

A New Program of Work to Conduct Research in Support of Gene Conservation, Restoration, and Proactive Deployment of Red Spruce in Light of Climate Change¹

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Abstract

Red spruce's (*Picea rubens* Sarg.) range extends from the southern and central Appalachians north into Vermont and Maine and then to the Canadian Maritime provinces with relic populations as far west as Ontario. Due to heavy logging and resultant severe fires in the 19th and early 20th centuries, and more recent declines related to air pollution and invasive pests, the amount of red spruce is now less than five percent of its former prevalence in the southern and central part of its range and these populations are highly fragmented. As a montane species over much of its range, it also has a high potential to become maladapted with predicted climate warming in the future. Restoration and gene conservation for the species has begun in the south and central regions. Currently, seed for restoration and gene conservation is collected by non-governmental organizations and state and federal entities. Seed collections are typically ad hoc; occurring in good seed years and in areas readily accessible by roads, potentially missing valuable populations. We will conduct work to guide both seed collection and restoration activities. We will develop a GIS data base to inventory seed collections to date. Stand characteristics will be input and then climate data will be overlaid. We will use these data to fill in the gaps of seed availability in terms of latitude and elevation. Second, we will conduct genecology research to assess if red spruce is a genetic generalist or specialist. If the latter, information of its adaption with respect to climate will be critical for restoration, gene conservation, and perhaps artificial migration of red spruce in light of climate change.

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