F26.31 Interrelationships among Habitat Alteration, Contaminant Exposure, and Species Vulnerability: Leveraging Museum Collections for Century Scale Investigations of Volant Vertebrates of the Amazon Basin and Atlantic Forest of Brazil

Overview

Due to the extreme anthropogenic transformation of the Amazon Basin and the Atlantic Forest over the past century, we hypothesize that toxicant exposures of birds and bats in these regions have increased over time, and that exposures will differ between regions and pattern of habitat transformation. We further posit that exposure patterns are influenced by trophic position and taxonomy. Lastly, we hypothesize that the levels and types of toxicant exposure are biologically relevant. To address these hypotheses, our research has four primary objectives:

1) Evaluate the spatiotemporal patterns of exposure of birds and bats to PCBs, DDT and toxic metals (Hg, Mn) over the past century in the Amazon Basin and Atlantic Forest.

2) Determine how trophic position and pattern of habitat change influence patterns toxicant exposure of volant vertebrates in these regions.

3) Assess the interrelationships among spatiotemporal patterns of toxicant exposure and biological consequences (endocrine, immune, morphology) of exposures of resident and migrant species. 4) Build a unifying statistical model that incorporates habitat characteristics, toxicant profiles, and biological responses of birds and bats of the Amazon Basin and Atlantic Forest.

What the student will DO and LEARN

As part of the overarching project, the student will quantify mercury exposures of a Neotropical migrant swallow, the Purple Martin, using cold vapor atomic absorption spectroscopy in my lab at NAU.

The student will learn 1) study design, 2) sample preparation and digestion, 3) mercury quantification, and 3) statistical approaches to analysis of contaminant data.

Additional benefits

The student will generate sufficient data to either lead author or co-author a peer-reviewed paper and to present data at either a local, regional or national scientific meeting. Because of the international nature of this project, the student will interact regularly with international collaborators and their students and thus will have both scientific and cultural exposures while completing their project.

Additional qualifications

The student should be a 2nd or 3rd year science major, preferably majoring in biology, chemistry, forestry or other quantitative science. A background in cold vapor atomic absorption spectroscopy is not required, as this will be taught. The ability to perform careful and focused work is a must. Further, given that the selected applicant will work with other students, post-docs and collaborators on the project, clear communication and reliability is essential.

Time commitment

6 hrs/week for 30 weeks