

***Abies fraseri* / *Viburnum lantanoides* / *Dryopteris campyloptera* - *Oxalis montana* /
Hylocomium splendens Forest**

COMMON NAME Fraser Fir / Hobblebush / Mountain Woodfern - Common Wood Sorrel / Stairstep Moss Forest
SYNONYM Fraser Fir Forest (Deciduous Shrub Type)
PHYSIOGNOMIC CLASS Forest (I)
PHYSIOGNOMIC SUBCLASS Evergreen forest (I.A)
PHYSIOGNOMIC GROUP Temperate or subpolar needle-leaved evergreen forest (I.A.8)
PHYSIOGNOMIC SUBGROUP Natural/Semi-natural (I.A.8.N)
FORMATION Conical-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.c.)

ALLIANCE *Abies fraseri* - *Picea rubens* Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 1

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This forest community is restricted to the highest mountain systems of the southern Blue Ridge Province in eastern Tennessee and western North Carolina.

Great Smoky Mountains National Park

On the two pilot quadrangles, this community is restricted to the summit and high slopes of Mount Le Conte. *Abies fraseri* Forests occur elsewhere within the Park boundary and should be looked for at elevations over 6000 feet (1830 meters).

ENVIRONMENTAL DESCRIPTION

Globally

This community occurs on steep ridges and mesic, north-facing slopes above 6000 feet (1830 meters) elevation, although it may extend lower on some sites. These forests occur on all topographic positions except the steepest rocky cliffs of the highest summits. Occurrences of this community are often steep and bouldery with seepage areas. Soils that support this community are classified as Inceptisols and are shallow, rocky, and often have a thick organic layer. Moisture regimes are mesic to wet, due to high rainfall, abundant cloud cover, fog deposition, and low temperatures. This community occurs as island-like stands in the southern Appalachian Mountains.

Great Smoky Mountains National Park

This community was found on and around the summit of Mount Le Conte, on exposed, broad, flat ridges and on moderately steep, north-facing slopes. This forest typically occurs at elevations over 6000 feet (1830 meters), but samples ranged from 5880 to 6540 feet elevation.

MOST ABUNDANT SPECIES

Globally

<u>Stratum</u>	<u>Species</u>
Tree canopy	<i>Abies fraseri</i>
Tall shrub	<i>Viburnum lantanoides</i> , <i>Vaccinium erythrocarpum</i> , <i>Sambucus racemosa</i> var. <i>pubens</i> , <i>Rubus allegheniensis</i>
Herbaceous	<i>Oxalis montana</i> , <i>Dryopteris campyloptera</i> , <i>Athyrium filix-femina</i> , <i>Huperzia lucidula</i>
Nonvascular	<i>Ptilium crista-castrensis</i> , <i>Hylocomium splendens</i>

Great Smoky Mountains National Park

<u>Stratum</u>	<u>Species</u>
Tree canopy	<i>Abies fraseri</i>
Tall Shrub	<i>Vaccinium erythrocarpum</i> , <i>Rubus allegheniensis</i> , <i>Viburnum lantanoides</i>
Herbaceous	<i>Aster acuminatus</i> , <i>Athyrium filix-femina</i> , <i>Oxalis montana</i> , <i>Clintonia borealis</i> , <i>Dryopteris campyloptera</i>

CHARACTERISTIC SPECIES

Globally

Abies fraseri, *Vaccinium erythrocarpum*, *Rubus allegheniensis*, *Viburnum lantanoides*, *Oxalis montana*, *Hylocomium splendens*

Great Smoky Mountains National Park

Abies fraseri, *Rubus allegheniensis*, *Diervilla sessilifolia*, *Sambucus racemosa* var. *pubens*, *Solidago glomerata*, *Rugelia nudicaulis*

VEGETATION DESCRIPTION

Globally

This needle-leaved evergreen forest has at least 75 percent of the canopy coverage composed of *Abies fraseri*, typically with many standing dead stems. Canopy trees are of small diameter (less than 20 cm) and short stature (less than 10 m tall), giving these forests a stunted appearance. Other species that may occur in the canopy or subcanopy with low coverage are *Picea rubens*, *Sorbus americana*, *Betula alleghaniensis*, *Prunus pensylvanica*, and *Acer spicatum*. There may be considerable variation in the density of shrub cover, but it is typically low (<20 percent) and dominated by deciduous species. Typical shrub species include *Viburnum lantanoides*, *Vaccinium erythrocarpum*, *Sambucus racemosa* var. *pubens*, *Menziesia pilosa*, *Rubus allegheniensis*, and *Rubus idaeus* ssp. *strigosus*. Where shrubs are sparse, herb cover is usually dense, with *Oxalis montana*, *Athyrium filix-femina* ssp. *asplenioides*, and *Dryopteris campyloptera* often dominant. Other common herbs include *Aster acuminatus*, *Aster chlorolepis*, *Clintonia borealis*, *Solidago glomerata*, *Rugelia nudicaulis*, *Ageratina altissima* var. *roanensis*, *Chelone lyonii*, *Circaea alpina* ssp. *alpina*, *Streptopus roseus*, *Viola macloskeyi* ssp. *pallens*, *Geum radiatum*, and *Huperzia lucidula*. Mosses, liverworts, and lichens grow densely on fallen logs, tree trunks, and the forest floor, giving the community a distinctive carpeted appearance. Characteristic bryophyte species include *Hylocomium splendens*, *Ptilium crista-castrensis*, *Rhytidiadelphus triquetrus*, *Hylocomiastrum umbratum*.

Great Smoky Mountains National Park

This forest has a canopy strongly dominated by *Abies fraseri*, often with many standing dead and fallen individuals. Minor amounts of other tree species (*Picea rubens*, *Betula alleghaniensis*, *Prunus pensylvanica*, and *Sorbus americana*) may occur in the canopy, subcanopy, or as tall shrubs/saplings. The shrub stratum is typically open and sparse but can have moderately dense coverage, especially in areas disturbed by past logging, deer browsing, or Balsam Woolly Adelgid (*Adelges piceae*). Shrubs can include *Diervilla sessilifolia*, *Rubus canadensis*, *Sambucus racemosa* var. *pubens*, *Vaccinium erythrocarpum*, and *Viburnum lantanoides*. The shrub stratum may also have areas of dense *Abies fraseri* regeneration, particularly in areas of canopy tree mortality. The herbaceous stratum has moderately dense coverage, with ferns and tall forbs locally dominant. Typical herbaceous dominants include *Aster acuminatus*, *Athyrium filix-femina*, *Oxalis montana*, *Clintonia borealis*, *Dryopteris campyloptera*, and *Solidago glomerata*. Other herbaceous species include *Carex brunnescens*, *Carex debilis*, *Huperzia lucidula*, *Rugelia nudicaulis*, and, in seepage areas, *Chelone lyonii*, *Impatiens pallida*, and the shrub, *Ribes rotundifolia*. In stands with intact *Abies fraseri* canopies, mosses have high coverage on fallen logs, and tree trunks.

OTHER NOTEWORTHY SPECIES

An exotic insect, the Balsam Woolly Adelgid (*Adelges piceae*), invaded the southern Appalachians in the late 1950s and has drastically altered the last undisturbed remnants of this community. This exotic pest kills mature *Abies fraseri* within seven years of infestation.

Rare or regionally rare vascular plant species associated with this community include *Abies fraseri*, *Betula papyrifera* var. *cordifolia*, *Cardamine clematidis*, *Glyceria nubigena*, *Phegopteris connectilis*, *Poa palustris*, *Rhododendron vaseyi*, *Stachys clingmanii*, *Streptopus amplexifolius*. Rare non-vascular plants include *Bazzania nudicaulis*, *Brachydontium trichodes*, *Leptodontium excelsum*, *Metzgeria temperata*, *Nardia scalaris*, *Plagiochila corniculata*, *Sphenolobopsis pearsonii*.

Animals endemic to high elevation areas of the southern Appalachians include Carolina Flying Squirrel (*Glaucomys sabrinus coloratus*), Yonahlossee Salamander *Plethodon yonahlossee*, Weller's Salamander (*Plethodon welleri*), Spruce-fir Moss Spider *Microhexura montivaga*. Rare animal species that are northern disjuncts include Black-capped Chickadee (*Parus atricapillus*, and Northern Saw-whet Owl (*Aegolius acadicus*). The spruce-fir moss spider (*Microhexura montivaga* G1) is specific to this community type. The spider populations seem to be decreasing with the decline of these forests. As the canopy thins, moss desiccation increases, thus affecting the spider's habitat.

CONSERVATION RANK G1

RANK JUSTIFICATION

This community occurs as island-like stands in the southern Appalachian Mountains. It has a naturally restricted distribution and exists in only a small portion of its original range due to the impact of early 20th century, post-logging fires and the ongoing outbreak of the Balsam Woolly Adelgid (*Adelges piceae*). Well-developed, undisturbed examples of this community are extremely rare.

DATABASE CODE CEGL006049

COMMENTS

Globally

This community may grade into forests dominated by northern hardwood species (*Betula alleghaniensis*, *Fagus grandiflora*, *Acer saccharum*) or forest codominated by *Picea rubens* and *Abies fraseri*. It may also occur adjacent to montane grasslands, high elevation shrublands, or high elevation rock outcrop communities. A similar forest, *Abies fraseri* / (*Rhododendron catawbiense* - *Rhododendron carolinianum*) Forest, has a canopy dominated by *Abies fraseri* but has a shrub stratum dominated by evergreen species.

Great Smoky Mountains National Park

On Mount Le Conte, this community occurs as discontinuous stands in a mosaic of standing dead *Abies fraseri* and areas variously dominated by shrubs (*Rubus canadensis* and/or *Diervilla sessilifolia*) or herbaceous species (*Athyrium filix-femina* and/or *Solidago glomerata*) – see *Rubus canadensis* - (*Rubus idaeus* ssp. *strigosus*) / *Solidago glomerata* - *Athyrium filix-femina* Shrubland (CEGL003893).

REFERENCES

Brown 1941, Bruck 1988, Busing et al. 1988, Crandall 1958, Davis 1930, McLeod 1988, Nicholas et al. 1992, North Carolina Natural Heritage Program 1993, Oosting and Billings 1951, Ramseur 1960, Schafale and Weakley 1990, White 1984, White and Pickett 1985, White et al. 1993, Whittaker 1956