

Ecological site group DX035X01BESG07

Circle Cliffs - Saline Hills and Badlands - saline, nongypsic

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Key Characteristics

- Circle Cliffs
- Saline Hills and Badlands
- Soil parent material is dominated by salts other than gypsum

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 site group occurs on hillslopes on mesas and structural benches, knolls and eroding shale hills, pediments, alluvial fans, and lower terraces. Typically, runoff is high to very high. Slopes typically range from 0-30% but may range to 60%. Elevations are generally 3500-6600 ft.

Climate

The climate of this site is characterized by hot summers and cool winters. Average annual precipitation ranges from 5 to 13 inches. About half of the precipitation occurs as convective thunderstorms from July through October. June is typically the driest month during the growing season. Large fluctuations in daily temperature are common, and precipitation varies greatly from month to month and from year to year. Some years are so dry that little plant growth occurs, and some plants remain dormant.

Soil features

The soils are very shallow to very deep but typically are moderately deep and shallower to paralithic shale bedrock. These soils are typically strongly saline and may be sodic. The soil surface layer often looks very raw and bare, with physical crusts as the dominant feature. The soils formed in residuum, colluvium, and alluvium derived dominantly from shale. Soil textures range from silty clay loam to clay. In some areas, influenced by alluvium from mixed sedimentary sources, up to 30 percent rock fragments may be present in the soil profile and on the surface. Soils are well drained with very slow to slow permeability. The available water-holding capacity ranges from 0.7 to 3.5 inches of water in the entire profile, reduced by both restricted depth and salinity. Soil moisture regime is typic aridic or ustic aridic and the soil temperature regime is mesic.

Vegetation dynamics

The ecological sites in this group are characterized by a sparse community of low-growing saltbush species, shadscale in some places, and a variable herbaceous layer of perennial grasses.

Large gaps between plants in relic areas indicate that this site did not historically burn often enough for fire to strongly influence the ecological processes of this site. Drought can affect the vegetative production, particularly of herbaceous plants, but does not appear to alter plant community structure.

Although the ecological sites in this group provide only minimal forage, they are often easily accessible and have been grazed by domestic livestock since the 1860s. The introduction of domestic livestock and the use of fencing and reliable water sources have apparently only minimally influenced the historic disturbance regime associated with this ecological site.

Modern disturbances such as invasive species and OHV use, could lower the resilience of these ecological sites' plant communities by creating an opportunity for invasive annuals to enter into the system. Halogeton and Russian thistle are most likely to invade these sites. At this time, cheatgrass is not readily invading these sites likely due the chemical properties of the soil.

Major Land Resource Area

MLRA 035X
Colorado Plateau

Subclasses

- R035XY103UT–Desert Clay (Castle Valley Saltbush)
- R035XY124UT–Desert Shallow Clay (Mat Saltbush)
- R035XY125UT–Desert Shallow Clay (Shadscale)

Correlated Map Unit Components

22480210, 22966965, 22966723, 22966722, 22966837, 22966838, 22966885, 22966886, 22966839, 22966860

Stage

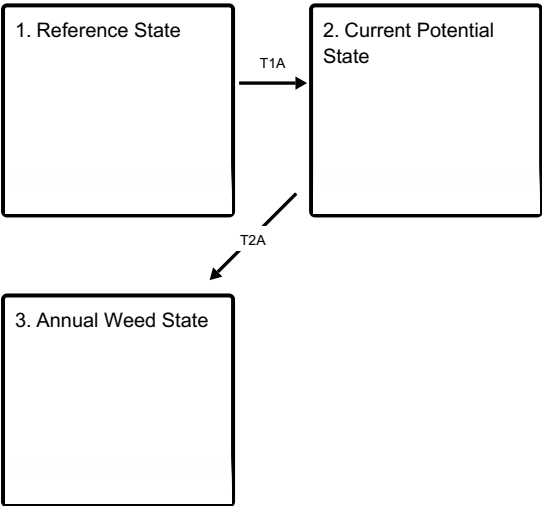
Provisional

Contributors

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State and transition model

Ecosystem states



T1A - D = Drought E = Establishment of non-native invasive species HWB = Heavy wildlife browsing ILG = Improper livestock grazing
T2A - D = Drought F = Fire HWB = Heavy wildlife browsing ILG = Improper livestock grazing SD = Surface disturbances

State 1 submodel, plant communities

1.1. Mat saltbush;
Perennial Grass
Community Phase

State 2 submodel, plant communities

2.1. Mat saltbush/
Invasive Weed Phase

State 3 submodel, plant communities

3.1. Annual Weedy
Herbaceous Phase

State 1 Reference State

This state is typically composed of a shrub layer dominated mat saltbush with lesser amounts of perennial warm and cool grasses present. It is normally self sustaining and stable due to its high resistance to natural disturbances and high resilience following natural disturbances. Once invasive plants become established, return to the reference state may not be possible.

Characteristics and indicators. Reference State: Community phases influenced by native herbivore grazing, insect herbivory, and weather. Indicators: A sparse perennial cool and warm season grass understory with mat saltbush forming the dominant visual aspect.

Resilience management. Feedbacks: Extended drought and/or improper grazing that result in a reduction of native perennial plant vigor which may cause invasive species to become established in the understory, increased bare spaces, erosion, and soil loss. Properly managed grazing that maintains the perennial bunchgrass understory. At-risk Community Phase: All communities in this state are at risk when native plants are stressed and/or nutrients become available for invasive plants to establish. Trigger: Introduction and establishment of non-native invasive plants such as cheatgrass and Russian thistle.

Community 1.1 Mat saltbush; Perennial Grass Community Phase

This community is characterized by a mat saltbush shrub canopy with perennial native grasses present in the herbaceous layer. Commonly occurring grasses include Indian ricegrass and James galleta. As grass cover increases, shrub interspaces are reduced. Other perennial grasses, shrubs, and forbs may or may not be present and cover is variable. Bare ground is variable (40-70%) depending on the number of surface rock fragments which is also variable. Steep hillslopes dissected by rills and gullies.

State 2 Current Potential State

The current potential state is similar to the reference state except that invasive species are now present. It is generally dominated by mat saltbush, native perennial grasses and forbs may also be present. 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. Timing of these disturbances dictates the ecological dynamics that occur. Due to a lack of disturbed locations, the long term effects of such disturbances are not understood.

Characteristics and indicators. Reference State: Community phases disturbed by climate fluctuations. Indicators: A site dominated by mat saltbush. James galleta, Indian ricegrass and sand dropseed may also be present. Non-native species are now present in the stand.

Resilience management. Feedbacks: Extended drought resulting in a reduction of native perennial plant vigor. Normal fluctuations in weather allowing for the maintenance of both shrubs and perennial grasses. At-risk Community Phase: This state is at risk when perennial plant cover is reduced and nutrients become available for invasive plants to flourish. Trigger: Spread of invasive plants to fill available niches.

Community 2.1

Mat saltbush/ Invasive Weed Phase

This community phase is characterized by a mat saltbush shrub canopy, where perennial native grasses are present. Invasive plants are also present. Commonly seen grasses include Indian ricegrass, James galleta, 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.

State 3

Annual Weed State

The Annual Weed State is generally dominated by invasive annual plants such as cheatgrass, halogeton and Russian thistle. Mat saltbush may or may not be present. Annual Weed State: Community phases maintained, in a self-sustaining manner, by invasive annual weed domination and/or occasional fire.

Characteristics and indicators. Indicators: A site where ecological processes are driven by cheatgrass and/or other invasive annual forbs.

Resilience management. Feedbacks: A self sustaining disturbance regime of invasive annual weed domination and/or occasional fire.

Community 3.1

Annual Weedy Herbaceous Phase

This community phase is characterized by a reduction in mat saltbush and other shrubs, and an increase in invasive annuals. Common invasives include Russian thistle, halogeton, and cheatgrass. This state is the result of disturbances that reduce shrub canopy cover. Bare ground, rock fragments, and biological crust cover are very similar to community phase 1.1 in their variability and responses to each other.

Transition T1A

State 1 to 2

This transition is from the reference state where only native perennial warm and cool season grasses occur to a state that also includes invasive species. Events may include combinations of conditions favorable for the establishment of invasive plant species, including season long grazing providing little rest and recovery for preferred grazed plants during critical growing periods coupled with high utilization, heavy wildlife browsing, prolonged drought, and surface disturbances. However, invasive species such as cheatgrass have been known to invade intact perennial plant communities with little to no disturbance. Once invasive species are present in the plant community, a threshold has been crossed.

Transition T2A

State 2 to 3

This transition is from a state dominated by perennial shrubs, grasses and invasive weeds to a state that is dominated by annual invasive species. Events include brush treatments, season long grazing providing little rest and recovery for preferred grazed plants during critical growing periods coupled with high utilization, coupled with prolonged drought, and surface disturbances that remove shrubs including off-road vehicle use, and road and pipeline development. Once brush is removed and invasive plants dominate, a threshold has been crossed.

Citations