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**Jerome Goddard II\*** (jgoddard@aum.edu), Department of Mathematics, P.O. Box 244023, Montgomery, AL 36124, and **E. Lee** and **R. Shivaji**. *Population models with diffusion, strong Allee effect, and nonlinear boundary conditions.*

We discuss the steady state solutions of a diffusive population model with strong Allee effect, namely,

$$\begin{aligned} -\Delta u &= a(x)u + b(x)u^2 - m(x)u^3 - ch(x); & \Omega \\ \alpha(u)\frac{\partial u}{\partial \eta} + [1 - \alpha(u)]u &= 0; & \partial\Omega \end{aligned}$$

where  $\Omega$  is a subset of  $\mathbb{R}^n$  with  $n \geq 1$ ,  $a(x), b(x)$ , and  $m(x)$  are Holder continuous functions such that  $b(x), m(x)$  are strictly positive on the closure of  $\Omega$  with  $a(x) < 0$  for some  $x$  in  $\Omega$ ,  $c \geq 0$ ,  $\alpha(u) : \mathbb{R} \rightarrow [0, 1]$  is a non-decreasing smooth function, and  $\frac{\partial u}{\partial \eta}$  is the outward normal derivative. Our study is focused on a population that satisfies a certain nonlinear boundary condition and on its persistence when constant yield harvesting is introduced. We establish our existence results by the method of sub-super solutions. (Received August 30, 2011)