

# A mathematical model for the population dynamics of feral cats and the spread of feline leukemia

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We formulate and analyze a mathematical model for the population dynamics of feral cats. The model includes three categories: kittens, adult females and adult males. Kittens are born at a rate proportional to the adult female population. Adults compete for resources with both members of their own sex and members of the opposite sex. Feral cats are subject to various animal control measures including impounding, adoption, and euthanasia. The feral cat population also interacts with a fixed population of outdoor house cats, some of which experience abandonment. In some cases, the feral population becomes extinct while other parameter cases allow for the population to persist at a positive and globally asymptotically stable equilibrium. If only adult males can be abandoned then the model can exhibit up to two positive equilibrium points. When all three categories of cats can be abandoned then the model can exhibit up to four positive equilibrium points. The model can be extended to include the spatial movement of adult males and it can be used to describe the spread of feline leukemia within a feral cat population.

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