Species: Red Spruce (*Picea rubens*)
Global Rank: G5
State Rank: S4
Climate Change Vulnerability Index: Extremely Vulnerable
Confidence: Very High

Habitat:

Red spruce is found at mostly higher elevations in northern Pennsylvania where the climate is cool and soils are derived from glacial till (Rhoads and Klein 1993; Sullivan 1993). Red spruce may be found in moist woodlands or along margins of bogs and swamps (Rhoads and Block 2007). Red spruce occurs from Cape Breton Island, Nova Scotia and New Brunswick west to Maine, southern Quebec, and southeastern Ontario, and south to central New York, northeast Pennsylvania, northern New Jersey, and northeastern Massachusetts. Its range extends south in the Appalachian Mountains of extreme western Maryland, eastern West Virginia, north and western Virginia, western North Carolina, and eastern Tennessee (NatureServe 2011).

Current Threats:

The overall health of red spruce stands seem to be declining due to pollution. Red spruce is negatively impacted by several insect pests (spruce budworm, eastern spruce beetle, European spruce sawfly, and yellow-headed spruce sawfly) (Sullivan 1993).

Main Factors Contributing to Vulnerability Rank:

Distribution relative to natural barriers: Red spruce occurs in mostly isolated high elevation woodlands and bogs and swamps in the northern tier of Pennsylvania that are surrounded by large forest tracts that could serve as a barrier against movement to a new site.

Dispersal and movement: Red spruce seeds are wind and rain disseminated, and limited to only a short dispersal distance within the site (Govindaraju 1988).

Predicted micro sensitivity to changes in temperature: Red spruce occurs in microsites/microhabitats towards the cooler end of the spectrum.

Predicted macro sensitivity to changes in precipitation, hydrology, or moisture regime: Within the species' range in Pennsylvania, the species has experienced a less than average precipitation variation in the past 50 years.

Predicted micro sensitivity to changes in precipitation, hydrology, or moisture regime: Red spruce is somewhat dependent on a moisture regime that is highly vulnerable to loss or reduction with climate change and the expected direction of moisture change is likely to reduce the species' distribution, abundance, or habitat quality.

Forms part of a mutulism: Reliance on a mycorrhizal symbiont somewhat increases the vulnerability of red spruce to climate change effects.

References:

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