SUBLETHAL EFFECTS OF ^{137}CS AND HG CONTAMINATION IN FLORIDA GREEN WATERSNAKES (*NERODIA FLORIDANA*)

Michaela M. Lambert[1,3], M. Kyle Brown[2,3], David L. Haskins[3,4], Amelia L. Russell[2,3], Melissa A. Pilgrim[2,3], Tracey D. Tuberville[3]
[1]University of Kentucky, Lexington, KY 40506
[2]University of South Carolina Upstate, Spartanburg, SC 29303
[3]UGA Savannah River Ecology Laboratory, Aiken, SC 29802
[4]D.B. Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA 30602

Mentors: Tracey D. Tuberville and Melissa A. Pilgrim

Due to their relatively long lifespans and high trophic positions, many reptile species are susceptible to negative impacts from contaminants that bioaccumulate. Nuclear and industrial activities on the Savannah River Site (SRS) have resulted in areas with mercury (Hg) and radiocesium (^{137}Cs) contamination. Both contaminants are known to bioaccumulate in reptiles and may alter their physiology. From 10-30 June 2016, we captured Florida Green Watersnakes (*Nerodia floridana*) from three permanent wetlands (PAR Pond, Pond B and Pond 2) that were previously nuclear cooling reservoirs. We quantified the ^{137}Cs whole body burden and total Hg concentration in tail tips of each snake. To estimate the effect of contaminant concentrations on snake metabolism, we used a SABLE flow through respirometry system to quantify total O_2 consumed by each animal (VO_2). Oxygen consumption ranged from 0.04 mL/hr to 56.78 mL/hr and averaged 12.233 mL/hr ± 1.130. The average VO_2 for Pond 2 (8.044 mL/hr ± 0.796) was significantly lower than that of Pond B (16.678 mL/hr ± 2.329), and PAR Pond (19.694 mL/hr ± 4.145). Interestingly, Pond B and PAR Pond snakes had the highest levels of contaminants (^{137}Cs highest at Pond B and Hg at PAR Pond). Multiple regression revealed that snake VO_2 was significantly and positively associated with Hg and ^{137}Cs concentrations ($p < 0.001$; Hg coefficient = 10.24, ^{137}Cs coefficient = 12.27). Roughly one-quarter of the variation in VO_2 was associated with contaminant concentrations ($r^2 = 0.26$). The association between Hg and ^{137}Cs concentration and oxygen consumption may indicate higher energetic costs associated with contaminant exposure. However, several factors impact snake metabolism (e.g., size, sex, and reproductive condition) and could also impact among-site variation in oxygen consumption. Our future analyses will include more complex models that let us refine our interpretation of the magnitude of contaminant effects on Green Watersnake metabolism.

Michaela on PAR Pond.