1077-35-55 **Bonni J Kealy*** (bkealy@math.wsu.edu), Department of Mathematics, Washington State University, Pullman, WA 99164-3113, and **David J Wollkind**. *A Nonlinear Stability Analysis of Vegetative Turing Pattern Formation for an Interaction-Diffusion Plant-Surface Water Model System in an Arid Flat Environment.*

The development of spontaneous stationary vegetative patterns in an arid flat environment is investigated by means of a weakly nonlinear diffusive instability analysis applied to the appropriate model system for this phenomenon. In particular, that process can be modeled by a partial differential interaction-diffusion equation system for the plant biomass density and the surface water content defined on an unbounded flat spatial domain. The main results of this analysis can be represented by closed-form plots in the rate of precipitation versus the specific rate of plant density loss parameter space. From these plots, regions corresponding to bare ground and vegetative patterns consisting of parallel stripes, labyrinth-like mazes, hexagonal arrays of gaps, irregular mosaics, and homogeneous distributions of vegetation, respectively, may be identified in this parameter space. Then those theoretical predictions are compared with both relevant observational evidence involving tiger and pearled bush patterns and existing numerical simulations of similar model systems as well as placed in the context of the results from some recent nonlinear vegetative pattern formation studies. (Received July 12, 2011)