

Ecological site group DX035X01BESG12

Circle Cliffs - Sandy Grasslands and Shrublands - low elevation

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Key Characteristics

- Circle Cliffs
- Sandy Grasslands and Shrublands
- Low elevation, 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

The ecological sites in this group typically occur on dunes and sand sheets on structural benches, cuerdas, hillslopes, mesas, fan piedmonts, and plateaus. Slopes typically range from 1 to 12 percent but may be as high as 30 percent. Run off is low and can be influenced by site micro-topography. Elevations range from 3,800 to 7,300 feet.

Climate

The climate is characterized by hot summers and cool winters which can be slightly modified by local topographic conditions, such as aspect. Average annual precipitation is 5 to 13 inches. Approximately 75 percent occurs as rain from March through October. On the average, February, May, and June are the driest months and April, August, September, and October are the wettest months. Precipitation is extremely variable from month to month and from year to year. Much of the summer precipitation occurs as convection thunder storms. Snow packs are generally light and not persistent.

Soil features

Characteristic soils in this site are 20 to 60 inches deep over sandstone and well drained to excessively well drained. They formed in eolian and alluvium deposits derived mainly from sandstone parent materials. Soils generally have high wind and water erosion potential. Coppice mounding is common. Soils are in the sandy or coarse-loamy textural family and often have a calcic horizon occurring at less than 24 inches. The available water supplying capacity is 2 to 4.5 inches in the upper 40 inches of soil. The soil moisture regime is typic aridic or ustic aridic and the soil moisture regime is mesic.

Vegetation dynamics

The dominant visual aspect of the plant communities in this ecological site group is typically a near pure stand of blackbrush. A perennial grass and forb layer is variable in composition and production; the most common herbaceous plants are James' galleta, Indian ricegrass, needle-and-thread, and dropseed species. Biological crust cover is also extremely variable ranging from very light cyanobacteria in the plant interspaces, with occasional moss and lichen pinnacles under shrub canopies, to sites with a dominance of lichen and moss pinnacles in the plant interspaces and cyanobacteria in the pinnacle interspaces.

An important natural disturbance regime consisted of infrequent fires that were likely ignited by both natural causes and Native Americans. When fire starts in this blackbrush community, it can spread easily when the right conditions are present due to the dense, close spaced nature of blackbrush. There are typically few forbs or grasses to provide fine fuels needed to carry fire in these communities, but it is still able to burn during extreme conditions such

as high temperature, high wind velocity, and low relative humidity. Fire is more common in moister years when annual production of grasses or forbs is highest. Blackbrush communities have the highest cover of any desert shrub community, and fires typically result in stand replacement. Blackbrush appears to act as a paleo-endemic species on some sites in this MLRA and may not be able to reestablish itself after significant disturbance. Though historical documentation of fire return intervals is lacking, the historical fire regime is estimated to be from 35-100+ years.

Another natural disturbance mechanism consists of fluctuating weather which can influence soil/water/vegetation relationships.

These ecological sites have been grazed by domestic livestock since they were first introduced into the area (~1860). They are highly resistant to grazing due to the unpalatable nature of blackbrush and lack of a significant grass component. Continuous season long grazing and/or heavy stocking rates may cause perennial grasses and *Mormontea* to decrease while yellow cryptantha, locoweed, desert trumpet, blackbrush, and snakeweed increase. This type of grazing may also increase the chance of invasion by cheatgrass and invasive annual forbs.

Major Land Resource Area

MLRA 035X
Colorado Plateau

Subclasses

- R035XY121UT–Desert Sandy Loam (Blackbrush)
- R035XY210UT–Semidesert Sand (Blackbrush)
- R035XY218UT–Semidesert Sandy Loam (Blackbrush)

Correlated Map Unit Components

22966749, 22966984, 22966905, 22965226, 22965573

Stage

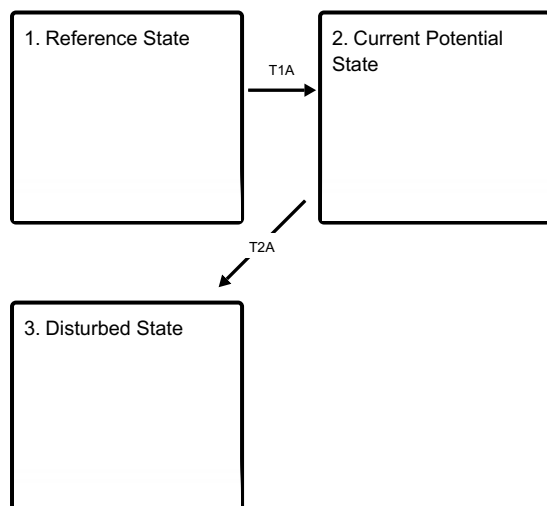
Provisional

Contributors

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State and transition model

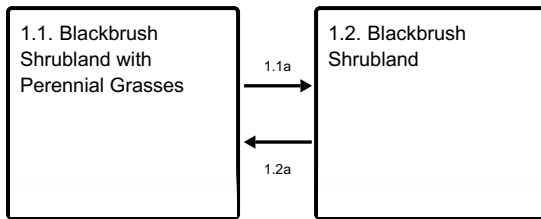
Ecosystem states



T1A - D = Drought E = Establishment of non-native invasive species ILG = Improper livestock grazing SD = Surface disturbances

T2A - D = Drought ILG = Improper livestock grazing SD = Surface disturbances

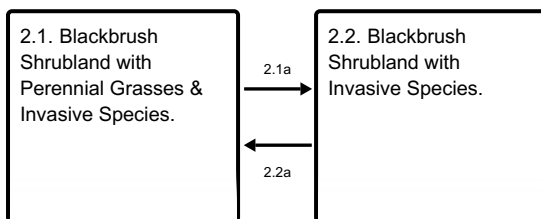
State 1 submodel, plant communities



1.1a - D = Drought ILG = Improper livestock grazing SD = Surface disturbances

1.2a - PLG = Proper livestock grazing T = Time without disturbances W = Wet weather periods

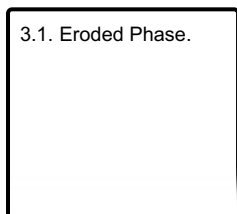
State 2 submodel, plant communities



2.1a - D = Drought ILG = Improper livestock grazing SD = Surface disturbances

2.2a - PLG = Proper livestock grazing T = Time without disturbances W = Wet weather periods

State 3 submodel, plant communities



State 1 Reference State

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. Primary disturbance mechanisms include climate fluctuations and both native and domestic herbivore grazing. Timing of these disturbances dictates the ecological dynamics that occur. The reference state is self sustaining and resistant to change due to high resistance to natural disturbances and high resilience following natural disturbances. Once invasive plants establish, return to the reference state may not be possible.

Characteristics and indicators. A community dominated by blackbrush where native perennial grasses and forbs may or may not be present.

Community 1.1 Blackbrush Shrubland with Perennial Grasses

This community phase is characterized by a blackbrush dominated shrub layer with Cutler's jointfir is also commonly present. Perennial grasses are also be present. Commonly occurring grasses include Indian ricegrass, needle-and-thread, Jamres galleta, six weeks fescue, and several dropseed species. These species are often concentrated near or within 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.

Community 1.2

Blackbrush Shrubland

This community phase is characterized by a shrub canopy dominated by blackbrush and Cutler's jointfir, a few perennial grasses may also be present. Where perennial grasses are present, Indian ricegrass, needle-and-thread, James galleta, six weeks fescue, and dropseed species are most common with many occurring solely in the shrub canopy. There is little herbaceous cover in the shrub interspaces.

Pathway 1.1a

Community 1.1 to 1.2

This community pathway occurs when any combination of season long grazing providing little rest and recovery for preferred grazed plants during critical growing periods coupled with high utilization, drought or surface disturbance reduces the amount of herbaceous vegetation

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

Current Potential State

The current potential state is similar to the reference state, however invasive species are now present. This state is generally dominated by blackbrush. Disturbance mechanisms that may occur include climate fluctuations, native herbivore grazing, domestic livestock grazing, and surface disturbances such as road and pipeline development and off road vehicle (OHV) use. The current potential state is still self sustaining but is losing resistance to change due to a lower resistance to disturbances and lower a resilience following disturbances. New disturbances such as fire are now more likely to occur.

Characteristics and indicators. A community dominated by blackbrush where native perennial grasses and forbs may also be present. Invasive grasses and forbs are present.

Community 2.1

Blackbrush Shrubland with Perennial Grasses & Invasive Species.

This community phase is characterized by a blackbrush dominated shrub layer with Cutler's jointfir is also commonly present. Perennial and invasive grasses are also be present. Commonly occurring native grasses include Indian ricegrass, needle-and-thread, James galleta, six weeks fescue, and several dropseed species. Commonly occurring invasive species include cheatgrass, red brome and Russian thistle. These species are often concentrated near or within the shrub canopy. As both perennial and annual herbaceous cover increases, shrub interspaces are filled. Other perennial grasses, shrubs, and forbs may also be present and cover is variable.

Community 2.2

Blackbrush Shrubland with Invasive Species.

This community phase is characterized by a shrub canopy dominated by blackbrush and Cutler's jointfir, a few perennial grasses may also be present. Where grasses are present, Indian ricegrass, needle-and-thread, James galleta, six weeks fescue, and dropseed species are most common with many occurring solely in the shrub canopy. There is little herbaceous cover in the shrub interspaces. Invasive annuals are now present with cheatgrass, red brome and Russian thistle being the most common. Other perennial grasses, shrubs, and forbs may also be present and cover is variable.

Pathway 2.1a

Community 2.1 to 2.2

This community pathway occurs when any combination Season long grazing providing little rest and recovery for preferred grazed plants during critical growing periods coupled with high utilization, drought or surface disturbance reduces the amount of herbaceous vegetation on the site.

Pathway 2.2a

Community 2.2 to 2.1

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 3

Disturbed State

This phase of the ecological state is characterized as highly disturbed. Blackbrush and other shrubs may or may not be present in the community. Where other shrubs are present, Cutler's and Torrey's jointfir, are common species. Perennial grasses and forbs are mostly missing. Pricklypear cactus, cheatgrass, red brome, and Russian thistle may be present. Utah juniper may be invading this site if a seed source is present. The appearance of many forbs is episodic in nature and is closely tied to precipitation events.

Community 3.1

Eroded Phase.

This community phase is highly variable. Native shrubs and grasses are significantly reduced or missing. Where shrubs are present, some blackbrush and Cutler's jointfir may occur along with invasive species such as pricklypear cactus, broom snakeweed, and rubber rabbitbrush. A few perennial grasses may also be present. Where perennial grasses are present, Indian ricegrass, needle-and-thread, James galleta, six weeks fescue, and dropseed species are most common with many occurring solely in the shrub canopy. Invasive species such as cheatgrass, red brome and Russian thistle may also be present. Cryptogamic crust, where present, may be holding the soil in place.

Transition T1A

State 1 to 2

This transition is from the native perennial grass understory in the reference state to a state that contains invasive species. . Events include season long continuous grazing providing little rest and recovery for perennial grasses during critical growing periods coupled with high utilization, prolonged drought, and surface disturbances, etc. However invasive species such as cheatgrass 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.

Transition T2A

State 2 to 3

This transition is from a mix of native shrubs and grasses along with invasive annual species found in community phase 2.1 to a state that is dominated by pricklypear cactus, broom snakeweed and/or a mix other non-native, invasive species. Events include season long continuous grazing providing little rest and recovery for perennial grasses during critical growing periods coupled with high utilization, prolonged drought, surface disturbances, etc. Once invasive species dominate the plant community a threshold has been crossed.

Citations