Ecological site group DX035X02FESG04
Kaibab Plateau - Ustic Aridic - Limestone or Loamy Upland

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Key Characteristics

- Kaibab Plateau (F)
- Site parent material is limestone or loamy.
- Soils are ustic aridic, or precipitation is within the range of 10 to 14 inches.
- Site is and/or located in an upland with slopes <15%.

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

Site is and/or located in an upland with slopes <15%. Aspects tend toward the perimeter of the LRU subset.

Climate

Site soils are ustic aridic or within a 10-14" precipitation zone. Precipitation comes predominantly from winter storm patterns from November through March at upper elevations. Monsoonal patterns and xeric patterns occur more equally at lower elevations.

Soil features

Parent material is limestone. Soils are loamy. Site consists of limited amounts of gently sloping sheet alluvial or eolian deposits over residuum of plateaus and structural benches.

Vegetation dynamics

This site is generally dominated by perennial grasses and mountain and/or Bonneville big sagebrush. 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 variable due to disturbance intensity. Once invasive plants establish, return to the reference state may not be possible.

Major Land Resource Area

MLRA 035X
Colorado Plateau

Subclasses

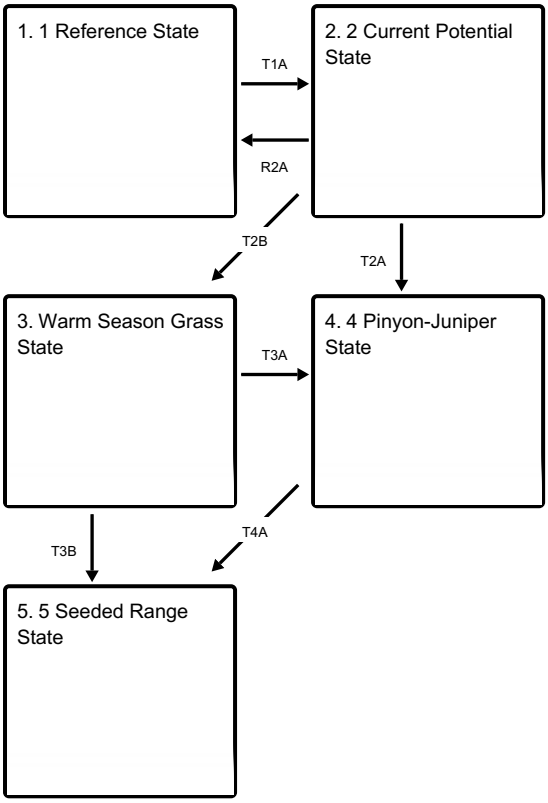
- R035XC313AZ–Loamy Upland 10-14" p.z.
- R035XC319AZ–Limestone/Sandstone Upland 10-14" p.z.
- R035XY308UT–Upland Loam (Mountain Big Sagebrush)
- R035XY313UT–Upland Shallow Loam (Cliffrose)
- R035XY315UT–Upland Shallow Loam (Pinyon-Utah Juniper) AWC <3

Stage

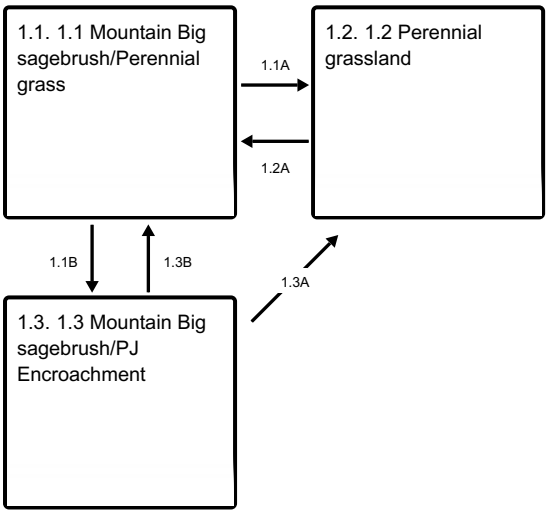
Provisional

State and transition model

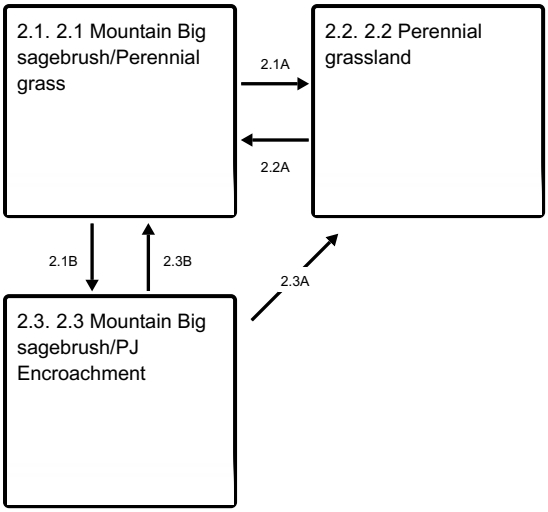
Ecosystem states



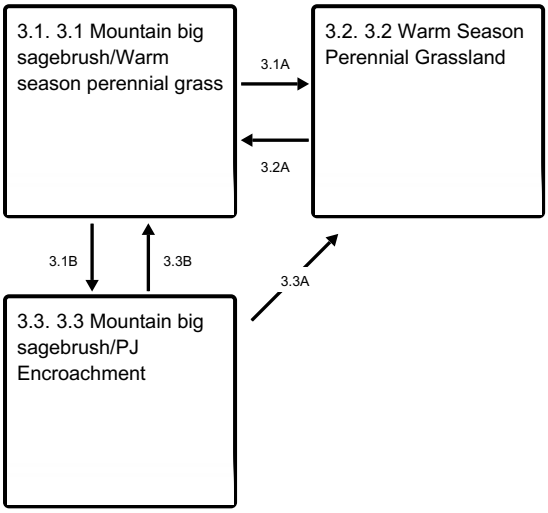
State 1 submodel, plant communities



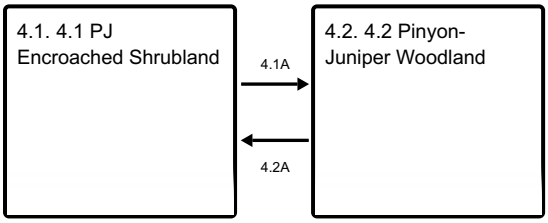
State 2 submodel, plant communities



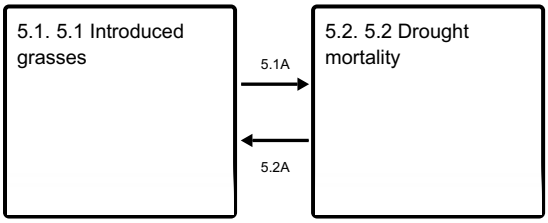
State 3 submodel, plant communities



State 4 submodel, plant communities



State 5 submodel, plant communities



State 1
1 Reference State

The reference state represents the plant communities and ecological dynamics of the upland loam (mountain big sagebrush) site. This state includes the biotic communities that become established on the ecological site if all successional sequences are completed under the natural disturbance regime. The reference state is generally dominated by perennial grasses and mountain and/or Bonneville big sagebrush. 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 variable due to disturbance intensity.

Once invasive plants establish, return to the reference state may not be possible.

Community 1.1
1.1 Mountain Big sagebrush/Perennial grass

This community is dominated by both Mountain big sagebrush and perennial grasses. Needleandthread and blue grama are typically the dominant grass species, but other functionally similar species may also be abundant. Composition by air-dry weight is 35-55% grass, 5-10% forbs, 35-55% shrubs, and 0-10% trees. Two-needle pinyon and Utah juniper may be present in this phase, but are only a minor component of the plant community.

Community 1.2
1.2 Perennial grassland

This community is dominated by perennial grasses, with possibly some fire-tolerant shrubs and shrub seedlings. Commonly seen grasses include Indian ricegrass and needle and thread, and blue grama. Composition by air-dry weight is 50-90% grasses, 5-15% forbs, and 5-35% shrubs.

Community 1.3
1.3 Mountain Big sagebrush/PJ Encroachment

This community is characterized by a mountain big sagebrush shrub canopy with abundant perennial grasses. Two-needle pinyon and Utah juniper are increasing in the community, while perennial grasses are decreasing somewhat. Composition by air-dry weight is 15-35% grasses, 2-10% forbs, 30-50% shrubs, and 10-30% trees.

Pathway 1.1A
Community 1.1 to 1.2

Fire, setting back shrubs.

Pathway 1.1B
Community 1.1 to 1.3

Encroachment of pinyon and juniper.

Pathway 1.2A
Community 1.2 to 1.1

Slow encroachment of shrubs back into burned areas.

Pathway 1.3B
Community 1.3 to 1.1

A disturbance to set back the pinyon and juniper.

Pathway 1.3A
Community 1.3 to 1.2

Fire opening up grass patches.

State 2
2 Current Potential State

The current potential state is similar to the reference state in community sturcture and ecological function, however the presence of invasive species reduces the resillience of the site to further degradation. This state is generally dominated by mountain or Bonneville big sagebrush. Primary disturbance mechanisms include climate fluctuations, fire, native herbivore grazing, domestic livestock grazing and surface disturbances such as road and pipeline development and off road vehicle (OHV) use. Timing of these disturbances dictates the ecological dynamics that

occur. The current potential state is self sustaining; but is losing resistance to change due to lower resistance to disturbances and lower resilience following disturbances.

Community 2.1
2.1 Mountain Big sagebrush/Perennial grass

This community is dominated by Mountain big sagebrush and perennial grasses. Needleandthread and blue grama are typically the dominant grass species, but other functionally similar species may also be abundant. Composition by air-dry weight is 25-50% grass, 5-10% forbs, 40-60% shrubs, and 0-10% trees. Two-needle pinyon and Utah juniper may be present in this phase, but are only a minor component of the plant community. Cheatgrass or other non-native species are present but not dominant.

Community 2.2
2.2 Perennial grassland

This community is dominated by perennial grasses, with possibly some fire-tolerant shrubs and shrub seedlings. Commonly seen grasses include Indian ricegrass and needle and thread, and blue grama. Composition by air-dry weight is 50-90% grasses, 5-15% forbs, and 5-35% shrubs. Cheatgrass or other non-native species are present but not dominant.

Community 2.3
2.3 Mountain Big sagebrush/PJ Encroachment

This community is characterized by a mountain big sagebrush shrub canopy with abundant perennial grasses. Two-needle pinyon and Utah juniper are increasing in the community, while perennial grasses are decreasing somewhat. Composition by air-dry weight is 5-15% grasses, 2-5% forbs, 25-55% shrubs, and 10-50% trees. Cheatgrass or other non-native species are present but not dominant.

Pathway 2.1A
Community 2.1 to 2.2

Fire opening up the sagebrush.

Pathway 2.1B
Community 2.1 to 2.3

Pinyon-Juniper encroachment

Pathway 2.2A
Community 2.2 to 2.1

Slow spread of sagebrush back into burned areas.

Pathway 2.3B
Community 2.3 to 2.1

Disturbance/treatment of pinyon-juniper

Pathway 2.3A
Community 2.3 to 2.2

Fire opening patches for grass production.

State 3
Warm Season Grass State

Community 3.1
3.1 Mountain big sagebrush/Warm season perennial grass

This community is dominated by Mountain big sagebrush and warm season perennial grasses. Blue grama and galleta are typically the dominant grass species, but other functionally similar species may also be abundant. Composition by air-dry weight is 25-50% grass, 5-10% forbs, 40-60% shrubs, and 0-10% trees. Two-needle pinyon and Utah juniper may be present in this phase, but are only a minor component of the plant community. Cheatgrass or other non-native species are present but not dominant.

Community 3.2
3.2 Warm Season Perennial Grassland

This community is dominated by warm season perennial grasses, with possibly some fire-tolerant shrubs and shrub seedlings. Commonly seen grasses include Blue grama and galleta. Composition by air-dry weight is 50-90% grasses, 5-15% forbs, and 5-35% shrubs. Cheatgrass or other non-native species are present but not dominant.

Community 3.3
3.3 Mountain big sagebrush/PJ Encroachment

This community is characterized by a mountain big sagebrush shrub canopy with abundant war season perennial grasses. Two-needle pinyon and Utah juniper are increasing in the community, while perennial grasses are decreasing somewhat. Composition by air-dry weight is 5-15% grasses, 2-5% forbs, 25-55% shrubs, and 10-50% trees. Cheatgrass or other non-native species are present but not dominant.

Pathway 3.1A
Community 3.1 to 3.2

Fire opening up patches for grass dominance.

Pathway 3.1B
Community 3.1 to 3.3

Pinyon-Juniper encroachment

Pathway 3.2A
Community 3.2 to 3.1

A slow encroachment of shrubs into burned areas.

Pathway 3.3B
Community 3.3 to 3.1

A disturbance or treatment on pinyon-juniper.

Pathway 3.3A
Community 3.3 to 3.2

Fire, opening up areas for grass dominance.

State 4
4 Pinyon-Juniper State

This state is dominated by two-needle pinyon and Utah juniper. It occurs when perennial grasses, shrubs, and forbs decrease in the community to the point where they are no longer capable of reproduction at a rate necessary to dominate the site in the event of tree removal by fire or other means. This state is the least resistant to soil erosion and may be at significant risk of permanent soil loss. An eroded state has not yet been documented on this site, but phase 3.2 has been characterized as having noticeable soil movement.

Community 4.1
4.1 PJ Encroached Shrubland

Two-needle pinyon and Utah juniper dominate. Mountain big sagebrush and other shrubs are still abundant in the understory, but perennial grasses and forbs are greatly reduced. Trees continue to increase in the absence of fire or other tree reducing disturbance.

Community 4.2
4.2 Pinyon-Juniper Woodland

Two-needle pinyon and Utah juniper dominate. Shrubs, perennial grasses and forbs are very sparse or absent. Trees continue to increase and are resistant to fires. Soil erosion is a hazard of this phase that increases with increased slope and decreased herbaceous cover.

Pathway 4.1A
Community 4.1 to 4.2

Two-needle pinyon and Utah juniper dominate. Shrubs, perennial grasses and forbs are very sparse or absent. Trees continue to increase and are resistant to fires.

Pathway 4.2A
Community 4.2 to 4.1

A disturbance such as drought and disease open areas for shrub encroachment.

State 5
5 Seeded Range State

This state is dominated by introduced perennial grasses. It is resistant to invasive annuals and resilient to grazing pressure. Primary disturbance mechanisms include climate fluctuations, fire, native herbivore grazing, domestic livestock grazing and surface disturbances such as road and pipeline development and off road vehicle (OHV) use. Timing of these disturbances dictates the ecological dynamics that occur.

Community 5.1
5.1 Introduced grasses

This community is dominated by introduced perennial grasses, with possibly some shrubs and tree seedlings. Commonly seen grasses include crested wheatgrass and Russian wildrye.

Community 5.2
5.2 Drought mortality

This community is dominated by sagebrush and juniper trees. Overall production is greatly diminished and the appearance of bare ground is prolific. This ecological site is particularly resistant to annual grass dominance. The circumstances observed in this plant community phase would typically result in weed invasion and dominance, however, the weed free condition of this plant community has been observed to exist for years.

Pathway 5.1A
Community 5.1 to 5.2

Overall production is greatly diminished and the appearance of bare ground is prolific.

Pathway 5.2A
Community 5.2 to 5.1

Increased grasses

Transition T1A
State 1 to 2

Invasion of introduced species.

Restoration pathway R2A
State 2 to 1

Once introduced species have invaded this site restoration to reference may not be possible.

Transition T2B
State 2 to 3

Excessive, repetitive grazing of cool season grass species in the winter and spring.

Transition T2A
State 2 to 4

Encroachment and dominance of pinyon-juniper.

Transition T3A
State 3 to 4

Encroachment of pinyon-juniper and loss of understory with excess erosion.

Transition T3B
State 3 to 5

Transition T4A
State 4 to 5

Citations