

# Ecological site group DX035X01CESG06

## Mesas and Benches - Saline Uplands and Flats - loam to clay

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### Key Characteristics

- Mesa and Benches
- Saline Uplands and Flats
- Soils are loams to clays

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 alluvial fans, drainageways, valley flats, structural benches, hills, and stream terraces. Runoff is low to very high and the soil is well drained. Slopes are typically 0-60%. Elevations are generally from 4000-6800 ft.

### Climate

The climate is characterized by hot summers and cool to warm winters. Large fluctuations in daily temperatures are common. Mean annual high temperatures range from 51-70 degrees Fahrenheit and mean annual low temperatures range from 46-52 degrees Fahrenheit. Approximately 65–70% of moisture occurs as rain from March through October. On the average, April, May, and June are the driest months and August, September, and October are the wettest months. Precipitation is extremely variable from month to month and from year to year but averages between 6-12 inches. Much of the precipitation occurs as convection thunderstorms.

### Soil features

The soils are shallow to very deep and well drained. The soil temperature and moisture regimes are mesic and typic aridic to ustic aridic respectively. Surface and subsurface textures are generally fine sandy loams, loams, clay loams, and silty clay loams. Rock fragments may occur on alluvial fan and hillslope positions and shale parashaners may occur in soils shallow to soft shale bedrock. Soils are slightly saline to strongly saline and may be sodic. Available water holding capacity is generally low.

### Vegetation dynamics

This site developed under Colorado Plateau ecological conditions and the natural influences of herbivory and climate. This site's plant species composition is generally dominated by James' galleta and shadscale. Torrey's tea, snakeweed, prickly pear and yellow rabbitbrush are common shrubs, and Indian ricegrass blue grama, mesa dropseed, and sand dropseed are common grasses.

There is no evidence that these sites historically burned on a regular basis due to very large and persistent gaps between plants. However, modern disturbances such as recreation and livestock grazing, may result in an opportunity for invasive annuals to enter the system. Cheatgrass, Russian thistle and halogeton have all been documented on these sites, but they are rarely dominant. Sharp and Sanders' photo record indicates that insect herbivory coupled with climate fluctuations appear to drive some shadscale communities (Sharp and Sanders 2002). During periods of drought perennial warm and cool season grasses decrease, while periods of normal and above average precipitation result in an increase in perennial warm and cool season grasses. Shrub cover is generally lower under dry climatic conditions, and annual production decreases during drought.

This ecological site has been grazed by domestic livestock since they were first introduced into the area around 1860. It is highly resistant to winter grazing, which is the common season of use. The introduction of domestic livestock and the use of fencing and reliable water sources have influenced the disturbance regime historically associated with these ecological sites in some areas. Improperly managed livestock grazing (continuous season long grazing, heavy stocking rates, etc.) may cause the sites to depart from the reference plant community. Native perennial grasses will decrease while invasive forbs, annual grasses, rabbitbrush and broom snakeweed will increase. While shadscale, due to its spinescent nature, is resistant to moderate browsing pressures, improper grazing may stress this plant and allow nutrients to become available for invasive species to flourish. Timing of grazing also affects the ecological dynamics—spring grazing results in a decline of cool season grasses, while heavy summer/early fall grazing results in a decline of warm season grasses. Intense grazing of shadscale in the spring and early summer can damage shadscale (USU.edu, 2009). Shadscale is also susceptible to diseases such as root rot, water mold, and vascular wilt fungi (USU.edu, 2009).

Suitability for rangeland seeding is very poor because of low annual precipitation, and low available water capacity.

--References--

USU.edu, 2009. Range Plants of Utah. Available: <http://extension.usu.edu/rangeplants/htm/shadscale>.

## Major Land Resource Area

MLRA 035X  
Colorado Plateau

## Subclasses

- R035XY109UT–Desert Loam (Shadscale)
- R035XY125UT–Desert Shallow Clay (Shadscale)
- R035XY136UT–Desert Stony Loam (Shadscale-Bud Sagebrush)
- R035XY242UT–Semidesert Gravelly Loam (Shadscale)

## Correlated Map Unit Components

22960255, 22960267, 22960244, 22960248, 22934197, 22934208, 22934133, 22592421, 22592535, 22592653, 22592447, 22592553, 22592483, 22592503, 22963384

## Stage

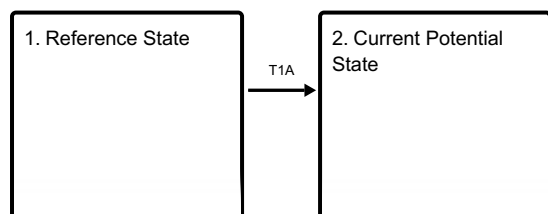
Provisional

## Contributors

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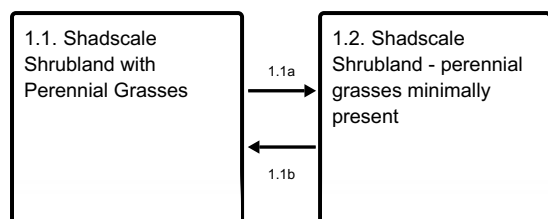
## State and transition model

Ecosystem states



**T1A** - E = Establishment of non-native plant species

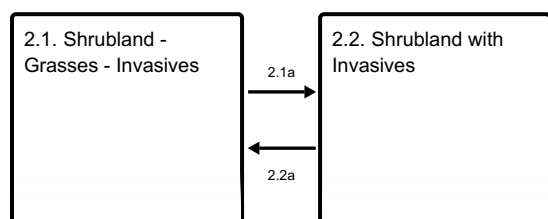
#### State 1 submodel, plant communities



**1.1a** - CLd = Climate, dry I = Insect Herbivory

**1.1b** - CLw = Climate, wet

#### State 2 submodel, plant communities



**2.1a** - CLd = Climate, dry G = Continuous, season-long grazing of perennial grasses I = Insect Herbivory

**2.2a** - CLw = Climate, wet

### State 1 Reference State

Reference State: Community phases disturbed by climate fluctuations and insect herbivory. The ecological sites in this group are dominated by native shrubs, usually shadscale, with perennial grasses, commonly, galleta. Indian ricegrass and sand dropseed.

#### Community 1.1 Shadscale Shrubland with Perennial Grasses

This plant community phase is dominated by shadscale, Torrey mormontea, and perennial grasses. Grasses may include but are not limited to, Indian ricegrass and galleta. Galleta is typically the dominant perennial grass species in this plant community phase. Other perennial grasses may or may not be present. Other perennial shrubs, and forbs may be present and cover is variable.

##### Dominant plant species

- shadscale saltbush (*Atriplex confertifolia*), shrub
- Torrey's jointfir (*Ephedra torreyana*), shrub
- Indian ricegrass (*Achnatherum hymenoides*), grass
- James' galleta (*Pleuraphis jamesii*), grass

#### Community 1.2 Shadscale Shrubland - perennial grasses minimally present

This plant community phase is dominated by shadscale and Torrey mormontea, where warm and cool season perennial grasses are minimally present. Grasses may include but are not limited to, Indian ricegrass and galleta. Galleta is typically the dominant perennial grass species in this plant community phase. Other perennial grasses, shrubs, and forbs may or may not be present and cover is variable.

##### Dominant plant species

- shadscale saltbush (*Atriplex confertifolia*), shrub
- Torrey's jointfir (*Ephedra torreyana*), shrub
- James' galleta (*Pleuraphis jamesii*), grass

### **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.

### **Pathway 1.1b**

#### **Community 1.2 to 1.1**

This pathway occurs when climatic events, such as years with normal to above average precipitation favor the establishment of perennial grasses.

## **State 2**

### **Current Potential State**

This state is similar to state one, however there are invasive species established in the understory—cheatgrass and halogeton being the most common. The primary disturbance mechanism is climate fluctuations; however livestock grazing may influence the ecological dynamics of the site.

### **Community 2.1**

#### **Shrubland - Grasses - Invasives**

This plant community phase is dominated by shadscale, Torrey mormontea, and perennial grasses. Grasses may include but are not limited to, Indian ricegrass and galleta. Galleta is typically the dominant perennial grass species in this plant community phase. Other perennial or invasive grasses, shrubs, and forbs may or may not be present and cover is variable. This plant community is very similar to plant community 1.1 in production and cover. The main difference is that invasive species are present in this phase.

#### **Dominant plant species**

- shadscale saltbush (*Atriplex confertifolia*), shrub
- Torrey's jointfir (*Ephedra torreyana*), shrub
- James' galleta (*Pleuraphis jamesii*), grass
- cheatgrass (*Bromus tectorum*), grass

### **Community 2.2**

#### **Shrubland with Invasives**

This plant community phase is dominated by shadscale and Torrey mormontea, where warm and cool season perennial grasses are minimally present. Grasses may include but are not limited to, Indian ricegrass and galleta. Galleta is typically the dominant perennial grass species in this plant community phase. Other perennial or invasive grasses, shrubs, and forbs may or may not be present and cover is variable. This plant community is very similar to plant community 1.2 in production and cover. The main difference is that invasive species are present in this phase.

#### **Dominant plant species**

- shadscale saltbush (*Atriplex confertifolia*), shrub
- Torrey's jointfir (*Ephedra torreyana*), shrub
- James' galleta (*Pleuraphis jamesii*), grass
- cheatgrass (*Bromus tectorum*), grass

### **Pathway 2.1a**

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

This pathway occurs when events, such as drought or season long grazing providing little rest and recovery for preferred grazed plants during critical growing periods coupled with high utilization of perennial grasses, disfavor the persistence of perennial grasses.

### **Pathway 2.2a**

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

This pathway occurs when events, such as years with normal to above average precipitation favor the establishment of perennial grasses, and when grazing regimes are used that promote the establishment and persistence of perennial grasses.

### **Transition T1A**

#### **State 1 to 2**

This transition occurs as invasive species become established in the plant community. Common invasive species include cheatgrass, halogeton, and Russian thistle. Disturbances that may accelerate this transition include season long grazing providing little rest and recovery for preferred grazed plants during critical growing periods coupled with high utilization and extended drought. Invasive species such as cheatgrass have also been known to invade intact perennial plant community where no disturbance has occurred.

### **Citations**

Sharp, L.A. and K.D. Sander. 2002. 50 Years of Change in a Shadscale Stand in Idaho: A Rangeland photo journal that charts the changes that have occurred in a shadscale stand in southern Idaho between 1951 and 2002..