IDENTIFYING AND CHARACTERIZING CERULEAN WARBLER *(DENDROICA CERULEA)* HABITATS IN BLACK ROCK FOREST AND SCHUNNEMUNK MOUNTAIN FOREST, ORANGE COUNTY, NY

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ABSTRACT

Habitat loss and anthropogenic pressures are threatening migratory songbirds and the ecosystem services they provide. We have chosen to study the breeding habitat of one of these birds, currently under review to be listed as endangered un the Endangered Species Act, the Cerulean Warbler *(Dendroica Cerulea)*. This species has a small range and a population that is on the decline. We intend to examine their habitat in Orange County, NY to better understand what conservation actions will benefit the bird in this part of its range. After collecting data on bird presence and microhabitat variables we plan to nominate the forests as Important Bird Areas to encourage a more rapid conservation response at a local scale or an NGO scale. Results will be determined after data analysis is completed in the fall of 2012.

INTRODUCTION

Birds play an important role in maintaining ecosystem services and biodiversity and they are good indicators of forest health. The services include protecting trees from pests and insects and helping to prevent the spread of infectious diseases (Marquis & Whelan 1994, Keesing *et al.* 2010). Due to habitat loss, degradation, and fragmentation caused by urbanization, agriculture, and climate change many migrating songbirds are becoming threatened (Rosenberg 2008, Smith & Marks 2008). Many northeastern forests, both publicly and privately owned, have been critical in maintaining proper breeding grounds for these birds. However, there are still many unprotected, privately owned, forested lands that are at risk of being developed. The only way to ensure forest connectivity is to direct more conservation funds to these areas. In this study we will be examining a potential habitat corridor for a popular, threatened species – the Cerulean Warbler – between Black Rock Forest and Schunnemunk Mountain Forest. By quantitatively describing selected habitats in these areas we will have a better sense of Cerulean Warbler populations in these areas and will be able to make more informed conservation decisions.

Important Bird Areas

Birdlife International understands that biodiversity conservation and bird conservation can go hand in hand. Birds and the ecosystems they are a part of provide vital environmental services. To pinpoint these areas and direct and prioritize conservation efforts they came up with the Important Bird Areas concept. This initiative aimed to support national conservation strategies and protected area programs, highlight areas to protect and identify urgent conservation needs, provide focus for civil society-led conservation, and inform the implementation of global and regional conservation agreements (Devenish *et al.* 2009). With a high diversity of birds that include 40% of all threatened birds, and a strong connection between wintering and breeding grounds, the Americas are the perfect example of a place in need of such agreement. There are currently 2,345 Important Bird Areas (IBAs), the first of which was established in 1995.

The goal of classifying land as an IBA and recording IBA inventories is to use scientific findings to provide a method for prioritizing conservation efforts and allocating funds in a way that ensures the maximum benefit to birds (Audubon IBA website). In order for a site to qualify as an IBA, there must be sufficient recent data showing the presence of bird species of global conservation concern, assemblages of restricted-range or biome-restricted bird species, or globally important congregations of birds (Devenish *et al.* 2009). These areas will then be monitored and conserved to ensure long-term protection of biodiversity. Given the Cerulean Warbler's declining populations (Buehler *et al.* 2008, Hamel 2000, Hamel *et al.* 2004, Rosenberg 2008, Rosenberg *et al.* 2000) we hope to identify enough individuals to meet the criterion of an IBA. (see Figure 1)

Habitat Investigation

According to Rosenberg *et al.* (2000) nearly all sites with breeding Cerulean Warblers in the state of New York have already been designated as Important Bird Areas – excluding Black Rock Forest. This nearly 4000-acre, mixed deciduous forest is located in the Hudson Highlands of Orange County and is a known breeding ground for this species (Gilly & Maenza-Gmelch, 2011, unpublished data). The goal of this study is to characterize the specific habitats in which Cerulean Warblers are found in Black Rock Forest and surrounding areas as the basis for nominating the forest and surrounding areas as an IBA. Previously collected data from Schunnemunk Mountain Forest, a mere 5 miles east of Black Rock Forest, also shows the presence of Cerulean Warblers (source TBD). We believe this could indicate that Cerulean Warblers are also present in the privately owned land between these two protected areas – Schunnemunk Mountain Forest as part of the Palisades Interstate Park Commission, and Black Rock Forest as a science research consortium.

METHODS/APPROACHES

Cerulean Warbler Abundance

Bi-weekly bird point counts (listening and viewing) will be conducted at Black Rock Forest, Schunnemunk Mountain Forest, and the private land connecting the two to determine Cerulean Warbler presence and abundance. As in the study of Dettmers and Bart (1999), presence data will be collected rather than presence-absence because it is almost impossible to declare that a given plot was never used by the target species, especially when working with

highly mobile subjects, such as birds. Point counts will last 5 minutes each, in accordance with the guidelines specified in Bird Census Techniques (Bibby *et al.,* 2000). Surveyors will stand in the center of a circular plot with a radius of 20 m^2.

Microhabitat Characterization

In order to try and understand the major habitat components Cerulean Warblers look for we will measure variables such as maximum tree height, dominant tree species, and percent cover of canopy and understory. To measure tree heights we will be using a Biltmore stick and a clinometer. To determine dominant tree species we will calculate basal area of all present species by using diameter at breast height measurements (Elledge & Barlow 2010). We would also factor in tree frequency to calculate the importance value of each species. Depending on what is available we will either be using a densiometer or a fish-eye lens camera to determine percent canopy cover (Jennings *et al.* 1999).

Habitat Size and Fragmentation

GPS points and GIS programming will be used to observe patch size and determine distance between patches, distance to wetlands, and distance to major roadways. These measurements will help us determine the location and number of the point counts that will be conducted.

Statistical Analysis

All habitat and microhabitat variables will be compared to Cerulean Warbler abundance data from point counts in regression analyses and Spearman/Pearson correlation tests.

WORK PLAN

April – preliminary literature research

May 1 – final thesis proposal due

May 2-20 – further develop methodology

May 21 - July 21 – field work at BRF, Schunnemunk, and connection

August 5 - 10 – ESA symposium in Portland, OR

August - November – data analysis, research, and writing

December – final thesis due

PRELIMINARY RESULTS/DISCUSSION

Research suggests that Cerulean Warblers tend to prefer mesic slopes or bottomland, riparian forests with tall trees that create a full canopy but an open understory. Habitats are also usually concentrated around streams or wetlands. (Hamel 2000, Rosenberg *et al.* 2000) Whereas they are affected greatly by large-scale edge effects, interior canopy disturbances almost seem to be preferred (Wood *et al.* 2006, Perkins 2006). We know that some parts of Black Rock Forest fit these criteria due to the Cerulean Warbler presence data collected there in the summer of 2011 (Gilly & Maenza-Gmelch 2011, unpublished data). During our bird surveying of 5 different habitat structures Cerulean Warblers were found to be present at only one. This habitat and other

habitats in Black Rock Forest, Schunnemunk Mountain Forest and the connecting land will be analyzed more closely this summer.

IMPLICATIONS

If we're able to successfully nominate Black Rock Forest, Schunnemunk Mountain Forest, and the corridor linking them as an IBA it could increase the chances for conservation action to become a higher priority. This would be especially beneficial to the privately owned corridor that is not currently under protection and is at risk for development. It would also be another hallmark of the success of Black Rock Forest as a research forest.

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FIGURE 1: Concept map proposed research.