

Ecological site group DX035X01CESG10

Mesas and Benches - Sandy Grasslands and Shrublands - sandy

Last updated: 10/12/2022
Accessed: 04/19/2024

Key Characteristics

- Mesa and Benches
- Sandy Grasslands and Shrublands
- Soils are sands

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 dunes, structural benches, plateaus, alluvial fans, mesas, sandsheets, and cuerdas. Vegetated dunes are very common. Depending up on plant community and the presences or absence of disturbance, active dunes can become more prevalent. Runoff potential is very low to low.

Climate

The climate is characterized by hot summers and cool winters, which can be slightly modified by local topographic conditions, such as aspect. Large fluctuations in daily temperature are common. Mean annual high temperatures range from 61-71 degrees Fahrenheit and mean annual low temperatures range from 33-43 degrees Fahrenheit. Approximately 70-75% of moisture occurs as rain from October-March as convection thunderstorms and snow. Precipitation is extremely variable from month to month and from year to year but averages between 6 -12 inches. Snow packs are generally light and not persistent.

Soil features

This groups soils are classified as moderately to very deep torripsamments and are excessively drained. Runoff is low or very low on flatter slopes, however, sites with slopes greater than 20% have a medium runoff potential. These soils have a high wind and water erosion potential and are subject to blowing and drifting even when the sites are in the reference state. The soil temperature and moisture regimes are mesic and ustic aridic respectively. Surface and subsurface textures are generally fine sands, sands, and loamy sands. Soils are nonsaline and the water holding capacity is generally low (2 to 3 inches). Surface and subsurface rock fragments are unusual.

Vegetation dynamics

This ecological site group occurs on moderately deep to very deep, poorly developed soils found on vegetated dunes and sandsheets on structural benches, plateaus, mesas, and cuerdas in Major Land Resource Area (MLRA) 35-The Colorado Plateau. Fourwing saltbush, sand sagebrush, or winterfat typically forms the dominant visual aspect. Small areas within intact communities may be subject to blowing; these areas are sparsely vegetated with dune vegetation including species such as purple sage, resin bush, and sandhill muhly. Utah juniper (0-5% canopy cover) may be found invading these plant communities when the site is in close proximity to a juniper stand.

These sites developed under Colorado Plateau climatic conditions and included natural influences of herbivory, fire, and climate. The natural disturbance regime consisted of fairly infrequent fires ignited by both natural causes and Native Americans. Fires are normally infrequent due to broken topography (i.e., large expanses exposed rock in the landscape), the fact that warm season grasses are usually green during the thunderstorm season, and that few lightning strikes actually occur. It is estimated that the historic fire return interval was 35-100+ years depending on

fine fuel accumulations (Howard, 2003).

This ecological site group has been grazed by domestic livestock since they were first introduced into the area. This livestock introduction, with its the use of fencing and the development of reliable water sources have influenced the disturbance regime historically associated with these ecological sites. Fires would typically only carry after several good moisture years created continuous fine fuels, however, the introduction of domestic livestock reduced these fine fuels, reducing fires periods. In addition to influencing this sites fire regime, improperly managed livestock grazing (i.e., continuous season long grazing, heavy stocking rates, etc.) can cause these sites to depart for the reference plant community. When this occurs, native perennial grasses and shrubs will decrease while invasive forbs and annual grasses will increase. Continued improper domestic livestock grazing will likely remove the native perennial grasses and shrubs from the system and create large bare interspaces, which can increase erosion, active duning, and opportunities for invasive plants to establish.

Other disturbance mechanisms include extended drought, changes in the site's drainage patterns, alluvial deposits, insect herbivory, poorly managed off road vehicle (OHV) use, and prolonged rodent activity. These disturbances can either facilitate the transition into different plant communities or the transition from one stable state to another, depending on severity, duration, and ecological site resilience.

As vegetation communities respond to changes in management or natural influences that move them to different ecological states, 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

- R035XY115UT–Desert Sand (Sand Sagebrush)
- R035XY212UT–Semidesert Sand (Fourwing Saltbush)

Correlated Map Unit Components

22960079, 22856739, 22592418, 22592292, 22592539, 22592678, 22592681, 22592558, 22592332, 22592699, 22592588, 22592488, 22592609, 22592490, 22592385, 22592386, 22592393, 22592398, 22592496, 22592744, 22592506, 22592623, 22592512, 22592634, 22966753, 22966750, 22967027, 22966737, 22966915

Stage

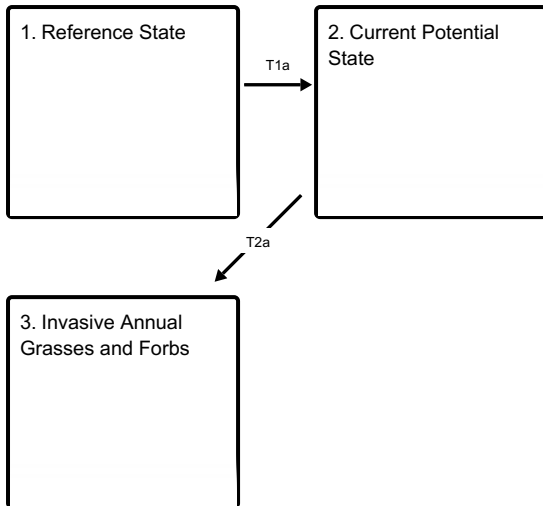
Provisional

Contributors

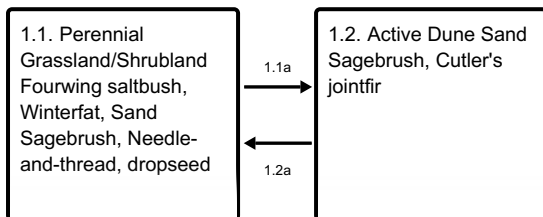
Vic Parslow
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State and transition model

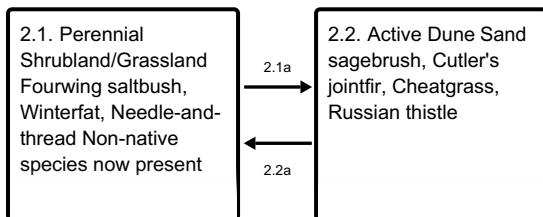
Ecosystem states



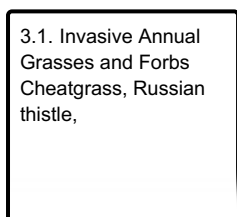
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1 Reference State

Native shrubs and an understory of perennial warm and cool season grasses form the dominant visual aspect.

Characteristics and indicators. The natural disturbance regime consisted of fairly infrequent fires ignited by both natural causes and Native Americans. It is estimated that the historic fire return interval was 35-100+ years depending on fine fuel accumulations (Howard, 2003).

Community 1.1

Perennial Grassland/Shrubland Fourwing saltbush, Winterfat, Sand Sagebrush, Needle-and-thread, dropseed

This plant community is characterized by both native shrubs and perennial warm and cool season grasses. Biological crusts are common (20-30% cover) and characterized by continuous moss and lichen pinnacles. Bare ground (10-20% cover) is minimal.

Community 1.2

Active Dune Sand Sagebrush, Cutler's jointfir

This plant community is characterized by dune vegetation. Sand sagebrush and Cutler's jointfir may dominate the shrub layer. Dominant perennial cool season grasses typically include Indian ricegrass and dominant perennial warm season grasses typically include sandhill muhly. This community is typically represented by small patches where localized surface disturbances have occurred within one of the other reference state plant communities. Bare ground (30-60% cover) is common, and biological crust (0-25%) cover is typically characterized as crustless to light cyanobacteria in the interspaces.

Pathway 1.1a

Community 1.1 to 1.2

This pathway occurs when events favor an increase in active dunes and common dune vegetation. Events could include any type of natural surface disturbance that would increase erosion and soil movement, such as prolonged rodent activity, a severe drought that reduces plant cover, excessive trampling by wildlife, etc.

Pathway 1.2a

Community 1.2 to 1.1

This pathway occurs as natural events such as time without surface disturbances favors the stabilization of the site and increased establishment of native shrubs and perennial warm and cool season grasses.

State 2

Current Potential State

This state is similar to the reference state except that non-native plants are now present in all plant community phases. The primary disturbance mechanisms can be natural or human induced. Events, such as improper livestock grazing, prolonged rodent activity, changes in historic fire regimes, OHV overuse, insect herbivory, or drought may influence this site. A shift in species composition will affect the nutrient cycling, soil-water relationships, hydrology, and soil stability.

Characteristics and indicators. A perennial cool and warm season grass understory with native shrubs forming the dominant visual aspect, when present. Non-native species are now present in all plant communities.

Community 2.1

Perennial Shrubland/Grassland Fourwing saltbush, Winterfat, Needle-and-thread Non-native species now present

This plant community is characterized by both native shrubs and perennial warm and cool season grasses. Biological crusts are variable (5-30% cover) and characterized by cyanobacteria and discontinuous moss and lichen pinnacles. Bare ground (10-40% cover) is variable.

Community 2.2

Active Dune Sand sagebrush, Cutler's jointfir, Cheatgrass, Russian thistle

This plant community is characterized by dune vegetation. Dominant perennial shrubs typically include Cutler's jointfir, sand buckwheat, resinbush, and purple sage. Dominant perennial cool season grasses typically include Indian ricegrass and dominant perennial warm season grasses include sandhill muhly. Commonly seen invasive plant species include cheatgrass, Russian thistle, annual *Cryptantha*, annual stickseed, and tansy mustard. Bare ground (30-60% cover) is common, and biological crust (0-25%) cover is typically characterized as crustless to light cyanobacteria in the interspaces.

Pathway 2.1a

Community 2.1 to 2.2

This pathway occurs when events favor an increase in active dunes and common dune vegetation. Events could

include any type of natural surface disturbance that would increase erosion and soil movement, such as prolonged rodent activity, a severe drought that reduces plant cover, excessive trampling by wildlife or livestock, OHV overuse, etc.

Pathway 2.2a **Community 2.2 to 2.1**

This pathway occurs as natural events such as time without disturbance favors the stabilization of the site and increased establishment of native shrubs and perennial warm and cool season grasses.

State 3 **Invasive Annual Grasses and Forbs**

This state is characterized by a near absence of native perennial vegetation. Broom snakeweed and sand sagebrush may be present to some degree, but the ecological dynamics are driven by cheatgrass and/or Russian thistle.

Community 3.1 **Invasive Annual Grasses and Forbs Cheatgrass, Russian thistle,**

This state is characterized by the dominance of invasive forbs/shrubs. These species may include, but are not limited to Russian thistle, cheatgrass, tansy mustard, broom snakeweed, annual stickseed, or annual Cryptantha. One or more invasive species has increased to a point where they influence or drive the disturbance regime and nutrient cycle. Russian thistle and/or cheatgrass are the most likely of these species to establish and dominate.

Transition T1a **State 1 to 2**

Introduction and establishment of non-native species

Transition T2a **State 2 to 3**

This transition occurs when events favor the increased establishment and dominance of invasive plant species. Events include any type of surface disturbance, such as fire, improper domestic livestock grazing, OHV overuse, and drought. Once invasive species drive the ecological dynamics a threshold has been crossed.

Citations