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SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES

Autumn 2024 SENR Seminar Series

**October 15, 2024
4:00 p.m. - 5:00 p.m.
103 Kottman Hall**

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ENGIE-Axium Fellow

Understanding the Influence of Climate and Landscape Change on Species Assemblage

ABSTRACT

Preserving biodiversity is crucial for ecosystem function, necessitating its measurement and monitoring to comprehend human impacts on the environment. β -diversity, a key metric, can be used to measure changes in community diversity over time. Multiple lines of evidence show that climate and land use land cover (LULC) independently influence diversity; more recent work also shows that LULC can decouple climate effects, creating wildlife refugia. Spatial structures also affect the relationships between ecological processes and environmental factors. This study uses Ohio Breeding Bird Atlas data to investigate the effects of environmental changes (i.e., climate and LULC) and spatial heterogeneity on bird species diversity in Ohio over 25 years. Utilizing machine learning, we identified core forest area and elevation variability as the most significant variables affecting β -diversity dissimilarity, with significant composition changes occurring in areas with the highest loss of core forest and flattest elevation. We pinpointed regions in Ohio experiencing significant composition changes in intensified agricultural and developed lands. A geographically weighted regression model indicated spatially non-stationary relationships between species composition change and annual maximum temperature, core forest area, and elevation variability. Our study integrates ecological processes with spatial patterns, showing that landscapes can interact with climate to mitigate regional climatic impacts and suggest effective conservation areas. Our findings also indicate that the relationships between ecological processes and the environment are not always stationary.



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