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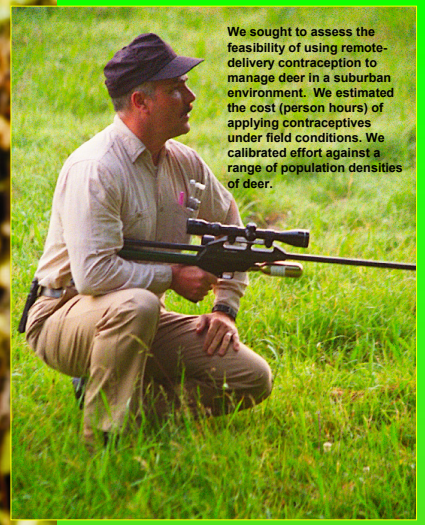
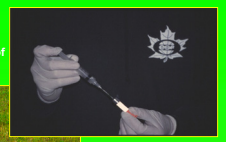
Contraception & Deer



We sought to assess the feasibility of using remote-delivery contraception to manage deer in a suburban environment. We estimated the cost (person hours) of applying contraceptives under field conditions. We calibrated effort against a range of population densities of deer.

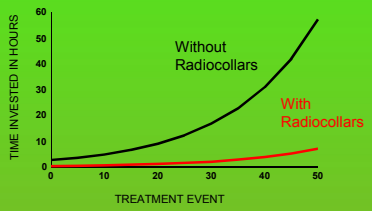
The study was conducted in Irondequoit, New York, a suburb of large metropolitan area.



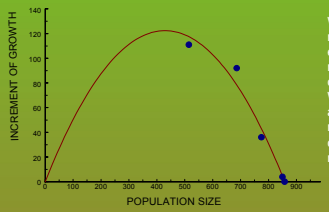
We captured deer using a mixture of ketamine and xylazine. We attached radiocollars and eartags. We treated deer annually using the immunocontraceptive Porcine Zona Pellucida (PZP) with Freund's Complete Adjuvant. We tracked via radiotelemetry over 4 years to measure home range size and site fidelity.

Estimating the Effort Required to Apply Contraceptive Treatment to Deer via Dart Rifle

Amount of effort to dart deer increases with each new individual. The rate of increase is not linear, but exponential. Radiocollaring deer reduces effort because deer can be located more efficiently.

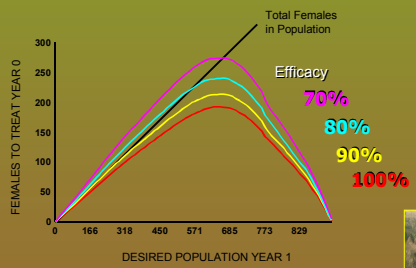


Adapting the Recruitment Curve from Sustainable Harvest to Contraceptive Treatment



We calibrated a standard recruitment curve from aerial estimates of deer density and reproductive rates of females culled from the population. We measured changes in age-specific reproductive rates through 5 years in concert with a managed reduction of density.

We used modeling to adapt the recruitment curve to predict numbers of females to treat with contraceptives.



Take Home Messages

Contraception can be used to control white-tailed deer populations, but estimating cost of application is not simple.

Cost is dependent on the number of females that must be treated, the efficacy of treatment, and the rate at which females can be darted. Darting rate depends on population density and approachability of each deer.

Effort to dart deer increases as more deer are darted because not all deer are equally approachable. The first deer darted tend to be those that are least wary of humans. With each deer that is darted, the pool of remaining deer is increasingly skewed toward those that are more wary.

Effort to dart is greater if the population is first reduced by culling because deer surviving the cull tend to be those that are more wary of humans.

The standard recruitment curve allows prediction of the number of females that must be culled to achieve a desired density. Adapting the recruitment curve for making similar prediction for contraception changes its shape. Exact shape varies depending on efficacy of contraceptive treatment.

Given 90% efficacy, the minimum population size that can be maintained through contraception is about 25% of ecological carrying capacity.

By reducing the geographic scale at which contraception is applied, costs can be minimized. Deer mangement using contraceptive may be possible at a geographic scale of 5-10 km^2.

Movement behavior of deer supports the possibility of neighborhood-scale management. Female deer show strong fidelity to home ranges that are <10 ha. A townwide (~40 km^2) population is actually composed of a set of neighborhood populations, each of which is relatively independent. Thus, management can be applied to deer in one neighborhood with little influence on or by surrounding deer populations.

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