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Wandi Ding*, MTSU Department of Mathematical Sciences, MTSU BOX 34, Murfreesboro, TN 37132, and **Suzanne Lenhart** (lenhart@math.utk.edu), 121 Ayres Hall, 1403 Circle Dr., Knoxville, TN 37919. *Optimal Harvesting of a Spatially Explicit Fishery Model.*

We consider an optimal fishery harvesting problem using a spatially explicit model with a semilinear elliptic PDE, Dirichlet boundary conditions and logistic population growth. We consider two objective functionals: maximizing the yield and minimizing the cost or the variation in the fishing effort (control). Existence, necessary conditions and uniqueness for the optimal harvesting control for both cases are established. Results for maximizing the yield with no-flux boundary conditions are also given. The optimal control when minimizing the variation is characterized by a variational inequality instead of the usual algebraic characterization, which involves the solutions of an optimality system of nonlinear elliptic partial differential equations. Numerical examples are given to illustrate the results. (Received July 05, 2007)