Species: Black Spruce (*Picea mariana*)
Global Rank: G5
State Rank: SNR
Climate Change Vulnerability Index: Highly Vulnerable
Confidence: Low

Habitat:

Black spruce is distributed transcontinentally across northern North America from Newfoundland and northern Quebec west across northern Canada to the west coast of Alaska, south to British Columbia, south and east to central Minnesota, and east to Rhode Island and Massachusetts. Black spruce occurs in isolated patches along the southern portion of its range in southern Wisconsin, southern Michigan, Pennsylvania, and New Jersey (Uchytil 1991; NatureServe 2011). In Pennsylvania, black spruce is rarely found in high elevation bogs in the northeast portion of the state (Rhoads and Klein 1993; Rhoads and Block 2007).

Current Threats:

Black spruce is susceptible to damage from flooding and disruptions in normal groundwater movements. Black spruce does not compete well with other woody tree species. Infection by eastern dwarf mistletoe (*Arceuthobium pusillum*) greatly damages black spruce stands (Uchytil 1991).

Main Factors Contributing to Vulnerability Rank:

Distribution relative to natural barriers: Black spruce occurs in mostly high elevation bogs in northeast Pennsylvania that are often separated by extensive upland forests that will likely serve as barriers against movement to new locations.

Dispersal and movement: Seed dispersal is mostly limited to within 80 m of the source (Uchytil 1991).

Predicted micro sensitivity to changes in temperature: Black 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, black spruce has experienced a less than average precipitation variation in the past 50 years.

Predicted micro sensitivity to changes in precipitation, hydrology, or moisture regime: Black 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 black spruce to climate change effects.

References:

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Rhoads, A. and W.M. Klein. 1993. The vascular flora of Pennsylvania annotated checklist and atlas. American Philosophical Society, Philadelphia, PA.

Uchytil, R.J. 1991. *Picea mariana*. In: Fire Effects Formation System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Science Laboratory. Available: http://www.fs.fed.us/database/feid/ [Accessed April 2011].