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Daniel L Kern, Suzanne Lenhart, Rachael Miller* (RMiller@math.utk.edu) and **Jiongmin Yong**. *Optimal control applied to native-invasive population dynamics.*

This article presents a model for population interactions between an invasive and a native species, where the effect of disturbance in the system (such as flooding) is modeled as a control variable in the growth terms. The motivating example is cottonwood-salt cedar competition, with flooding being detrimental at low and high levels and being advantageous at medium levels, which led us to consider quadratic growth functions of the control. An objective functional is formulated to maximize the native species while minimizing the cost of implementing the control. A new existence result for an optimal control with these quadratic growth functions is given. Numerical results are examined for various parameter values. The results provide suggestions for managing the disturbance regime when invasive species are present. (Received May 31, 2007)