1153-92-531 **Mark Alber**, **Kurt Anderson**, **Daniel Collister*** (dcoll010@ucr.edu), **Francesco Pancaldi** and **Ryan Conway**. *Using Satellite Imagery to Predict Persistence and Distribution of Populations.*

Predicting the persistence of populations is becoming increasingly important due to the habitat deterioration caused by climate instability and pollution. Several mathematical models have been developed to represent population dynamics under a variety of conditions. In this study, we approach the problem of insect population persistence and resettlement in a river network through first principles modeling. By extracting elevation data from satellite imagery, we are able to create an energy gradient to inform a random walk agent-based model to create population dispersal kernels. By varying our model parameters, we considered several motion types for our agents, including unbiased random walk and upstream and downstream biased walks. Additional parameters were studied using the ranges established in the literature, including lifespan, reproductive rates and movement speeds. We demonstrate that there is a direct connection between the geometry of the underlying river network and the persistence locations of the species. Finally, we identified optimal values for our model parameters with respect to the population persistence and individual distance traveled, allowing to evaluate population survival and expansion in specific river basins. (Received September 04, 2019)