

Hellberg, M. E., R. S. Burton, J. E. Neigel, and S. R. Palumbi. 2002. Genetic assessment of connectivity among marine populations. Bull. Mar. Sci. 70(1) Suppl.: 273-290.

Geographical surveys of genetic variation provide an indirect means of tracing movements made between marine populations by larvae and other propagules. Genetic markers can provide strong evidence that populations are closed (self-recruiting) because genetic differentiation is highly sensitive to migration. However, inferences based on genetic data must necessarily be based on models that make assumptions concerning inheritance, selective neutrality of markers, and equilibrium between genetic drift, migration, and mutation. We briefly introduce the types of genetic markers that can be used to infer demographic connections between populations and the forces causing evolutionary changes in these markers, and then we outline six patterns revealed by geographic surveys of genetic markers in marine species. Four of these patterns represent the possible combinations of high or low migration rates and large or small effective population sizes; two others are due to history and natural selection. Future genetic surveys should include more detailed spatial and temporal sampling and employ analyses of DNA sequence data that can reveal the signatures of natural selection and historical changes.