1109-92-216 **H. Thomas Banks*** (htbanks@ncsu.edu), Ctr for Research in Sci Computation, Raleigh, NC 27695-8212. *Structured Population Models for Daphnia magna.*

We use statistical validation techniques to verify density-dependent mechanisms hypothesized for populations of Daphnia magna. This species of water flea has been characterized by the National Institutes of Health as a model organism for biomedical research. D. magna is also widely used in ecotoxicology to assess the hazard of exogenous chemicals, e.g., pesticides, on ecosystems. These assessments, however, have mainly focused on endpoints below the population level of biological organization, i.e., at the molecular, cellular, or organism levels. Structured population models can be used to propagate organismal assessments to the population level, thereby enabling the causal association of organismal responses to ecosystem adversity. We develop structured population models that exemplify specific mechanisms, and use multi-scale experimental data from our laboratory in order to test their importance. We show that fecundity and survival rates are affected by both time-varying density-independent factors, such as age, and density-dependent factors, such as competition. We perform uncertainty analysis and show that our parameters are estimated with a high degree of confidence. (Received February 01, 2015)