

# Ecological site group DX035X01BESG06

## Circle Cliffs - Saline Hills and Badlands - gypsum

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### Key Characteristics

- Circle Cliffs
- Saline Hills and Badlands
- Soil parent material is dominantly gypsiferous

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 sites in this group occur on knolls, pediments, structural benches, alluvial fans, hillslopes and ridges at elevations ranging from 4300-6800 ft. Slopes typically range from 2-50% but can be as high as 60% in highly dissected areas. Runoff is high.

### Climate

The climate is characterized by hot summers and cool winters. Large fluctuations in daily temperatures are common. On average, May and June are the driest months and July through October are the wettest months during the growing season. Precipitation is extremely variable from month to month and from year to year but averages between 5 and 13 inches. Much of the summer precipitation occurs as convection thunderstorms.

### Soil features

The soils of these sites have high amounts of gypsum and range from very shallow to deep. Soil textures range from silt loams to fine sandy loams and are well drained. Rock fragments are not common on the soil surface or in the profile but may range up to 30 percent. Water holding capacity ranges from 1.5 to 3 inches of water in the upper 40 inches of soil but may be higher on deeper soils. Erosion hazard from both water and wind is severe. Runoff is high. Soil moisture regime ranges from typical aridic to ustic aridic and soil temperature regime is mesic.

### Vegetation dynamics

The sites in this group are characterized by sparse vegetation consisting of a shrub overstory and an understory of perennial grasses. The shrub layer is dominated by Torrey's jointfir in most areas, but in more moist areas near Kanab, green Mormon tea is the dominant shrub. James galleta, Indian ricegrass and other perennial grass production is somewhat dependant on weather patterns (summer or winter precipitation). In areas that have not been excessively disturbed these sites support a fairly strong biologic soil crust in the interspaces between plants.

There is no evidence to indicate that these sites historically maintained a short burn frequency. Large gaps between plants (very discontinuous fuels) in relic areas indicate that these sites may have historically very rarely burned.

These ecological sites have been grazed by domestic livestock since they were first introduced into the area (~1860). The introduction of domestic livestock and the use of fencing and reliable water sources have influenced the historic disturbance regime. These ecological sites served as wintering pastures for sheep and cattle producers. Improperly managed livestock grazing (continuous season long grazing, heavy stocking rates, etc.) may cause this site to depart from the reference plant community. Indian ricegrass, needleandthread will decrease while galleta, invasive forbs, annual grasses, rabbitbrush and broom snakeweed will increase.

## Major Land Resource Area

MLRA 035X  
Colorado Plateau

### Subclasses

- R035XY106UT–Desert Gypsum Loam (Torrey's Jointfir)
- R035XY126UT–Desert Shallow Gypsum (Torrey's Jointfir)
- R035XY142UT–Desert Very Shallow Gypsum (Torrey's Jointfir)
- R035XY237UT–Semidesert Shallow Gypsum (Mormontea)

### Correlated Map Unit Components

22966829, 22966986, 22966920, 22966843, 22966842, 22966888, 22966890, 22966952, 22966951, 22966949, 22967013, 22967018, 22967017, 22965717, 22965718, 22965162, 22965451, 22965785

### Stage

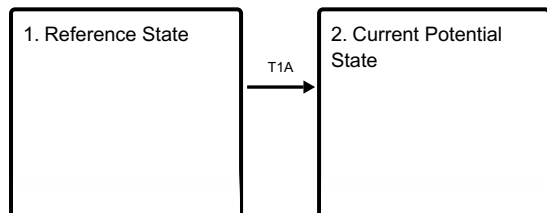
Provisional

### Contributors

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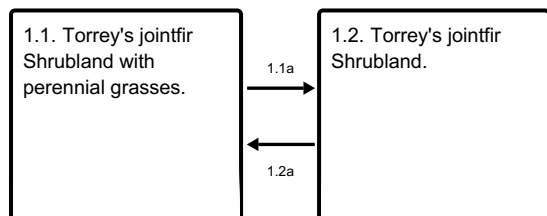
### State and transition model

#### Ecosystem states



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

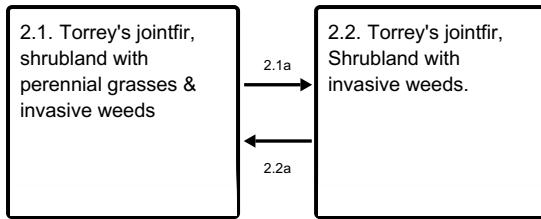
#### State 1 submodel, plant communities



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 1

### Reference State

This state includes the biotic communities that become established on the site if all successional sequences are completed under current climatic conditions; natural disturbances are inherent in its development. This state is dominated by Torrey's jointfir, a mixture of other shrubs, and limited amounts of perennial grasses. The reference state is self sustaining and resistant to change due to high resistance to natural disturbances and high resilience following natural disturbances. Biological soil crusts are highly variable in their expression on this site.

**Characteristics and indicators.** Reference State: Community phases resistant to natural disturbances. Indicators: A site dominated by Torrey's jointfir where James galleta, Indian ricegrass and sand dropseed may also be present.

**Resilience management.** Feedbacks: Natural fluctuations in climate that allows for a self sustaining Torrey's jointfir and a native grass community understory. Any disturbance that may allow for the establishment of invasive species. At-risk Community Phase: All communities are at risk when perennial plants are stressed and nutrients are available for invasive plants to establish. Trigger: Introduction of invasive plants to fill available niches.

### Community 1.1

#### Torrey's jointfir Shrubland with perennial grasses.

The dominant aspect of the plant community is Torrey's jointfir, Blackbrush, and James galleta. Matted crinklemat is the dominant forb. The composition by air-dry weight is approximately 20% perennial grasses, 20% forbs, and 60% shrubs

### Community 1.2

#### Torrey's jointfir Shrubland.

The dominant aspect of the plant community is Torrey's jointfir, blackbrush, with some James galleta. Matted crinklemat is the dominant forb. The average annual production and species composition tables for this community phase are very similar to those tables developed for community phase 1.1 except that production of perennial grasses is lower and production of shrubs is higher.

### Pathway 1.1a

#### Community 1.1 to 1.2

This pathway occurs when climatic events, such as drought disfavor the establishment and persistence of perennial grasses. Season long grazing providing little rest and recovery for preferred grazed plants during critical growing periods coupled with high utilization and/or surface disturbance may accelerate this transition.

### Pathway 1.2a

#### Community 1.2 to 1.1

This pathway occurs when weather events, such as years with normal to above average precipitation favor the establishment and persistence of perennial grasses. Carefully managed livestock grazing, where present can accelerate this transition.

## **State 2**

### **Current Potential State**

The plant communities found on this State are similar to those found State 1 except that invasive species have become established in the herbaceous layer. Species commonly invading this state include cheatgrass, red brome, Russian thistle and possibly halogeton.

**Characteristics and indicators.** Indicators: A site dominated by Torrey's jointfir where James galleta, Indian ricegrass and sand dropseed may also be present. Invasive weeds are present also.

**Resilience management.** Feedbacks: Natural fluctuations in climate that allow for the self-sustainment of Torrey's jointfir and a native grass community. Any disturbance that may allow for an increase in those invasive species presently occupying the state. Trigger: Any activity that allows invasive weeds to become more prominent in the plant communities.

### **Community 2.1**

#### **Torrey's jointfir, shrubland with perennial grasses & invasive weeds**

This plant community is similar to Reference State Community 1.1. except that invasive species are now present. The dominate aspect of this community is composed of Torrey's jointfir with a mixture of other shrubs including blackbrush, shadscale, and crispleaf buckwheat commonly occurring. Cheatgrass and/or red brome are common invasive species. Native perennial grasses are still present and may include but are not limited to, Indian ricegrass, James galleta, and several dropseed species. Other native and invasive forbs may also be present and cover is variable. Bare ground is 0-40% and biological crusts range from 5-60%.

### **Community 2.2**

#### **Torrey's jointfir, Shrubland with invasive weeds.**

This plant community is similar to Reference State Community 1.2 except that invasive species are now present. The dominate aspect of this community is composed of Torrey's jointfir with a mixture of other shrubs including blackbrush, shadscale, and crispleaf buckwheat commonly occurring. Cheatgrass and/or red brome are common invasive species. Native perennial grasses are still present and may include, but are not limited to, Indian ricegrass, James galleta, and several dropseed species. Other native and invasive forbs may also be present and cover is variable.

### **Pathway 2.1a**

#### **Community 2.1 to 2.2**

This pathway occurs when weather events, such as drought disfavor the establishment and persistence of perennial grasses. Season long grazing providing little rest and recovery for preferred grazed plants during critical growing periods coupled with high utilization and/or surface disturbance may accelerate this transition. Annuals such as cheatgrass may be able to take advantage of these conditions during short term wet spells.

### **Pathway 2.2a**

#### **Community 2.2 to 2.1**

This pathway occurs when weather events, such as years with normal to above average precipitation favor the establishment and persistence of perennial grasses. Carefully managed livestock grazing, where present can accelerate this transition. Annual species such as cheatgrass may increase during this period

### **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 season long grazing providing little rest and recovery for preferred grazed plants 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.

**Constraints to recovery.** Once invasive plants are found in the plant community a threshold has been crossed.

## **Citations**