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Abstract

This paper proposes and analyses a nonlinear mathematical model to study the impact of anthropogenic activities on forest biomass and forest-dependent wildlife populations using a system of differential equations. It is assumed that the growth of forest biomass, forest-dependent wildlife populations, and the human population follow logistic equations. The effect of forest biomass depletion on the survival of forest-dependent wildlife populations is investigated by introducing a function that denotes the dependence on forest biomass. The system's behaviour near all ecologically acceptable equilibria is studied, and to confirm the analytical conclusions, a numerical simulation is performed. The model analysis shows that as forest biomass declines due to an increase in human population and its associated activities, the population of wildlife species also declines, and if no measures are taken, both forest biomass and the wildlife population may become extinct.