Investigating mammal population densities in relation to habitat using the Random Encounter Model

Growing up, I loved spending my summers on the Norfolk Broads and have carried this appreciation for the beauty of this natural habitat into my university studies. This has grown into a keen interest in ecology, conservation and camera trapping. Therefore, for my third-year Biological Sciences undergraduate research project at the University of East Anglia, I have designed and undertaken a research project focused around working in the Norfolk Broads to investigate the relative population sizes of mammals in the Norfolk Broads. I based the project at two separate sites Buremarsh at Woodbastwick and at the Ted Ellis reserve, over the summer of 2018 from July until October. In this article I will be mainly focusing on the work and results based at Wheatfen.

It is widely considered that invasive species are one of the most deleterious forces that need to be combated to maintain a habitats biodiversity. In Britain monitoring relative population sizes of both native and invasive species is a crucial part of ecological conservation, making the monitoring of the animal species inhabiting the Broads of particular importance to conserve this vital natural habitat.
The aims of the project were to investigate how environmental connectivity in fens affected mammal population densities, using a method of surveying called the Random Encounter Model (REM). This method involved setting remote camera traps at separate locations around Wheatfen to measure the relative contact rate between the animals and the cameras. Cameras were placed away from trails, either animal or man-made, that would result in exaggerated populations densities caused by placement bias. Markers (garden canes with coloured electrical tape) as seen in the images above, at set distances from the camera allow the animals’ detection distance to be identified with some accuracy. This method is useful for estimating the populations of more elusive species such as carnivores, when compared to the more commonly employed capture recapture methods. My hypotheses state that species density will decrease in relation to the distance to water and that species population density is related to the vegetation density where native and invasive species are found in separate areas. I am currently in the analysis stage of my project, which has so far successfully produced thousands of photographs that show that the REM method is appropriate for use in the Norfolk broads to effectively estimate mammal populations in a range of different habitats.

Whilst I was running my project, I became intrigued about comparing the encounter rate of cameras placed off any trails and cameras placed on obvious trails, to see if the number of species identified differed in any way. This will be interesting to test as species such as the otter usually patrol along rivers and dykes, making direct overland trails between bodies of water meaning their trails are
visible here, but outside of these areas their identification rates appeared to be very low. To evaluate these assumptions, I placed a further round of camera traps at sites that showed signs of regular use by animals or in locations that Will commonly place his cameras. This additional test showed a far greater number of encounters with the otter and fox as well as with a larger proportion of the bird species that use the managed areas of the reserves for movement around the reserve. This shows that both methods of camera trapping can be applied successfully depending upon the intention of the survey taking place. I would like to thank my supervisor, Iain Barr and Will Fitch for all of their help throughout my project and access to the Ted Ellis Reserve for my research.