

USGS-NPS Vegetation Mapping Program
Acadia National Park

***Picea rubens* - *Picea glauca* Forest**

COMMON NAME Red Spruce - White Spruce Forest
SYNONYM Maritime Spruce - Fir Forest
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 PICEA RUBENS - ABIES BALSAMEA FOREST ALLIANCE

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Terrestrial

RANGE

Acadia National Park

This association occurs abundantly throughout the park. On Mount Desert Island, most of these forests occur on the west and southeast portions. This is the most extensive forest type on Schoodic peninsula, Isle au Haut, Long Island, and other smaller islands.

Globally

This association occurs in Maine.

ENVIRONMENTAL DESCRIPTION

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At various landscape positions, aspects, and all elevations within the Park, although less frequent on hill crests than on slopes and low flats. Slopes are generally low to moderate, up to 30%. Most occur on till soils, though some occur on thin soil over bedrock. Most sites have loamy to sandy soils that are moderately well drained; pH is in the 4.8 - 5.2 range (occasionally slightly higher). Though shallow (10 - 40 cm), the soils are generally deeper than those supporting conifer woodlands. Most of the spruce - fir forests sampled were in portions of the Park that were not burned in 1947, although a few stands contain evidence of past fire nonetheless; of the three samples within the 1947 fire area, only one actually contained evidence of fire. Historic fires have played a role over most of this area, but this vegetation type appears to take longer after fire to develop than some of the other upland forest and woodland types.

Globally

This community is a spruce - fir forest of maritime regions on the coast of northern New England and the maritime provinces of Canada. Soils are well-drained to moderately well-drained, often with a thick organic mat over a thin mineral layer. Occurrences are associated with cool and fog-laden maritime winds and are mostly found within 1/2 mile (occasionally 3 miles) of the coast. Cool temperatures and frequent fogs create comparatively mesic conditions. These coniferous forests are efficient at intercepting cloud moisture, creating local conditions with elevated humidity and water flux.

MOST ABUNDANT SPECIES

Acadia National Park

<u>Stratum</u>	<u>Species</u>
Tree Canopy	<i>Picea rubens</i> , <i>Picea glauca</i> , <i>Abies balsamea</i> , <i>Thuja occidentalis</i> , <i>Picea mariana</i> , <i>Larix laricina</i> , <i>Tsuga canadensis</i> , <i>Pinus strobus</i>
Tree Subcanopy	<i>Picea rubens</i> , <i>Abies balsamea</i>
Short Shrub	<i>Alnus viridis</i> , <i>Betula cordifolia</i>
Herbaceous	<i>Trientalis borealis</i> , <i>Maianthemum canadense</i> , <i>Coptis trifolia</i> , <i>Rubus pubescens</i> , <i>Aster umbellatum</i> , <i>Cornus canadensis</i>
Non-vascular	<i>Pleurozium schreberi</i> , <i>Bazzania trilobata</i> , <i>Ptilidium ciliare</i> , <i>Dicranum</i> spp., <i>Leucobryum glaucum</i> , <i>Hypnum imponens</i> , <i>Dicranum polysetum</i> , <i>Cladina sylvatica</i> , <i>Hylocomium splendens</i> , <i>Sphagnum palustre</i> , <i>Sphagnum girgensohnii</i>

Globally

<u>Stratum</u>	<u>Species</u>
Tree Canopy	<i>Picea rubens</i> , <i>Abies balsamea</i>
Short Shrub	<i>Vaccinium angustifolium</i>
Herbaceous	<i>Trientalis borealis</i> , <i>Coptis trifolia</i>
Non-vascular	<i>Pleurozium schreberi</i> , <i>Bazzania trilobata</i> , <i>Dicranum</i> spp., <i>Hylocomium splendens</i> , <i>Hypnum imponens</i> , <i>Sphagnum palustre</i> , <i>Sphagnum girgensohnii</i> , <i>Ptilium</i> spp.

CHARACTERISTIC SPECIES

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Picea glauca or *Vaccinium vitis-idaea*, where present; *Pleurozium schreberi* or *Ptilidium ciliare* as bryoids.

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Globally

VEGETATION DESCRIPTION

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The most extensive original forest type along the Maine coast. *Picea rubens* is strongly dominant in the canopy and present in the lower layers. *Picea glauca* (present in half the samples) may be locally concentrated, particularly near the shoreward forest edge. *Abies balsamea* is present in the canopy and lower layers of most stands (60% of the samples), but at much lower abundance than spruce. Certain other conifers, though infrequent, may be common in occasional stands: *Thuja occidentalis*, *Picea mariana*, *Larix laricina*, *Tsuga canadensis*, and *Pinus strobus*. The canopy is sometimes fairly open, or patchy with blowdown openings, with a patchy layer below of regenerating spruce or fir or, less commonly, *Alnus* spp. with or without *Sorbus americana*. The dwarf shrub stratum is noticeably sparse, if present at all. *Vaccinium angustifolium* is the most frequent (60%) low shrub; *Kalmia angustifolia* and *Vaccinium vitis-idaea* are also characteristic, though less frequent (20%). The herb stratum is variable in cover and species composition, and includes the common tree species as well as the standard boreal herbs *Maianthemum canadense*, *Trientalis borealis*, and (less frequently) *Coptis trifolia*. One of the distinguishing features of these forests is the well developed bryoid layer. At most sites it exceeds 15% cover, and ranges up to 90% (average 34%). The most frequent and abundant species are *Pleurozium schreberi*, *Bazzania trilobata*, *Ptilidium ciliare*, and *Dicranum* spp. *Hypnum imponens* is frequent but at lower cover; locally abundant but less frequent mosses include *Hylocomium splendens*, *Sphagnum palustre*, and *S. girgensohnii*. Bryoid species richness almost always exceeds that of herbs, shrubs, or trees.

The basal area ranged from 16 - 64 m²/ha.. Canopy heights were 10 - 24 m (avg. 17 m).

Globally

The tree canopy ranges from closed to partially open as a result of blowdowns. *Picea rubens* and/or *Abies balsamea* are dominant. In many locations *Picea glauca* is a prominent canopy component, especially along the shore where it populates blowdowns and extensive openings. However, white spruce may die off locally under prolonged closed-canopy conditions. Other minor associate canopy species may include *Picea mariana*, *Betula papyrifera*, *Betula alleghaniensis* var. *alleghaniensis* (= *Betula lutea*), *Acer rubrum*, *Populus tremuloides*, *Pinus strobus*, *Tsuga canadensis*, *Thuja occidentalis*, *Larix laricina*, and occasionally *Betula populifolia*. Shrubs and herbs are sparse but typically include *Vaccinium angustifolium*, *Vaccinium vitis-idaea*, *Viburnum nudum* var. *cassinoides*, *Nemophanthus mucronatus*, *Kalmia angustifolia*, *Maianthemum canadense*, *Trientalis borealis*, *Cornus canadensis*, *Coptis trifolia* ssp. *groenlandica* (= *Coptis groenlandica*), *Gaultheria hispidula*, *Aralia nudicaulis*, and *Clintonia borealis*. The well-developed mossy ground layer is dominated by *Pleurozium schreberi*, *Bazzania trilobata*, *Dicranum* spp., *Hylocomium splendens*, *Hypnum imponens*, *Sphagnum palustre*, *Sphagnum girgensohnii*, and *Ptilium* spp. On coastal islands and outer peninsulas, where salt spray is a factor, trees may be contorted or short.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G4G5.

DATABASE CODE CEG006151

COMMENTS

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Spruce - fir forests along the immediate coast best express the maritime influence, but all coniferous spruce - fir forests in Acadia are mapped as this type. Some of the more interior stands in Acadia could conceivably fit into a different state type, the Spruce - Fir - Broom-moss forest, which is characterized by an absence of maritime indicators and an extremely depauperate herb and bryoid layer.

The Red Spruce - Hardwoods Forest (*Picea rubens* - *Betula alleghaniensis* / *Dryopteris campyloptera* Forest) and Successional Spruce - Fir Forest (*Picea rubens* - *Abies balsamea* - *Betula* spp. - *Acer rubrum* Forest) are variations of this type which are mixed forests rather than strongly coniferous, although there is a continuum from one to the other. Mixed conifer woodlands dominated by spruce can also grade into open-canopy versions of this forest type; generally, the presence of a heath shrub layer is used to distinguish the two.

Globally

This association is differentiated from inland spruce-fir forests by the abundance of *Vaccinium vitis-idaea* and bryophyte species *Pleurozium schreberi* and *Ptilidium ciliare*.