Demography and Dispersal Modeling Workshop:
An empirical modeling approach to determining the relative roles of demography and dispersal in population distributions
April 6, 8, and 9th, from 6-8 PM. SLB 2060

Workshop organizer: Jean H. Burns, Center for Population Biology Research Fellow

One of the central questions in ecology and evolution is why some species are widely distributed, while others are narrowly distributed. The distribution of populations in the landscape is governed by two processes, the demography of individual populations, including survival and fecundity, which contribute to population growth, and dispersal across populations, or colonization of new populations. Determining the empirical importance of these two processes to species distribution is important for understanding the basic ecology of the species, and from a conservation prospective. Understanding the spread or shrinking of populations in the landscape will yield insights into biological invasions, species distribution shifts in response to climate change, and shrinking distributions for rare or endangered species.

Integrodifference models have recently been developed that can be used to analyze the relative importance of demography and dispersal to population spread, or "invasion speed", for the first time (Neubert and Caswell 2000, Caswell et al. 2003). These models extend the stage/age-based modeling approaches that have become standard in demographic modeling to include stage/age-based dispersal. The goals of this workshop are to familiarize participants with these models and their potential uses and provide hands-on training in parameterizing these models, using example data sets. For example, participants will use invasive plant dispersal data to estimate dispersal kernels and parameterize empirical moment generating functions. Using these models, participants will learn to quantify the roles of demography and dispersal in invasion speed (or range shrinking), and determine the relative importance of different life cycle transitions (e.g. germination, survival) to invasion speed. This will yield insights into significant questions about species ranges with conservation implications.

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Caswell H, Lensink R, Neubert MG . 2003. Demography and dispersal: Life table response experiments for invasion speed. ECOLOGY 84: 1968-1978.
Neubert, Michael G.; Hal Caswell. 2000. Demography and Dispersal: Calculation and Sensitivity Analysis of Invasion Speed for Structured Populations. *Ecology*, 81: 1613-1628.