USING ENVIRONMENTAL AND SITE-SPECIFIC VARIABLES TO MODEL CURRENT AND POTENTIAL DISTRIBUTION OF RED SPRUCE FOREST HABITAT IN WEST VIRGINIA

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With the extensive loss of presettlement habitat for red spruce, this species is a high priority for restoration in West Virginia. The advent of climate change caused by human activity and the uncertainty of future environmental changes has also raised interests in the protection and restoration of red spruce ecosystems. Red spruce forests are considered preferred habitat for the endangered Cheat Mountain salamander (*Plethodon nettingi* Green) and provide optimal habitat for the recently delisted Virginia northern flying squirrel (*Glaucomys sabrinus fuscus* Miller). In addition, the ability of red spruce to grow on high-elevation, nutrient-poor soils is beneficial for carbon sequestration. The expansion and/or recovery of red spruce forest habitat are needed for conservation of the valuable resources which these forests offer. The objective of our research is to use environmental and site-specific variables to model the current distribution of red spruce habitat in West Virginia. Specifically, we wish to model habitat along abundance gradients of low, medium, and high, using red spruce importance values derived from plot data (~250 samples) collected in summers 2008 and 2009 throughout the Appalachian Mountain Region of West Virginia. Finally, we wish to perform a risk assessment using hypothesized climate change scenarios. This assessment will be done by manipulating climatic variables of the models to simulate expected changes in climate. Modeling efforts will be performed using Maximum Entropy (MAXENT), a species distribution modeling technique used to characterize a species' niche in environmental space. This analysis will allow us to model future distribution of red spruce habitat in West Virginia, identifying areas where red spruce would likely occur under select climate change scenarios. This research will make a valuable contribution to the conservation and restoration efforts for threatened red spruce ecosystems in West Virginia.

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