1077-92-1716 **Erin N Bodine*** (bodinee@rhodes.edu), 2000 N. Parkway, Mathematics & Computer Science Department, Rhodes College, Memphis, TN 38112, and **Suzanne Lenhart** (lenhart@math.utk.edu), 227 Ayres Hall, 1403 Circle Drive, Mathematics Department, University of Tennessee, Knoxville, TN 37996-1320. *Bang-bang Optimal Control of Continuous Time Species Augmentation.*

Species augmentation is a method of reducing species loss via augmenting declining/threatened populations with individuals from captive-bred or stable, wild populations. We examine a differential equations model and optimal control formulation for continuous time augmentation of a general declining population. Two populations of the same species are modeled: a target/declining population and a reserve population. The objective functional is linear with respect to the optimal control, and we find a characterization for the optimal control utilizing Pontryagin's Maximum Principle and the generalized Legendre-Clebsch condition. Numerical results for scenarios of different illustrative parameter sets show the optimal controls are of bang-bang type. These numerical simulations articulate to natural resource managers the best they can do given certain constraints, and what augmentation strategy will yield that "best" outcome. (Received September 20, 2011)