

ST 506 Homework Set 12
Due December 4, 2008.

Q1. Population metrics like abundance, survival rates, recruitment rates, and migration rates clearly are crucial in population ecology but they are very difficult and expensive to measure and are often estimated at smaller than ideal spatial scales. Recently (Mackenzie et al. 2005) have suggested the simpler occupancy metric, as a useful alternative metric for studying individual species at larger spatial scales.

One crucial component for building the likelihood is the set of detection histories for each site and thus I would like you to write down the cell probability structures for site with the following detection histories 11101, 111-1, 10000, 1-000, 00000 and 00-00. Here 1 means species detected on a visit and 0 species not detected while - means the visit to a site was missed.

Q2. Now a very short question along the same lines as Q5 but now for multiple season occupancy modelling. Using the notation given in the class notes:

- a) Write down the detection history probability for a 3 season study where there are two visits per season and the history is 11 00 01.
- b) Repeat for the 3 season 2 visit study with history 11 00 00. This one is a little harder. Writing down a diagram of all the possibilities will help.