

BIOL 480 Project – Stable Isotope Analysis of Bird Diets

An student majoring in Biology or Environmental Biology is needed to participate in aspects of a undergraduate research project where the effects of diets on stable isotope signatures in bird tissues will be investigated. The project will commence in early January and be completed before the end of April 2020. The student will be expected to enrol in BIOL 480 and be able to allocate 6 hrs of lab work per week to this project over the 2020 winter term.

Prerequisites for enrolment in BIOL 480 are completion of BIOL 301; and BIOL 380 or 15 additional credit units of BIOL courses at the 200-level or above, of which at least 6 credit units must be at the 300-level or above; and permission of the department. Additional course details are available in the University Course Catalogue. Apply directly to Dr. Gurney (contact details below).

Project Details:

Stable isotope analysis (SIA) is a non-invasive tool that is greatly contributing to improved understanding of animal diets, but current methods for SIA have rarely been validated in controlled studies. Through feeding experiments and laboratory-based studies, our diet validations will allow more accurate descriptions of ecosystem-level processes, in a way that is less disruptive to animals. Such improvements will clarify the risks of contaminant exposure for different species and help identify the fate and impacts of critical contaminants in natural systems. Additionally, these advancements will benefit research programs that aim to predict potential impacts (primary and cumulative) of other stressors, including climate change and resource development, on ecosystems and wildlife.

The SIA validation we are planning will follow a fully randomized sampling design, with individual killdeer being assigned to one of two isotopically distinct experimental diet groups, and blood samples will be collected at regular intervals (5 – 7 days). Each group will receive their specified diet (ad libitum), water for drinking, a heat lamp and bedding material. Food and water will be changed daily and care schedules will follow established protocols and meet Canadian Council on Animal Care recommendations (CCAC 2010).

Experimental diets will be formulated with the assistance of experts in the Animal and Poultry Science Department (University of Saskatchewan) to provide diets that are both isotopically distinct (for carbon and nitrogen) and nutritionally balanced for growing birds. After raising the birds exclusively on experimental diets for 28 days, we will collect blood and feather samples and (if feasible) will euthanize a subsample of the birds to collect muscle tissue.

Supervisor: Dr. Kristy Gurney, Adjunct Professor, Department of Biology and Research Scientist, Environment and Climate Change Canada. Email: kirsty.gurney@canada.ca