Stochastic Models of Species in a Three Patch Connected System

Boris Efroimskiy, Jennifer Hanley and Jimmy Kimball

Abstract

During the eight-week period spanning June 1, 2004—July 24, 2004 we have constructed a series of models which 1) simulate the life cycle of migrating species in a system of three patches connected by varying patterns of corridors, and 2) predict the probability that a certain species will become extinct in a given system over a long interval of time. A General Model was created to simulate the migration of an arbitrary predator and prey species depending upon the number of animals in all three patches. A modified version of the General Model was then used to create a set of Panther Models to simulate the behavior of the endangered Florida Panther, in an attempt to determine whether a connected three patch system would allow the population to grow and thrive.