Meeting: 1006, Lubbock, Texas, SS 10A, Special Session on Extinction, Periodicity, and Chaos in Population and Epidemic Models

1006-92-145 **J. M. Cushing*** (cushing@math.arizona.edu), Department of Mathematics, 617 N Santa Rita, University of Arizona, Tucson, AZ 85721, and **R. F. Costantino**, **Robert A. Desharnais** and **Shandelle M. Henson**. *Chaos and Habitat Size.* Preliminary report.

I will discuss the results of an experiment designed as a follow up to an eight year experiment we carried out to study chaotic dynamics in a population of insects. Even though data was obtained under controlled conditions, the model predicted chaotic attractor was "contaminated" in the original experiment by two major causes, one stochastic and one deterministic: namely, demographic stochasticity and state space lattice effects. The continuous state space, deterministic model whose predicted chaotic attractor was the basis of the experimental design derives from the mean one-step predictions of a demographic stochastic, lattice based model. This stochastic model predicts that as habitat size (and as a result population size) increases, stochastic realizations will "converge" to the deterministic model orbits. I will briefly illustrate this convergence using some toy models. This prediction implies that in the eight year study we would have obtained a sharper view of the predicted (deterministic) chaotic attractor if the populations had been grown in larger habitats. I will give some preliminary analysis of results from an experiment designed to test this prediction by growing populations in a habitat three times larger than that of the original eight year study. (Received February 12, 2005)