

Ecological site F030XC289NV

Pinus flexilis-Pinus longaeva/Ribes cereum-Juniperus communis var. depressa

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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 the backslopes of mountains. Slopes range from 30 to 75 percent. Elevations range from 7500 to 10500 feet. The soils associated with this site are moderately deep, well drained soils that formed in residuum and colluvium derived from limestone.

This site is part of general provisional concept F030XC284NV.

Associated sites

F030XC282NV	Abies concolor var. concolor/Ribes cereum Lower elevation, deeper soils, white fir site with little to no limber or bristlecone pine.
R030XC029NV	SNOWPOCKET

Table 1. Dominant plant species

Tree	(1) <i>Pinus flexilis</i> (2) <i>Pinus longaeva</i>
Shrub	(1) <i>Ribes cereum</i> (2) <i>Juniperus communis var. depressa</i>
Herbaceous	Not specified

Physiographic features

This forest site occurs on the backslopes of mountains. Slopes range from 30 to 75 percent. Elevations range from 7500 to 10500 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope
Elevation	7,500–10,500 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.

The mean annual precipitation is about 18 to 22 inches. The mean annual air temperature is 40 to 45 degrees F. The average growing season is about 50 to 90 days.

Snow Course, Spring Mountains, Nevada. Average snow depth and snow water equivalent from 1971 to 2000 at March 1 and April 1 of each year.

Kyle Canyon. (Elevation 8200 feet.) March 1. 36 inch snow depth, 10.9 inches of water equivalent. April 1. 31 inch snow depth, 11.7 inches of water equivalent.

Rainbow Canyon #2 (Elevation 8100 feet) March 1. 44 inch snow depth, 13.8 inches of water equivalent. April 1. 46 inch snow depth, 16.7 inches of water equivalent.

Lee Canyon #2. (Elevation 9000 feet) March 1. 35 inch snow depth, 10.6 inches of water equivalent. April 1. 31 inch snow depth, 11.1 inches of water equivalent.

Lee Canyon #3. (Elevation 8500 feet) March 1. 28 inch snow depth, 8.5 inches of water equivalent. April 1. 24 inch snow depth, 9.1 inches of water equivalent.

Table 3. Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	
Precipitation total (average)	22 in

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are moderately deep, well drained soils that formed in residuum and colluvium derived from limestone. The soil surface is covered by 40 to 65 percent gravel and 1 to 10 percent cobbles and 1 percent stones. Soil temperature regime is frigid. Soil moisture regime is ustic. Soil series associated with this site is Kitgram.

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate
Soil depth	20–40 in
Surface fragment cover <=3"	40–65%
Surface fragment cover >3"	1–10%
Available water capacity (0-40in)	1.4–1.5 in
Calcium carbonate equivalent (0-40in)	30–70%

Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	35–60%
Subsurface fragment volume >3" (Depth not specified)	10–25%

Ecological dynamics

The amount and nature of the understory vegetation in a forestland is highly responsive of the amount and duration of shade provided by the overstory canopy. Significant changes in kinds and abundance of plants occur as the canopy changes. Some changes occur slowly and gradually as a result of normal changes in tree size and spacing. Other changes occur dramatically and quickly, following intensive harvesting, thinning or fire.

Fire Ecology:

Wildfires are less frequent in limber pine communities than in other conifer habitats because of limited productivity and fuel accumulation associated with poor soil development, short growing seasons, and late snowmelt. Fire return intervals are probably very long and unpredictable. Limber pine is often killed by fire because of its relatively thin bark. The degree of stem scorch usually determines the extent of fire injury to trees. Young trees are usually killed by any fire and mature trees with thicker bark can survive. The vulnerability of this species to fire is reduced by the open stand structure, sparse fuels, and sparse undergrowth of limber pine communities.

Wax currant regeneration is favored by short-duration, low-severity fire because soil-stored seed requires scarification to germinate. Most wax currant plants are severely damaged or killed by fire and it is considered a weak sprouter.

The foliage of common juniper is resinous and very flammable making this species easily susceptible to fire. The degree of damage depends on the severity of the fire. Where common juniper is killed by fire, some seeds may survive in the soil on-site and germinate when conditions become favorable. Seeds from off-site, carried by birds or small mammals also aid in reestablishment.

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 for tree harvest. Skeleton forest (dead trees) remaining after the fire or residual trees left following harvest have little affect on the composition and production of the herbaceous vegetation.

SHRUB-HERBACEOUS: Herbaceous vegetation and woody shrubs dominate the site. Various amounts of conifer 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-POLE: In the absence of disturbance, the conifer seedling develop into saplings (20 inches to 4.5 feet in height) with a range in canopy cover of about 10 to 20 percent. Vegetation consists of grasses, forbs and shrubs in association with conifer seedlings and in some locations, young aspen trees.

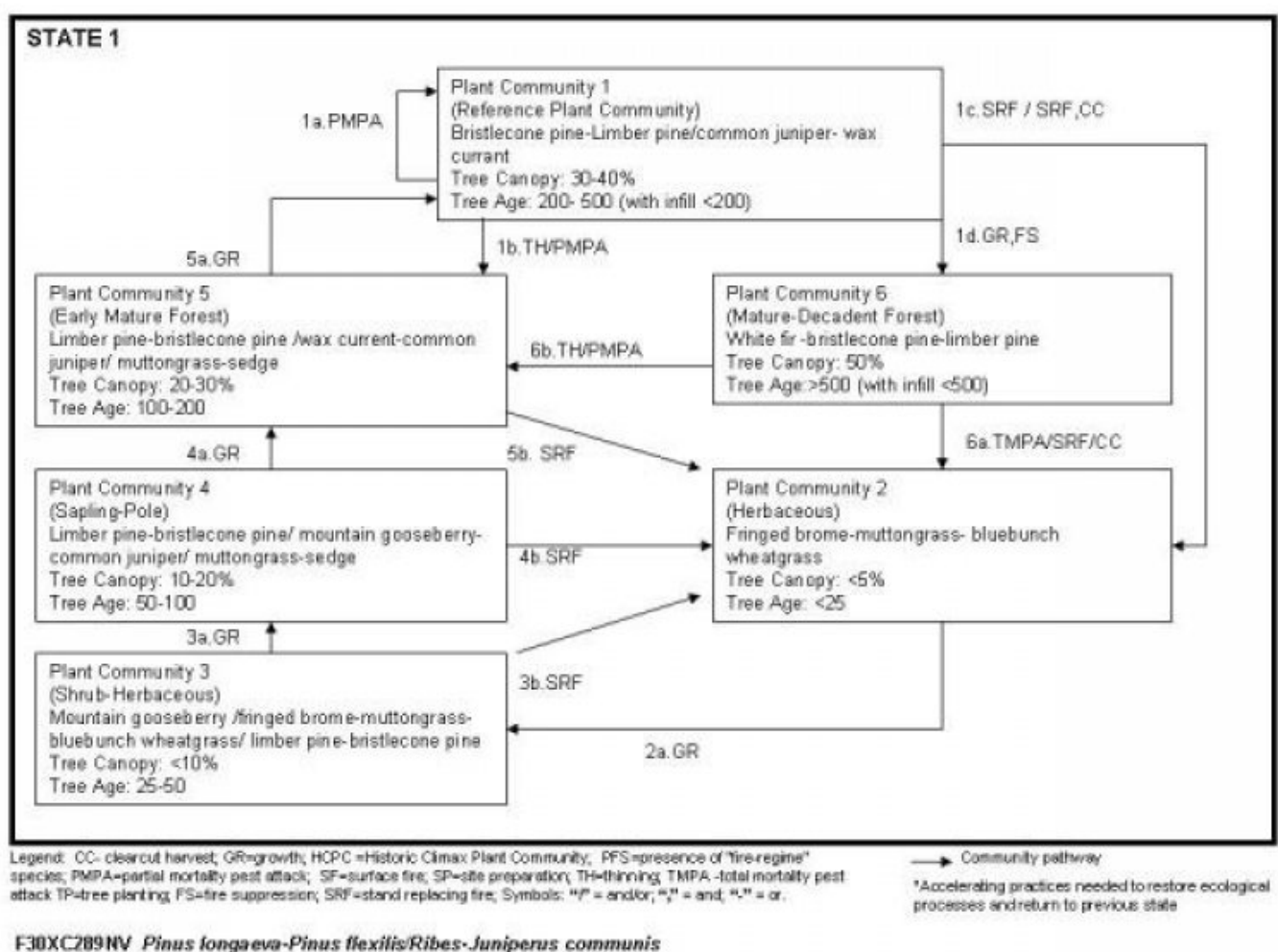
EARLY MATURE FOREST: The visual aspect and vegetal structure are dominated by limber pine and bristlecone pine greater than 4.5 feet in height. Seedlings and saplings of white fir and limber pine are present in the understory. Limber pine are the tallest trees on the site due to the slow growth of bristlecone pine and white fir. Understory vegetation is moderately influenced by a tree overstory canopy of about 20 to 30 percent.

MATURE FOREST (Reference Plant Community): The visual aspect and vegetal structure are dominated by limber

pine and bristlecone pine with some white fir that have reached or are near maximal heights for the site. Dominate trees average ten inches or greater in diameter at breast height. Tree canopy cover ranges from 30 to about 40 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Few seedlings and/or saplings of white fir occur in the understory.

MATURE-DECADENT FOREST: In the absence of wildfire or other naturally occurring disturbances, the tree canopy on this site can become dense. This stage is dominated by white fir that have reached maximal heights for the site. Dominate and codominant trees average greater than ten inches in diameter at breast height. Understory vegetation is sparse due to tree competition, overstory shading, duff accumulations, etc. Tree canopy cover is commonly greater than 50 percent.

State and transition model



State 1 Reference Plant Community

Community 1.1 Reference Plant Community

The reference plant community is dominated by limber pine and Great Basin bristlecone pine. Rocky Mountain white fir occurs within the overstory in varying amounts depending on elevation and slope aspect. Bluebunch wheatgrass is the most common understory grass. An overstory canopy cover of 30 to 40 percent is assumed to be representative of tree dominance on this site in the pristine environment. Overstory tree canopy composition is

about 50 to 70 percent limber pine, 40 to 50 percent Great Basin bristlecone pine and 5 to 30 percent Rock Mountain white fir. Wax currant and common juniper are the principal understory shrubs.

Forest overstory. Mature Forest: The visual aspect and vegetal structure are dominated by limber pine and bristlecone pine with some white fir that have reached or are near maximal heights for the site. Dominate trees average ten inches or greater in diameter at breast height. Tree canopy cover ranges from 30 to about 40 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Few seedlings and/or saplings of white fir occur in the understory.

Forest understory. Understory composition is about 10 percent grasses, 5 percent forbs and 85 percent shrubs and young trees when the average overstory canopy is 35 percent. Average understory production ranges from 400 to 700 pounds per acre with a medium canopy cover (30 to 40 percent). Understory production includes the total annual production of all species within 4.5 (excluding boles of trees)feet of the ground surface under low, high, and representative canopy covers.

Table 5. Ground cover

Tree foliar cover	30-40%
Shrub/vine/liana foliar cover	5-20%
Grass/grasslike foliar cover	1-5%
Forb foliar cover	1-2%
Non-vascular plants	0%
Biological crusts	0%
Litter	20-30%
Surface fragments >0.25" and <=3"	40-60%
Surface fragments >3"	1-10%
Bedrock	1-5%
Water	0%
Bare ground	20-40%

Table 6. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	1-5%	1-5%	1-5%	1-2%
>0.5 <= 1	1-5%	10-20%	1-5%	1-2%
>1 <= 2	1-5%	10-20%	1-2%	—
>2 <= 4.5	5-15%	5-7%	—	—
>4.5 <= 13	15-20%	—	—	—
>13 <= 40	30-40%	—	—	—
>40 <= 80	1-5%	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

Additional community tables

Animal community

Livestock Interpretations:

This site is not very suited to cattle and sheep grazing due to steep slopes and lack of water. Wild horses may use this site during the summer. Grazing management should be keyed to bluebunch and muttongrass 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 or lack of adequate water. Harvesting trees under a sound management program can open up the tree canopy to allow increased production of understory species desirable for grazing.

Stocking rates vary over time depending upon season of use, climate variations, site, and previous and current management goals. A safe starting stocking rate is an estimated stocking rate that is fine tuned by the client by adaptive management through the year and from year to year.

Wildlife Interpretations:

Open and sparse tree canopies on this site provide forage and browse, and medium to dense tree canopies provide shelter and protection for mule deer and elk. This site may be used by a variety of upland game species including rabbits and grouse. Various songbirds, rodents, reptiles and associated predators natural to the area also use this woodland. The large, wingless seeds of limber pine have high energy content and provide food for rodents and birds. The shade and cover value of common juniper tends to be greatest for birds and small mammals.

Hydrological functions

Runoff is high. Permeability is moderately rapid. Potential for sheet and rill erosion is moderate to severe depending on slope.

Recreational uses

This site has moderate aesthetic value and provides a variety of recreational opportunities such as hiking, camping and deer and upland game bird hunting. Steep slopes and the fragile soil-vegetation complex, however, inhibit many other forms of recreation such as the use of off-road vehicles.

Wood products

Principle uses of white fir are poles, fuelwood, and some lumber. The wood produced from this site is generally of poor quality, however, white fir has potential for the production of pulp, possibly boxwood, and other manufactured wood products.

Limber pine has been used for mine props, railroad ties, and fuelwood. Since the limbs of limber pine cling to the trunk for many years, the lumber cut from this tree is characteristically knotty. This tree has little commercial value at present. As demand for lumber increases, however, it may be used for knotty pine lumber and paneling.

Bristlecone pine has been used locally for mine timbers. The wood of bristlecone pine is denser and harder than that of most conifers.

This site is of very low quality for tree production. Site index is less than 20.

Tree volume ranges from less than 40 cubic feet per acre for stands averaging 30 to 40 feet in height and 70 years of age.

Fuelwood Production: About 20 to 40 cords per acres for stands averaging 30 to 40 feet in height and 70 years of age. There are about 210,000 British Thermal Units (BTU's) of heat energy per cubic foot of mixed white fir, limber pine and bristlecone pine wood. Firewood is stacked unit equivalent to 128 cubic feet. Solid wood volume in a cord varies but straight material of even taper will give a solid volume of 80 to 90 cubic feet. Assuming an average of 85 cubic feet of solid wood per cord, there are about 18 million BTU's of heat value in a cord of wood of mixed white fir, limber pine, and bristlecone pine firewood.

Management Guides and Interpretations

1. Limits and Considerations

- a. Potential for sheet and rill erosion is moderate to severe depending on slope.
- b. Severe equipment limitations on steeper slopes.

2. Essential Requirements

- a. Adequately protect from uncontrolled burning to protect woodland resources and reduce potential erosion hazards.
- b. Protect soils from accelerated erosion. Use water bars at designed spacing on roads. Follow designed in-sloping, out-sloping or crowning of roads (with necessary ditching and reliable culverts).

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

Other products

Great Basin bristlecone pine is of unique biological and dendrological interest because of the great age attained by some individuals.

Other information

Within this ecological site, there are 12 plant species of concern, 3 of which are endemic to the Spring Mountain National Recreation Area (SMNRA). There are also 11 animal species of concern, 3 which are endemic to the SMNRA.

Table 7. 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
	ABCOC	1	20	1	40	—	—	—	

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T19 S R56 E S29
UTM zone	N
UTM northing	4014149
UTM easting	614680
General legal description	Wallace Canyon, Spring Mountains, Clark County, Nevada.

Other references

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Fire Effects Information System [Online]<http://www.fs.fed.us/feis>

Glenne, G. and D.Johnson.2002. Guide to Species of Concern in the Spring Mountains National Recreation Area, Clark and Nye Counties, Nevada. USFS, Las Vegas, NV.

Lanner, R.M. 1984. Trees of the Great Basin. University of Nevada Press, Reno NV.

Nachlinger, J. and G. Reese. 1996. Plant Community Classification of the Spring mountains National Recreation

Area, Clark and Nye Counties, Nevada. The Nature Conservancy. Reno, Nevada. III.

USDA-NRCS National Forestry Handbook, Exhibit 637-32. 190-V-NFH, Feb. 2001.

USDA-SCS National Forestry Manual, Table 21 190-V-NFN, Amend. 3, 1983.

Contributors

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Approval

Kendra Moseley, 4/26/2024

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:**
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17. **Perennial plant reproductive capability:**
