PhD opportunity based at the University of Massachusetts-Amherst supervised by Chris Sutherland (University of Massachusetts-Amherst), Xavier Lambin (University of Aberdeen) and Andy Royle (U.S. Geological Survey - Patuxent)

Quantifying structural, functional and genetic connectivity in spatially structured populations.

General project description

How populations respond to fragmentation, or are able to persist in a fragmented state, depends crucially on the ability of individuals to balance inevitable local extinctions through the process of movement/ dispersal based recolonization: connectivity! One of the great difficulties, however, is the ability to formally quantify connectivity in a manner that allows predictions to be made over space and across time. Part of this difficulty is the fact that connectivity can broadly be defined in different ways, e.g., by animal movement (functional connectivity), by the structure of the landscape (structural connectivity), or emerging as a multi-generation process of dispersal (genetic connectivity).

Using a large (>100 patches across >140 km$^2$) and long term (>15 yrs) metapopulation study of water voles (Fig. 1) in the Assynt, in North West Scotland, UK (Fig. 2), we have a rare opportunity to quantify each of these classical measure of connectivity in order to assess which provides the best predictor of colonization-extinction dynamics in this unique system. The project aims to combine detection/non-detection data, demographic data from live trapping, and genetic data from tissue samples, to better understand the spatial processes underpinning metapopulation dynamics.

This is a terrific opportunity for a student interested in developing research interest in both spatial population ecology and quantitative ecology. The student will spend at least 6 weeks in the remote North West Scotland as part of a >6 person field team conducting visual latrine surveys and live trapping. Additional time at the University of Aberdeen can also be arranged. While not set in stone, we envisage a combination, and eventually integration, of spatial occupancy and spatial capture-recapture methods, the development of which will be motivated by ecological theory about dispersal, connectivity and metapopulations.

Qualifications

We are looking for applicants that have a genuine interest in both applied and quantitative ecology. There will also be a genetic component so either experience, or an interest in, conservation genetics would be welcomed. The candidate will have performed at a high level academically and would hold a M.S. degree Ecology, Wildlife Biology, Natural Resources, Statistics or a closely related field. The field component requires that the candidate has demonstrable experience being part of/leading fieldwork.
**Applying**

While we envisage the student starting in September 2016, there is the possibility of early enrollment in the early part of 2016 which will allow the student to be employed as a paid field technician in the 2016 field season in Assynt (June through August - 2016). Here I have provided some general information about the project; please feel free to email me if you have any questions about the specifics of the project (csutherland@umass.edu). The position is open to all nationalities. Interested candidates should send a CV/resume and a letter of interest to csutherland@umass.edu on or before **January 31st, 2016**.

*Figure 1- A view over part of the picturesque Assynt study area in North West Scotland.*

*Figure 2- A water vole, the wonderful beast.*