1067-60-409 **Qingshuo Song** (song.qingshuo@cityu.edu.hk), Department of Mathematics, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon Tong, Hong Kong, Hong Kong, **Richard Stockbridge** (stockbri@uwm.edu), Department of Mathematical Sciences, University of Wisconsin-Milwaukee, Milwaukee, WI 53201, and **Chao Zhu*** (zhu@uwm.edu), Department of Mathematical Sciences, University of Wisconsin-Milwaukee, Milwaukee, WI 53201. *On Optimal Harvesting Problems in Random Environments.*

This work investigates the optimal harvesting strategy for a single species living in random environments whose growth is given by a switching diffusion. Harvesting acts as a stochastic control on the population size. The objective is to find a harvesting strategy which maximizes the expected total discounted income from harvesting up to the time of extinction of the species. This is a singular stochastic control problem, with both the extinction time and harvesting policy depending on the initial condition. Consequently one no longer obtains continuity of the value function using the standard arguments. We provide a sufficient condition for the continuity of the value function. Further, we characterize the value function as a viscosity solution of a coupled system of quasi-variational inequalities. We also establish a verification theorem. Based upon the verification theorem, an ϵ-optimal harvesting strategy is constructed and two examples are analyzed in detail. The novelties of this work include the modeling of abrupt changes in the random environments and the state- and regime-dependent marginal yield function. While these considerations enable a better approximation of the real world dynamics, they add considerable difficulty to the analysis. (Received September 01, 2010)