

Organismal response to environmental stressors: From tree frogs to watersnakes

Across the globe anthropogenic climate change is resulting in unprecedented shifts in abiotic conditions with extreme temperatures and rainfall patterns increasingly widespread. On local scales, additional anthropogenic modifications such as habitat conversion can exacerbate these patterns, leading to quickly changing environmental conditions and novel environmental stressors with potentially dire consequences to the survival of local organisms. This is especially the case for ectotherms that rely on their external environment for basic physiological functions and range restricted taxa that are limited in their ability to respond through long-distance dispersal. My program of research examines organismal response to abiotic and biotic stressors across herpetofauna taxa. Using ecophysiology experiments, spectrometry, and full-spectrum photography, my previous research investigated how hylid tree frogs alter visible and near-infrared spectral reflectance as a means of thermoregulation. Our results showed significantly increased visible and near-infrared reflectance in response to warmer temperatures in three out of four study species. This is the first evidence of its kind to visually document and quantitatively measure frogs using real-time changes in both the visible and near-infrared spectra to thermoregulate. In my current position at Texas State University, I am assessing the response of *Nerodia harteri*, a species of threatened riverine watersnake endemic to two river drainages of north-central Texas, to the conversion of riverine habitat to reservoir habitat. Using minnow traps and hand capture we sampled hundreds of *N. harteri* and congeners across seven reservoirs and employed mark-recapture techniques to investigate spatial, temporal, and disease dynamics across species, seasons, and reservoirs. We also used radiotelemetry tracking of select individuals and geospatial data, to glean fine-scale habitat use and behavior data and found distinct ecological differences and disease dynamics between presently occupied and unoccupied historic *N. harteri* sites. Our results highlight the sensitivity of range restricted ectotherms to environmental perturbations in aquatic and semi-aquatic systems, and the complexity of organismal response in a shifting landscape.