

1035-62-1395

Joe Liddle* (joseph.liddle@uas.alaska.edu), 609 SMC Rd., Sitka, AK 99835. *Bayesian Mark Recapture for Small Samples*. Preliminary report.

Mark-recapture methods are used to estimate the abundance of populations but produce highly uncertain results when sample sizes are small. We develop a new estimator for a single-release, single-recapture experiment with Bayesian methodology to handle this situation. The number of marked recaptures is assumed to have a binomial likelihood as a function of the marked proportion. The conjugate family for this likelihood is the beta distribution, so that the posterior distribution of the marked proportion is simply an updated beta distribution. The probability density function for population abundance is derived from this posterior distribution, from which a closed-form estimator of abundance emerges. A Bayesian credible interval is found by numerical integration of the posterior density. The method is extended to a multiple-release, multiple-recapture experiment. Sensitivity analysis shows that estimation is insensitive to the choice of prior parameters. The method is illustrated with data from sperm whales off the coast of Alaska. (Received September 19, 2007)