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Suzanne Lenhart*, University of Tennessee, Knoxville, TN 37996. *Optimal Control of the Flow Rate in a PDE Model of an Invasive Species in a River*. Preliminary report.

Managing invasive species in rivers can be assisted by appropriate adjustment of flow rates. Using a partial differential equation (PDE) model representing an invasive population in a river, we investigate controlling the water discharge rate as a management strategy. Our goal is to see how controlling the water discharge rate will affect the invasive population, and more specifically how water discharges may force the invasive population downstream. We complete the analysis of a flow control problem, which seeks minimize the invasive population upstream while minimizing the cost of this management. Using an optimality system, consisting of our population PDE, an adjoint PDE and corresponding optimal control characterization, we illustrate some numerical simulations in which parameters are varied to determine how far upstream the invasive population reaches. We also change the river's cross-sectional area to investigate the impacts of this on the optimal control. This work is in collaboration with Rebecca Pettit. (Received September 05, 2019)