Undergraduate Student Poster Presentation

**Bird community responses to climate change and forest management in a red pine plot at Itasca State Park**

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We used a combination of meta-analysis and primary data to analyze the response of 54 species of male breeding birds to climate and management changes through time in a red pine (*Pinus palustris*) plot at Itasca State Park. Breeding bird census data was collected in approximately the same location beginning with an initial survey in 1980, through four surveys during the 1990s, and most recently in 2018. We were able to quantify breeding bird responses to changes in the local climate and forest management actions. Bird counts were conducted on 68 (1980; 12.75 ha) or 55 (1990-2018; 10 ha) gridpoints for approximately 10 minutes at each survey point. Bird point counts were then repeated five to eight times per growing seasons in years 1980, 1990, 1991, 1992, 1997, and 2018. We also measured habitat data such as tree diameter and species, woody shrub stem counts, and understory and overstory cover, and we collected historic climate data from the Weather Service. We found that 10 surveyed bird species (18.5%) increased in abundance, 1 (1.9%) decreased in abundance, and 43 (79.6%) did not change through time. The Black-throated Green Warbler, which breeds in mature conifer forests in Minnesota, declined in abundance, whereas species such as Red-eyed Vireo and Chestnut-sided Warbler increased in abundance. This may be related to the decline of the mature red pines in this forest and the shrubby understory encroachment as this plot succeeds from planted coniferous to mixed hardwood forest.