USDA Natural Resources Conservation Service

Ecological site F030XC287NV
Pinus ponderosa ssp. scopulorum-Abies concolor var. concolor/Ericameria compacta/Pseudoroegneria spicata ssp. spicata

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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 site occurs on south-facing back slopes of mountains. Slopes range from 30 to 75 percent. Elevations are 8000 to 11,000 feet. The soils associated with this site are very shallow and shallow, somewhat excessively drained soils that formed in residuum and colluvium from limestone and dolomite.

This is a group concept and provisional STM that also covers the following ecological sites: F030XC285NV F030XC287NV F030XC283NV, F030XC282NV, F030XC290NV, F030XC292NV, F030XC293NV, F030XC294NV, F030XC295NV

Associated sites

F030XC280NV	**Pinus ponderosa ssp. scopulorum/Ribes cereum/Pseudoroegneria spicata ssp. spicata** Occurs on alluvial fans, inset fans and mountain slopes. More productive site. Higher site index.

Similar sites

F030XC280NV	**Pinus ponderosa ssp. scopulorum/Ribes cereum/Pseudoroegneria spicata ssp. spicata** Occurs on alluvial fans, inset fans and mountains slopes. More productive site. Higher site index.
F030XC279NV	**Pinus ponderosa var. scopulorum-Juniperus scopulorum/Cercocarpus ledifolius var. intermontanus/Bouteloua gracilis** Overstory includes Rocky Mountain juniper, found on fan remnants.

Table 1. Dominant plant species

Tree	(1) *Pinus ponderosa ssp. scopulorum* (2) *Abies concolor var. concolor*
Shrub	(1) *Ericameria compacta*
Herbaceous	(1) *Pseudoroegneria spicata ssp. spicata*

Physiographic features

This site occurs on south-facing back slopes of mountains. Slopes range from 30 to 75 percent. Elevations are 8000 to 11,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope
Elevation	2,438–3,353 m

Slope	30–75%
Aspect	S

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 16 to 20 inches. The mean annual air temperature is 41 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)	508 mm

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very shallow and shallow, somewhat excessively drained soils that formed in residuum and colluvium from limestone and dolomite. The surface is covered by approximately 80 percent gravel and 3 percent cobbles. The soil moisture is usually moist in late winter and spring, and periodically moist in the upper part following summer thunderstorms. The soil moisture regime is ustic bordering on aridic. Soil series associated with this site includes Thesisters.

Table 4. Representative soil features

Surface texture	(1) Extremely gravelly silt loam
Family particle size	(1) Loamy
Drainage class	Somewhat excessively drained

Permeability class	Moderate
Soil depth	10–51 cm
Surface fragment cover <=3"	75–80%
Surface fragment cover >3"	1–3%
Available water capacity (0-101.6cm)	1.02 cm
Calcium carbonate equivalent (0-101.6cm)	60–80%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	50–75%
Subsurface fragment volume >3" (Depth not specified)	1–3%

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. Rocky Mountain ponderosa pine evolved under a regime of frequent surface fires and infrequent mixed-severity and stand-replacement fires. Prior to the 1900s, Rocky Mountain ponderosa pine was perpetuated by surface fires that reoccurred every 5 to 30 years. Fire return intervals tended to be shorter in the warm, dry forests of the Southwest than in the cool, dry forests of the central Rocky Mountains. Presettlement fires in lower-elevation ponderosa pine communities were mostly low- to moderate-severity surface fires that maintained open, parklike stands. Periodic surface fire removed the heavy litter and duff that accumulates in ponderosa pine forests. Wind-borne seeds falling from the crowns of surviving or fire-killed trees land on a mineral seedbed under an open canopy that favors germination and seedling establishment. These frequent fires created openings for pine seedling establishment, thus maintaining its persistence. Ponderosa pine trees are relatively resistant to cool, slow burning, wildfires through the understory because of their thick, insulating bark. Ground fires affect understory vegetal structure and composition leaving a more open grass-forb community with scattered, dense patches of shrub species.

Fire suppression, however, has allowed for the unnatural buildup of forest fuels, increasing the occurrence of stand-replacing fires. Over the last 60 to 80 years of fire suppression, ponderosa pine stands have been replaced by shade-tolerant species such as white fir. White fir is very shade tolerant and will regenerate under shade as where ponderosa pine will not. Fire exclusion has also created closed-canopy stands with dense understories and ladder fuels. As a result, severe, stand-replacing fires, which were uncommon in the past, are now common.

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 a crown fire. Skeleton forest (dead trees) remaining after fire have little to no affect on the composition and production of the herbaceous vegetation.

SHRUB-HERBACEOUS: Herbaceous vegetation and woody shrubs dominate the site. This stage is experienced within two or three years after fire or harvest. The majority of shrub species in the understory are crown-sprouters and can dominate the plant community following disturbance. With abnormally frequent wildfire, the understory vegetation reflects a chaparral community. Many chaparral communities are retarded from progressing towards ecologically higher stages by an unnaturally, short fire cycle. 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.

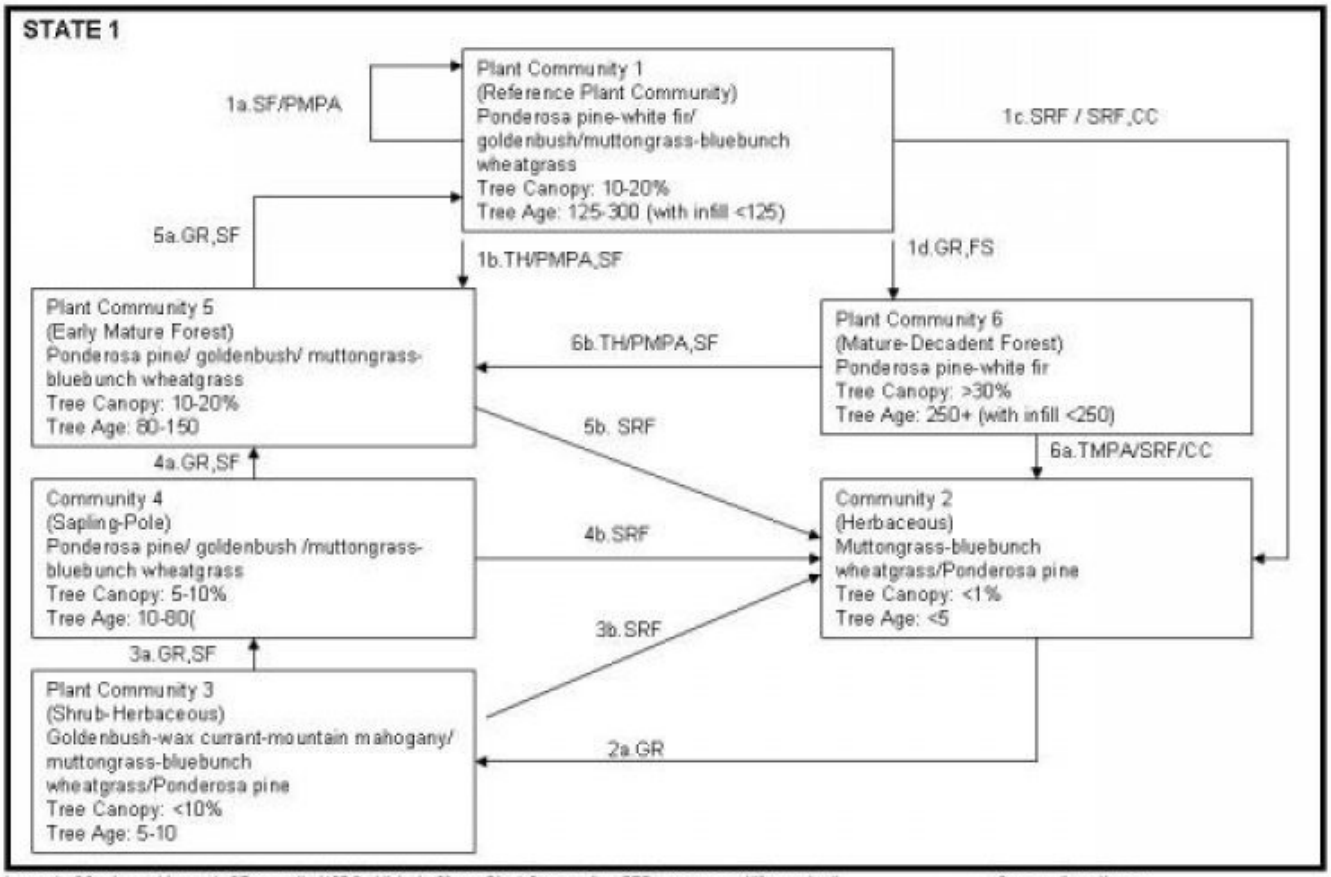
SAPLING-POLE: In the absence of disturbance the tree seedlings develop into saplings (20 inches to 4.5 feet in height) with a range in canopy cover of about 5 to 10 percent. Understory shrubs dominate the plant community.

EARLY MATURE FOREST: The visual aspect and vegetal structure are dominated by ponderosa pine greater than 4.5 feet in height. At this stage of woodland development, the tree canopy has successfully broken through the suppression of a chaparral community. The young ponderosa pine are common in the understory. Dominants are the tallest trees on the site; co-dominants are 65 to 85 percent the highest of dominant trees. Understory vegetation is moderately influenced by a tree overstory canopy of about 10 to 20 percent.

MATURE FOREST (Reference Plant Community): The stage is dominated by ponderosa pine that have reached or are near maximal heights for the site. Tree canopy cover ranges from 10 to 20 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Infrequent, yet periodic, wildfire is presumed to be a natural factor influencing the understory of mature ponderosa pine forests. Ponderosa pine trees, at this stage of growth, are relatively resistant to cool, slow burning, wildfires through the understory because of their thick, insulating bark. Ground fires affect understory vegetal structure and composition leaving a more open grass-forb community with scattered, dense patches of chaparral species. This stage of community development is assumed to be representative of this forest site in the pristine environment.

MATURE-DECADENT FOREST: This stage is dominated by ponderosa pine that have reached maximal heights for the site. Understory vegetation is much reduce due to tree competition, overstory shading, duff accumulation, etc. Few seedlings or saplings of ponderosa pine are found in the understory. Tree canopy cover is commonly greater that 30 percent.

State and transition model



State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by Rocky Mountain ponderosa pine. The overstory canopy cover is about 15 to 25 percent. This is assumed to be representative of tree dominance on this site in the pristine environment. This site is dominated by Rocky Mountain ponderosa pine with a mix of Rocky Mountain white fir, Rocky Mountain juniper and to a lesser extent, limber and bristlecone pine. Charleston goldenbush and wax currant are the most prevalent understory shrubs. Bluebunch wheatgrass and muttongrass are the most prevalent grasses. The visual aspect and vegetal structure are dominated by ponderosa pine that have reached or are near maximal heights for the site. Tree heights average approximately 40 feet (30 to 50 feet.) Average tree spacing is 50 to 80 feet, average DBH is 15-20 and average trees/acre is 10 to 20. Tree canopy cover ranges from 10 to 20 percent. Overstory tree canopy composition is 70 percent Rocky Mountain ponderosa pine with 30 percent or more of Rocky Mountain white fir. On the drier slopes, Rocky Mountain juniper may compose up to 5 percent of overstory. At higher elevations, limber pine and bristlecone pine are more prevalent in the overstory.

Table 5. Ground cover

Tree foliar cover	10-20%
Shrub/vine/liana foliar cover	5-10%
Grass/grasslike foliar cover	1-5%
Forb foliar cover	1-5%

Non-vascular plants	0%
Biological crusts	0%
Litter	5-10%
Surface fragments >0.25" and <=3"	75-80%
Surface fragments >3"	0-3%
Bedrock	0-10%
Water	0%
Bare ground	10-20%

Table 6. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	1-5%	1-5%	1-5%	1-5%
>0.15 <= 0.3	1-5%	1-5%	1-5%	1-5%
>0.3 <= 0.6	1-5%	1-5%	–	1-2%
>0.6 <= 1.4	5-5%	1-5%	–	–
>1.4 <= 4	5-5%	–	–	–
>4 <= 12	5-10%	–	–	–
>12 <= 24	10-20%	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Additional community tables

Animal community

Livestock Interpretations:
This site has limitied value for livestock grazing because of low forage production, steep slopes and lack of water. Wild horses will use this site during the summer and fall if water is available. 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.

Wildlife Interpretations:
This site has moderate value for mule deer and elk, especially during the summer and fall. Various songbirds, rodents, reptiles and associated predators native to the area are also found.
Rocky Mountain ponderosa pine provides habitat for many rodent species, and the seeds are an important food source for some rodents and shrews. Ponderosa pine snags also provide sites for cavity-nesting birds and mammals.

Hydrological functions

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

Recreational uses

Recreational activities, such as hiking and camping, are possible but are somewhat limited by the steep slopes.

Wood products

The wood of ponderosa pine is valuable for lumber. Although no longer harvested, the oleoresin, or pitch, of ponderosa pine has been a source of turpentine in the past (Lanner, 1984).

This forest community is of low site quality for tree production. Site Index is approximately 20. (Table 21, SCS, 190-V-NFM Amend. 3; from Meyer, 1938. USDA Tech. Bull. 630).

Fuel wood production: Less than 20 cords per acre of stands averaging 50 feet in height and 150 years of age with a medium canopy cover. There is about 213,750 gross British Thermal Units (BTUs) heat content per cubic foot of ponderosa pine wood. 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 16 million BTU's of heat value in a cord of ponderosa pine wood.

Posts (7 foot): 25 to 50 per acre in stands of medium canopy.

Tree volume per Acre: For stands averaging 50 feet in height and 150 years old.
Site Index 20 = <3,700 cu ft

Management Guides and Interpretations

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

2. Essential Requirements
a.Adequately protect from wildfire.
b.Protect soils from accelerated erosion.
c.Apply proper grazing management.

3. Silvicultural Practices
a.Harvest cut selectively or in small patch size dependent upon site conditions to enhance forage production.
1)Thinning and improvement cutting – Removal of poorly formed, diseased and low vigor trees for fuel wood.
2)Harvest cutting – Selectively harvest surplus trees to achieve desired spacing. Save large, healthy, full crowned trees for cone (fruit) producers. Do not select only "high grade" trees during harvest.
3)Slash Disposal – broadcasting slash improves reestablishment of native understory herbaceous species and establishment of seeded grasses and forbs after tree harvest.
4)Spacing Guide – D+9

b.Prescription burning program to maintain desired canopy cover and manage site reproduction.
c.Pest control – Porcupines can cause extensive damaged and populations should be controlled.
d.Fire hazard – Fire usually not a problem in well-managed, mature stands.

Other products

Native Americans ate interior ponderosa pine seeds and the sweet, edible phloem in the inner bark.

Ponderosa pine is widely used as a drought tolerant ornamental for landscaping.

Other information

Rocky Mountain ponderosa pine (Pinus ponderosa var. scopulorum) has migrated into the Great Basin following the ice ages by way of the southern Rocky Mountains. Rocky Mountain ponderosa pines never attain the size of the typical variety (P. ponderosa var. ponderosa). The fascicles of this tree tend to have only two needles and the needles are shorter than the typical variety. The cones of Rocky Mountain ponderosa pine are also smaller then the typical variety.
There are 10 plant species of concern associated with this ecological site within the Spring Mountain National Recreational Area (SMNRA). One species is an endemic to the SMNRA. There are also 9 animal species of concern, three 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	20	40	–	–	–	
ponderosa pine	*PIPOS*	20	20	15	29	–	–	–	

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T19 S R56 E S9 NW
UTM zone	N
UTM northing	401993n
UTM easting	0616956e
General legal description	1.5 miles up Bristlecone trail from Scout Canyon trailhead, Lee Canyon, 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., Johnson, D. 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., Reese, G. 1996. Plant Community Classification of the Spring Mountains National Recreation Area, Clark and Nye Counties, Nevada. The Nature Conservancy. Reno, Nevada.

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	07/17/2024
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:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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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:**
