

Ecological site F030XC237NV

Juniperus osteosperma/Coleogyne ramosissima/Bouteloua gracilis- Bouteloua eriopoda

Last updated: 4/25/2024

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General information

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.

Ecological site concept

This forest site occurs on mountain summits and sideslopes. This site occurs on all aspects at mid- to lower elevations and primarily on southerly aspects at higher elevations. Slopes are typically 30 to 75 percent. Elevations are 4400 to about 6500 feet. Soils are shallow and very shallow and well drained. They are formed in residuum and colluvium from metamorphic rocks.

Please refer to group concept R030XC189CA to view the provisional STM.

Table 1. Dominant plant species

Tree	(1) <i>Juniperus osteosperma</i>
Shrub	(1) <i>Coleogyne ramosissima</i>
Herbaceous	(1) <i>Bouteloua gracilis</i> (2) <i>Bouteloua eriopoda</i>

Physiographic features

This forest site occurs on mountain summits and sideslopes. This site occurs on all aspects at mid- to lower elevations and primarily on southerly aspects at higher elevations. Slopes are typically 30 to 75 percent. Elevations are 4400 to about 6500 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope
Elevation	4,400–6,500 ft
Slope	30–75%
Aspect	Aspect is not a significant factor

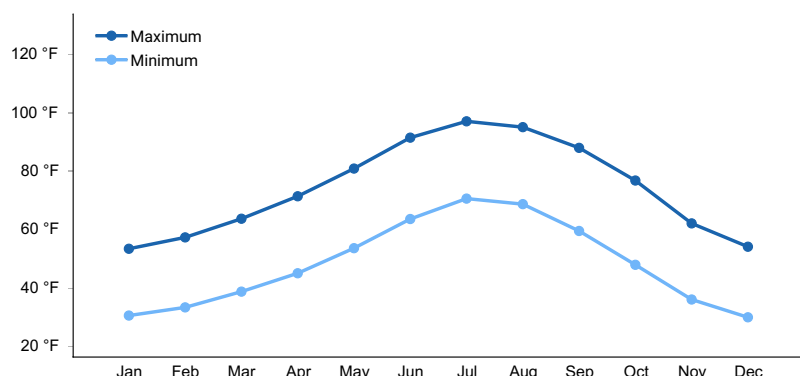
Climatic features

The primary air masses affecting the Spring Mountains are cold maritime polar air from the Gulf of Alaska and warmer, moist maritime subtropical air from lower latitudes. Occasionally there are invasions of cold continental polar air from northern Canada or the Rocky Mountains. Precipitation in the area results primarily from the passage of cyclones with associated fronts during fall, winter and spring; from closed cyclones in late winter and spring; and from the flow of moist tropical air from the southeast to the southwest quadrant in the summer.

Average annual precipitation is about 9 to 11(12) inches. Mean annual air temperature is 50 to 56 degrees F. The average growing season is about 130 to 180 days.

Table 3. Representative climatic features

Frost-free period (average)	180 days
Freeze-free period (average)	
Precipitation total (average)	11 in

**Figure 1. Monthly average minimum and maximum temperature**

Influencing water features

There are no influencing water features associated with this site.

Soil features

Soils are shallow and very shallow and well drained. They are formed in residuum and colluvium from metamorphic rocks. Surface soils are generally less than 5 inches thick to a heavy textured subsoil. Available water capacity is very low but trees and shrubs extend their roots into fractures in the bedrock allowing them to utilize deep moisture. There are high amounts of rock fragments on the soil surface which occupy plant growing space, yet help to reduce evaporation and conserve soil moisture. Runoff is to very high and potential for sheet and rill erosion is slight to moderate depending on slope. The soil series associated with this site is McClanahan.

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam (2) Extremely gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	6–14 in
Surface fragment cover <=3"	40–50%
Surface fragment cover >3"	10–20%
Available water capacity (0-40in)	0.5–0.9 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.6–7.8

Subsurface fragment volume <=3" (Depth not specified)	31–56%
Subsurface fragment volume >3" (Depth not specified)	10–23%

Ecological dynamics

Please refer to group concept R030XC189CA to view the provisional STM.

Across the West, junipers have expanded their historical range in the years since European settlement, especially into sagebrush-grass communities below areas of traditional pinyon-juniper. Overgrazing, fire suppression, and climatic change have been identified as potential causes of juniper invasion. In the absence of fire or other disturbances, trees eventually dominate the site and crowd out herbaceous and shrub species.

Juniper litter has an allelopathic effect on some understory species, especially Sandberg bluegrass, and blue grama. This effect is particularly evident on heavy, poorly drained clay soils. Broadcasting grass seeds over litter appeared to lower the allelopathic effects.

Utah juniper is not shade tolerant. It is a climax species in harsh areas where stands are open and regeneration can occur without competition for light.

Fire Ecology:

Wildfire is recognized as a natural disturbance that strongly influenced the structure and composition of the climax vegetation of this forest site. The fire return intervals for Utah juniper communities range from 10 to 30 years. Utah juniper is usually killed by fire, especially when trees are small. However, Utah juniper habitat types rarely have sufficient fine fuels to produce severe or continuous fires.

Blackbrush is killed by fire and is slow to reestablish.

Blue grama has variable fire tolerance; it has fair tolerance when dormant but experiences some damage if burned during active growth, especially during drought. Fire generally favors blue grama, generally increasing its occurrence, production, and percent cover. It usually recovers from fire slowly, through vegetative spread. However, black grama grows quickly in response to summer moisture, and its postfire recovery can be good if the stand was healthy before fire and there is adequate precipitation in the 1st 2 growing season.

Major Successional Stages of Forest Development

HERBACEOUS: Vegetation is dominated by grasses and forbs under full sunlight. This stage is experienced after a major disturbance such as crown fire. Skeleton forest (dead trees) remaining after fire or residual trees left following harvest have little or no effect on the composition and production of the herbaceous vegetation.

SHRUB-HERBACEOUS: Herbaceous vegetation and woody shrubs dominate the site. Various amounts of tree seedlings (less than 20 inches in height) may be present up to the point where they are obviously a major component of the vegetal structure.

SAPLING: In the absence of disturbance the tree seedlings develop into saplings (20 inches to 4.5 feet in height) with a range in canopy cover of about 5 to 10 percent. Vegetation consists of grasses, forbs and shrubs in association with tree saplings.

IMMATURE FOREST: The visual aspect and vegetal structure are dominated by Utah juniper trees greater than 4.5 feet in height. The upper crown of dominant and co-dominant trees are cone or pyramidal shaped. Seedlings and saplings of Utah juniper are present in the understory. Dominants are the tallest trees on the site; co-dominants are 65 to 85 percent of the highest of dominant trees. Understory vegetation is moderately influenced by a tree overstory canopy of about 10 to 20 percent.

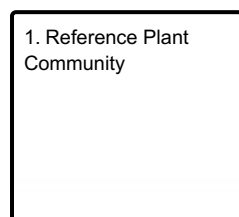
MATURE FOREST: The visual aspect and vegetal structure are dominated by Utah juniper that have reached or are near maximal heights for the site. Dominant trees average greater than five inches in diameter at one-foot stump height. Upper crowns of Utah juniper are typically either irregularly or smoothly flat-topped or rounded. Tree canopy cover ranges from 20 to 30 percent. Understory vegetation is strongly influenced by tree competition, overstory

shading, duff accumulation, etc. Few tree seedlings and/or saplings occur in the understory. Infrequent, yet periodic, wildfire is presumed to be a natural factor influencing the understory of mature juniper forests. This stage of community development is assumed to be representative of this forest site in the pristine environment.

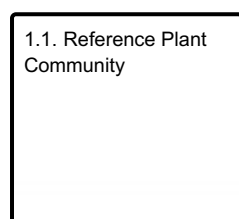
OVER-MATURE FOREST: In the absence of wildfire or other naturally occurring disturbances, the tree canopy on this site can become very dense. This stage is dominated by Utah juniper that have reached maximal heights for the site. Dominant and co-dominant trees average greater than five inches in diameter at one-foot stump height. Upper crowns are typically irregularly flat-topped or rounded. Understory vegetation is sparse or absent due to tree competition, overstory shading, duff accumulation, etc. Tree canopy cover is commonly greater than 35 percent.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1 Reference Plant Community

Community 1.1 Reference Plant Community

The reference plant community is dominated by Utah juniper. Singleleaf pinyon may, sporadically, occur on the site. Blackbrush, green ephedra, and banana yucca are the principal understory shrubs. Black grama, blue grama, desert needlegrass, and muttongrass are the most prevalent understory grasses. Overstory tree canopy composition is 85 to 100 percent Utah juniper and less than 15 percent, or less, singleleaf pinyon. An overstory canopy cover of 25 percent is assumed to be representative of tree dominance on this site in the pristine environment.

Forest overstory. **MATURE FOREST:** The visual aspect and vegetal structure are dominated by Utah juniper that have reached or are near maximal heights for the site. Dominant trees average greater than five inches in diameter at one-foot stump height. Upper crowns of Utah juniper are typically either irregularly or smoothly flat-topped or rounded. Tree canopy cover ranges from 20 to 30 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Few tree seedlings and/or saplings occur in the understory. Infrequent, yet periodic, wildfire is presumed to be a natural factor influencing the understory of mature juniper forests. This stage of community development is assumed to be representative of this forest site in the pristine environment.

Forest understory. Understory vegetative composition is about 65 percent grasses, 10 percent forbs and 25 percent shrubs and young trees when the average overstory canopy is medium (20 to 30 percent). Average understory production ranges from 250 to 500 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.

Additional community tables

Animal community

Livestock Interpretations:

This site is suited to cattle and sheep grazing where terrain permits. Grazing management should be keyed to black grama and desert needlegrass production.

Livestock will often concentrate on this site taking advantage of the shade and shelter offered by the tree overstory. Many areas are not used because of steep slopes and lack of adequate water. Attentive grazing management is required due to steep slopes and associated erosion hazards. Harvesting trees under a sound management program for fuelwood, posts or other products can open the tree canopy to allow increased production of understory species desirable for grazing.

Stocking rates vary with such factors as kind and class of grazing animal, season of use and fluctuations in climate. Actual use records for individual sites, a determination of the degree to which the sites have been grazed, and an evaluation of trend in site condition offer the most reliable basis for developing initial stocking rates.

The forage value rating is not an ecological evaluation of the understory as is the range condition rating for rangeland. The forage value rating is a utilitarian rating of the existing understory plants for use by specific kinds of grazing animals.

Wildlife Interpretations:

This site has high value for mule deer during the winter. Juniper trees provide shelter from winter storms and juniper foliage is also browsed during the winter. Sites where water is available offer good quail habitat and are visited seasonally by mourning dove. It is also used by various song birds, rodents, reptiles and associated predators natural to the area.

Hydrological functions

Runoff is very high and permeability is moderately slow.

Recreational uses

The trees on this site provide a welcome break in an otherwise open landscape. It has potential for hiking, cross-country skiing, camping, and deer and upland game hunting.

Wood products

Utah juniper wood is very durable. Its primary uses have been for posts and fuelwood. It probably has considerable potential in the charcoal industry and in wood fiber products.

PRODUCTIVE CAPACITY

This forest community is of very low site quality for tree production. Site index ranges from 20 to 35 (Howell, 1940).

Productivity Class: 0.1 to 0.2

CMAI*: 1.5 to 2.7 ft³/ac/yr;

0.1 to 0.2 m³/ha/yr.

Culmination is estimated to be at 100 years.

*CMAI: is the culmination of mean annual increment or highest average growth rate of the stand in the units specified.

Fuelwood Production: 4 cords per acre for stands averaging 5 inches in diameter at 1 foot height with a medium canopy cover. There are about 274,000 gross BTUs heat content per cubic foot of Utah juniper. Solid wood volume in a cord varies but usually ranges from 65 to 90 cubic feet. Assuming an average of 75 cubic feet of solid wood per cord, there are about 20.6 million BTUs of heat value in a cord of Utah juniper fire wood.

Posts (7 foot): The juniper trees on this site typically average less than 12 feet in height and production of usable posts is minimal.

MANAGEMENT GUIDES AND INTERPRETATIONS

1. LIMITATIONS AND CONSIDERATIONS

- Potential for sheet and rill erosion is moderate to severe depending on slope.
- Moderate equipment limitations on steeper slopes and moderate to severe equipment limitations on sites having extreme surface stoniness.
- Proper spacing is the key to a well managed, multiple use and multi-product juniper forest.

2. ESSENTIAL REQUIREMENTS

- Adequately protect from wildfire.
- Protect soils from accelerated erosion.
- Apply proper grazing management.

3. SILVICULTURAL PRACTICES

Silvicultural treatments are not reasonably applied on this site due to poor site quality and severe limitations for equipment and tree harvest.

Other products

The berries of Utah juniper have been used by Indians for food.

Other information

Blackbrush contributes to desert fertility by 1) protecting the soil against wind erosion through retarding the movement of soil and increasing the accumulation of fine soil particles around its base; 2) protecting understory vegetation from the effects of high temperatures, thereby helping to retain surface nitrogen and adding organic matter to the soil; and 3) serving as a nitrogen reservoir through the storage of nitrogen in roots, leaves, and stems. Because of blue grama's wide adaptation, ease of establishment, and economic value, it is used extensively for conservation purposes, rangeland seeding, and landscaping. Blue grama is useful for reclamation and for erosion control in arid and semiarid regions.

Utah juniper is occasionally heavily infested by juniper mistletoe (*Phoradendron juniperum* ssp. *juniperum*) and dense mistletoe (*P. bolleanum* ssp. *densum*).

Table 5. Representative site productivity

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
Utah juniper	JUOS	20	35	2	3	—	—	—	

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T27S R61E S32
General legal description	South-facing mountain sideslopes, about 3 1/2 miles south of McCullough Mountain, McCullough Range, Clark County, Nevada.

Other references

Fire Effects Information System (Online; <http://www.fs.fed.us/database/feis/plants/>).

USDA-NRCS Plants Database (Online; <http://www.plants.usda.gov>).

Howell, J. 1940. Pinyon and juniper: a preliminary study of volume, growth, and yield. Regional Bulletin 71. Albuquerque, NM: USDA, NRCS; 90p.

Jordan, M. 1974. An Inventory of Two Selected Woodland Sites in the Pine Nut Hills of Western Nevada. Master's Thesis, UNR Reno.

Contributors

BLS

Approval

Kendra Moseley, 4/25/2024

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	05/19/2024
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

2. Presence of water flow patterns:

3. Number and height of erosional pedestals or terracettes:

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):

5. Number of gullies and erosion associated with gullies:

6. Extent of wind scoured, blowouts and/or depositional areas:

7. Amount of litter movement (describe size and distance expected to travel):

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**
-
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant:
- Sub-dominant:
- Other:
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
-
14. **Average percent litter cover (%) and depth (in):**
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
-
16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**
-
17. **Perennial plant reproductive capability:**
-