1023-92-1055   **Amy J. Drew*** (`a.drew@ttu.edu`), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409-1042, and **Linda J. S. Allen** (`linda.j.allen@ttu.edu`), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409-1042. *Stochastic Metapopulation Models for Patch Occupancy.*

While ODE metapopulation models describe general population patterns, they do not account for the variability inherent in the process of colonization and extinction. Based on three existing ODE metapopulation models, we formulate corresponding continuous time Markov chain (CTMC) models and stochastic differential equation (SDE) models to incorporate this variability. The first model is based on Levins model modified to include migration from a mainland. The number of occupied and unoccupied patches is modeled. The second model includes variables for patches that are not habitable, patches that are habitable but empty, and patches that are habitable and occupied. The third model is spatially explicit; colonization and extinction rates vary based on the patch. For each stochastic model, differential equations for the expectation and higher order moments are obtained. Assuming approximate normality, the system of differential equation can be solved. The dynamics of the stochastic models are illustrated in several numerical examples. (Received September 24, 2006)