

Ecological site group DX035X01GESG17

Chinle Valley Loamy Moderately Deep to Very Deep Benches, Mesas, and Terraces

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Key Characteristics

- Chinle Valley
- Loamy
- Upland
- Moderately deep to very deep
- Benches, mesas, terraces

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 group occurs in an upland position as gently rolling plains, fans and terraces on gently undulating high stream terraces and fan remnants, toeslopes and summits of mesas and cuerdas. It occurs on all exposures. Elevations range from 4,800 to 6,300 feet.. Slopes generally range from 0% to 15% with occasional steeper slopes up to 30%. It neither benefits significantly from run-in nor experiences excessive loss of moisture from runoff.

Climate

The area has a very dry and windy climate that is hot in the summer and cold in the winter. Average annual precipitation is from 6 to 10 inches. A slight majority of the precipitation arrives during the late fall, winter, and early spring. This winter season moisture originates in the Pacific Ocean and arrives as rain, or sometimes snow, during widespread frontal storms of generally low intensity. The majority of the snow falls from December through February, but rarely lasts more than a few days. The driest period is from late May to early July. Summer rains occur from July through September during brief intense local thunderstorms. The rain is sporadic in intensity and location.

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.

High-velocity winds are common in late winter and early spring, but can occur in any month.

Cool season plants begin growth in early spring and mature by early summer. Warm season plants take advantage of summer rains and actively grow from July through September.

Soil features

Soils grouped in this site are moderately deep to very deep. Moderately deep and deep soils form at bases and summits of mesas and benches. Deeper soils are formed in alluvium derived from mixtures of sandstone and shale. The surface horizons have textures of very fine sandy loam to sandy clay loam with various amounts of gravel on the surface. The surface layers are about 2 to 8 inches thick. The subsurface horizons have textures ranging from clay to loam with coarse fragments ranging from 0 to 40% by volume. The substratum, which occurs at depths of

15 to 36 or more inches, ranges from clay loam to very gravelly sand and in some soils has a strong accumulation of lime. The soil reaction is neutral to moderately alkaline (pH 6.6 to 8.4). Soluble salt accumulations are low. Available water holding capacity is moderate to high. The hazard of soil blowing is severe. The soil moisture regime is typical aridic or ustic aridic, and the soil temperature regime is mesic.

Vegetation dynamics

This ecological group has a plant community made up primarily of short- and mid-grasses mixed with shrubs and a small percentage of forbs. In the historic climax plant community, there is a mixture of cool- and warm-season grasses.

Plant species most likely to invade or increase on this site when it deteriorates are Russian thistle, annual weeds, galleta, alkali sacaton, Greene's rabbitbrush, and broom snakeweed. When this site is continuously grazed during winter and spring, cool-season grasses and palatable shrubs are replaced by lower value forage plants.

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 group has 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 disturbance regime historically associated with this ecological site. This ecological site 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. 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 (Simonin, 2001). 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).

Major Land Resource Area

MLRA 035X
Colorado Plateau

Subclasses

- DX035X011113—Loamy Upland 10-14" p.z.
- DX035X03B134—Gravelly - Woodland
- R035XB020NM—Loamy 6-10" terrace
- R035XB021NM—Loamy Upland 7-10
- R035XB210AZ—Loamy Upland 6-10" p.z.
- R035XB275AZ—Loamy Fan 6-10" p.z.
- R035XC313AZ—Loamy Upland 10-14" p.z.
- R035XC329AZ—Loamy Upland 10-14" p.z. Gravelly
- R035XY109UT—Desert Loam (Shadscale)

Correlated Map Unit Components

22397516, 22397443, 22397475, 22397460, 22397448, 22397221, 22397298, 22397589, 22397308, 22397620, 22397278, 22397594, 22397301, 22397349, 22856875, 22999487, 23000016, 22999511, 22999523, 22999524, 23000021, 22999575, 22999587, 22999589, 22999594, 22999599, 22999996, 22999605, 22999610, 22999641, 22999650, 22999681, 22999697, 22999706, 22999704, 22999713, 22999716, 22999717, 22999721, 22999719, 22999723, 22999730, 22999732, 22999734, 22999741, 22999743, 22999748, 22999750, 22999753, 22999755,

22999761, 22999763, 22999770, 22999774, 22999772, 22999779, 22999820, 22999899, 22999942, 22598352, 22598227, 22601092, 22601135

Stage

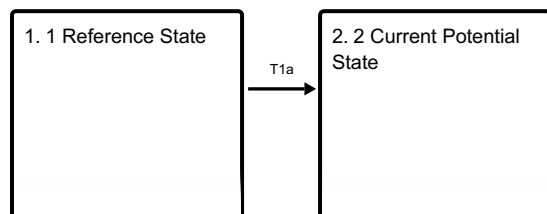
Provisional

Contributors

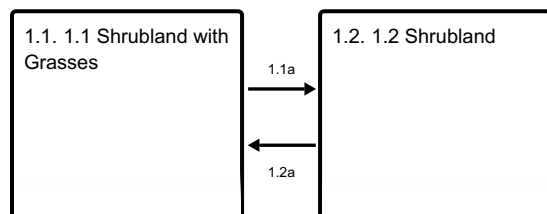
Curtis Talbot

State and transition model

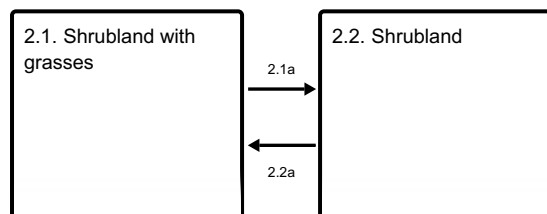
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1

1 Reference State

The reference state represents the historic plant communities and ecological dynamics of the desert loam, shadscale site. This state includes the biotic communities that become established on the ecological site if all successional sequences are completed under current climatic conditions; natural disturbances are inherent in its development. This state is dominated by warm season perennial grasses and shadscale. The primary disturbance mechanism is climate fluctuations. The reference state is self sustaining and resistant to change due to high resistance to natural disturbances and high resilience following natural disturbances. When natural disturbances occur, the rate of recovery is relatively rapid due to niches being filled with highly adapted native vegetation. Reference State: Community phases disturbed by climate fluctuations and insect herbivory. Indicators: A site dominated by shadscale with galleta. Indian ricegrass and sand dropseed may or may not be present. Feedbacks: Extended periods of above average precipitation resulting in an increase in the native perennial plant vigor. Insect herbivory that reduces shrub vigor and allows grass production to increase. At-risk Community Phase: All communities are at risk when nutrients are available for invasive plants to establish. Plant community 1.2 is especially at risk due to limited production and cover of understory grasses. Trigger: Introduction of invasive plants to fill available niches.

Community 1.1

1.1 Shrubland with 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. Bare ground is 2-19% and biological crusts are 0-30%. Surface rock fragments (0-35%) can be very prevalent.

Community 1.2

1.2 Shrubland

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. Bare ground is 2-19% and biological crusts are 0-30%. Surface rock fragments 0-35%.

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 1.2a

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

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. Current Potential State: Plant communities disturbed by fluctuating climatic conditions insect herbivory, and livestock grazing. Indicators: A site dominated by shadscale and galleta, where Indian ricegrass and sand dropseed may or may not be present. Invasive species are present. Feedbacks: Fluctuations in climate allow for the maintenance of both shrubs and perennial grasses.

Community 2.1

Shrubland with 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 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. Bare ground is 2-19% and biological crusts are 0-30%. Surface rock fragments (0-35%) can be very prevalent.

Community 2.2

Shrubland

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. Bare ground is 2-19% and biological crusts are 0-30%. Surface rock fragments (0-35%) can be very prevalent.

Pathway 2.1a

Community 2.1 to 2.2

This pathway occurs when events, such as drought or continuous season long grazing 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 improper livestock grazing and extended drought. Invasive species such as cheatgrass have also been known to invade intact perennial plant community where no disturbance has occurred.

Citations