

# Ecological site group DX035X01GESG21

## Chinle Valley Sandstone Shallow, MAST > 54 degrees F

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### Key Characteristics

- Chinle Valley
- Sandstone or sandy loam
- Shallow
- MAST > 54 degrees F

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.

### Physiography

This ecological group is found on structural benches, mesas, cuevas, summits and gentle side slopes of plateaus, south facing hillslopes and pediments. The slopes mostly range from 1 to 15 percent, with occasional areas as steep as 25 percent. This ecological group occurs in weathered sandstone. Slopes are generally less than 15 percent, but can be higher in spots. Elevations are generally 3700-6000 ft.

### Climate

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. 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.

Large fluctuations in daily temperatures are common. The mean annual air temperature ranges from 40 to 57 degrees Fahrenheit.

Windy conditions are common year round, but the winds are strongest and most frequent during the spring.

### Soil features

Soil associated with this group are very shallow and shallow soils that formed in residuum on hills, sand sheets on structural benches and plateaus. These soils are very shallow to sandstone. The depth is typically 5 to 10 inches deep with occasional small areas of deeper soils. The soil moisture regime is typic aridic and the soil temperature regime is mesic.

### Vegetation dynamics

There is little evidence to indicate that this site historically maintained a short burn frequency. Large gaps between plants (very discontinuous fuels) in relic areas indicate that this site may have historically rarely burned. Until further research indicates that fire played a significant role in the ecosystem processes of this site, this ecological site description will not include fire as a disturbance in the reference state. However, due to modern disturbances such as brush treatments and OHV use, the resilience of the historical vegetation may be at risk. Disturbances that result

in an opportunity for invasive annuals to enter the system, and possibly produce sufficient fuel loads for fire to occur, can cause the site to become at risk. Cheatgrass, red brome, and Russian thistle are most likely to invade this site.

This ecological group has been grazed by domestic livestock since they were first introduced into the area around 1860. It is highly resistant to grazing due to the unpalatable nature of blackbrush and lack of forage plants. The introduction of domestic livestock and the use of fencing and reliable water sources have therefore only minimally influenced the historic disturbance regime associated with this ecological site.

Improper livestock grazing including, season long grazing and/or heavy stocking rates, may cause this site to depart from the reference plant community. As ecological condition deteriorates perennial grasses and jointfir decrease while yellow cryptantha, locoweed, desert trumpet, blackbrush, and snakeweed increase. Improper grazing may also increase the chance of invasion by cheatgrass, red brome and invasive annual forbs. On the Colorado Plateau, however, these species are capable of establishing themselves even in the absence of grazing but rarely increase to a point where they dominate blackbrush communities.

Management practices that maintain or improve rangeland vegetation include prescribed grazing and the proper location of water developments. Severe drought may adversely affect the production of the herbaceous perennial vegetation.

## Major Land Resource Area

MLRA 035X  
Colorado Plateau

## Subclasses

- R035XB226AZ–Sandstone/Shale Upland 6-10" p.z. Warm
- R035XB230AZ–Sandstone Upland 6-10" p.z. Very Shallow, Warm
- R035XB234AZ–Sandstone Upland 6-10" p.z. Warm
- R035XY133UT–Desert Shallow Sandy Loam (Blackbrush)

## Correlated Map Unit Components

22397404, 22397407, 22397453, 22397422, 22397496, 22397413, 22397513, 22397514, 22397417, 22999835, 22999858, 22999869, 22598323, 22598209, 22598213, 22597901, 22598092, 22598382, 22601095, 22601315, 22601321, 22601531, 22600874, 22600899

## Stage

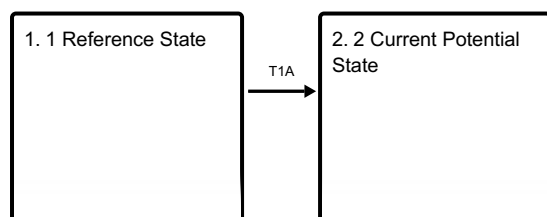
Provisional

## Contributors

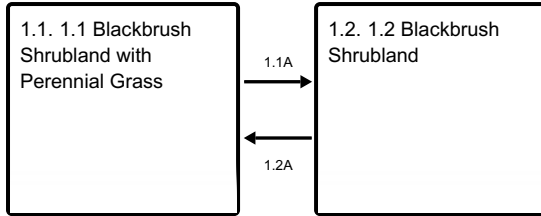
Curtis Talbot

## State and transition model

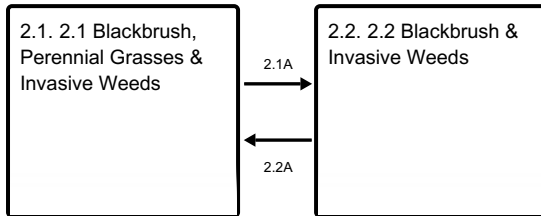
### Ecosystem states



### State 1 submodel, plant communities



### State 2 submodel, plant communities



## State 1 1 Reference State

The reference state represents the plant communities and ecological dynamics of the desert shallow sandy loam, blackbrush site. This state includes the biotic communities that become established on the ecological site if all successional sequences are completed under the natural disturbance regimes. The reference state is generally dominated by blackbrush, however depending on disturbance history, native grasses, forbs, or other shrubs may occupy significant composition in the plant community. Generally, as soil depth increases on these shallow sites, the herbaceous vegetative component of the site increases. The reference state is self sustaining and resistant to change due to high resistance to natural disturbances and high resilience following natural disturbances. Reference State: Plant community resistant to fluctuations in climate. Indicators: A community dominated by blackbrush where native perennial grasses and forbs may or may not be present. Feedbacks: Natural fluctuations in climate that allow for a self sustaining blackbrush and native grass community. Any disturbance that may allow for the establishment of invasive species. At-risk Community Phase: All communities are at risk when native plants are stressed and nutrients become available for invasive plants to establish. Trigger: The establishment of invasive plant species.

### Community 1.1 1.1 Blackbrush Shrubland with Perennial Grass

This community phase is characterized by a blackbrush shrub canopy, where perennial grasses are also be present. Commonly seen grasses include Indian ricegrass, James galleta, needle-and-thread, six weeks fescue, and dropseeds, with many occurring solely in the shrub canopy. As grass cover increases, shrub interspaces are filled. Other perennial grasses, shrubs, and forbs may also be present and cover is variable. Composition by dry weight is approximately 10 percent forbs, 15 percent grasses, and 75 percent shrubs. Bare ground is variable (7-25%) depending on biological crust cover, which is also variable (13-30%) and surface rock fragments (0-44%). Biological crusts can be anywhere between sites dominated by light cyanobacteria in the plant interspaces, with occasional moss and lichen pinnacles under shrub canopies, to a dominance of lichen and moss pinnacles in the plant interspaces, with cyanobacteria in the pinnacle interspaces.

### Community 1.2 1.2 Blackbrush Shrubland

This community phase is characterized by a blackbrush shrub canopy, where perennial grasses are mostly absent. Minor amounts of Indian ricegrass, James galleta, needle-and-thread, six weeks fescue, and dropseeds, may be present often solely located within the shrub canopy. Composition by dry weight is approximately 5 percent forbs, 10 percent grasses, and 85 percent shrubs. Bare ground is variable (7-25%) depending on biological crust cover, which is also variable (13-30%) and surface rock fragments (0-44%). Biological crusts can be anywhere between sites dominated by light cyanobacteria in the plant interspaces, with occasional moss and lichen pinnacles under shrub canopies, to a dominance of lichen and moss pinnacles in the plant interspaces, with cyanobacteria in the pinnacle interspaces.

## **Pathway 1.1A**

### **Community 1.1 to 1.2**

This community pathway occurs when any combination of improper livestock grazing, drought or surface disturbance reduces the amount of herbaceous vegetation on the site.

## **Pathway 1.2A**

### **Community 1.2 to 1.1**

This community pathway occurs when proper livestock grazing, wet weather periods and time allow for the recovery of surface disturbance which increases the amount of perennial herbaceous vegetation on the site.

## **State 2**

### **2 Current Potential State**

The current potential state is similar to the reference state, however invasive species are present in all community phases of the current potential state. This state is generally dominated by blackbrush, however depending on disturbance history, native grasses, forbs, or other shrubs may dominate the site. Primary disturbance mechanisms include climate fluctuations, native herbivore grazing, domestic livestock grazing, and surface disturbances such as road and pipeline development and off road vehicle (OHV) use. Due to lack of disturbed areas, the community responses to such disturbances are not documented, and are not currently included in the state and transition model. The current potential state is still self sustaining; but is losing resistance to change due to lower resistance to disturbances and lower resilience following disturbances, and new drastic disturbances such as fire being more likely to occur in the future. Current Potential State: Plant community is resistant to climate fluctuations. Indicators: A community dominated by blackbrush where native perennial grasses and forbs may or may not be present. Invasive grasses and forbs are present. Feedbacks: Natural fluctuations in climate that allow for a self sustaining blackbrush and grass community. Continuous, season-long grazing may result in a decrease of the perennial grasses.

## **Community 2.1**

### **2.1 Blackbrush, Perennial Grasses & Invasive Weeds**

This community phase is characterized by a blackbrush shrub canopy, where perennial grasses are also present. Invasive plants, primarily Cheatgrass, Red brome and Russian thistle are present. Commonly seen grasses include Indian ricegrass, galleta, needle-and-thread, six weeks fescue, purple threeawn, and cheatgrass. Other grasses, shrubs, and forbs may or may not be present and cover is variable. Bare ground, rock fragments, and biological crust cover are very similar to community phase 1.1 in their variability and responses to each other.

## **Community 2.2**

### **2.2 Blackbrush & Invasive Weeds**

This community phase is characterized by a blackbrush shrub canopy, where perennial grasses are mostly absent. Minor amounts of Indian ricegrass, James galleta, needle-and-thread, six weeks fescue, and dropseeds, may be present often solely located within the shrub canopy. Invasive plants, primarily Cheatgrass, Red brome and Russian thistle are present. Composition by dry weight is approximately 5 percent forbs, 10 percent grasses, and 85 percent shrubs. Bare ground is variable (7-25%) depending on biological crust cover, which is also variable (13-30%) and surface rock fragments (0-44%). Biological crusts can be anywhere between sites dominated by light cyanobacteria in the plant interspaces, with occasional moss and lichen pinnacles under shrub canopies, to a dominance of lichen and moss pinnacles in the plant interspaces, with cyanobacteria in the pinnacle interspaces.

## **Pathway 2.1A**

### **Community 2.1 to 2.2**

This community pathway occurs when any combination of improper livestock grazing, drought or surface disturbance reduces the amount of perennial herbaceous vegetation on the site which allows for an increase of invasive weeds.

## **Pathway 2.2A**

### **Community 2.2 to 2.1**

This community pathway occurs when any combination of improper livestock grazing, drought or surface disturbance reduces the amount of perennial herbaceous vegetation on the site which allows for an increase of invasive weeds.

## **Transition T1A**

### **State 1 to 2**

This transition is from the native perennial warm and cool season grass understory in the reference state to a state that contains invasive species. Events include improper livestock grazing which reduces perennial grasses, prolonged drought, and surface disturbances, etc., where a seed source for invasive weed species is present. Invasive species such as cheatgrass, red brome, and Russian thistle, however, have been known to invade intact perennial plant communities with little to no disturbances. Once invasive plants are found in the plant community, a threshold has been crossed.

## **Citations**