

Ecological site group DX035X01CESG08

Mesas and Benches - Shallow Shrublands and Woodlands - sandy loams

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Key Characteristics

- Mesa and Benches
- Shallow Shrublands and Woodlands
- Soils are sandy loams

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 site is located on dissected pediments, escarpments, ledges, hillslopes on structural benches, benches, rolling ridges, dissected cuerdas, structural benches, top mesas, south facing hillslopes, and canyons. Runoff is high to very high. Slopes typically range from 1-20%, but in some areas, slopes are as steep as 60%. Elevations are generally 3700-6000 ft, but this site has been found on elevations as high as 7100 ft.

Climate

The climate is characterized by hot summers and cool to warm winters. Large fluctuations in daily temperatures are common. The mean annual air temperature ranges from 40 to 57 degrees Fahrenheit. Approximately 65–70% of precipitation 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. Much of the precipitation occurs as convection thunderstorms.

Soil features

The soils are very shallow to shallow and well drained to somewhat excessively well drained. The soil temperature and moisture regimes are mesic and typic aridic to ustic aridic respectively. Surface and subsurface textures are generally fine gravelly fine sandy loams, loamy fine sands, gravelly very fine sands, and sandy loams. These soils formed in eolian deposits derived mainly from eroded calcareous sandstone parent materials. Soils are calcareous to the surface and have a layer of carbonate accumulation just above the bedrock. Runoff is rapid for slopes over 15%. Site is often associated with rock outcrops. Sites with lower levels of surface rock fragments (generally <20%) often have a well developed biological crust characterized by isolated pinnacles of lichen with little continuity. The average annual soil loss in potential is approximately 0.5-1.5 tons/acre. Available water holding capacity is 0.6 to 3.1 inches.

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 blackbrush. Some shadscale can occur on loamier textured soils. The amount of James galleta and Indian ricegrass present is dependant on weather patterns (summer or winter precipitation) and on soil depth to a caliche or other restrictive layer. The shallower the soil, the fewer herbaceous species. 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.

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 site 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.

Suitability for rangeland seeding is very poor. It is not practical to revegetate large areas of this ecological site because of the shallow soil depth, low annual precipitation, and very low available water capacity. Additionally, the Piute soil has a high hazard of soil blowing because of its sandier textures. To control erosion in areas where the need is critical, small areas can be mechanically treated and seeded. Adapted native plants and forage kochia are suitable for seeding in these areas.

As vegetation communities respond to changes in management or natural influences that move them to a different ecological state, a return to previous states may not be possible without major energy inputs. The amount of energy needed to affect vegetative shifts depends on present biotic and abiotic features and the desired results.

Major Land Resource Area

MLRA 035X
Colorado Plateau

Subclasses

- R035XY133UT–Desert Shallow Sandy Loam (Blackbrush)
- R035XY145UT–Desert Very Shallow Sandy Loam (Blackbrush)
- R035XY233UT–Semidesert Shallow Sandy Loam (Blackbrush)
- R035XY248UT–Semidesert Very Shallow Sandy Loam (Blackbrush)

Correlated Map Unit Components

22933959, 22592309, 22592559, 22592336, 22592579, 22592467, 22592583, 22592470, 22592474, 22592586, 22592595, 22592598, 22592720, 22592395, 22592618, 22592624, 22592403, 22592407, 22592405

Stage

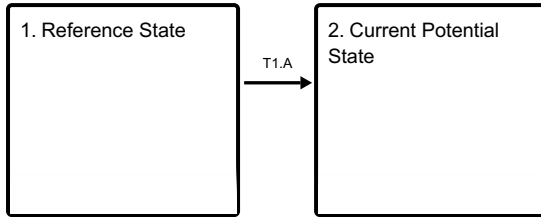
Provisional

Contributors

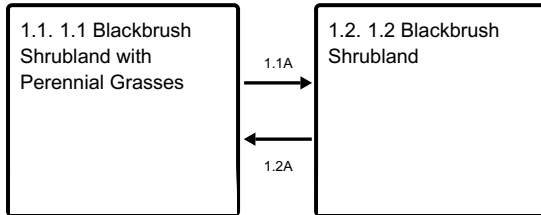
Keith Crossland
Harry Hosler
Vic Parslow

State and transition model

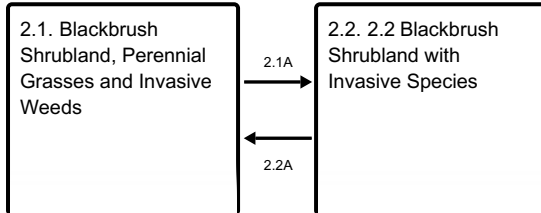
Ecosystem states



State 1 submodel, plant communities



State 2 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.

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

Dominant plant species

- blackbrush (*Coleogyne ramosissima*), shrub
- James' galleta (*Pleuraphis jamesii*), grass
- Indian ricegrass (*Achnatherum hymenoides*), grass

Community 1.1 1.1 Blackbrush Shrubland with Perennial Grasses

This community phase is characterized by a shrub canopy dominated by blackbrush and Torrey's jointfir, perennial grasses are also present. Commonly occurring grasses include Indian ricegrass, James galleta, needle-and-thread, six weeks fescue, and dropseed species. Grasses make up 10 to 20 percent of the annual production.

Dominant plant species

- blackbrush (*Coleogyne ramosissima*), shrub
- James' galleta (*Pleuraphis jamesii*), grass
- Indian ricegrass (*Achnatherum hymenoides*), grass

Community 1.2

1.2 Blackbrush Shrubland

This community phase is characterized by a shrub canopy dominated by blackbrush and Torrey's jointfir, perennial grasses may also be present. Herbaceous vegetation makes up less than 10 percent of the annual production.

Dominant plant species

- blackbrush (*Coleogyne ramosissima*), shrub
- James' galleta (*Pleuraphis jamesii*), grass
- Indian ricegrass (*Achnatherum hymenoides*), grass

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

Current Potential State

The current potential state is similar to the reference state, however invasive species are now present in all community phases of the current potential state. This state is generally dominated by blackbrush and Torrey's jointfir, however, depending on disturbance history, native grasses, forbs, or other shrubs may also commonly occupy the site.

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

Resilience management. Primary disturbance mechanisms include weather 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 can be losing resistance to change due to lower resistance to disturbances and lower resilience following disturbances. Where annual species such as cheatgrass is present, disturbances such as fire are more likely to occur.

Dominant plant species

- blackbrush (*Coleogyne ramosissima*), shrub
- James' galleta (*Pleuraphis jamesii*), grass

Community 2.1

Blackbrush Shrubland, Perennial Grasses and Invasive Weeds

This community phase is characterized by a shrub canopy dominated by blackbrush and Torrey's jointfir, perennial grasses are also present. Commonly occurring grasses include Indian ricegrass, James galleta, needle-and-thread, six weeks fescue, and dropseed species. Non-native and/or invasive species are now present with cheatgrass being most common. Herbaceous species make up 20 to 30 percent of annual production.

Dominant plant species

- blackbrush (*Coleogyne ramosissima*), shrub
- James' galleta (*Pleuraphis jamesii*), grass

Community 2.2

2.2 Blackbrush Shrubland with Invasive Species

This community phase is characterized by a shrub canopy dominated by blackbrush and Torrey's jointfir. Non-native, invasive species are now present on the site and may increase following wet weather periods. There is little perennial herbaceous cover in the shrub interspaces but annuals may be present. Perennial herbaceous species make up less than 10 percent of annual production. Invasive species account for 5 to 25 percent of annual production.

Dominant plant species

- blackbrush (*Coleogyne ramosissima*), shrub
- cheatgrass (*Bromus tectorum*), grass

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. Invasive annual species may increase following short term wet periods.

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. Non-native invasive species may also increase during this time.

Transition T1.A

State 1 to 2

Transition from Reference State (State 1) to Current Potential State (State 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 may include any combination of improper livestock grazing, prolonged drought, and/or surface disturbances. 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.

Citations