1023-49-857 **Wandi Ding***, 121 Ayres Hall, 1403 Circle Dr., Knoxville, TN 37996-1300, and **Suzanne Lenhart**, 121 Ayres Hall, 1403 Circle Dr., Knoxville, TN 37996-1300. *Optimal Harvesting of a Semilinear Elliptic Fishery Model.*

We consider an optimal fishery harvesting problem using a semilinear elliptic PDE model, which has logistic growth and the harvest depends on the location of the fish. 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. 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 for both cases. (Received September 22, 2006)