**Spatiotemporal Models for Ecologists**

**Homework Week #7 – Project data simulation**

Goal: Individual projects provide an opportunity to develop models that are specific to your area of study. Typically through the process of developing a project idea, obtaining the data, and developing the model, one gains a greater understanding of the modelling framework.

We would like each student to develop a simulation script in R to simulate a data set with underlying dynamics that include temporal, spatial, or spatiotemporal autocorrelation. As in previous models developed in class, the simulation model should be state-space; that is, there should be a set of equations to describe the process portion of the model and equations to define the observations of this underlying process. The autocorrelation component will likely be included in the process portion of the model.

The simulation model should be tailored to your specific project, and will provide the first step in understanding how the underlying dynamics are incorporating temporal, spatial, or spatiotemporal autocorrelation. A side benefit of constructing the simulation model is the ability to test your estimation model (the next step) on a data set with known parameter values. A side benefit of writing up the simulation model is the ability to plug it in to the Methods section of your final report for the class.

Files to turn in:

1. 2-3 page written description of:

(a) Short (1 paragraph) description of what type of spatiotemporal process is being included and the rationale for including it.

(b) The equations underlying your simulation model with equations for the process and observation components along with definitions of parameters in the equations

(c) Figures of the simulated data

2. R code used to generate the data and make the plots