

Urban Pollution's Impact on the Forest Territory, Wildlife and Human Population: A Mathematical Model

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ABSTRACT

Earth's forests are a complicated ecosystem. The maintenance of human well-being depends critically on forests' ability to provide ecosystem services. Their continued decline is primarily due to urbanization and overpopulation. In light of this, a nonlinear mathematical model is proposed and analysed the effects of urban pollution on forest territory, wildlife population, and human population. Urban forest territory, wildlife population, human population, population pressure, urban development, and urban pollution are six dynamical variables included in the model's formulation. The model is examined using the stability theory of differential equations, and numerical simulation is employed to verify the analytical findings. Urban forest territory and human inhabitants are assumed to be increasing logarithmically and being affected by numerous real factors at the same time. wildlife and human inhabitants are either directly or indirectly dependent on the forest for its survival. These urban inhabitants of human are badly affected by the urban pollutant in the surroundings through different ways. The uninterrupted growing urban population imposes high requirements and orders, after that population force creates (builds) up on the surroundings. It is rises with growth in population. So, keeping these views, the growth of population force is to be considered directly comparative to the urban inhabitants, along with its natural running down in the differential equation. The urban forest territory's density and wildlife population diminish as urban development increases there. The expansion of the human population has also been found to put an undue strain on forests, accelerate the decline of wildlife populations, and raise the rate at which forest reserves are being used for their original purposes. Unplanned urban growth is anticipated to have a significant impact on the range of wildlife species and the health of the environment by increasing the concentration of pollutants.

Keywords: forest territory, wildlife population, urban development, urban pollution.



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