-83 | – |
| | blue grama | BOGR2 | <i>Bouteloua gracilis</i> | 49-83 | – |
| | bush muhly | MUPO2 | <i>Muhlenbergia porteri</i> | 49-83 | – |
| | James' galleta | PLJA | <i>Pleuraphis jamesii</i> | 17-33 | – |
| | spike dropseed | SPCO4 | <i>Sporobolus contractus</i> | 17-33 | – |
| | James' galleta | PLJA | <i>Pleuraphis jamesii</i> | 15-29 | – |
| Forb | | | | | |
| 0 | | | | 7-31 | |
| | Forb, annual | 2FA | <i>Forb, annual</i> | 7-31 | – |
| | Forb, perennial | 2FP | <i>Forb, perennial</i> | 7-31 | – |
| | wildrye | ELYMU | <i>Elymus</i> | 0-17 | – |

Animal community

This range site is relatively low in productivity. Rocky soils make mechanical range improvement practices impractical. This site may provide shelter for livestock in cold winter weather. The site has fair to good diversity, but poor plant cover and productivity for wildlife. Permanent open waters are lacking. Breaks and crevices provide additional cover for some species such as the mule deer.

Recreational uses

The site consists of broken and undulating sandstone mesas and plateaus. It has a relatively sparse complex of shrubs and grasses, with interspaces of fractured layers of exposed sandstone. Winters are cold and summers are warm. Spring and fall are typically dry, cool and windy. Hunting, cross country riding and wildlife observation are the occasional recreational activities on the site.

Other products

Sandstone slabs are occasionally quarried on this site.

Other information

Threatened and Endangered Species: Golden eagles and Prairie falcons occasionally use the site for feeding areas.

Type locality

| | |
|---------------------------------|---|
| Location 1: Coconino County, AZ | |
| Township/Range/Section | T37N R4E S15 |
| General legal description | In Coconino County; 19 miles southwest of Marble Canyon; Section 15, T37N, R4E. |

Contributors

Larry D. Ellicott
Steve Barker
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:

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

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

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

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:

17. Perennial plant reproductive capability:
