USDA Natural Resources
Conservation Service

# Ecological site R035XB202AZ
# Clayey Wash 6-10" p.z.

Last updated: 5/20/2025
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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.

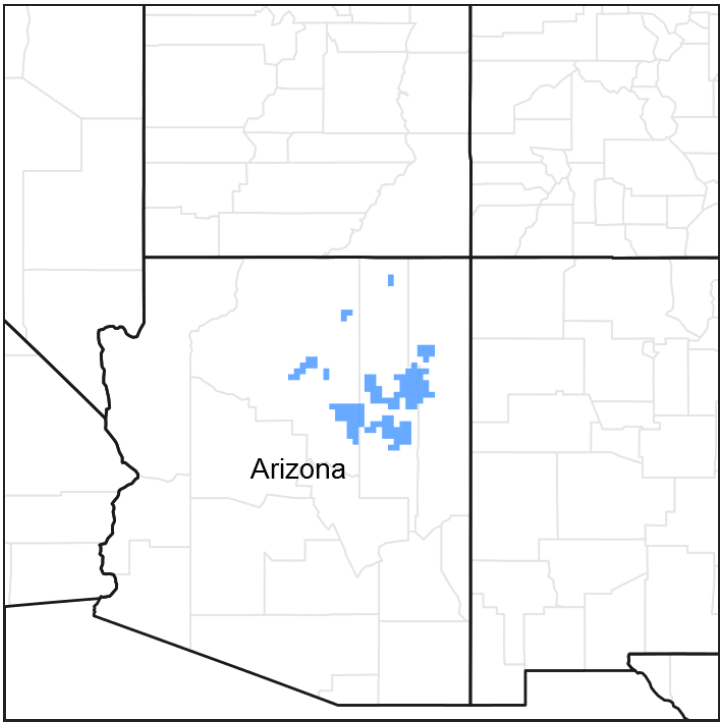


**Figure 1. Mapped extent**

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.

## Ecological site concept

Soils grouped on this site are deep and well drained. The surface horizons have textures ranging from clay loam to vertic clays. This ecological site occurs in a bottom position with gentle slopes ranging from 0 to 5 percent. It benefits significantly from run-in moisture.

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Atriplex canescens* |
| Herbaceous | (1) *Sporobolus airoides*<br>(2) *Bouteloua gracilis* |

## Physiographic features

This site occurs in a bottom position with gentle slopes ranging from 0-5%. It benefits significantly from run-in moisture.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Wash<br>(2) Alluvial fan<br>(3) Flood plain |
| Flooding duration | Brief (2 to 7 days) |
| Flooding frequency | Occasional |
| Elevation | 1,158–1,768 m |
| Slope | 0–5% |
| Aspect | Aspect is not a significant factor |

## Climatic features

About 50% of annual precipitation is received as rain from July to September. With the least amount from May and June. Most of the moisture that comes from November to

February is in the form of snow. Strong winds are common during the winter and spring.

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (average) | 181 days |
| Freeze-free period (average) | 207 days |
| Precipitation total (average) | 254 mm |

## Influencing water features

This ecological site is located in the low areas along the drainages where runoff water flows following rainfall events. The soil moisture on this site is from both rainfall, and run-on moisture from the watershed above it. This additional water makes this site much more productive than the adjacent uplands that only receive moisture from rainfall.

## Soil features

Soils in this site are deep and well drained. The surface horizons have textures ranging from clay loam to vertic clays. The subsurface textures are clay, silty clay, clay loam, or silty clay loam and contain very little gravel.

Typical taxonomic units include:
Coconino County Central Part (AZ631) Soil Map Units- 26-Navajo Clay; 51-Tours Silty Clay Loam; 52-Tours.
Navajo County Central Part (AZ633) Soil Map Unit- 67-Tours.
Little Colorado River Area (AZ707) Soil Map Unit- 61-Tours.
Navajo Mountain(AZ711) Soil Map Units- 7-Berryhill family; 47-Sanfeco.
Fort Defiance Area (NM - AZ)(AZ715) Soil Map Units- 133-Wepo, 134-Wepo.
Shiprock Area (NM-AZ) (AZ717)Soil Map Unit- 527-Outpost.

**Table 4. Representative soil features**

| | |
|---|---|
| Surface texture | (1) Clay loam<br>(2) Clay |
| Family particle size | (1) Clayey |
| Drainage class | Moderately well drained to well drained |
| Permeability class | Moderately slow to very slow |
| Soil depth | 102–152 cm |
| Surface fragment cover <=3" | 0–5% |
| Available water capacity (0-101.6cm) | 15.24–33.02 cm |

| | |
|---|---|
| Calcium carbonate equivalent (0-101.6cm) | 0–15% |
| Electrical conductivity (0-101.6cm) | 16–30 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0–2 |
| Soil reaction (1:1 water) (0-101.6cm) | 7.4–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–5% |

## 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 data provided in this site description is standardized to the air-dry weight of one year's growth. The plant communities described in this site description are based on near normal rainfall years.

## State and transition model

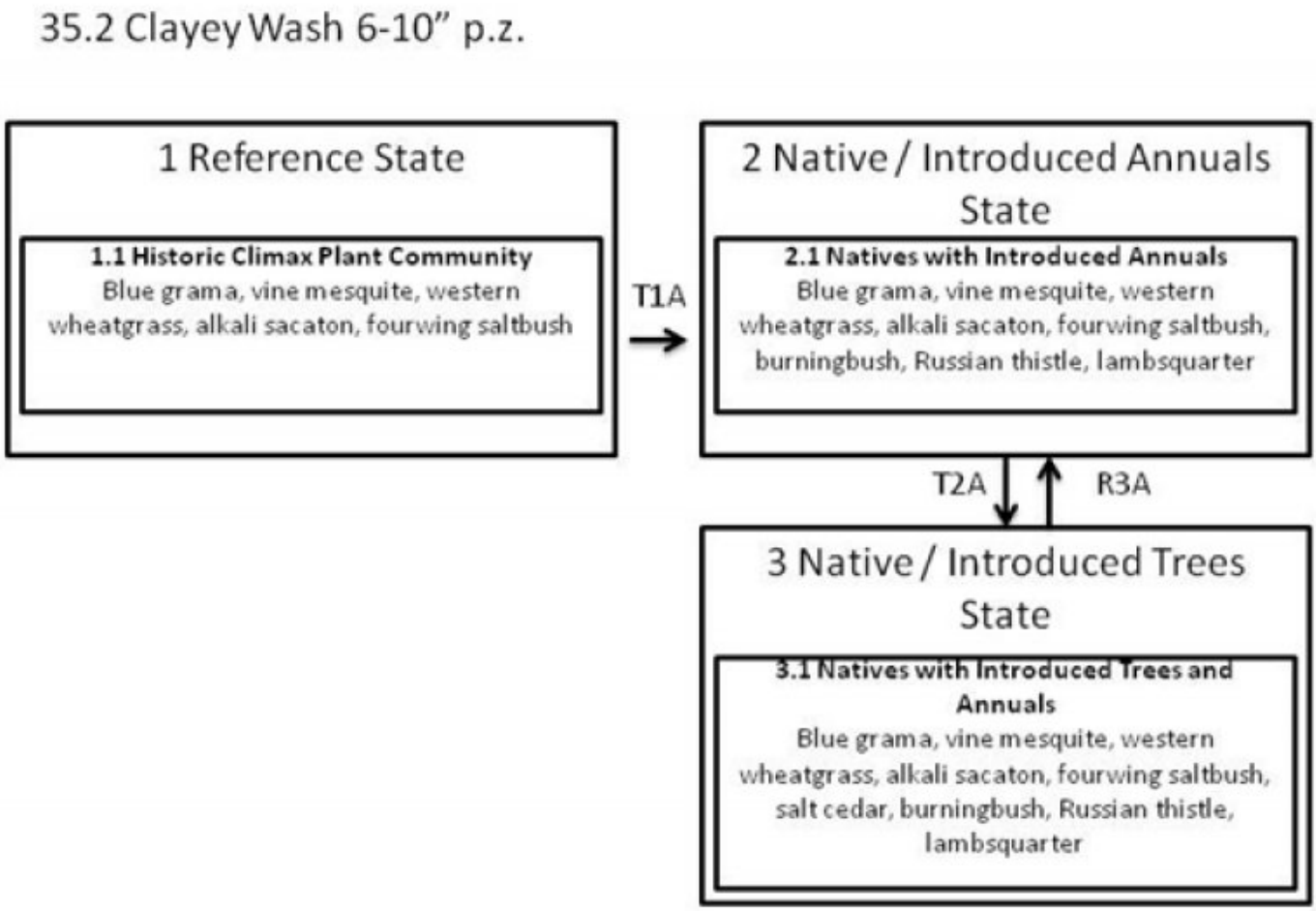


**Figure 4. 35.2 Clayey Wash S&T**

## State 1
## Reference State

This plant community is a perennial grassland with some shrubs and a small percentage of forbs.

## Community 1.1
## Historic Climax Plant Community

This plant community is dominated by warm and cool season perennial grasses with fourwing saltbush and other shrubs and a small percentage of forbs. Plants most likely to increase or invade on this site due to disturbance are rabbitbrush, broom snakeweed, wooly groundsel, annuals and succulents.

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

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---|---|---|
| Grass/Grasslike | 504 | 616 | 785 |
| Shrub/Vine | 280 | 392 | 448 |
| Forb | 28 | 67 | 112 |
| **Total** | **812** | **1075** | **1345** |

**Table 6. Ground cover**

| | |
|---|---|
| Tree foliar cover | 0% |
| Shrub/vine/liana foliar cover | 4-12% |
| Grass/grasslike foliar cover | 6-25% |
| Forb foliar cover | 1-5% |
| Non-vascular plants | 0% |
| Biological crusts | 0% |
| Litter | 10-40% |
| Surface fragments >0.25" and <=3" | 0% |
| Surface fragments >3" | 0% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 10-30% |

**Figure 6. 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 7. 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 8. Plant community growth curve (percent production by month). AZ5211, 35.2 6-10" p.z. fourwing saltbush. Growth begins in spring and**

**continues through the summer. Seed stalk extension occurs in summer with seed set in the fall..**

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

## State 2
## Natives with Introduced Annuals State

This site is a grassland with increased native shrubs along with the introduction of non-native invasive species.

## Community 2.1
## Native/Non-native Grass and Shrubland

This site is a grassland with warm and cool season grasses and increased native shrubs along with the introduction of non-native invasive species. The amount of non-native invasive species does not change the overall function of this site. The amount of bare ground has increased on this site. Trace amounts of tamarisk may be present.

## State 3
## Natives with Introduced Tree State

This site is dominated by an overstory of tamarisk with an understory of primarily annuals and few native shrubs and perennial grasses.

## Community 3.1
## Introduced Tree Community

**Figure 9. 35.3 Clayey Wash Community Phase 3.1**

This site contains an overstory of tamarisk leaving little ground cover. Native shrubs and

grasses are being replaced by non-native annual species, such as Russian thistle, in the understory.

## Transition T1A
## State 1 to 2

Unmanaged grazing/drought/introduction of non-native invasive species.

## Transition T2A
## State 2 to 3

Unmanaged grazing, persistent drought, increase in invasive species.

## Restoration pathway R3A
## State 3 to 2

Managed grazing, woody species control, invasive weed control, range seeding.

## Additional community tables

**Table 7. Community 1.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|---|---|---|---|---|---|
| **Grass/Grasslike** | | | | | |
| 1 | **Dominant Warm Season Grasses** | | | 280–448 | |
| | alkali sacaton | SPAI | *Sporobolus airoides* | 224–336 | – |
| | James' galleta | PLJA | *Pleuraphis jamesii* | 56–168 | – |
| | blue grama | BOGR2 | *Bouteloua gracilis* | 112–168 | – |
| | sideoats grama | BOCU | *Bouteloua curtipendula* | 28–140 | – |
| | vine mesquite | PAOB | *Panicum obtusum* | 56–112 | – |
| 2 | **Cool Season Grasses** | | | 224–280 | |
| | western wheatgrass | PASM | *Pascopyrum smithii* | 168–280 | – |
| | Indian ricegrass | ACHY | *Achnatherum hymenoides* | 28–140 | – |
| | squirreltail | ELELE | *Elymus elymoides ssp. elymoides* | 28–140 | – |
| 3 | **Other Grasses** | | | 84–168 | |
| | threeawn | ARIST | *Aristida* | 6–34 | – |
| | mat muhly | MURI | *Muhlenbergia richardsonis* | 6–34 | – |

| | | | | | |
|---|---|---|---|---|---|
| | ring muhly | MUTO2 | *Muhlenbergia torreyi* | 6–34 | – |
| | burrograss | SCBR2 | *Scleropogon brevifolius* | 6–34 | – |
| | tumblegrass | SCPA | *Schedonnardus paniculatus* | 6–34 | – |
| | spike dropseed | SPCO4 | *Sporobolus contractus* | 6–34 | – |
| | sand dropseed | SPCR | *Sporobolus cryptandrus* | 6–34 | – |
| | Grass, annual | 2GA | *Grass, annual* | 0–22 | – |
| | Grass, perennial | 2GP | *Grass, perennial* | 0–22 | – |
| **Forb** | | | | | |
| 4 | **Forbs** | | | 28–112 | |
| | Forb, perennial | 2FP | *Forb, perennial* | 16–73 | – |
| | Forb, annual | 2FA | *Forb, annual* | 12–67 | – |
| | sideoats grama | BOCU | *Bouteloua curtipendula* | 28–56 | – |
| | burrograss | SCBR2 | *Scleropogon brevifolius* | 11–45 | – |
| | tumblegrass | SCPA | *Schedonnardus paniculatus* | 11–45 | – |
| | threeawn | ARIST | *Aristida* | 6–45 | – |
| | spike dropseed | SPCO4 | *Sporobolus contractus* | 6–34 | – |
| | sand dropseed | SPCR | *Sporobolus cryptandrus* | 6–34 | – |
| | mat muhly | MURI | *Muhlenbergia richardsonis* | 6–34 | – |
| | ring muhly | MUTO2 | *Muhlenbergia torreyi* | 6–34 | – |
| | Grass, perennial | 2GP | *Grass, perennial* | 0–11 | – |
| **Shrub/Vine** | | | | | |
| 5 | **Shrubs** | | | 280–448 | |
| | fourwing saltbush | ATCA2 | *Atriplex canescens* | 280–392 | – |
| | shadscale saltbush | ATCO | *Atriplex confertifolia* | 11–45 | – |
| | winterfat | KRLA2 | *Krascheninnikovia lanata* | 11–45 | – |
| | menodora | MENOD | *Menodora* | 11–45 | – |
| | New Mexico groundsel | PANE7 | *Packera neomexicana* | 6–22 | – |
| | pricklypear | OPUNT | *Opuntia* | 6–11 | – |
| | rabbitbrush | CHRYS9 | *Chrysothamnus* | 6–11 | – |
| | broom | GUSA2 | *Gutierrezia sarothrae* | 6–11 | – |

| | | | | | |
|---|---|---|---|---|---|
| | broom snakeweed | GUSA2 | *Gutierrezia sarothrae* | 0–11 | – |

## Animal community

This site is suitable for grazing during any period of the year by cows and calves, stocker cattle, sheep and horses. Prescribed grazing systems can benefit this site by allowing rest periods for the cool season species.
This site is dominated by grassland wildlife species. However, the site is transitory to almost all species because of the proximity of water.

## Recreational uses

Since this site is located on non-entrenched swales and bottoms it has good aesthetic appeal from being mostly grasslands interspersed with brushy thickets. Winters are cold and springtime is windy, however, mild summers make this site attractive for horseback riding, wildlife observation, and hunting.

## Type locality

| Location 1: Navajo County, AZ | |
|---|---|
| General legal description | Typical example of this site is located on the Turquoise ranch, two miles northwest of Winslow, AZ. |

## Other references

Information and updates collected during 2009-2010 for this ESD was conducted as part of an Interagency Technical Assistance Agreement between the Bureau of Indian Affairs–Navajo Region and the NRCS-Arizona.

## Contributors

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## Approval

Kendra Moseley, 5/20/2025

## 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 State Office - Phoenix, AZ |
| Date | 08/27/2012 |
| Approved by | Kendra Moseley |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

1. **Number and extent of rills:** Few. Any rills present will continually form and reshape periodically due to occasional flooding on the site.

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2. **Presence of water flow patterns:** Some water flow patterns may be present, but are highly variable due to position on landscape and dependant on run-in moisture from uplands. The high shrink/swell characteristics of the soil and occasional flooding (overland flow) will continually reshape the surface.

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3. **Number and height of erosional pedestals or terracettes:** Very few expected, some minor pedestals/terracettes may occur along water flow patterns.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** This site has moderate to high potential to produce herbaceous cover and low amounts of bare ground. Bare ground ranges from 15-35%.

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5. **Number of gullies and erosion associated with gullies:** Uncommon, some gullies may form due to location on floodplains. Any gullies present should be stable with vegetation and

no signs of active erosion.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Some deposition areas (from sediments) may occur due to overland flow and occasional flooding.

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7. **Amount of litter movement (describe size and distance expected to travel):** Most herbaceous and woody litter will be transported throughout the site during intense overland flow/flood events. Only minor amounts of fine litter will be transported by wind.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Expected values of 1-3 in interspaces and 4-6 under the plant canopies. This site is fairly resistance to erosion when well vegetated.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface textures typically range from clay loam to clay with a thickness of 2-14 inches. Typically soil structure is moderately (thin, fine to medium) platy structure. Surface colors range from light reddish brown to reddish brown.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is characterized as a native grassland with scattered large and half shrubs with few forbs. This site is dominated by a mix of bunch and colonizing grasses providing a diverse root structure and vegetation pattern. Perennial grasses reduce raindrop impact and slow run-in moisture (overland flow) to allow for increased infiltration.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. These soils have a naturally platy structure.

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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 > Cool season grasses >

Sub-dominant: Large shrubs > Half shrubs > Forbs > Cacti

Other:

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All plants functional groups are adapted to survival in all but the most severe droughts. Severe winter droughts affect shrubs the most. Severe summer droughts affect grasses the most.

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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):** Average annual production on this site is expected to be 900 to 1100 lbs/ac. in a year of average annual precipitation.

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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:** Tamarisk, cheatgrass, foxtail barley, silverleaf nightshade, Russian thistle, and camelthorn.

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17. **Perennial plant reproductive capability:** All plants native to this site are adapted and are capable of producing seeds, stolons and rhizomes in all but the most severe drought.

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