Ecological site F030XC283NV
Abies concolor var. concolor/Cercocarpus ledifolius var. intermontanus

Last updated: 4/26/2024
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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 woodland community occurs on the cool, moist back slopes of mountains at higer elevations and in drainageways at lower elevations. Slopes range from 30 to 75 percent. Elevations range from 6900 to 9710 feet. Soils associated with this site are generally moderately deep to deep and well drained. They have formed in colluvium from limestone and dolomite.

This site is part of group concept F030XC287NV.

Associated sites

F030XC280NV	**Pinus ponderosa ssp. scopulorum/Ribes cereum/Pseudoroegneria spicata ssp. spicata** Occur adjacent to site at lower elevations and on warmer slopes. Ponderosa pine site.
F030XC282NV	**Abies concolor var. concolor/Ribes cereum** Occurs at higher elevations, limber and brislecone pine in overstory.

Similar sites

F030XC282NV	**Abies concolor var. concolor/Ribes cereum** Occurs at higher elevation with limber and brislecone pine in overstory.

Table 1. Dominant plant species

Tree	(1) *Abies concolor var. concolor*
Shrub	(1) *Cercocarpus ledifolius var. intermontanus*
Herbaceous	Not specified

Physiographic features

This woodland community occurs on the cool, moist back slopes of mountains at higer elevations and in drainageways at lower elevations. Slopes range from 30 to 75 percent. Elevations range from 6900 to 9710 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Drainageway
Elevation	6,900–9,710 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 24 inches. Mean annual air temperature is 41 to 45 degrees F. The average growing season is about 60 to 95 days. There is no available climate station available for this site.

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)	95 days
Freeze-free period (average)	
Precipitation total (average)	24 in

Influencing water features

There are no influenceing water features associated with this site.

Soil features

Soils associated with this site are generally moderately deep to deep and well drained. They have formed in colluvium from limestone and dolomite. There may be a 1 to 4 inch thick layer of forest litter in various stages of decomposition at the surface. This layer of organic matter reduces moisture loss due to evaporation. Approximately 10 to 30 percent of the surface is covered with a needle and twig organic layer. The soil temperature is frigid. Soils are usually moist in late winter and spring, and periodically moist in the upper part following summer thunderstorms. Soil series associated with this site include Robbersfire and Devilsthumb.

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam (2) Extremely gravelly loam (3) Very gravelly silt loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate

Soil depth	20–60 in
Surface fragment cover <=3"	45–55%
Surface fragment cover >3"	1–10%
Available water capacity (0-40in)	2.4–3 in
Calcium carbonate equivalent (0-40in)	15–90%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	35–70%
Subsurface fragment volume >3" (Depth not specified)	1–5%

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:
Wildfire is recognized as a natural disturbance that strongly influenced the structure and composition of the climax vegetation of this forest site. At mid-elevations in the white fir zone, fires may have burned in a pattern of different severities, including patches where most of the moderately susceptible trees such as white fir, survived, and patches where white fir stands were completely destroyed. This type of fire regime creates a forest mosaic of stands with varied structures, species compositions, and seral stages. White fir is also a component of forest communities that evolved with less frequent, stand-replacing fires.

White fir seedlings, saplings and poles have resin-blistered thin-bark and long hanging lower branches which make them highly susceptible to fire damage and kill. Young white fir are usually killed by even low-intensity, surface fires. As trees mature and bark thickens, and some self-pruning of lower branches occurs, they become more resistant to fire. However, the tendency to retain some low branches, the moderately shallow roots, and heavy lichen growth on the branches of white fir make it only moderately fire resistant. In larger trees, mortality results from crown scorch, girdled stems from cambial heating, or damage to moderately shallow roots from soil heating.
Curlleaf mountainmahogany is highly flammable due to its resinous leaves and high incidence of persistent dead branches in the crown. Curlleaf mountainmahogany is occasionally a weak sprouter after fire.
Wax currant regeneration is favored by short-duration, low-severity fire because soil-stored seed requires scarification to germinate. Most wax currant plants, however, are severely damaged or killed by fire. Plants do not typically resprout.

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.

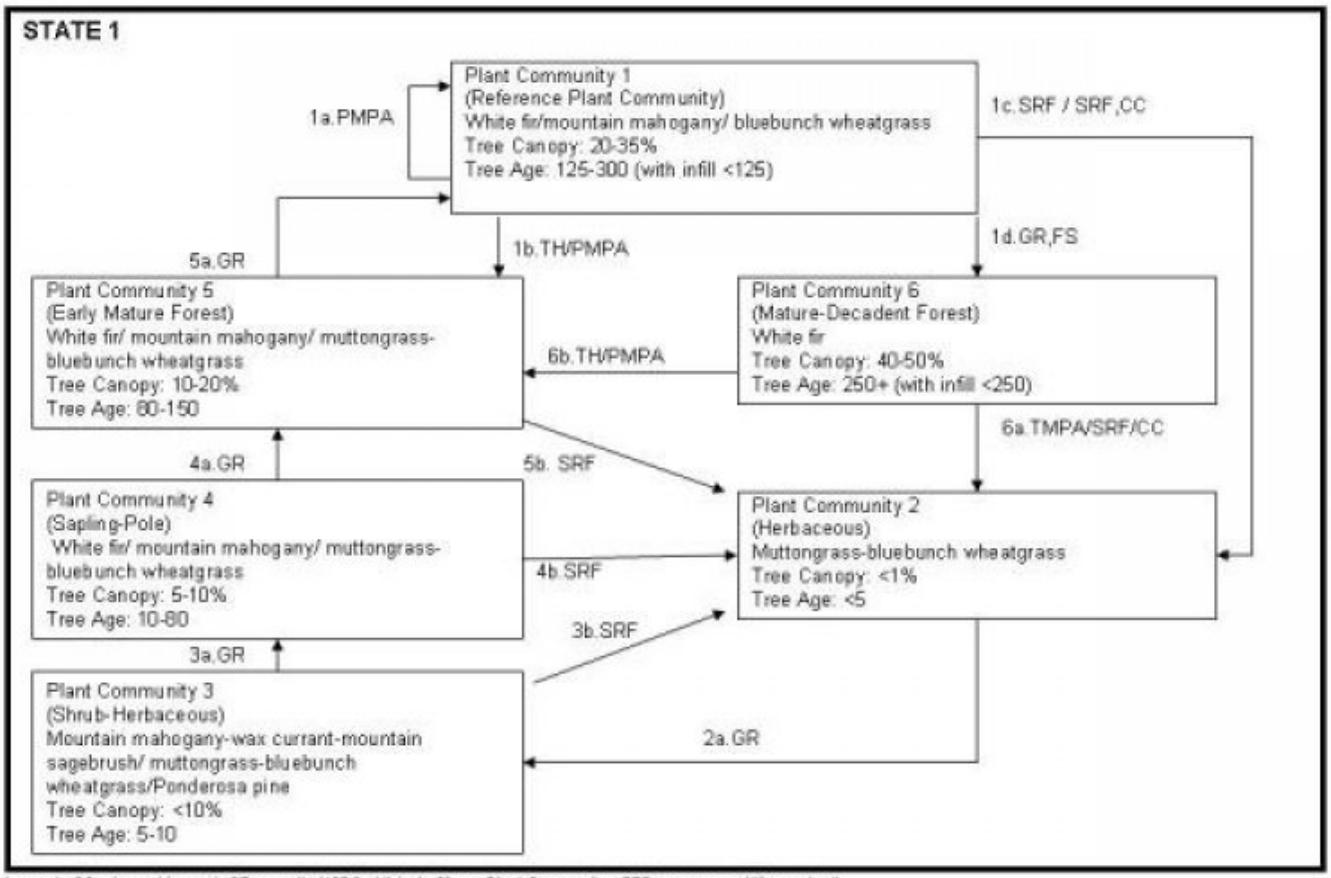
SAPLING-POLE: In the absence of disturbance, the conifer seedlings develop into saplings (20 inches to 4.5 feet in height) with a range in canopy cover of about 5 to 10 percent. Vegetation consists of grasses, forbs, and shrubs in association with conifer seedlings and in locations, young curlleaf mountainmahogany.

EARLY MATURE FOREST: The visual aspect and vegetal structure are dominated by white fir greater than 4.5 feet in height. Seedlings and saplings of white fir are present in the understory. Understory vegetation is moderately influenced by a tree overstory canopy of about 10 to 25 percent. As the fir trees continue to develop, they will eventually dominate the site.

MATURE FOREST: The visual aspect and vegetal structure are dominated by 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 25 to about 35 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Few seedlings and/or saplings of bristlecone pine 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 40 to 50 percent.

State and transition model



F30XC283NV *Abies concolor var. concolor/ Cercocarpus ledifolius/Pseudoroegneria spicata ssp. spicata*

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by Rocky Mountain white fir. Rocky Mountain ponderosa pine occurs within the overstory in varying amounts depending on elevation and slope aspect. Bluebunch wheatgrass is the most prevalent understory grass. An overstory canopy cover of 25 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment. Overstory tree canopy composition is about 50 to 75 percent white fir, 10 to 25 percent ponderosa pine and 1 to 5 percent curlleaf mountain mahogany at lower elevations. Wax currant, curlleaf mountainmahogany and mountain big sagebrush (A. tridentata var. pauciflora) are the principal understory shrubs.

Forest overstory. Mature Forest: The visual aspect and vegetal structure are dominated by 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 20 to about 35 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Few seedlings and/or saplings of bristlecone pine occur in the understory.

Forest understory. Understory vegetative composition is about 30 percent grasses, 5 percent forbs and 65 percent shrubs and young trees when the average overstory canopy is 30 percent. Average understory production ranges from 400 to 600 pounds per acre with a canopy cover of 25 to 35 percent. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.

Table 5. Ground cover

Tree foliar cover	20-30%
Shrub/vine/liana foliar cover	5-30%
Grass/grasslike foliar cover	1-5%
Forb foliar cover	1-2%
Non-vascular plants	0%
Biological crusts	0%
Litter	10-30%
Surface fragments >0.25" and <=3"	35-55%
Surface fragments >3"	1-10%
Bedrock	0%
Water	0%
Bare ground	10-30%

Table 6. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	1-5%	1-5%	1-5%	1-3%
>0.5 <= 1	1-5%	1-5%	1-5%	1-3%
>1 <= 2	1-5%	1-5%	1-2%	–
>2 <= 4.5	5-10%	10-30%	–	–
>4.5 <= 13	10-25%	–	–	–
>13 <= 40	10-15%	–	–	–
>40 <= 80	1-2%	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Additional community tables

Animal community

Livestock Interpretations:
This site is suited to cattle and sheep grazing during the spring and fall. 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 the lack of adequate water. Attentive grazing management is required due to steep slopes and erosion hazards. Harvesting trees under a sound management program can open up the tree canopy to allow increased production of understory species desirable for grazing. Stands dominated by white fir seldom produce enough forage for domestic livestock grazing except on harvested or open forest sites, or where grasses and sedges dominate the understory.

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:
These forests provide abundant browse and cover for large and small wildlife species. Mule deer, elk, and bear often use white fir habitats as either summer or winter range. Mule deer generally eat small amounts of white fir during the spring, fall, and winter, and sometimes larger amounts during the summer. Spring browsing of white fir by deer can be particularly heavy when small white firs are the only green food available; all of the current or previous year's growth may be consumed. Porcupines also feed on the bark of white fir, and may destroy saplings. Rodents feed on the cambial tissue of white fir. During the winter, mice feed on the leaders of small white firs near snow level. In the spring, they feed on seedlings, sometimes destroying a large proportion of the current year's seedlings. Pocket gophers also feed on white fir seedlings in the winter and spring. White fir needles are an important part of the diet of blue grouse. White fir seeds are eaten by several species of small mammals and birds including grouse, chipmunks and mice, flying squirrels, chickadees, crossbills, and Clark's nutcracker. Hollow logs and snags of white fir can be important to various birds and animals for foraging in the interior wood. Because they contain resins, terpenes, and other substances that make the foliage irritating to the digestive tract, most conifers are not particularly palatable to grazing animals. White fir may be slightly palatable to goats. Immature foliage is also consumed by mule deer. White fir seeds are palatable to numerous species of small rodents.

White fir's evergreen foliage provides good hiding cover year-round and is usually continuous from the ground upward on trees less than 8 to 10 inches (20-25 cm) dbh. White fir stands of this nature provide excellent hiding cover for large wildlife species such as deer, elk, and black bear. If enough shrubs are present in the understory to provide adequate hiding cover, mature white fir forests are used by deer during fawning and by elk during calving.

Hydrological functions

Runoff is high. 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.
The wood of ponderosa pine is valuable for lumber.

This site is of very low quality for tree production. Site index ranges from less than 20 for white fir and ponderosa pine.

Tree volume for white fir ranges from less than 40 cubic feet per acre for stands averaging 30 to 40 feet in height at 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.

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

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.)

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

Other products

Although no longer harvested, the oleoresin, or pitch, of ponderosa pine has been a source of turpentine in the past.

Other information

Associated with this ecological site are 14 plant species of concern, 4 of which are endemic to the Spring Mountain National Recreation Area (SMNRA). There are also 10 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	20	20	40	40	–	–	–	

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T23 S R54 E S23
UTM zone	N
UTM northing	4026321
UTM easting	600618
General legal description	Approximately 5 miles east and 5 miles north of Mount Stirling on the west side of the Spring Mountains, Clark County, Nevada.

Other references

Clokey, Ira. 1951. Flora of the Charleston Mountains Clark County, Nevada. University of California Press, Berkeley and Los Angeles.

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.

Meyer, W.H. 1938. Even-aged stands of Ponderosa Pine. USDA Tech Bull 630.

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. High conifer forest and Woodland Zone. 8 Abies concolor-Pinus ponderosa var. scopulorum-Cercocarpus ledifolius var intermontanus Series. White fir-ponderosa pine-cuflleaf mountain mahogany Series. Page I-46-47.

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:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**
