

**THE COMPLEXITIES OF CONTROL:
A SIMULATION MODELING APPROACH FOR EVALUATING ALTERNATIVE METHODS
OF CONTROLLING FREE-ROAMING CAT POPULATIONS**

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The Alliance for Contraception in Cats & Dogs, with generous support from ASPCA, facilitated the formation of a team of experts to explore stochastic demographic simulation modeling as a tool to evaluate different methods of reducing abundance of free-roaming cat populations. The models feature different types of cat populations occupying urban or rural landscapes, leading to different initial population densities, survival rates and abundances. Focal populations subject to treatment can be demographically linked to surrounding neighborhood populations, and also receive litter equivalents through abandonment of owned litters. Management alternatives include trapping of individuals followed by removal, permanent sterilization, or temporary contraception. The robust model represents a significant step forward in studying the details of cat demographic dynamics in the presence of reproductive management efforts. Sensitivity analysis indicates that free-roaming cat populations are more sensitive to changes in age-specific survival than to age-specific reproduction (fecundity). Demographic connectivity with the surrounding environment, namely through dispersal and litter abandonment, can dramatically reduce the effectiveness of targeted population management efforts. For any given level of treatment intensity, the models indicate that (i) treating adults is more effective than treating only kittens; (ii) treating females is more effective than treating males; and (iii) trapping and removal leads to the highest rate of population abundance reduction, followed by permanent sterilization and temporary contraception. These findings have significant implications for the practical application of population control options for free-roaming cats. Finally, the model is used briefly to address the popular idea of the “cat pyramid” and the utility of applying the idea to the free-roaming cat management conversation.