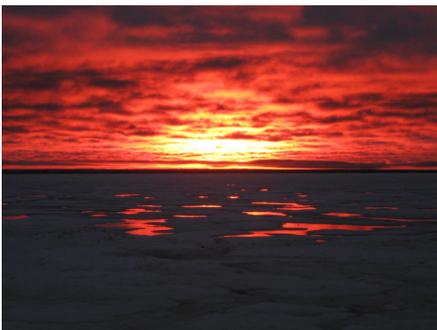
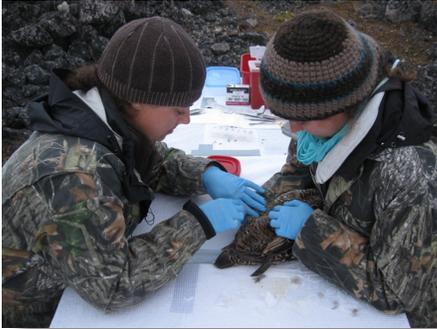


Patuxent Wildlife Research Center

Corticosterone, Energetics and Individual State in Diving Seaducks



The Challenge: The reproductive decisions of migratory individuals are determined to be a combination of an individual's internal state and environmental factors. One of the key decisions that female birds make is the timing of laying which is positively correlated with reproductive success. Generally, it is thought that body mass mediates this relationship with heavier females laying earlier and having higher reproductive success, however a substantial amount of variation remains unexplained. Energetic physiological traits are prime candidates for understanding the underlying mechanisms driving this unexplained inter-individual variability in energetic (fat) stores and timing of reproduction. In particular, corticosterone (CORT; primary avian glucocorticoid regulating energetics) and triglycerides (TRIG; rate of fat deposition) are useful for quantifying energetic state. Using a combination of body mass and energetic physiology may help us to better understand the underlying mechanisms driving changes in energetic stores and their downstream effects on reproductive decisions and reproductive success.

The Science: After establishing baseline hormone levels, the energetic physiology of white-winged scoters at USGS Patuxent Wildlife Research Center will be manipulated with subcutaneous implants of CORT. Three treatments will be used: a control, a low dose of CORT (15 mg), and a high dose of CORT (35 mg). After implantation, individuals will be weighed to track changes in mass (fat accrual) and blood sampled to assay for CORT and TRIG concentrations every other day for 21 days. Each bird will receive all treatments in three separate trials to compare both inter- and intra-individual variability in energetics.

The Future: This research will increase our understanding of the influence of energetic physiological traits on fattening rates. Understanding this link is crucial in determining the underlying mechanisms driving variation in individual abilities to invest in reproduction, the timing of reproduction and reproductive success. Additionally, better understanding individual variation in energetic physiology of Arctic-breeding species may be important in predicting the adaptability of individuals in this environment which is facing increasing climatic variability.