

Ecological site R035XB225AZ Clay Loam Upland 6-10" p.z. Sodic

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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): 035X–Colorado Plateau

This ecological site occurs in Common Resource Area 35.2 - the Colorado Plateau Shrub – Grasslands

Elevations range from 3800-5800 feet and precipitation averages 6 to 10 inches per year. Vegetation includes shadscale, fourwing saltbush, Mormon tea, blackbrush, Indian ricegrass, galleta, blue grama, and black grama. 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 confertifolia</i> (2) <i>Atriplex obovata</i> |
| Herbaceous | (1) <i>Pleuraphis jamesii</i> (2) <i>Sporobolus airoides</i> |

Physiographic features

This ecological site occurs on nearly level to gently sloping plateaus, structural benches and fans with slopes up to 15 percent. The site does not benefit from run-on moisture. The soils are derived from shale, claystone, and sandstone and are moderately deep to soft bedrock. Soil surface textures range from very fine sandy loam to clay loam.

Table 2. Representative physiographic features

| | |
|--------------------|------------------------------------|
| Landforms | (1) Plateau (2) Mesa (3) Fan |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 3,800–5,800 ft |
| Slope | 0–15% |
| Aspect | Aspect is not a significant factor |

Climatic features

The 35.2 Colorado Plateau Cold Desert Shrub - Grassland common resource area has a very dry and windy climate that is hot in the summer and cold in the winter. The annual precipitation averages between 6 and 10 inches. The soil moisture regime is typical aridic and the soil temperature regime is mesic. A slight majority of the precipitation arrives during the late fall, winter, and early spring. This winter season moisture originates in the Pacific Ocean and arrives as rain, or sometimes snow, during widespread frontal storms of generally low intensity. The majority of the snow (average range of 1 to 17 inches) falls from December through February, but rarely lasts more than a few days. A seasonal drought occurs from late May through early July. Summer rains occur from July through September during brief intense local thunderstorms. The rain is sporadic in intensity and location. The moisture originates from the Gulf of Mexico in the early summer and the Gulf of California in the late summer/early fall. Windy conditions are common year round, but the winds are strongest and most frequent during the spring.

Table 3. Representative climatic features

| | |
|-------------------------------|----------|
| Frost-free period (average) | 181 days |
| Freeze-free period (average) | 207 days |
| Precipitation total (average) | 10 in |

Influencing water features

The soil moisture on this ecological site comes from precipitation. The site does not benefit significantly from run-on moisture. The clay loam surface texture of the soil allows the site to capture snow, gentle winter storms and the light to moderate summer storms if the site has good vegetative cover. Intense summer thunderstorms will produce runoff, reducing the amount of effective rainfall available on this site to produce vegetation.

Soil features

The soils on this site consist of well drained, slowly permeable, sodic soils which are moderately deep to soft bedrock. The soils formed in alluvium, slope alluvium and residuum derived from shale, claystone, and sandstone. Soil surface textures generally very fine sandy loam to clay loam. Subsurface textures are typically loam, clay loam, silty clay, silty clay loam and clay.

Soil survey map unit components correlated to this ecological site include:

SSA-711 Navajo Mountain Area 19-Typic Natrargids;

SSA-715 Fort Defiance Area AZ/NM 96-Whitecone;

SSA 717 Shiprock NM - 504-Tahona.

Table 4. Representative soil features

| | |
|--|--|
| Parent material | (1) Alluvium–shale (2) Slope alluvium–claystone (3) Residuum–sandstone |
| Surface texture | (1) Very gravelly clay (2) Gravelly clay loam (3) Very fine sandy loam |
| Family particle size | (1) Clayey |
| Drainage class | Moderately well drained to well drained |
| Permeability class | Moderately slow to slow |
| Soil depth | 20–60 in |
| Surface fragment cover ≤3" | 5–50% |
| Surface fragment cover >3" | 0–5% |
| Available water capacity (0–40in) | 1–3 in |
| Calcium carbonate equivalent (0–40in) | 3–10% |
| Electrical conductivity (0–40in) | 0–16 mmhos/cm |
| Sodium adsorption ratio (0–40in) | 0–30 |
| Soil reaction (1:1 water) (0–40in) | 7.2–9 |

Ecological dynamics

An ecological site is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Spatial boundaries of the communities; however, can be recognized by characteristic patterns of species composition, association, and community structure. The historic climax plant community for this ecological site has been described by sampling relict or relatively undisturbed sites and/or reviewing historic records. The historic climax plant community is the plant community that evolved over time with the soil forming process and long term changes in climatic conditions of the area. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site.

Natural disturbances, such as drought, fire, grazing of native fauna, and insects, are inherent in the development and maintenance of these plant communities. The effects of these disturbances are part of the range of characteristics of the ecological site. Fluctuations in plant community structure and function caused by the effects of natural disturbances help establish the boundaries and characteristics of an ecological site. They are accounted for as part of the range of characteristics of the ecological site. Recognizable plant community phases are identified in the reference state of the ecological site. Some sites may have a small range of variation, while others have a large range. Some plant community phases may exist for long periods of time, while others may only occur for a couple of years after a disturbance.

Deterioration of the plant community, hydrology, or soil site stability on an ecological site can result in crossing a threshold or potentially irreversible boundary to another state, or equilibrium. This can occur as a result of the loss of soil surface through erosion, the loss of the stability of the site due to disturbances that cause active erosion on the site, increases in the amounts and/or patterns or runoff from rainstorms, changes in availability of surface and

subsurface water, significant changes in plant structural and functional types, or the introduction of non-native species. When these thresholds are crossed, the potential of the ecological site to return to the historic climax plant community can be lost, or restoration will require significant inputs. There may be multiple states possible for an ecological site, determined by the type and or severity of disturbance.

The known states and transition pathways for this ecological site are described in the state and transition model. Within each state, there may be one or more known plant community phases. These community phases describe the different plant community that can be recognized and mapped across this ecological site. The state and transition model is intended to help land users recognize the current plant community on the ecological site, and the management options for improving the plant community to the desired plant community.

Plant production information in this site description is standardized to the annual production on an air-dry weight basis in near normal rainfall years.

State and transition model

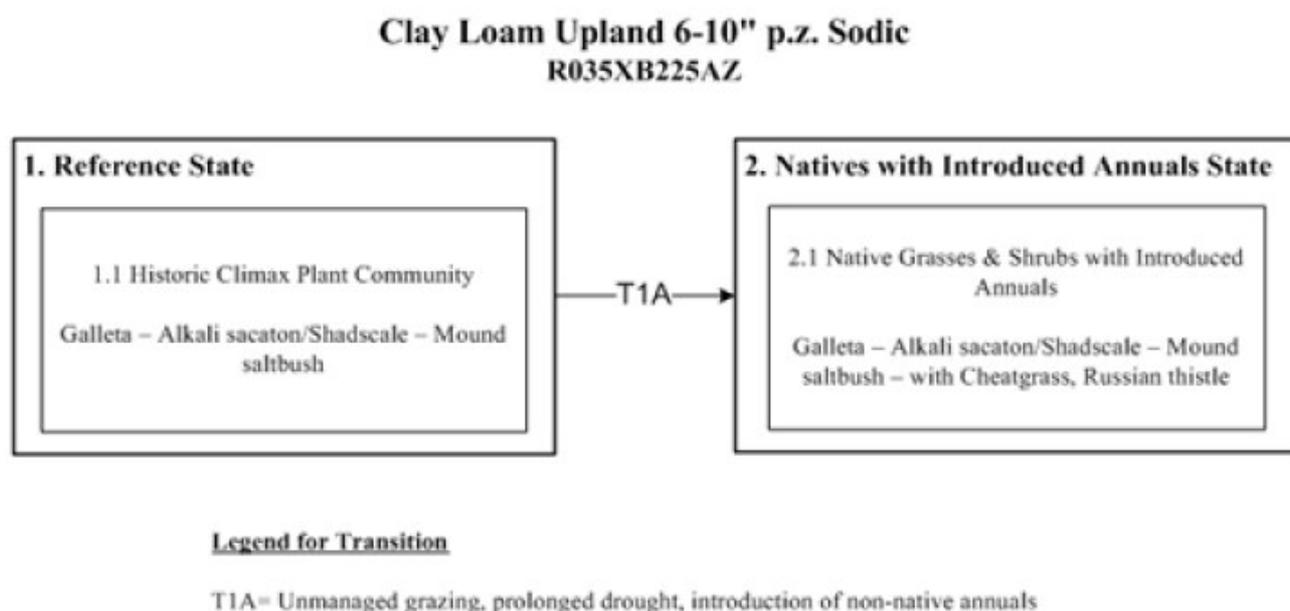


Figure 4. STM - R035XB225AZ

State 1 Reference State

This plant community is a perennial grassland with a moderate amount of low shrubs and a small percentage of forbs. Natural climatic variation can result in changes in the amount of and ratio of both individual plants. Dominate plants are galleta, alkali sacaton, shadscale and mound saltbush.

Community 1.1 Historic Climax Plant Community



Figure 5. Clay Loam Upland, Sodic (High Elevation Site)

This site has a plant community made up primarily of mid and short grasses with a small percentage of forbs and low growing shrubs. In the original plant community there is a predominance of warm season grasses with shrubs, half shrubs, and cool season grasses. Plant species most likely to invade or increase on this site when it deteriorates are mound saltbush, shadscale, broom snakeweed, Greene's rabbitbrush, and annuals.

Table 5. Annual production by plant type

| Plant Type | Low (Lb/Acre) | Representative Value (Lb/Acre) | High (Lb/Acre) |
|-----------------|---------------|--------------------------------|----------------|
| Grass/Grasslike | 95 | 190 | 285 |
| Shrub/Vine | 50 | 100 | 150 |
| Forb | 5 | 10 | 15 |
| Total | 150 | 300 | 450 |

Table 6. Ground cover

| | |
|-----------------------------------|--------|
| Tree foliar cover | 0% |
| Shrub/vine/liana foliar cover | 3-12% |
| Grass/grasslike foliar cover | 5-16% |
| Forb foliar cover | 0-2% |
| Non-vascular plants | 0% |
| Biological crusts | 0% |
| Litter | 5-15% |
| Surface fragments >0.25" and <=3" | 5-50% |
| Surface fragments >3" | 0-5% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 30-70% |

Figure 7. Plant community growth curve (percent production by month). AZ3509, 35.3 10-14" p.z. shadscale saltbush. Growth begins in spring and extends through the summer. Seed set occurs in summer to early fall..

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

Figure 8. Plant community growth curve (percent production by month). AZ3521, 35.2 6-10" p.z. all sites. Growth begins in the spring and continues through the summer. Most growth in this CRA occurs in the spring using

stored winter moisture..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 9 | 20 | 27 | 14 | 10 | 11 | 5 | 3 | 0 | 0 |

Figure 9. Plant community growth curve (percent production by month). AZ5201, 35.2 6-10" p.z. galleta. Growth begins in spring, most growth occurs during summer rains..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 5 | 10 | 20 | 10 | 15 | 35 | 5 | 0 | 0 | 0 |

Figure 10. Plant community growth curve (percent production by month). AZ5203, 35.2 6-10" p.z. alkali sacaton. Growth begins in the spring, most growth occurs in the summer, goes dormant in the fall..

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

Figure 11. Plant community growth curve (percent production by month). AZ5210, 35.2 6-10" p.z. mound saltbush. Growth begins in spring and continues through the summer. Seed stalk extension occurs in late summer with seed set in the fall..

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

State 2

Natives with Introduced Annuals

This site is a grassland - shrubland with increased of native forbs along with the introduction of non-native invasive annuals.

Community 2.1

Native Grasses & Shrubs with Introduced Annuals

This plant community is a grassland with warm season grasses dominate with native shrubs along with the introduction of non-native invasive annuals species. Annuals, including non-natives, can make up to 15% of the total plant community composition. The amount of bare ground has increased on this site and sodic slickspots are present.

Transition T1A

State 1 to 2

Unmanaged grazing, prolonged drought, introduction of non-native annuals

Additional community tables

Table 7. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Lb/Acre) | Foliar Cover (%) |
|------------------------|------------------------|--------|--|-----------------------------|------------------|
| Grass/Grasslike | | | | | |
| 1 | Grasses | | | 95–285 | |
| | James' galleta | PLJA | <i>Pleuraphis jamesii</i> | 75–125 | – |
| | alkali sacaton | SPAI | <i>Sporobolus airoides</i> | 25–75 | – |
| | sand dropseed | SPCR | <i>Sporobolus cryptandrus</i> | 10–40 | – |
| | Indian ricegrass | ACHY | <i>Achnatherum hymenoides</i> | 0–15 | – |
| | squirreltail | ELELE | <i>Elymus elymoides ssp. elymoides</i> | 0–15 | – |
| | Grass, annual | 2GA | <i>Grass, annual</i> | 0–10 | – |
| | Grass, perennial | 2GP | <i>Grass, perennial</i> | 0–10 | – |
| | western wheatgrass | PASM | <i>Pascopyrum smithii</i> | 0–5 | – |
| | blue grama | BOGR2 | <i>Bouteloua gracilis</i> | 0–5 | – |
| Forb | | | | | |
| 2 | Forbs | | | 5–15 | |
| | widewing springparsley | CYPU | <i>Cymopterus purpurascens</i> | 2–3 | – |
| | Forb, perennial | 2FP | <i>Forb, perennial</i> | 0–3 | – |
| | funnel lily | ANDRO4 | <i>Androstaphium</i> | 0–3 | – |
| | mariposa lily | CALOC | <i>Calochortus</i> | 0–3 | – |
| | rose heath | CHER2 | <i>Chaetopappa ericoides</i> | 0–2 | – |
| | mealy goosefoot | CHIN2 | <i>Chenopodium incanum</i> | 0–2 | – |
| | western tansymustard | DEPI | <i>Descurainia pinnata</i> | 0–2 | – |
| | globemallow | SPHAE | <i>Sphaeralcea</i> | 0–2 | – |
| | Forb, annual | 2FA | <i>Forb, annual</i> | 0–2 | – |
| Shrub/Vine | | | | | |
| 3 | Shrubs | | | 50–150 | |
| | shadscale saltbush | ATCO | <i>Atriplex confertifolia</i> | 25–75 | – |
| | mound saltbush | ATOB | <i>Atriplex obovata</i> | 5–35 | – |
| | Greene's rabbitbrush | CHGR6 | <i>Chrysothamnus Greenei</i> | 0–10 | – |
| | desert seepweed | SUSU | <i>Suaeda suffrutescens</i> | 0–10 | – |
| | Bigelow sage | ARBI3 | <i>Artemisia bigelovii</i> | 0–10 | – |
| | fourwing saltbush | ATCA2 | <i>Atriplex canescens</i> | 0–10 | – |
| | broom snakeweed | GUSA2 | <i>Gutierrezia sarothrae</i> | 0–5 | – |
| | plains pricklypear | OPPO | <i>Opuntia polyacantha</i> | 0–5 | – |
| | Shrub (>.5m) | 2SHRUB | <i>Shrub (>.5m)</i> | 0–5 | – |

Animal community

This site is suitable for yearlong grazing by either cows and calves or stocker cattle. Prescribed grazing systems can be applied when this site is involved. When deteriorated this site responds rather slowly to good management.

This site offers a fair diversity in the vegetative complex for wildlife. In higher condition classes the site is most suitable to grassland wildlife species. As retrogression occurs the woody species increase and wildlife species utilizing the site may change.

Recreational uses

This site typically occurs on dipslopes of cuestas, summits of structural benches, and footslopes below mesas.

Winters are cold, however, relatively mild spring, fall and summer months are attractive to recreationists.

Activities include hunting, cross-country riding, photography, hiking, and wildlife observation.

Type locality

| | |
|-------------------------------|--|
| Location 1: Apache County, AZ | |
| Township/Range/Section | T41N R30E S25 |
| General legal description | Teec Nos Pos Quad; East 1/2 Section 25, T41N, R30E. One mile northeast of Teec Nos Pos on the Navajo Indian Reservation, AZ. |

Contributors

Ken Gishi

Larry D. Ellicott

Steve Barker

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) | Kenneth Gishi |
| Contact for lead author | State Rangeland Management Specialist, NRCS-Arizona State Office, Phoenix, AZ |
| Date | 09/20/2012 |
| Approved by | |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

- 1. Number and extent of rills:** Somewhat common, especially on steeper slopes. Rills less than 10 feet long due to fine-textured soils and scattered perennial plant cover. Sites armored with coarse fragments (pebbles, gravels and cobbles) will have shorter rills and less frequent.

- 2. Presence of water flow patterns:** Somewhat common throughout site. Water flow patterns may be long but should not be connected. On sites armored with coarse fragments will have less evidence of flow patterns, but still common. Water flow patterns will show some signs of deposition.

- 3. Number and height of erosional pedestals or terracettes:** Some long-lived plants may show some slight pedestals of less than a 1/2" on slopes and edges of flow paths. Terracettes are common, especially on slopes.

-
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Expected bare ground range 30-70 depending on amount of surface fragments.
-
5. **Number of gullies and erosion associated with gullies:** None to very few. When site is well vegetated and covered with rock fragments gullies are stable and will only show minor signs of active erosion.
-
6. **Extent of wind scoured, blowouts and/or depositional areas:** None.
-
7. **Amount of litter movement (describe size and distance expected to travel):** Litter movement or redistribution by water is common and expected in water flow patterns. Some litter removal in water flow patterns is expected.
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** The expected average soil stability is 3. Surface fragments, litter, and vegetation cover aid in reducing erosion.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface horizon is 1 to 3 inches deep. Structure is mostly weak-moderate, thin-thick platy or moderate fine prismatic. Color can vary depending on parent material. See specific soil survey for additional site information.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is characterized by a relatively even distribution of perennial grasses with scattered low shrubs and is well distributed across the site and lends to slowing runoff and allowing for some infiltration.
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. This site has a sodium-affected layer (Btn) between 2 and 5 inches; this layer may have a prismatic or blocky structure and could be mistaken for a compaction layer as it is somewhat difficult to excavate. This salt-affected layer may be exposed in areas where the surface horizon has been scoured or eroded from the soil surface.
-
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: Warm season grasses >
- Sub-dominant: Low shrubs > Cool season grasses > Large shrubs
- Other: Forbs > cacti
- 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 but the most severe droughts. Severe winter droughts affect the shrubs the most. Severe summer droughts affect grasses the most.
-

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):** The expected annual total production in an average year is 250 – 350 lbs/ac.
-

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:** Mound saltbush, shadscale, snakeweed and rabbitbrush are native to the site but may have the potential to increase with continued disturbance. Cheatgrass, annual wheatgrass, and Russian thistle are non-native annuals that have the potential to invade the site with or without disturbance.
-

17. **Perennial plant reproductive capability:** All plants native to the site are adapted to the climate and are capable of producing seeds, stolons, and/or rhizomes during the most severe droughts.
-