

# **WHITE-TAILED DEER FIELD STERILIZATION PROPOSAL**

**Mt. Storm Park  
Rawson Woods  
Edgewood Grove**

**Cincinnati, Ohio**

**Submitted by**

**Dr. Anthony J. DeNicola**

**White Buffalo, Inc.**

**20 February 2015**

## Introduction

Deer overabundance and the associated conflicts are pervasive throughout the eastern US. Alternative management techniques (i.e., controlled hunting, sharpshooting, trap and relocation, fertility control research) have been explored from Georgia to Texas to Minnesota and back through Maine and nearly all the states contained therein. Throughout this large geographic region deer are creating both social and ecological conflicts in suburban, corporate, and park environments. Many federal, state and local agencies are struggling to address this ever-increasing problem. Fertility control technology has been shown to be effective for use on white-tailed deer and several other mammalian species. The general public has expressed considerable interest in this approach to managing deer, and it has promise for use on localized deer populations (Rutberg et al., 2013). The ultimate goal for this management approach is short- and/or long-term population management to minimize human-deer interactions or disease outbreaks in areas with high deer populations where hunting is limited, controlled, or prohibited and where other management tools are difficult or impossible to implement. We are evaluating surgical sterilization because it is safe for treated deer (Maclean et al. 2006, DeNicola 2013, DeNicola 2014) and theorized to be more cost effective than the all present vaccine technology (Boulanger et al. 2012).

## Study Area

The Clifton neighborhood of the City of Cincinnati, Ohio is home to three city parks (the “Clifton Parks”):

- Mt. Storm Park, a 75 acre neighborhood park that mostly serves a population residing within several blocks of the park.
- Rawson Woods, a 10.6 acre preserve; and
- Edgewood Grove, a 32 acre preserve.

Mt. Storm Park is primarily a hilltop park with west facing slopes. Forest canopy covers 69.8% of the park, the majority of the remaining 30.2 acres is turf with a small ¼ acre patch of native prairie and a 100’ wide strip of brush below the utility transmission line that runs parallel to I-75. In 2015, the Ohio Department of plans to remove approximately 3 acres of the Mt. Storm Park slope along I-75 to widen the highway. The plan calls for reforesting the slope with native seedling trees and seeding it with a native prairie mix.

Rawson Woods and Edgewood Grove are generally undeveloped and include wooded hillside properties and open space. Generally where there is development it is limited to trails and public access. Rawson Woods and Edgewood Grove are primarily forested (81% and 99% canopy) with secondary growth of deciduous species.

Because deer are not limited to the parks under consideration we have delineated the study area as: Ludlow Avenue as the southern boundary, Clifton Avenue to the east, and I75 on the north and west. This area encompasses approximately ~1 mile<sup>2</sup>. The Clifton Parks and the surrounding Clifton neighborhood represent one of the most challenging situations for deer managers. The community is nearing the point of being “built out” with most of its land area covered by single family homes surrounded by the Clifton Parks. This provides excellent deer habitat, with very limited predation,

and at the same time can be restrictive to the implementation of some deer management options. Given the favorable conditions, the deer population in and around the Clifton Parks is reaching a level that is incompatible with the Cincinnati Park Board's goals of a healthy park eco-system. To date, no management actions have been used to control the deer population. These site characteristics, along with deer approachability, make the Clifton Parks and the surrounding Clifton neighborhood a suitable site to conduct a surgical sterilization research project.

## **Objectives of Proposed Research**

We would expect that surgically sterilizing >95% of a localized deer population would result in a population reduction, based on empirical findings of Rutberg et al. 2013, and published data on natural mortality and recruitment rates of female white-tailed deer in suburban environments (DeNicola et al. 2008, Grund 2011, Etter et al. 2002). Rutberg et al. 2013 conducted their research efforts on a closed population (i.e., an island), so they did not have the potential of immigration effects on population dynamics. Furthermore, there are few data available that accurately quantify local immigration rates subsequent to management efforts on suburban deer populations for either lethal or non-lethal management actions. The rate of potential population decline will depend on the relative percentage of the population sterilized combined with local mortality and immigration/emigration rates. Therefore, our primary objective is to assess the cost, feasibility, and population impacts of a very high percentage white-tailed deer (*Odocoileus virginianus*) capture and sterilization project in a densely developed suburban community. We will quantify effort, cost, immigration/emigration rates in an open suburban population, and population size annually. Ultimately, we want to determine the lowest density that can be achieved with only nonlethal management techniques given potential immigration effects. Our secondary objective is to assess the feasibility of training local program participants to capture, handle, and surgically sterilized female white-tailed deer to determine how well this concept can be scaled with minimal professional consultant staffing. Local program participants are defined as competent local personnel identified by the police department to eventually assume operation of the program. Those personnel may include contracted or volunteer local vets, police personnel trained in remote immobilization techniques, and other support staff.

## **Field Methods**

We will conduct focal capture and sterilization efforts throughout the study area in the first year using experienced personnel while training local program participants. In the second year, we will attempt to maximize the involvement of local program participants in the field work to assess the feasibility of reducing costs with limited paid professional consultant involvement.

### **YEAR 1**

**Capture** – We will capture  $\geq 95\%$  female white-tailed deer of all age classes using remote immobilization (darting) techniques (Pneu-dart X-caliber dart rifle with 2cc transmitter darts) to administer 4.4 mg Telazol (tiletamine HCl + zolazepam HCl) and 2.2 mg xylazine HCl. Based on preliminary field observation there are likely less than 100 deer in the City limits. We will approach deer in a vehicle on public roadways and private roadways/properties where permission has been granted. A police officer will accompany the capture professional. Once deer are located masks

will be placed over the eyes and ophthalmic ointment will be applied to prevent ocular desiccation. Deer then will be transported to a temporary veterinary surgical sterilization site. Deer will be captured before 1 March (November 2015) to minimize difficulties while performing the sterilization procedure later in gestation.

To accomplish the objectives of a high percentage capture (>95% of females) and sterilization project with maximal efficiency (i.e., lowest cost), there should be complete access to the local population from roadways. Female deer will be captured using remote immobilization (darting) equipment from a vehicle and through the use of bait at select locations.

One mature doe in each matrilineal group will be radio-collared ( $n = \sim 10$ ) to facilitate future capture efforts (e.g., to locate unmarked deer for subsequent capture) and to assess survival rates. All sterilized animals will be fitted with livestock ear tags labeled “Call Before Consumption – 860-790-0224”. We will use Extra Large DuFlex ear-tags and modified traditional VHF radio-collars (1/3 the size of traditional deer collars (150 grams) – 5 year battery life) to lessen the unnatural appearance of deer. We also will collect data on weight, age, and general health of the deer. Additional does may be captured and treated over the subsequent four years to compensate for potential immigration.

**Surgical Procedure** – After capture, all female deer will be premedicated with flunixin meglumine at a dosage of 1-3 mg/kg IM, and a long acting antibiotic (ceftiofur - Excede) at 3-6 mg/kg also IM. To maintain anesthesia supplemental doses of ketamine HCl may be given intravenously at dosages up to 5 mg/kg, as needed. Routine prepubic ventral midline laparotomy will be used to expose the uterine horns and ovaries. We will perform bilateral ovariectomies using a combination of clamping, electrocautery and excision for removal of the ovary, and coagulation to prevent hemorrhage. In select cases the ovarian artery will be ligated with 0 PDS suture or a titanium hemostatic clip. We also may conduct surgical fallopian tubal ligectomies in late-term gestation if deemed necessary based on pregnancy status. Tubal ligectomy is performed in similar fashion to the ovariectomy, however, ovaries will be left undisturbed, while the fallopian tubes are ligated using a single titanium hemostatic clip near the insertion site of each uterine horn and a 1-2cm section of each tube is removed with electrocautery. Routine three layer closure of the abdomen will be performed to complete the procedure. In over 400 sterilization surgeries in deer (black-tailed and white-tailed deer) we have never had a known dehiscence (DeNicola 2013A, 2013B). The suture materials and patterns support continued use, as does the use of stainless steel staples for skin closure. We have recaptured many of the previously sterilized deer and found the staples absent after only a few months.

All animals will be returned to the area where they are captured (in locations with the lowest likelihood of human disturbance during recovery), administered the reversal agent tolazoline HCl (2.0 mg/kg) intravenously, and monitored for complications with recovery.

**Training** – We will use experienced capture and handling staff and veterinarians while training local program participants for all aspects of the program. Local program participants will include personnel responsible for future capture, handling, transport, and surgical sterilization. Training for local program participants, that are not law enforcement or veterinarians, will include:

- 1) Use of radio-telemetry for locating recumbent deer
- 2) How to approach and secure immobilized individuals
- 3) Handling and transport methods to ensure minimal stress for animals
- 4) Fundamentals of ear-tagging, application of radio-collars, aging, and data collection
- 5) Final preparations for surgery including surgical site prep. This includes clipping of fur in the lower abdominal area, scrubbing the skin with disinfectants (e.g., chlorhexidine, betadine) followed by an alcohol derivative (this process is completed 3 times), and surgical draping of the disinfected area

Participating local law enforcement personnel will be trained in basic immobilization techniques and advanced remote immobilization equipment usage. They will then perform required tasks under direct supervision until they are deemed proficient to operate independently. Training for veterinarians will include a hands-on tutorial focused on the optimal methods for performing deer ovariectomies followed by continued oversight until techniques have been refined and can be performed independently.

**Monitoring** – We will assess survival and emigrations rates by monitoring radio-collared females after each capturing phase. Immigration will be determined by observing the number of unmarked females in the treatment area each year during capturing efforts. These procedures will allow us to assess the fertility control program's effect on population demographics

## **YEAR 2**

**Capture and surgical sterilization** – Same as Year 1, with the primary effort focused on locating, capturing, and sterilizing any female immigrants or females not captured in Year 1. We also will use local program participants, while supervising with experienced personnel, to determine if local personnel can maintain program operations in the future.

**Monitoring** – As described in Year 1 with the option to adapt methods based on findings from the first year's efforts.

## **YEARS 3 - 5**

**Capture and surgical sterilization** – Same as Year 2 with the primary effort focused on locating, capturing, and sterilizing any female immigrants.

**Monitoring** – As described in Year 1 with the option to adapt methods based on findings from the first year's efforts.

## Report Submission

We will be responsible for the submission of annual reports to a designated agent of the Ohio Department of Natural Resources, Division of Wildlife, and to the Cincinnati Park Board Commissioners through the Superintendent of Park Operations and Land Management. All data will be made available upon request at any time to authorized agents of the State and to the Cincinnati Park Board Commissioners through the Superintendent of Park Operations and Land Management.

## Background of Principal Investigators

**Dr. Anthony J. DeNicola** is President of White Buffalo, Inc., a non-profit research organization dedicated to conserving ecosystems through wildlife population control. He received a M.S. degree from the Yale School of Forestry and Environmental Studies and a Ph.D. from Purdue University. Dr. DeNicola has conducted contraceptive and sterilization projects throughout the United States over the last 22 years. Dr. DeNicola's research interests include ecological approaches to control wildlife damage, control of introduced vertebrate species, and wildlife reproductive control.

**Dr. Randy Junge** MS, DVM, Dipl ACZM (American College of Zoological Medicine). Dr. Junge is a 1985 graduate of the University of Illinois College of Veterinary Medicine. After completing a residency in zoo medicine he joined the staff of the St. Louis Zoo where he served as staff veterinarian (1988 - 2003) and then Director of Animal Health (2004 - 2011). He then accepted the position of Vice President of Animal Health at the Columbus Zoo and the Wilds. Dr. Junge's interests are disease ecology and conservation medicine, and has directed the Prosimian (Lemur) Biomedical Survey Project in Madagascar since 2000. Finally, he worked with Dr. Steve Timm and White Buffalo, Inc. conducting rapid ovariectomies on white-tailed deer in Missouri in 2009-10.

## Literature Cited

Boulanger, J. R., P. D. Curtis, E. G. Cooch, and A. J. DeNicola. 2012. Sterilization as an alternative deer control technique. *Human-Wildlife Interactions*. 6:273-282.

DeNicola, A. J., D. Etter, and T. Almendinger. 2008. Demographics of non-hunted white-tailed populations in suburban areas. *Human-Wildlife Conflicts* 2:102-109.

DeNicola, A. J. 2014. Field evaluation of surgical sterilization of black-tailed deer in San Jose, California: 2014 Progress Report to the California Department of Fish and Wildlife.

DeNicola, A. J. 2013. Field evaluation of surgical sterilization of white-tailed deer in the Village of Cayuga Height, New York: 2013 Progress Report to the New York Department of Environmental Conservation.

Etter, D.R., K.M. Hollis, T.R. VanDeelen, D.R. Ludwig, J.E. Chelsvig, C.L. Anchor, R.E. Warner. 2002.

- Survival and movements of white-tailed deer in suburban Chicago, Illinois. *Journal of Wildlife Management*. 66: 500-510.
- Grund, M. D. 2011. Survival analysis and computer simulations of lethal and contraceptive management strategies for urban deer. *Human–Wildlife Interactions* 5:23–31.
- Jacobson, H. A., J. C. Kroll, R. W. Browning, B. H. Koerth, and M. H. Conway. 1997. Infrared-triggered cameras for censusing white-tailed deer. *Wildlife Society Bulletin* 25:547–556.
- MacLean, R. A., N. E. Mathews, D. M. Grove, E. S. Frank, and J. Paul-Murphy. 2006. Surgical technique for tubal ligation in white-tailed deer (*Odocoileus virginianus*). *Journal of Zoo and Wildlife Medicine*. 37:354-60.
- Rutberg A. T., R. E. Naugle, and F. Verret. 2013. Single-treatment porcine zona pellucida immunocontraception associated with reduction of a population of white-tailed deer (*Odocoileus virginianus*). *Journal of Zoo and Wildlife Medicine*. 44: In press.