Research Proposal: Recolonization in the Face of Disaster

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1 Introduction

Recent occurrences in the Claremont area have begged the question: What are the long-term effects of a natural disaster on animal populations, in terms of recolonization? There has been much work done on investigating ecological invasion using diffusion and logistic growth. Invasion is the process in which a single species is introduced into an area with no competition and allowed to increase in range. However, it seems that little work has been done to model the opposite situation, in which a large population of creatures at carrying capacity suddenly lose an interior portion of their range, as would be the case in something like a fire, mudslide, or oil spill.

2 Proposed Research

For my thesis, I propose to examine recolonization time under various circumstances. We will start of by analyzing a very basic model that is single species, with logistic growth and stable carrying capacity, and with a homogeneous and instantly recolonizable environment. Once we have a good understanding of this model, we will vary this model to include environmental obstacles and possible two species interactions. We may also attempt to consider special situations, such as the fact that an oil spill or other natural disaster, after the initial damage, would leave a very hostile environment for years to come. If possible, I will attempt to check my predictions against real data.

3 Prior Research

I have taken several classes related to this research, including Biology 108 (Ecology and Environmental Science), Math 118/119 (Mathematical Biology), and Math 182 (Partial Differential Equations). I have also done biological research that included literature searches and some field work experience. Additionally, this summer I plan to do research that includes more extensive field work experience.