

## SUMMER 2020 – SC INBRE / EPSCOR RET PROJECT DESCRIPTION FORM

Please complete the project description form and return to John Kaup via e-mail at [john.kaup@furman.edu](mailto:john.kaup@furman.edu).

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<b>Research Subject Area</b>	Avian Ecology and Land Use Change

### A. Briefly describe overall research program at your laboratory.

The goals of my research program at Furman University are twofold: first, to identify the impacts of local, regional, and global land use and land cover change on biodiversity, with a focus on bird behavior, occupancy, and abundance, and second, to develop conservation solutions that address the needs of birds and people that share the landscape across coupled human-natural systems.

My specific research goals for this summer are to better understand how urbanization and agriculture affects bird abundance and bird communication.

### B. Briefly describe specific project(s) for your teacher

Given the pace of forest loss in South Carolina's Piedmont region, data are needed to quantify the conservation value of remaining forest patches to South Carolina's wildlife populations. In particular, data are needed to identify the conservation value of forest patches beyond protected areas to local bird populations and communities. This is particularly true given that the Piedmont region of the eastern United States is expected to see a greater than 100% increase in urbanization in the next 50 years, likely driving continued loss of forest cover in the absence of evidence of the negative impacts of this change.

Thus, we will measure bird abundance and diversity in forest patches along an urban-rural gradient in Upstate South Carolina. Specifically we will assess the contribution of patch and matrix land use and land cover to the conservation value of forest patches. This effort will build on data collected in 2013 and 2014 where we showed that the ecologically-sensitive Brown-headed Nuthatch (*Sitta pusilla*) was more abundant in urban and suburban landscapes than areas set-aside for nature conservation. However, unlike past years where we focused exclusively on pine patches, going forward we will monitor a diversity of forest patch types including deciduous, pine, and mixed. These patches will vary size, structure, and matrix type. Ultimately, these data will help conservation practitioners identify opportunities for forest conservation beyond protected areas

In addition, my research group has shown that birds change their vocalizations as a consequence of traffic noise. Our most recent work demonstrates that select bird species shift vocalization to be heard over urban and traffic noise. Species will shift minimum and maximum frequency, intensity, or pattern of their vocalizations. However, research on the effects of these changes on intra-species communication is limited.

In this project, we will evaluate the impacts of traffic and urban noise on bird vocalizations. In particular, we will test if birds adjust their vocalizations to communicate the presence of a predator (e.g., Eastern

Screech Owl (*Megascops asio*) over din of ambient noise. Initially we will focus on the alarm calls of Carolina Chickadee (*Poecile carolinensis*) and Tufted Titmouse (*Baeolophus bicolor*). We will also monitor the response calls of woodpeckers species, nuthatch species and other species that form mixed flocks.

**C. Will any other people (grad students, colleagues, etc.) be involved directly with your teacher?**

I will have 3-5 undergraduate students working in the lab this summer. One of the students will be working on a similar project as described above and can serve as a mentor for this teacher

**D. Will you require any advanced reading/preparation for the teacher? If yes, please briefly describe.**

Yes, I will have the teacher read several review papers in preparation for the summer research to provide background information for the teacher. I will also have them begin to learn to identify by sight and sound birds of the region.