MARK-DEPENDENT RECAPTURE PROBABILITY AND TEMPORARY EMIGRATION IN MARK-RECAPTURE STUDIES

Sophie Smout [1,2], Paddy Pomeroy [2], Ruth King [1]

1 CREEM The Observatory, Buchanan Gardens, St Andrews, Fife KY16 9LZ;
2 SMRU Gatty Marine Lab, St Andrews University, St Andrews, Fife, KY16 8LG

In mark-recapture studies, absences may be recorded for individual animals either because they are not present, or because the observation process is imperfect. Typically, re-sighting probability is confounded with the probability of temporary migration away from the study area in populations that are not completely isolated spatially. Using data from a long-term study of female grey seals at UK breeding colonies, where animals are usually faithful to previous breeding sites, we develop methods to estimate the probability of temporary migration based on additional covariate information, namely the annual observation effort at the colony. The seals were marked used multiple methods including flipper-tags and brands, and the CJS-based models we develop therefore take into account the possibilities that (a) re-sighting probabilities may be mark-dependent and (b) tags may be lost. The data are analysed within an integrated framework using Bayesian methods, allowing us also to explore (based on covariate information) whether inferences can be made about the reproductive status of missing individuals, which may be breeding away from the “home” colony or may have "skipped" a breeding year. Such inferences are of particular importance because of the extra resolution they offer in estimating demographic parameters.