

Spruce-fir Forest Desired Condition

Operational Draft: This document is prepared to provide guidance to Forest Plan revision teams. As this guidance is implemented, we expect to learn improved ways to do this work. As we learn, this document will be updated. This document was reviewed and revised as appropriate in April 2010 to conform to the requirements of the 1982 Planning Rule provisions.

General Description

The Spruce-fir Forest vegetation community generally occurs at elevations ranging from approximately 9,500 to 11,500 feet. It is often dominated by Engelmann spruce, but contains other species depending on elevation. The understory commonly includes currants, maples, honeysuckle, common juniper, huckleberry, alpine clover, and sedges. Spruce-fir forests occur on the coldest, wettest, and highest elevation sites in the Region. This forest vegetation community can be subdivided into lower elevation (spruce fir mix) and upper elevation (subalpine spruce fir) spruce-fir types with differing fire regimes and subdominant species composition. The lower spruce-fir type typically occurs between 9,500 and 10,500 feet in elevation, while the upper spruce-fir type typically occurs between 10,500 and about 11,500 feet in elevation and is bounded, where present, by the alpine tundra vegetation above 11,500 feet.

The lower elevation spruce-fir type resembles the wet mixed conifer except with a different composition of tree species, due to colder and wetter conditions, and is a transition zone between wet mixed conifer and the upper elevation spruce-fir forest type. In the lower type, the common seral tree species are aspen, Douglas-fir, white fir, and Southwestern white/limber pine. The climax forest is dominated by Engelmann spruce, white fir and occasionally blue spruce. Subdominant species may include corkbark/subalpine fir, white fir, and bristlecone pine. In the upper type, the dominant tree species are Engelmann spruce and corkbark fir (subalpine fir). Patches of aspen are occasionally present, but are usually absent. Disturbances in these types typically occur at two temporal and spatial scales; large-scale infrequent disturbances (mostly fire) and small-scale frequent disturbances (fire, insect, disease, wind).

Landscape Scale Desired Conditions:

The Spruce-fir Forest vegetation community is a mosaic of structural and seral stages ranging from young trees through old and is composed of multiple species. The landscape arrangement is an assemblage of variably-sized and aged groups and patches of trees and other vegetation similar to historic patterns. . Tree canopies are generally more closed than in mixed conifer. An understory consisting of native grass, forbs, and/or shrubs is present.

Old growth generally occurs over large areas as stands or forests where old growth is concentrated. Old growth includes old trees, dead trees (snags), downed wood (coarse woody debris) and structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).

The Spruce-fir Forest vegetation community is composed predominantly of vigorous trees, but older declining trees are a component and provide for snags, top-killed, lightning- and fire-scarred trees, and coarse woody debris, all well-distributed throughout the landscape. The number of snags and amount of downed logs (>12 inch diameter at mid-point, >8 feet long) and coarse woody debris (>3 inch diameter) vary by seral stage.

The composition, structure, and function of vegetative conditions are resilient to the frequency, extent and severity of disturbances and climate variability. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g. insects, diseases, fire, and wind), including old trees, downed logs, and snags. Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and to ecosystem function. In the lower spruce-fir type, mixed severity fires (Fire Regime III) infrequently occur. In the upper spruce-fir type, high severity fires (Fire Regime IV and V) occur very infrequently. Natural and anthropogenic disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

Mid-Scale Desired Conditions:

At the mid-scale, the size and number of groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. Patch sizes vary but are mostly in the hundreds of acres, with rare disturbances in the thousands of acres. There may be frequent small disturbances resulting in groups and patches of tens of acres or less. A mosaic of groups and patches of trees, primarily even-aged, that are variable in size, species composition, and age is present. Grass, forb, shrub openings created by disturbance may comprise 10 to 100 percent of the mid-scale area following major disturbance and depending on time since disturbance. Aspen is occasionally present in large patches.

Density ranges from 20 to 250 square foot basal area per acre, depending upon disturbance and seral stages of the groups and patches. Snags 18 inches or greater at DBH range from 1 to 3 snags per acre, with the lower range of snags this size associated with early seral stages and the upper range associated with late seral stages. Snags density in general (> 8" DBH) averages 20 per acre with a range of 13 to 30. Coarse woody debris, including downed logs, averages vary by seral stage, ranging from 5 to 30 tons per acre for early-seral stages; 30 to 40 tons per acre for mid-seral stages; and 40 tons per acre or greater for late-seral stages.

Mixed (Fire Regime III) and high (Fire Regime IV and V) severity fires and other disturbances maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

The wildland urban interface (WUI)¹ is comprised primarily of grass/forb/shrub vegetation. Structures in the WUI are surrounded by grassy openings with very few or no trees. These conditions result in ground fires.

Forest conditions in goshawk post-fledging family areas (PFAs) are similar to general forest conditions except these forests contain 10 to 20 percent greater tree density (basal area) than goshawk foraging areas and the general forest. Nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively denser canopies than other areas in the spruce-fir type.

Fine Scale Desired Conditions:

Mid-aged to old trees grow tightly together with interlocking crowns. Trees are generally of the same height and age in early group\patch development but may be multilayered in late development. Small openings (gaps) are present as a result of disturbances.

¹ Note – each Forest needs to provide here the definition for WUI that they are using.