NSERC Canadian Network for Aquatic Ecosystem Services

CNAES
HQP Research & Collaborative Exchange Funding

Visit report

1. Exchange information

Visitor: **Gretchen Lescord, PhD Candidate, Theme I**

Supervisor: **Dr. John Gunn and Dr. Tom Johnston**

Location, Dates: **Stable Isotope Mixing Models using SIBER, SIAR, MixSIAR course, PRStatistics, Orford QC, 28-May-2018 to 31-May-2018**

2. Objective/Purpose

As part of my research, I examine how food web ecology impacts Hg cycling in the lakes and rivers across the Attawapiskat Drainage Basin. To do this, I use stable carbon and nitrogen isotopes to characterize an organism's diet and trophic position. Recent advances in statistical techniques to analyze such stable isotope data are capable of providing better niche estimates and quantifications of the diet of predators and prey in an ecosystem. The main purpose of my trip was to learn more about these powerful techniques by attending a course on Stable Isotope Mixing Models using *SIBER, simmr, MixSIAR* in the widely-used statistical program, R.

3. Description of the visit

The course was held at the Orford Musique in the lovely town of Orford, QC. Many of the course participants traveled long distances to attend (e.g., Norway, Australia, and Russia), including the course instructors and creators of the statistical packages of interest, Dr. Andrew Jackson (Trinity College, Dublin Ireland) and Andrea Parnell (University College, Dublin Ireland). Starting with only basic understanding of statistical models, the course will covered the "do's and don'ts" of using SIMMs. The instructors explained the Bayesian statistical models behind the commonly used package, *simmr,* and the more advanced, *MixSIAR.* I worked with example datasets to simulate complex interactions and learned some of the advanced features of these packages. This knowledge will enable me to produce powerful statistical models assessing how changes in food web ecology impact Hg bioaccumulation and biomagnification in the Far North of Ontario. I will be able to share these skills with other HQP at my home institution and across CNAES network. These specialized tools are not commonly taught in statistics classes at the undergraduate or graduate level and this course offered a unique opportunity to learn techniques that I will use not only in my PhD thesis, but likely throughout my scientific career as a food web ecologist. I also met many interesting researchers from different fields who use the same stable isotopes tools in their studies including: the diets of Caribbean sea turtles and Antarctic penguins, tracing movements of human ancestors, and identifying diet shifts in deep sea sponges.