

1106-A0-137

Jim Cushing*, University of Arizona. *Can Cannibalism Save the Day? Dynamic Models for Adaptive Life History Strategies in Response to Climate Change.*

Changing environments generally induce changes in a species' life history traits as it struggles to survive. Traits related to reproduction, survival, and so on can all be affected in various ways that involve complex trade-offs. Cannibalism functions as a natural behavioral trait in a wide variety of animals, including protozoans, invertebrates, and all major vertebrate classes. For example, the interdisciplinary team with which I collaborate has recently documented a strong correlation between cannibalism and climate change (mean sea surface temperature) in colonies of marine seabirds (the Glaucous-winged Gull) on Protection Island WA, a wildlife refuge managed by the US Fish & Wildlife Service. Other traits, such as reproductive synchrony within the colony, have also shown similar correlations. Motivated by these observations, we ask: what are the long term consequences of such changes? Are they adaptive in the long run or simply desperate aberrations of a doomed species? I will describe some mathematical models designed to address these questions. The mathematical backdrop is that of nonlinear, discrete time dynamical systems defined by projection matrices, a fundamental bifurcation theorem, and backward bifurcations that lead to so-called strong Allee effects. (Received July 28, 2014)