

# Ecological site group DX035X01JESG07

## Paria and Kaibito Plateaus Sandy Moderately Deep to Very Deep

Last updated: 10/25/2022  
Accessed: 05/02/2024

---

### Key Characteristics

- Paria and Kaibito Plateaus
- Sandy
- Uplands
- Moderately deep to very deep

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 is found on nearly level to gently rolling uplands to partially stabilized or stabilized dunes on plateaus, fans and abandoned stream terraces. The soils are deep to very deep to any plant root restricting layer. The texture of the soil throughout the profile is generally sandy loams to loamy coarse sand. The slope of the site is generally 1 to 10 percent, but may be as high as 15 percent.

Elevations for the Common Resource Area where this ecological site may occur range from 4800 to 6700 feet and precipitation averages 10 to 14 inches. The elevation range is lower (about 4500 to 6000 ) on the western edge of the Colorado Plateau along the Grand Canyon, and moves up about 500 to 800 feet higher on the eastern side in the areas of the Navajo and Hopi Indian Reservations due to rain shadow effects from the Kaibab Plateau and Mogollon Rim.

### Climate

Winter summer moisture ratios range from 70:30 to 60:40. Late spring is usually the driest period, and early fall moisture can be sporadic. Summer rains fall from June through September; moisture originates in the Gulf of Mexico and creates convective, usually brief, intense thunderstorms. Cool season moisture from October through May tends to be frontal; it originates in the Pacific and the Gulf of California and falls in widespread storms with longer duration and lower intensity. Precipitation generally comes as snow from December through February. Accumulations above 12 inches are not common but can occur. Snow usually lasts for 3-4 days, but can persist much longer. Summer daytime temperatures are commonly 95 - 100 F and on occasion exceed 105 F. Winter air temperatures can regularly go below 10 F and have been recorded below - 20 F.

### Soil features

The soils associated with this ecological site are deep to very deep to any plant root restricting layer. The soil textures throughout the profile range from loamy fine sands to coarse sands. Where the site has been stable for long periods of time, there may be some accumulation of carbonates at moderate depths that can help the site retain more soil moisture within the root zone. The soil ranges from neutral to moderately alkaline (pH 6.6 to 8.4). The permeability is rapid to very rapid and the soil profile can capture both gentle winter rains and intense summer thunderstorms. The available water capacity is low. Wind erosion is a severe problem if the vegetative cover is lost.

### Vegetation dynamics

The historic climax plant community is composed of mid and short grasses with a moderate percentage of forbs and shrubs. There is a mixture of both cool and warm season grasses and half-shrubs.

Plant species most likely to invade or increase on this site when it deteriorates are sand sagebrush, big sagebrush,

rabbitbrush, annuals, sandhill muhly, wooly groundsel, and snakeweed. Drought, fire, and/or unmanaged grazing reduce the perennial herbaceous component and some of the shrubs further reducing the biotic integrity of the site. Introduced annual grasses and forbs move into the plant community. Soil site stability and hydrogic function are at least moderately departed from the reference state.

Major Land Resource Area

MLRA 035X  
Colorado Plateau

Subclasses

- R035XA118AZ–Sandy Upland 10-14" p.z.
- R035XB206AZ–Sandy Upland 6-10" p.z. Warm
- R035XB216AZ–Sandy Wash 6-10" p.z.
- R035XC315AZ–Sandy Upland 10-14" p.z.
- R035XC373AZ–Sandy Upland 10-14" p.z. Warm
- R035XC377AZ–Sandy Slopes 10-14" p.z.
- R035XD412AZ–Sandy Upland 7-11" p.z.
- R035XY115UT–Desert Sand (Sand Sagebrush)
- R035XY212UT–Semidesert Sand (Fourwing Saltbush)

Correlated Map Unit Components

22340782, 22340786, 22340789, 22340794, 22340863, 22340867, 22340869

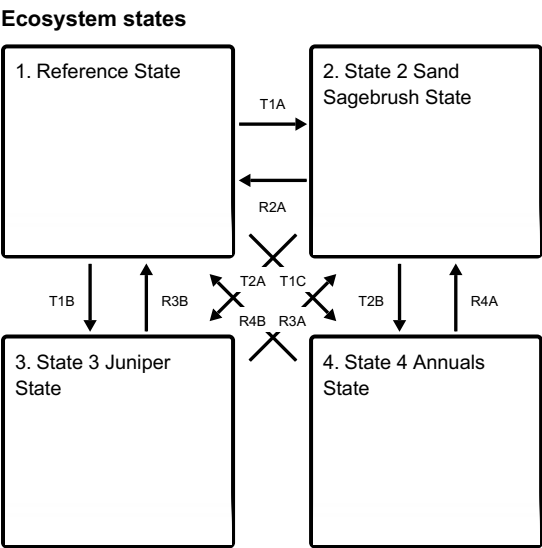
Stage

Provisional

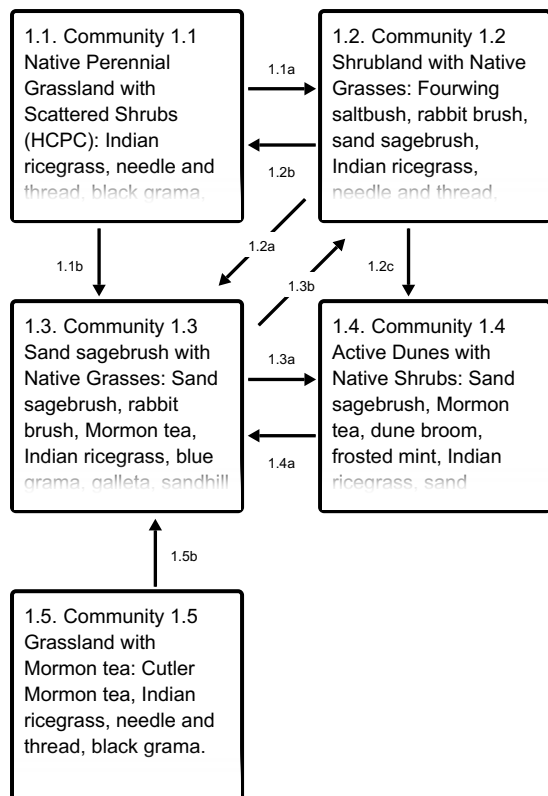
Contributors

Curtis Talbot

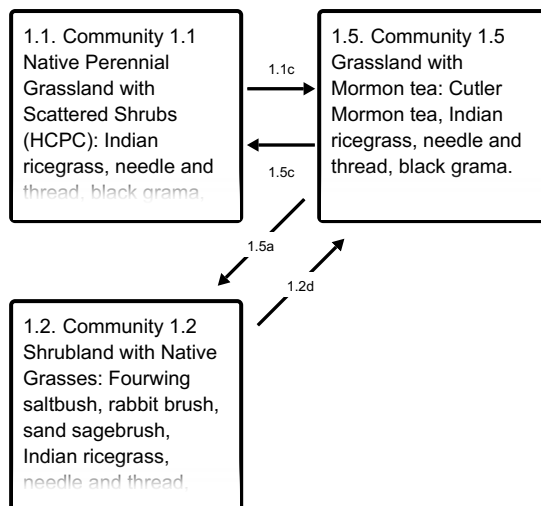
State and transition model



### State 1 submodel, plant communities



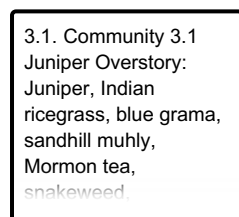
### Communities 1, 5 and 2 (additional pathways)



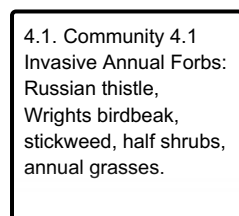
### State 2 submodel, plant communities



### State 3 submodel, plant communities



### State 4 submodel, plant communities



## State 1 Reference State

State 1 Reference State The refence state includes the Historic Climax Plant Community. This plant community (1.1) is composed primarily of cool season and warm season grasses with a small percentage of forbs and scattered large and half shrubs. Minor amounts (<5%) of introduced annuals may be present in this state.

## Community 1.1

## **Community 1.1 Native Perennial Grassland with Scattered Shrubs (HCPC): Indian ricegrass, needle and thread, black grama, fourwing saltbush, Cutler's Mormon tea, rabbitbrush.**

Community 1.1 Native Perennial Grassland with Scattered Shrubs (HCPC) This plant community is composed primarily of cool and warm season grasses with a small percentage of forbs and scattered large and half shrubs. Dominant grasses include Indian ricegrass, needle and thread, blue grama, black grama, sand dropseed and galleta. Dominant shrubs include sand sagebrush, winterfat and fourwing saltbush. Trees may be present, but are widely scattered across the landscape. Natural disturbances, such as fire, maintain the native grassland with a light overstory of woody vegetation.

## **Community 1.2**

### **Community 1.2 Shrubland with Native Grasses: Fourwing saltbush, rabbit brush, sand sagebrush, Indian ricegrass, needle and thread, blue grama .**

Community 1.2 Shrubland with Native Grasses This plant community is characterized by a mix of shrubs and a well developed understory of perennial grasses and forbs. Common shrubs include fourwing saltbush, sand sagebrush, mormon tea, winterfat, rabbitbrush along with other native shrubs. The understory is a mix of cool season and warm season grasses and smaller amounts of forbs. Common grasses include Indian ricegrass, bluegrama, needle and thread, dropseeds, galleta and other native grasses. Junipers may be present, but occur scattered across the landscape. Shrub canopy is usually less than 25%.

## **Community 1.3**

### **Community 1.3 Sand sagebrush with Native Grasses: Sand sagebrush, rabbit brush, Mormon tea, Indian ricegrass, blue grama, galleta, sandhill muhly.**

Community 1.3 Sand sagebrush with Native Grasses This plant community is characterized by an increase of sand sagebrush with a well developed understory of perennial grasses. This plant community phase is maintained by some soil disturbance and sand sage's ability to thrive after surface disturbance. This also includes other shrubs such as rabbitbrush, Cutler's mormon tea, sand buckwheat, snakeweed, fourwing saltbush and/or other native shrubs. The understory is mixture of cool and warm season grasses such as needle and thread, blue grama, Indian ricegrass, sand dropseed, sandhill muhly and other native grasses. Shrub canopy is usually less 25% with an occasional scattered juniper.

## **Community 1.4**

### **Community 1.4 Active Dunes with Native Shrubs: Sand sagebrush, Mormon tea, dune broom, frosted mint, Indian ricegrass, sand dropseed, sandhill muhly.**

Community 1.4 Active Dunes with Native Shrubs This plant community is characterized by areas of bare ground with scattered shrubs and grasses. Vegetation cover is highly variable and tends to be patchy on more active dunes. The canopy is dominated by shrubs, such as sand sagebrush, sand buckwheat, Cutler's mormon tea, dune broom, frosted mint, Bigelow rabbitbrush as well as other native shrubs. Dominate grasses include Indian ricegrass, sand dropseed, spike dropseed, giant dropseed, sandhill muhly as well as other native grasses. Bare ground ranges from 60 to 90% with large connected bare areas common.

## **Community 1.5**

### **Community 1.5 Grassland with Mormon tea: Cutler Mormon tea, Indian ricegrass, needle and thread, black grama.**

Community 1.5 Grassland with Mormon tea This plant community is characterized by a dominance of Cutler's mormon tea, Indian ricegrass, blue grama and dropseeds. This plant community can result from a combination of drought and/or unmanaged grazing.

## **Pathway 1.1a**

### **Community 1.1 to 1.2**

Increases insect/wildlife herbivory, drought, lack of natural fire

**Pathway 1.1b**  
**Community 1.1 to 1.3**

Insect/wildlife herbivory, drought, lack of natural fire, increase soil surface disturbance (soil deposition from wind or water).

**Pathway 1.1c**  
**Community 1.1 to 1.5**

Drought, insect herbivory, unmanaged grazing, lack of fire. Unmanaged grazing can be described here as: Season-long grazing providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization.

**Pathway 1.2b**  
**Community 1.2 to 1.1**

Fire to remove shrubs, favorable moisture.

**Pathway 1.2a**  
**Community 1.2 to 1.3**

Drought, insect herbivory, lack of fire. Increased bare ground, along with frequent soil surface disturbance favors the increase of sand sagebrush.

**Pathway 1.2c**  
**Community 1.2 to 1.4**

Prolonged drought with frequent soil surface disturbance and reduced perennial herbaceous cover.

**Pathway 1.2d**  
**Community 1.2 to 1.5**

Drought, herbivory, unmanaged grazing, lack of fire. Unmanaged grazing can be described here as: Season-long grazing providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization.

**Pathway 1.3b**  
**Community 1.3 to 1.2**

Reduced disturbance, favorable moisture, available seed source for perennial grasses provides increased soil stability allowing grasses to establish.

**Pathway 1.3a**  
**Community 1.3 to 1.4**

Prolonged drought with frequent soil surface disturbance and reduced perennial herbaceous cover.

**Pathway 1.4a**  
**Community 1.4 to 1.3**

Reduced soil disturbance, favorable moisture allows for increased soil stability and an increase of large shrubs (sand sagebrush, fourwing saltbush, rabbitbrush) and perennial grasses.

**Pathway 1.5c**  
**Community 1.5 to 1.1**

Managed grazing with Rest, reduced soil disturbance, favorable moisture allows for increased soil stability and an

increase of large shrubs (fourwing saltbush, rabbitbrush, sand sagebrush) and perennial grasses.

### **Pathway 1.5a**

#### **Community 1.5 to 1.2**

Reduced disturbance, favorable moisture, seed source for shrubs and grasses, managed grazing.

### **Pathway 1.5b**

#### **Community 1.5 to 1.3**

Reduced disturbance, favorable moisture, seed source for perennial grasses, managed grazing.

## **State 2**

### **State 2 Sand Sagebrush State**

State 2 Sand Sagebrush State This plant community is dominated by sand sagebrush with other shrubs present. Perennial grasses are sub-dominant with scattered forbs and occasionally scattered junipers.

### **Community 2.1**

#### **Sand Sagebrush Overstory :Sand sagebrush, Mormon tea, sand buckwheat, sand dropseed, blue grama, sandhill muhly, cheatgrass, Russian thistle.**

Community 2.1 Sand Sagebrush Overstory This plant community is dominated by sand sagebrush. Other shrubs present are sand buckwheat, Mormon tea and rabbitbrush. Perennial grasses are sub-dominant with scattered forbs and occasionally scattered junipers. Grasses are mainly dropseeds, sandhill muhly, blue grama threeawns and galleta. Non-native annuals, such as cheatgrass or Russian thistle are present as are other introduced annuals. Shrub canopy is usually greater than 25 percent, with sand sagebrush the dominant component and most productive. Reduced competition from perennial grasses, increased bare ground, unmanaged grazing and drought conditions favor sand sagebrush persistence. Bare ground ranges between 60-80 percent with large connected bare patches common.

## **State 3**

### **State 3 Juniper State**

State 3 Juniper State This plant community has an increased overstory of juniper (>10% cover) with a mixed shrub understory and few perennial grasses.

### **Community 3.1**

#### **Community 3.1 Juniper Overstory: Juniper, Indian ricegrass, blue grama, sandhill muhly, Mormon tea, snakeweed, rabbitbrush, cheatgrass, Russian thistle.**

Community 3.1 Juniper Overstory This plant community has an increase in juniper canopy greater than 10% with a mixed shrub understory. Grass cover is generally low, but forb cover is highly variable depending on climatic events. Bare ground ranges between 50-80 percent with large connected bare patches common. Common herbaceous vegetation includes Indian ricegrass, sandhill muhly, blue grama, sand dropseed with other native grasses and forbs. Shrubs include Mormon tea, snakeweed, sand sage, rabbitbrush, sand buckwheat along with other native shrubs. Non-native annuals, such as cheatgrass and Russian thistle are present along with other introduced annuals.

## **State 4**

### **State 4 Annuals State**

State 4 Annuals State This plant community is characterized by a dominance of non-native and native annual forbs with half shrubs and few annual grasses. Some perennial grasses and forbs may be present in smaller amounts.

### **Community 4.1**

## **Community 4.1 Invasive Annual Forbs: Russian thistle, Wrights birdbeak, stickweed, half shrubs, annual grasses.**

Community 4.1 Invasive Annual Forbs This plant community is characterized by dominance of non-native and native annuals forbs with half shrubs, annual grasses. Some perennial grasses and forbs may be present in smaller amounts. Russian thistle is the most prevalent annual forb and very productive on this site. Other common annuals include croton, stickseed, woolly plantain, buckwheats, wire lettuce, false buffalograss, cheatgrass and scorpionweed.

### **Transition T1A State 1 to 2**

Dominance of sand sagebrush and increased composition of non-native species from lack of fire, unmanaged grazing, and other frequent ground disturbance. Unmanaged grazing can be described here as: Season-long grazing providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization.

### **Transition T1B State 1 to 3**

Juniper establishment on site. Reduced competition from perennial grasses and shrubs, lack of fire, unmanaged grazing, juniper seed source available from adjacent sites coupled with increased bare ground allow for seedling establishment and encroachment. Favorable precipitation may increase seedling establishment even with moderate grass or shrub cover.

### **Transition T1C State 1 to 4**

Prolonged drought, unmanaged grazing, along with severe and frequent soil surface disturbance occurs. Soil stability is reduced and soils are subject to active soil erosion, blowouts and mounding. Low perennial herbaceous cover, along with large connected areas of bare ground are common. This allows for invasion of annuals and the increase of less desirable shrub species. Unmanaged grazing can be described here as: Season-long grazing providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization.

### **Restoration pathway R2A State 2 to 1**

Reduced soil surface disturbances that maintain sand sage persistence. This site may return to a shrubland/grassland (1.2 or 1.3) with prescribed grazing, favorable moisture and a perennial grass seed source. This pathway is also possible with woody species control (chemical or mechanical) and re-seeding to accelerate grass establishment.

### **Transition T2A State 2 to 3**

Juniper establishment on site. Reduced competition from perennial grasses and shrubs, lack of fire, unmanaged grazing, juniper seed source available from adjacent sites coupled with increased bare ground allow for seedling establishment and encroachment. Favorable precipitation may increase seedling establishment even with moderate grass or shrub cover. Unmanaged grazing can be described here as: Season-long grazing providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization.

### **Transition T2B State 2 to 4**

Prolonged drought, unmanaged grazing, along with severe and frequent soil surface disturbance occurs. Soil stability is reduced and soils are subject to active soil erosion, blowouts and mounding. Low perennial herbaceous cover, along with large connected areas of bare ground are common. This allows for invasion of annuals and the

increase of less desirable shrub species. Unmanaged grazing can be described here as: Season-long grazing providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization.

### **Restoration pathway R3B State 3 to 1**

Juniper control through fire or mechanical methods, managed grazing and a seed source for grass re-establishment.

### **Restoration pathway R3A State 3 to 2**

Juniper control through fire or mechanical methods, managed grazing and a seed source for grass re-establishment.

### **Restoration pathway R4B State 4 to 1**

This restoration pathway would require extensive inputs. Improved soil stability with perennial grass re-seeding or available seed source, non-native invasive weed control, favorable moisture, and managed grazing with rest could allow for the increase of perennial grass and shrubs. This pathway could take several years to decades to occur without significant inputs.

### **Restoration pathway R4A State 4 to 2**

This restoration pathway would require extensive inputs. Improved soil stability with perennial grass re-seeding or available seed source, non-native invasive weed control, favorable moisture, and managed grazing with rest could allow for the increase of perennial grass and shrubs. This pathway could take several years to decades to occur without significant inputs.

## **Citations**