2014

CINCINNATI PARK BOARD NON-LETHAL DEER POPULATION CONTROL PILOT PROJECT:
Mt. Storm Park
Rawson Woods Preserve
Edgewood Grove

Deer Sterilization Program presented by the Clifton Deer Sterilization Working Group

12/12/2014
December 12, 2014

Willie F. Carden, Jr., Director
Cincinnati Parks
950 Eden Park Drive
Cincinnati, OH 45202

Re: Clifton Pilot Non-Lethal Deer Population Control Program

Dear Director Carden:

With appreciation to you and the Board of Commissioners for offering this opportunity, we are pleased to present a non-lethal deer population control program that we believe will be affordable, effective and most likely to be approved by the Ohio Department of Natural Resources, Ohio Division of Wildlife (ODNR).

As you requested, we began working with the other Clifton residents, as well as non-resident animal rights activists, who had expressed opposition to the Park Board’s bow-hunting program. With the exception of one who thought we should do nothing to the deer, the group quickly narrowed the choices to immunocontraception and sterilization. For reasons more fully explained in the attached proposal, the undersigned (all Clifton residents) were convinced that contraception, which is less than 100% effective and requires repeated vaccinations over the life of the doe, was less likely to succeed in meeting the Parks’ deer population goals than sterilization, would be more difficult and expensive to implement over the life of the program, was probably not feasible within the Parks’ time frame, and was less likely than sterilization to be approved by the ODNR. Believing that contraception is less invasive than sterilization, the others in the group voted to pursue a contraception option, and we understand they may present a separate proposal for that method. We note that if long promised advances in the longevity of and delivery methods for chemical contraceptive agents are achieved in years to come, contraception might become an equivalent or better choice. No one can predict when or if such advances will be available.

As explained in the enclosed budget, we have conservatively estimated the first year program costs to be approximately $26,800, although we anticipate that the receipt of certain “in kind” donations may result in materially lower actual costs. We now have pledges for $10,000 and will raise the balance of funding when ODNR approval is received or seems likely.

This program is ready to go. If the Cincinnati Park Board, as the landowner, approves this program, the primary consultant, Dr. Anthony DeNicola and his company White Buffalo, will immediately submit a permit request to the ODNR. If the ODNR grants that request promptly, White Buffalo is prepared to come to Cincinnati and treat our deer this coming February. If the February date is not possible, the next best time for implementation would be Fall of 2015.
Thank you once again for allowing us to join our award winning Cincinnati Parks in this exciting program.

Sincerely,

The Clifton Deer Sterilization Working Group

Laurie A. Briggs

Christine Lottman

Robert Rack

Cc: City Council Member Yvette Simpson, Chair
Human Services, Youth, and Arts Committee
I. BACKGROUND

A. Park Board Action and Criteria for Non-Lethal Program

The Cincinnati Park Board of Commissioners (the “Commissioners”) voted on October 16, 2014 to suspend the Park Board’s deer culling program in Mt. Storm Park, Edgewood Grove, and Rawson Woods (the “Clifton Parks”) and to collaborate with interested Clifton residents in the development of a non-lethal pilot project to stabilize and reduce the deer population in the Clifton Parks. The resolution adopted by the Commissioners makes clear that if a viable non-lethal pilot program has not been developed and approved by the Ohio Department of Natural Resources, Ohio Division of Wildlife (“ODNR) by June 15, 2015, the Park Board’s deer culling program may be reinstituted in the Clifton Parks.

Parks Director Willie Carden initiated the collaboration by appointing Superintendent Jim Burkhardt as the Parks’ liaison to meet with those citizens who appeared or were represented at the October 16, 2014 Park Board meeting in opposition to the bow-hunting program. The criteria offered to guide the collaboration were developed with Superintendent Burkhardt, as follows: The non-lethal pilot program selected should be the one with the greatest likelihood of being (a) affordable (funded or fundable); (b) approved by ODNR; and (c) successful in stabilizing and reducing the deer population in the Clifton Parks to eco-sustainable levels. Additionally, the Park Board staff has requested that any plan address the following elements:

- A step by step process, including staffing and reporting procedures
- Peer reviewed research support
- A budget with documented funding resources
- All required federal, state, county, and city permits
- Documentable results

The group found itself divided between those favoring contraception and those favoring sterilization. The latter group, calling itself the Clifton Deer Sterilization Working Group, is presenting for consideration a deer sterilization program (the “Program”) for female deer as described in detail herein. The Program contains all the elements requested by the Park Board, satisfies the criteria developed with Superintendent Burkhardt, and can be implemented in the time frame established by the Commissioners.

B. The Clifton Parks

Mt Storm Park (75 acres) is a neighborhood park with a mixture of forest, native prairie, and turf. Rawson Woods (10.6 acres) and Edgewood Grove (32 acres) are heavily forested preserves. A more detailed description of the Clifton Parks is attached as Exhibit A. Because deer will range outside formal Clifton Park boundaries, the delineated Program area will be Ludlow Avenue to the south, Clifton Avenue to the east, and I-75 on the north and west. This area encompasses approximately one square mile.
C. Deer Population In And Around The Clifton Parks

An aerial infrared deer count of the Clifton Parks conducted on April 18, 2014 showed 10 deer inside the Clifton Parks and 28 deer outside (but in the vicinity of) the Clifton Parks, for a total count of 38 deer. The contractor hired by the Park Board to conduct the aerial count believes his aerial counts to be about 90% accurate, on average.

Herd size, of course, is not static. Births, deaths, immigration of new deer into the area, and emigration of deer out of the area may have resulted in material increase (or theoretically, decrease) in the Clifton Parks’ deer population since the date of the aerial count. For planning purposes, the Working Group estimates the current deer population to be 56, 60% (or 30) of which are female.¹

II. THE PROGRAM

A. Program Overview

We propose to reduce the deer population in the Clifton Parks through surgical sterilization of female deer using a procedure known as an ovariectomy (the removal of the ovaries). The procedure, which is done in the field and takes less than 20 minutes, is similar to, but less invasive than, typical spay surgeries used to sterilize domestic dogs and cats (which involve a complete hysterectomy).

Surgical sterilization is well-recognized in veterinary medicine, having been used in lions, tigers, llamas, macaques, rhesus monkeys, donkeys, horses, sheep, cows, dogs, cats, rabbits, hamsters, rats and mice, as well as white tailed and black tailed deer and other animals. Resources (including peer reviewed articles) regarding surgical sterilization are identified in Exhibit B.

Surgical sterilization is 100% effective and permanent. Deer mortality rates associated with the ovariectomy technique to be used in the Clifton Parks are less than 1%.

Answers to frequently asked questions regarding sterilization are provided in Exhibit C.

B. Effects Of Sterilization

Once sterilized by ovariectomy, a doe will never give birth again. The first and immediate result of sterilizing the females in a deer herd is that herd growth through fawning, which can exceed 25% per year for urban deer, will stop and the deer population will be stabilized (i.e., the only additions to the population will be through immigration, not births). Thereafter, the population typically will shrink through natural attrition. The rate of reduction will depend upon a variety of factors (including immigration of any new, unsterilized deer into the Clifton Parks), but most communities experience a reduction of 10% to 20% per year.

Deer sterilized by ovariectomy do not go into heat. This means they do not attract bucks to the area and breeding activity (chasing, for example) that has been associated in some communities with an increase in deer-vehicle collisions, is reduced or eliminated.

¹ Estimate assumes (a) 10% mortality; (b) 40% of herd is adult female; (c) 1.2 surviving fawns per adult female; and (d) 60% of total herd is female.
Additionally, because sterilized deer do not spend almost 7 months every year pregnant and 2 to 3 months nursing, they are believed to have lower caloric needs (so they graze less) and to be healthier.

**C. Program Partners and Service Providers**

As the landowner and steward of the Cincinnati Parks, the Cincinnati Parks Board will be an important partner in the Program.

The Program is being designed and will be implemented by Dr. Anthony J. DeNicola, Ph.D., President of White Buffalo, Inc. White Buffalo is a non-profit research organization dedicated to conserving ecosystems through wildlife population control. White Buffalo’s Business Portfolio is attached as Exhibit D.

Dr. DeNicola received an M.S. degree from the Yale School of Forestry and Environmental Studies and a Ph.D. from Purdue University in wildlife ecology. His dissertation was entitled "Control of reproduction in overabundant white-tailed deer populations." In addition to being recognized as a Certified Wildlife Biologist by the Wildlife Society, he holds research affiliate positions with the University of Georgia and the Denver Zoological Society. Dr. DeNicola has conducted both contraceptive and sterilization projects throughout the United States over the past 22 years. His curriculum vitae is attached as Exhibit E and a letter from Dr. DeNicola is attached as Exhibit F.

It is our expectation that Dr. Randy Junge, DVM, DACZM will be invited to be the lead veterinarian for the Program. As such, he would perform ovariectomies as well as train and supervise local veterinarians to perform the procedure. Dr. Junge is Vice President of Animal Health at the Columbus Zoo and The Wilds and a Diplomat of the American College of Zoological Medicine. Dr. Junge has personally performed approximately 60 ovariectomies on white tail deer. A letter from Dr. Junge regarding his experience with White Buffalo and the ovariectomy procedure is attached as Exhibit G.

The Humane Society of the United States (HSUS), the nation’s largest animal protection organization, has agreed to partner with the Working Group and White Buffalo on the Program. The Working Group anticipates that HSUS will provide tactical support and technical advice and will assist with the recruitment of volunteers. The Working Group is engaged in discussions with HSUS regarding additional in-kind contributions of personnel and materials to reduce Program costs. A letter from HSUS regarding its partnership is attached as Exhibit H.

The Program will utilize local volunteers to the extent possible to lower costs and increase community participation. A discussion of volunteer opportunities is attached as Exhibit I and a White Buffalo homeowner authorization form (for the protection of Clifton residents who permit the capture team to enter or place bait traps on their property) is attached as Exhibit J.

The Working Group will work closely with all Program partners, service providers, and volunteers and will be responsible, in conjunction with the Park Board’s staff to the extent desired by the Park Board, for coordinating all aspects of the Program.
D. **Timing**

Dr. DeNicola estimates that all or nearly all (approximately 95%) of the female deer population of the Clifton Parks can be sterilized in a week or less. If ODNR approval were to be received by the end of January 2015, Dr. DeNicola is prepared to conduct sterilizations in February 2015. If ODNR approval is received after January 2015, Dr. DeNicola would schedule sterilizations for a week between October and December 2015, unless a different timeframe is required by the ODNR.

Any female deer not sterilized during the first year of the Program, as well as any female deer who have immigrated from other locations, would be sterilized in the second year of the Program. Thereafter, only new immigrants would require treatment.

E. **Program Funding**

1. **Cost**

   The vast majority of the costs will be borne in the first year of the Program. For planning purposes, we have conservatively estimated that total costs associated with the first year of the Program will be approximately $26,800, although we anticipate that actual costs may be materially lower if the Working Group is successful in obtaining commitments for “in kind” donations of materials and services from HSUS, other donors, and volunteers. Certain costs could be higher than the estimate if delay in regulatory approvals requires us to wait until Fall 2015 (when the deer population will be larger than it is now), although many of the first year Program costs are fixed in nature and not dependent on the number of deer treated. A detailed Program Budget for year 1 is attached as Exhibit K.

   Subsequent year costs are expected to be significantly lower. Only female deer who were missed in year 1 or who have newly immigrated to the area will need to be sterilized, and local volunteers trained during the first year are expected to do most of the work. Annual costs are estimated to range between $3,000 and $5,000 in year 2, and between $1,500 and $2,100 per year thereafter.\(^2\)

2. **Source of Funding**

   The costs of the Program are expected to be “front-loaded” with the highest costs incurred in the first year of the program, modest costs incurred in the second year, and (depending on the rate of immigration) minimal costs incurred thereafter.

   To date, we have received private pledges totaling $10,000, more than 1/3rd of the estimated first year total costs. The balance will be raised when approval by ODNR has been received or looks likely. Additionally, as noted above, we are in discussions with the HSUS about in-kind donations.

   The Working Group commits that it will not request public financing for the first year of the Program. We may wish to discuss funding assistance with City Council and the Park Board with respect to

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\(^2\) These estimates are based on the following assumptions: (i) an annual immigration rate of 10% (about 3 female deer), (ii) about 7% (2 deer) in the current female population will not be sterilized in Year 1, and (iii) local capture professionals will be able to work without Dr. DeNicola’s direct supervision, and with their own or donated capture equipment, after Year 2. If capture equipment must be purchased, a one-time additional cost of approximately $3,000 would be incurred. Other communities have achieved a “per deer” cost of as low as $500 to $600 through use of trained volunteers, so we believe our estimates are realistic and, if anything, are on the high end (unless immigration is materially higher than assumed).
subsequent years of the Program (in which costs are expected to be much lower) if and when the benefits of the Program have been demonstrated.

Donations to the Program should be made to a 501(c)(3) organization and be tax deductible. The Working Group is in discussions with several non-profit animal welfare or conservation organizations about the possibility of offering a Cincinnati Deer Sterilization Fund to which donations could be made. This assumes the Parks would prefer not to use the Cincinnati Parks Foundation for this purpose.

**F. Regulatory Process And “Research” Component Of Program**

Under Ohio law, the State of Ohio owns and holds title to all wild animals in Ohio, including all deer, in trust for the benefit of all the people. Ohio Law does not specifically address the surgical sterilization of deer. However, it does provide that any person wishing to take, possess or transport a wild animal (activities that are involved when a deer is sterilized), even for a brief period of time, may do so only with the permission of the ODNR. To proceed with the Program, therefore, an application must be filed with and approved by the ODNR.

The ODNR has the regulatory authority to recognize surgical sterilization as a management tool for deer population control (just as it recognizes lethal culling as a management tool). However, we understand that currently it will only consider sterilization (or any non-lethal option, for that matter) on a “research” basis under its “scientific collecting” permit authority. This means that the Sterilization Program application to the ODNR must be submitted as a research proposal.

The research proposal has been prepared and will be submitted by Dr. DeNicola, and he and White Buffalo will be responsible for satisfying any conditions of approval imposed by, and making annual reports to, the ODNR and the Park Board. The specific research objectives of the proposal are:

1. To assess the cost, feasibility, and population impacts of capturing and sterilizing a very high percentage of white-tailed deer in a densely developed suburban community. Dr. DeNicola will quantify effort, cost, immigration/emigration rates in an open suburban population, and population size annually.

2. To assess the feasibility of training local program participants to capture, handle, and surgically sterilize female white-tailed deer to administer the Program after the first year with minimal professional consultant staffing. Local program participants are defined as competent local personnel who can 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.

The research proposal, a draft of which is attached as Exhibit L, will request a permit to conduct the Program for a 5 year period.

The Working Group has asked Park Board staff to assist it in determining whether any amendment to the Cincinnati Municipal Code or Park Board Rules will be required in order for the capture professionals to “dart” the deer in and around the Clifton Parks. If any amendment is determined to be necessary, the Working Group will, in conjunction with the Park Board, approach City Council regarding the amendment.
**G. Documentation Of Results**

Dr. DeNicola and White Buffalo will be responsible for monitoring the Program and preparing annual reports to the ODNR and the Park Board regarding the number of sterilizations performed, annual mortality rates and causes (if known), migration rates, and overall population size changes. The Working Group will serve as a liaison between White Buffalo and the Park Board with respect to any additional information requested by the Park Board from time to time.

The Working Group also will discuss with the Park Board how we can help facilitate other related research projects (such as possible wildflower deer exclusion pens in Rawson Woods) that the Park Board may wish to conduct or sponsor during the term of the Program.

**III. STERILIZATION PROGRAMS AROUND THE COUNTRY**

Deer sterilization programs (including those using ovariectomies) have been done or are currently underway in Maryland, New York, California, Virginia, Connecticut, Missouri, and Illinois. A description of one Maryland community’s experience with its deer sterilization program and with White Buffalo is attached as Exhibit M. Based on the success of the Maryland program, the Maryland Department of Natural Resources recently approved sterilization as a recognized management tool no longer requiring a “research” permit.

The National Institute of Health, an agency of the United States Department of Health and Human Services, recently announced a deer sterilization program on its 500 acre campus in Bethesda, Maryland. After an open bid process, it selected White Buffalo as its program provider. The program is expected to begin this month (December 2014).

**IV. OTHER NON-LETHAL ALTERNATIVES**

Non-lethal alternatives to bow-hunting or sharpshooting are practically limited to sterilization, as presented in this Program, and immunocontraception. There are two chemical contraception options available at this time: GonaCon™ and Porcine Zona Pellucida (PZP).

**A. GonaCon™**

GonaCon™ (including a formulation known as “GonaCon-Blue”) is a gonadotropin-releasing hormone (GnRH) immunocontraceptive vaccine that stimulates the production of antibodies that bind to GnRH, a hormone that signals the production of sex hormones (such as estrogen and progesterone). By binding to GnRH, the antibodies reduce GnRH’s ability to stimulate the release of these sex hormones. As a result, mating activity is reduced and a deer receiving GonaCon™ will be infertile for as long as a sufficient level of antibody activity is present. GonaCon™ has been registered with the EPA for use in white tailed deer 1 year of age or older.

Currently, a single shot of GonaCon™ is highly effective in the first year, and in some deer antibody levels remain high enough to prevent pregnancy for up to 5 years. However, antibody levels fall off more quickly in other deer, such that 20% to 50% of treated deer regain their fertility between treatments. The efficacy rates tend to be higher in controlled studies (e.g., with captive deer) than in typical field
conditions. GonaCon™ currently is only EPA registered for hand injection each time it is given (rather than being registered for remote darting). This means that a deer who is first treated with GonaCon™ at age 1 will likely need to be captured, sedated, and vaccinated at least twice in her lifetime, and may still give birth to multiple fawns.

Scientists are working to develop improvements to GonaCon™, including possible oral or remote darting delivery methods. These improvements are not yet available and their timing is uncertain.

**B. Porcine Zona Pellucid (PZP)**

PZP is a naturally occurring protein found in pig eggs. When the PZP vaccine is injected into the muscle of a female deer, it stimulates her immune system to produce antibodies against the vaccine. These antibodies block fertilization, but unlike GonaCon™, do not suppress the stimulation of sex hormones, so deer receiving PZP continue to go into heat. In fact, PZP appears to extend by approximately 2 months the estrus cycles of treated deer who do not become pregnant. There is no evidence this harms the treated deer, though it does extend the mating season and may increase undesirable mating behavior such as chasing.

PZP has been registered with the EPA for use in wild horses and burros. It has not yet been registered for use in white tailed deer but is approved routinely for research purposes.

The most researched formulations of PZP have been found to be highly effective when given twice in the first year (the vaccine and a booster several months later) and annually thereafter. Newer formulations currently being tested in field studies do not require a first year booster and can last up to 2 or 3 years, and treatments after the first one can be delivered remotely by dart. The efficacy of the multi-year formulations of PZP start at 90% to 95% and may decline further in years 2 and 3 (meaning that at least 5% to 10% of the treated deer will give birth to fawns between treatments). A deer who is first treated with PZP at age 1 will likely need to be treated 3 to 4 times in her lifetime.

As with GonaCon™, scientists are working to develop improvements to PZP (to increase the length of time needed between treatments, as well as its efficacy) and current delivery technology. These improvements could make contraception using PZP a much more desirable option, but they are not yet available and their timing is uncertain.

**C. Advantages of Sterilization over Immunocontraceptives Today**

We believe sterilization is the best choice at this time because:

- Sterilization is 100% effective over the lifetime of the deer. The effectiveness of multi-year immunocontraceptives declines over time. Any non-lethal program will only be successful in reducing the deer population if natural attrition through death and emigration exceeds natural increases through births and immigration. Even a 10% “break through rate” (deer who become pregnant between treatments) can be enough to offset natural attrition.

- Sterilization requires only one treatment over the lifetime of the deer. Immunocontraceptives require multiple treatments.

- It is less expensive to sterilize each deer once than to vaccinate every deer multiple times.

- Deer subject to repeated darting tend to become “educated”, making them less approachable and less easily lured to bait traps. Locating and successfully revaccinating previously treated
deer becomes more challenging and labor intensive over time. This does not happen with sterilization.

- A deer who is sterilized and emigrates out of the study area will remain infertile and will not contribute to fawning in her new area. A vaccinated deer who leaves the study area (or who can’t be located or darted when it is time for her revaccination) will become fertile again.

- If the ODNR does not allow the Program to continue at the end of the 5 year study period, sterilized deer will remain sterilized. The investment will not be lost. Deer who have been vaccinated will become fertile again, and the investment in contraceptives will be lost.

- Deer who have received ovariectomies do not go into heat, so bucks are not attracted to the area during mating season (adding to the deer population) and undesirable “chasing” and other breeding activity do not occur. With PZP, the breeding season is actually extended by up to 2 months.

- It is our understanding that the ODNR has granted permits for two PZP studies (a very small one in Columbus, and a larger one in Cleveland) in the past, but after several years declined to issue renewal permits. And as recently as last year, the ODNR reportedly placed conditions on a proposed PZP study in Avon Lake, Ohio that effectively scuttled the proposal. It appears that the ODNR has, fairly or unfairly, developed an unfavorable view of contraceptives that may be challenging to overcome. To our knowledge, the ODNR has never been asked to approve a sterilization proposal and has no entrenched position against it.

- An experienced sterilization program provider is available to work in Cincinnati now. Immunocontraceptive studies typically require more deer for research purposes than are present in the Clifton Parks, so finding an experienced contraception program provider (particularly within the Park Board’s timeframe) may be challenging.

- If contraception becomes a better choice in the future, there will be no loss or impediments to switching methods on immigrant deer.
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Exhibit A:
Description of the Clifton Parks
Description of Clifton Parks

1. Mt. Storm (75 acres)

Mt Storm Park is a neighborhood park that mostly serves a population residing within several blocks of the park. It is primarily a hilltop park with west facing slopes. Forest canopy covers almost 70% of the park. The majority of the remaining acreage is turf, with a small ¼ acre patch of native prairie and a 100 foot wide strip of brush below the utility transmission line that runs parallel to I-75. The majority of the forested area is secondary growth with most of the trees even aged. There is a mixture of deciduous trees on most of the slopes with a degraded understory of over 50% Asian honeysuckle and other invasive species such as garlic mustard and euonymus vines. A few small pockets of older growth with high quality mature trees and understory woodland wildflowers exist. The Park Board has removed, or has removal scheduled, for 40 dead ash trees situated in high use areas or along property lines. Many more are dead or dying within the forested areas of the park.

2. The I-75 Widening project

The Ohio Department of Transportation plans to remove approximately 3 acres of the slope in Mt. Storm 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.

3. Rawson Woods (10.6 acres) and Edgewood Grove (32 acres)

Rawson Woods and Edgewood Grove are categorized as preserves. These sites 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, respectively) with secondary growth of deciduous species. Degraded understories are mostly comprised of invasive species such as Asian honeysuckle, garlic mustard, lesser celandine and periwinkle. Seventy-eight dead or dying ash trees have or will be removed along property lines. Many more are dying within the forested area of the parks.

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1 This exhibit is adapted from information provided to the Working Group by Park Board staff.
Exhibit B: Resources
Resources


Exhibit C:
Frequently Asked Questions
Frequently Asked Questions about Surgical Sterilization

**What is an ovarietomy?**

An ovarietomy is the removal of a female deer’s ovaries. The procedure is similar to, but less invasive than, typical spay surgeries used to sterilize domestic dogs and cats. Using the “rapid ovarietomy” technique developed by Dr. Steven Timm, DVM, and the White Buffalo team, preparation and surgery take place in the field and typically take 20 minutes or less.

**What is the process for capturing, sterilizing and releasing deer?**

The capture and sterilization team works at night when deer are most active and few people are utilizing the parks.

Female deer are lured to bait stations where they are darted with a tranquilizer. The deer are tracked until they are unconscious. A capture team recovers and transports the doe to a temporary surgical sterilization site, often accompanied by a police officer. A licensed and trained veterinarian then performs the ovarietomies and gives the deer injections of long-acting antibiotics and pain medication.

All sterilized deer are fitted with numbered ear tags, and one mature doe in each matrilineal group will be radio-collared to facilitate future capture efforts, track migration rates and patterns, and assess survival rates. Data regarding size, age and condition is also collected.

Treated deer are then returned to the area where they were captured (in locations with the lowest likelihood of human disturbance during recovery), administered a reversal agent intravenously, and are monitored for complications with recovery.

The entire process, from initial darting to release, takes approximately 1 hour per deer.

**Is the procedure humane? What is the surgical mortality rate?**

Yes. Surgical sterilization is routinely used to control population growth of domestic animals (i.e., dogs and cats) and has also been used in at least 14 species. It is recognized as safe and humane for use in deer by The Humane Society of the United States. The surgical mortality rate, as reported by The Humane Society of the United States and in White Buffalo studies, is less than 1%. Sterilized deer tend to be healthier and calmer than fertile deer because they don’t experience the physical stresses of being chased by bucks during mating season and of pregnancy, birth and nursing.

**Why do you plan to sterilize female deer and not males?**

Suburban female deer typically spend their entire lives in matriarchal herds in a small (1 square mile or less) range. Male deer travel, particularly during rutting season, and will breed as much and as often as the opportunity presents itself. Because a single unsterilized male can impregnate as many female deer, across multiple herds, as several unsterilized males, there is little advantage to sterilizing males unless every single male over a large geographic area can be located, captured and sterilized.
**Why are sterilizations only done in Fall or Winter?**

There are several reasons: (1) Deer can be more easily lured to bait stations and captured when foliage, their normal food source, is scarce; (2) they are more easily tracked when the forest canopy cover provides minimal visual obstruction; and (3) sterilizations done after March 1st, when female deer are typically entering the late stages of pregnancy, are more complicated as the surgeon must work around an enlarged uterus, increasing risks to maternal and fetal health. Further, pregnant deer give birth typically between April and July, and may still be nursing as late as September.

Taking these factors together, the optimal time for sterilization is between October and Mid-February.

**Are deer put at risk by having surgery in cold weather?**

No. Unlike the situation with small animals (such as feral cats), deer are biologically adapted to living outside in winter. Veterinarians who have performed the procedure in the field have determined that deer are not harmed by post-surgical release into cold weather conditions.

**What is the impact of sterilization on the fetus of a pregnant doe?**

It depends upon the stage of pregnancy. The gestation period of a female deer is typically between 190 and 210 days (a little less than 7 months). Most deer will become pregnant in November or December and will give birth between the months of April and July.

Up to approximately the 150th day of pregnancy (the 5th month), the ovaries are necessary to sustain a deer’s pregnancy, so sterilization will result in miscarriage. The fetus at this stage of pregnancy is still extremely small (likely less than 1 lb.), and there is no evidence that deer experiencing miscarriages under these circumstances are harmed.

After approximately the 150th day of pregnancy, the ovaries are not necessary to sustain pregnancy. A deer sterilized after the 150th day of pregnancy can be expected to give birth to the fawn(s) she is carrying in the Spring, but will thereafter be infertile.

**How do ovarioectomies differ from tubal ligations? Will tubal ligations ever be used?**

Ovariectomies involve the removal of the ovaries; the deer becomes infertile and will never experience estrus (i.e., go into heat) again. Tubal ligations involve the tying of the deer’s fallopian tubes to prevent implantation of a fertilized egg in the uterine lining. Deer with tubal ligations continue to experience estrus, and because they do not become pregnant after breeding, they may continue to cycle for up to 5 months. Having a large number of female deer repeatedly going into heat over a multiple month period has been associated in one field study with an increase in the number of bucks drawn to the study area; even though the population of female deer and fawns declines with tubal ligation, the overall population may not be reduced (at least during the breeding season) because of the influx of bucks.

It is White Buffalo’s practice to only do tubal ligations when a deer is found to be in late state gestation and switching to a tubal ligation is necessary to protect maternal or fetal health. Because White Buffalo does not perform sterilizations after March 1st, these occurrences are quite rare. Out of over 500 sterilizations performed by White Buffalo since 2009, tubal ligations have only been necessary in 22 cases (about 4.4% of the time).
Why choose sterilization over immunocontraception?

While both methods are viable alternatives to lethal population control, sterilization is the only option at present that is 100% effective and that does not require repeated treatments. Researchers are working on advancements in contraceptive agents and delivery technology that may make immunocontraceptives the better choice in the future. Until then, sterilization offers the most practical and most cost effective method of fertility control.

Which is more invasive – immunocontraception or sterilization?

It depends on how one defines “invasive.” Sterilization involves a 20 minute surgery, but only occurs once in the deer’s lifetime and does not involve chemically altering the deer’s reproductive processes. Immunocontraceptives do not involve surgery, but do require repeated darting of the deer throughout their lifetimes with contraceptives that chemically alter their reproductive processes.
Exhibit D:
White Buffalo, Inc.’s Business Portfolio
WHITE BUFFALO INC. is a 501(c)(3) nonprofit wildlife management and research organization dedicated to conserving native species and ecosystems through damage and population control. We also sponsor, support, and conduct scientific research and educational efforts to improve the understanding of natural resources for the purpose of conservation. Our approach is unique, in that we generate funding for conservation research by providing management alternatives in non-traditional settings.

CONTACT INFORMATION

Dr. Anthony DeNicola
860-790-0224

www.whitebuffaloinc.org
wbuffaloinc@aol.com
POPULATION REDUCTION PROGRAMS

We have a 100% success rate for deer reduction programs. To date, WHITE BUFFALO INC. personnel have removed over 10,000 deer. As a result of these programs more than 200,000 pounds of venison have been donated to various food shelters.

**Burnsville, Minnesota** (38 square miles):
- November 2001 - 21 deer harvested in 2 days
- November 2002 - 67 deer harvested in 7 days
- January 2003 - 24 deer harvested in 7 days
- March 2004 - 36 deer harvested in 4 days

**Crystal Airport, Minnesota:**
- October 2000 - 11 deer were removed regional airport, over 2 days, to eliminate the chance of deer strikes on the runway

**Dune Acres, Indiana** (1 square mile):
- February 1998 - 50 deer harvested over 5 days

**Eden Prairie, Minnesota** (36 square miles):
- November 1997 - 160 deer harvested over 15 days
- November 1998 - 124 deer harvested over 11 days
- November 1999 - 125 deer harvested over 8 days
- November 2001 - 125 deer harvested over 7 days
- November 2002 - 154 deer harvested over 14 days
- March 2004 - 135 deer harvested over 11 days
- November 2004 - 115 deer harvested over 8 days
- November/December 2005 - 115 deer harvested over 14 days
- November 2007 - 106 deer harvested over 11 days
- November 2010 - 115 deer harvested over 14 days
- November 2012 - 110 deer harvested over 14 days

**Edina, Minnesota:**
- December 1999 - 40 deer harvested in 1 day
- November 2001 - 30 deer harvested over 3 days
- November 2002 - 26 deer harvested over 4 days

**Fairfax County, Virginia:** (Pilot program - 2 County-owned Parks)
- January - February 2014 - 98 deer harvested, reduced densities below 20/mile$^2$

**George Reserve (University of Michigan), Pinckney, Michigan** (2 square miles enclosed):
- March 2001 - 103 deer harvested over 3 days for tuberculosis testing.

**Greenwich, Connecticut:** (Pilot program - 3 town-owned parcels)
- March 2005 - 80 deer harvested over 4 days
Iowa City, Iowa (6 square mile area):

- January 2000 - 360 deer harvested over 10 days
- December/January 2001 - 340 deer harvested over 21 days
- December 2001 - 250 deer harvested over 18 days
- November 2003 - 200 deer harvested over 14 days
- February 2005 - 154 deer harvested over 9 days
- January/February 2006 - 150 deer harvested over 11 days
- January 2007 - 199 deer harvested over 14 days
- January 2008 - 89 deer harvested over 8 days
- February 2009 - 69 deer harvested over 15 days (2 Biologists only)
- February 2010 - 57 deer harvested over 11 days (2 Biologists only)

Long Island, New Hampshire (2 square mile peninsula):

- November 1996 - 90 deer harvested over 3 days

Lower Makefield, Pennsylvania (Pilot program - 6 town-owned parcels):

- February/March 2010 - 94 deer harvested over 9 days

Monhegan Island, Maine (1 square mile):

- April 1997 - 52 deer harvested over 3 days
- April 1998 & March 1999 - remaining 27 deer harvested*

* Successful eradication of all deer on the island

Northern Indiana Public Service Company, Wheatfield, Indiana:

- March 1996 - 100 deer harvested over 4 days from a 2500 acre enclosed facility *
  * Population estimated at 130 deer prior to reduction.

Peaks Island, Maine (1 square mile):

- February/March 2000 - 223 deer harvested over 8 days*
  * Population was estimated at 240 before reduction.

Princeton Township, New Jersey:

- February/March 2001 - 322 deer harvested over 15 days
- January/February 2002 - 303 deer harvested over 27 days
- February/March 2003 - 280 deer harvested over 21 days
- January/February 2004 - 276 deer harvested over 27 days
- January 2005 - 124 deer harvested over 13 days
- February 2006 - 150 deer harvested over 15 days
- February 2007 - 126 deer harvested over 14 days
- February 2008 - 107 deer harvested over 15 days
- January/February 2009 - 154 deer harvested over 19 days (2 Biologists only)
- February/March 2010 - 148 deer harvested over 16 days (2 Biologists only)
- February/March 2012 - 116 deer harvested over 16 days (2 Biologists only)
- February/March 2013 - 159 deer harvested over 17 days (2 Biologists only)
- February/March 2014 - 127 deer harvested over 18 days (2 Biologists only)
Ramsey County, Minnesota (Maplewood, St. Paul):
  November/December 2005 - 200 deer harvested over 12 days

Roanoke, Virginia:
  January 2005 - 109 deer harvested over 7 days

Solon, Ohio:
  March 2005 - 602 deer harvested over 37 days.
  January/March 2006 - 400 deer harvested over 40 days
  January/February 2007 - 150 deer harvested over 15 days
  March 2008 - 175 deer harvested over 22 days
  January/March 2009 - 250 deer harvested over 33 days (2 Biologists only)

Swarthmore College, Swarthmore, Pennsylvania:
  December 2009/January 2010 - 31 deer harvested over 4 days
  December 2010/January 2011 - 21 deer harvested over 4 days
  December 2011/January 2012 - 9 deer harvested over 4 days
  January-March 2013 - 21 deer harvested over 8 days
  January-March 2014 - 19 deer harvested over 8 days

Town and Country, Missouri:
  December 2009 - 112 deer harvested over 7 days
  December 2010 - 75 deer harvested over 7 days
  December 2011- Jan 2012 - 288 deer harvested over 28 days
  December 2012 - 115 deer harvested over 11 days
  January 2014 - 87 deer harvested over 8 days

Tuxedo Park, New York:
  February 2012 - 98 deer harvested over 9 days

Vassar College, Poughkeepsie, New York:
  January 2010 - 64 deer harvested over 2 days
CAPTURE

We are experienced and fully equipped to provide capture services (i.e., drop-nets, rocket-nets, darting equipment). Using various techniques, WHITE BUFFALO INC. personnel have captured over 2000 deer.

**Bald Head Island, North Carolina:** We captured 18 deer using darting techniques for a GonaCon™ research project. In addition, we trained employees of the Conservancy and local volunteers in deer capture and handling techniques (January-March 2014).

**Bedford and Lewisboro, New York, USDA-ARS 4 Poster Lyme Disease Research:**
May 1998 - 8 deer captured using darting techniques over 3 days
October 1998 - 12 deer captured using darting techniques over 3 days
Oct. /November 1999 - 40 deer captured using darting techniques over 8 days
* All deer captured were checked for number and distribution of ticks.

**Bluff Point/Mumford Cove, Groton, Connecticut:** Urban white-tailed deer habitat use and home range study - We volunteered our service and equipment to assist in capturing white-tailed deer as part of a state-conducted research project. Deer were captured using darting equipment (Winter 1995-96).

**Bridgeport, Connecticut:** We captured 18 deer using a combination of drop nets and darting techniques to apply an experimental Amitraz-impregnated collar to control ticks as part of a CDC Lyme disease research project (March 1999).

**Carlisle, Massachusetts:** We captured 27 deer using darting techniques and applied radio transmitter collars as part of a state organized research project to assess mortality rates of suburban deer populations in eastern Massachusetts (March 1999).

**Connecticut College Arboretum:** We removed deer completely to prevent damage to native plant collections and research plots. We inspected and repaired the perimeter fence to ensure it was deer-proof. We then captured the 3 remaining deer enclosed in the 100-acre arboretum using darting techniques. Deer were released outside the fence on Connecticut College property (January 1996).

**George Reserve, Pinckney, Michigan:** We captured 25 deer over 3 days using darting techniques for a doctoral research project (University of Michigan). In addition, we trained a doctoral student and technician in deer capture and handling techniques (November 1997).

**Lake Gaillard Reservoir, Connecticut, Connecticut Agricultural Experiment Station:**
We captured, tagged, and radio-collared 35 deer for a research project (November 2000).

**Old Lyme, Connecticut, USDA-ARS 4 Poster Lyme Disease Research:**
We captured 11 deer using darting techniques to apply radio-transmitter collars and to assess the number and distribution of ticks (April 1999).

**Point Reyes National Seashore, California:** Captured elk to deploy GPS collars to assess elk movements relative to conflicts with ranches. (October 2012).
Towson, Maryland, USDA-ARS 4 Poster Lyme Disease Research:
We captured 11 deer using darting techniques over 3 days to assess the number and distribution of ticks (November 1998).

RESEARCH

We are committed to further understanding causes and solutions to wildlife/human conflicts. We will continue to assess alternative management techniques for a variety of species.

Fertility Control Research

“Field sterilization of white-tailed deer”, Fairfax City, Virginia: We captured 18 females over 6 days using darting techniques and performed ovariectomies/tubal ligations (January/February 2014).

“Field sterilization of black-tailed deer”, The Villages Golf and Country Club, San Jose, California: We captured all females (99) over 9 days using darting techniques and performed ovariectomies/tubal ligations (January/February 2013). We captured 9 females using darting techniques and performed ovariectomies (October 2013). Population estimates were derived using local demographics and the known number of females in conjunction with Distance sampling surveys. Detailed data on immigration and survival rates also were collected.

“Field sterilization of white-tailed deer”, Cayuga Heights, New York: We captured 137 females (>97% of females present) over 14 days using a combination of drop nets and darting techniques and performed ovariectomies (December 2012). We captured all remaining females (n = 12) using darting techniques and performed ovariectomies. (December 2013). Population estimates were derived using local demographics and the known number of females in conjunction with camera surveys at baited locations. Detailed data on immigration and survival rates also were collected.

“Field sterilization of white-tailed deer”, Wildlife Rescue, Phoenix, Maryland: We captured 32 does over 8 days using darting techniques and performed ovariectomies (February 2011). We captured 14 does over 5 days using darting techniques and performed ovariectomies (February 2012). We captured 9 does over 3 days using darting techniques and performed ovariectomies. (February 2013 and 2014). Population estimates were derived using local demographics and the known number of females in conjunction with direct observations at baited locations. Data on immigration and survival rates also were collected.


“Field sterilization of white-tailed deer”, Town and Country, Missouri: We captured 100 does using a combination of drop nets and darting techniques and performed ovariectomies (December 2009). We captured 30 does over 6 days using darting techniques and performed ovariectomies. (December 2010). Population estimates were derived using Distance sampling methods.
“Feasibility and efficiency of field sterilizations via tubal ligation/ovariectomy in female white-tailed deer”, Bridgeport, Connecticut: A research project to determine the relative efficiency of sterilization procedures compared to immunocontraceptive vaccines (June 2008 - present).

“Efficacy evaluation of the GonaCon™ immunocontraceptive vaccine in fallow deer: an EPA pivotal field study”, Point Reyes National Seashore, California: This study is to be conducted as a requirement of the EPA authorization process for a New Animal Drug. The primary objective is to verify the magnitude and duration of a single shot of GonaCon™ on female fallow deer. Seventy does were captured and treated. (July 2007 – 2009).

“Efficacy evaluation of the GonaCon™ immunocontraceptive vaccine in white-tailed deer: an EPA pivotal field study”, Giralda Farms, Madison, New Jersey: This study is to be conducted as a requirement of the EPA authorization process for a New Animal Drug. The primary objective is to verify the magnitude and duration of a single shot of GonaCon™ on female white-tailed deer. Sixty-six does were captured and treated. (July 2005 – 2009).

“Experimental density maintenance using infertility agents of a suburban population of white-tailed deer following a reduction using sharpshooting techniques”, Newark, Delaware: A research project to assess the utility of combining fertility control methods with lethal management options within a 600 acre privately owned facility. Twenty-one deer were captured and 100 harvested. (August 2005 – 2008).

“Experimental control of a suburban population of white-tailed deer using immunocontraception”, Princeton Township, New Jersey: A research project to assess the practicality and feasibility of reducing, then maintaining the local deer population, within a 3-mile² area of town, at approximately 40/deer/mile² using SpayVac and GonaCon™. To date, 105 does have been captured and treated. The first year’s funding was provided by White Buffalo, Inc. (March 2003 – 2008).

“Evaluation of alternative PZP immunocontraceptive formulations in female white-tailed deer”, Bridgeport, Connecticut: A research project to determine the relative efficacy and longevity of various formulations of the PZP vaccine (June 2000 - 2007).

“Cost-effectiveness of maintaining an enclosed deer population using anti-fertility agents after an initial population reduction using sharpshooting techniques”, Duke Farms, Hillsborough, New Jersey: A research project to assess the utility of combining fertility control methods with lethal management options within a 2700 acre privately owned facility. Forty deer were captured and 221 harvested. (November 2004 – 2006).

“Experimental control of an urban population of white-tailed deer using contraception”, Cleveland, Ohio: A research project to assess the feasibility and practicality of using a contraceptive agent to reduce herd size in the Ohio and Erie Canal Reservation. Over 300 deer captured. Funding provided by the Cleveland Metroparks (March 2001 - 2005).

“Experimental control of an enclosed suburban population of white-tailed deer using contraception”, Bridgeport Connecticut: Designed and implemented a research protocol to assess the feasibility and practicality of using a contraceptive agent to maintain herd size (June 1999 - June 2000).
Lyme Disease Research

"An Integrated and Individual Tick Management Program to Reduce Risk of Lyme Disease in a Residential Endemic Area", Redding, Connecticut: A collaborative effort between White Buffalo, Inc. and the Connecticut Agricultural Experiment Station to evaluate whether localized deer population reductions can reduce *Ixodes* tick abundance and subsequent risk of Lyme disease. Funding provided by the Center for Disease Control (September 2012 - August 2015).

"Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at a suburban Lyme disease focus", Old Lyme, Connecticut: A collaborative effort between White Buffalo, Inc., the Connecticut Agricultural Experiment Station, Yale University, and the United States Department of Agriculture-Agricultural Research Service to evaluate a four-poster feeder system to control deer ticks on free-ranging white-tailed deer in a suburban community. Funding provided by the United States Department of Agriculture (USDA). (August 1997 - July 2002).

"Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at an urban Lyme disease focus", Bridgeport, Connecticut: A collaborative effort between White Buffalo, Inc. and the Connecticut Agricultural Experiment Station to evaluate an experimental Amitraz-impregnated collar to control ticks on an enclosed white-tailed deer population. Funding provided by the Center for Disease Control (March 1999 - February 2000).

"Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at an urban Lyme disease focus", Bridgeport, Connecticut: A collaborative effort between White Buffalo, Inc. and the Connecticut Agricultural Experiment Station to evaluate a four-poster feeder system to control deer ticks on an enclosed white-tailed deer population. Funding provided by the Center for Disease Control (CDC) (May 1997 - February 1999).

Other Research

“Infant survival and den site selection of female raccoons following removal and exclusion from residences”, Hartford County, Connecticut: A research project designed to assess the management implications of on-site release of female raccoons during the infant-rearing season (April 1998 - 2000).

“White-tailed deer herd health assessment”, Purdue University: We coordinated and conducted deer harvest and capture operations and data collection to assess morphological and physiological parameters as indicators of individual deer condition. These data were then used to assess herd health of deer in hunted versus unhunted areas in Indiana. Research sites included Brown County State Park, Crane Naval Surface Warfare Center, Pigeon River State Fish and Wildlife Area, and Pokagon State Park (March 1996).
INTERNATIONAL RESEARCH/MANAGEMENT PROJECTS

Botswana: Assisted the Denver Zoological Society in capturing vultures to study their ecology and to determine causes of their decline. Vultures were captured with remotely launched nets and GPS units were attached (June 2012).

Japan: Consulted for the Japanese Ministry to establish a program to address Sika deer overpopulation issues. Designed a management and training program for government and university biologists (July 2010).

Mongolia: Assisted the Denver Zoological Society and the Mongolian Academy of Sciences in capturing threatened Argali Sheep and Ibex. The intent of the research is to study Argali ecology and to determine feasibility of repopulating areas where numbers have declined. Argali were remotely captured with darting equipment and drive nets, and radio-collars were attached (September 2002, April 2003, September 2003, 2004, and 2006).

Bhutan: Consulted for the Bhutan Ministry of Agriculture and the Bhutan Trust Fund to assess techniques and equipment used for wild pig control. Designed a research program that incorporated lethal components to address subsistence agricultural damage in remote villages (May 2003, October 2003).

Galapagos National Park, Ecuador: Participated in an international workshop to design a program for the eradication of feral goats on Isabela Island (9-18 September 1997).

MISCELLANEOUS MANAGEMENT PROJECTS

Channel Island National Park, Santa Rosa Island, California: Successfully completed a Island-wide non-native ungulate (mule deer and elk) eradication program. We removed deer and elk using ground and aerial shooting techniques. Some deer were captured from a helicopter using a net gun to serve as Judas animals. (October 2011 - November 2013).

Point Reyes National Seashore, California: Successfully completed a Park-wide non-native deer (Fallow and Axis deer) eradication program. We first implemented an EPA pivotal study using the GonaCon™ vaccine on 80 female Fallow deer. Deer were then live-trapped followed by euthanasia to reduce large group sizes. We then removed deer using ground and aerial shooting techniques. Some deer then were captured from the ground and from a helicopter using a net gun and dart rifle to serve as Judas animals. Finally, Fallow deer were captured and sterilized using ovariectomies (females) and vasectomies (on males) (June 2007 - April 2009).

Desecheo Island, Puerto Rico: Participated in an island wide rhesus macaque eradication program. Feral macaques were removed using ground-shooting techniques during the day and at night (March 2009/April 2010/March 2011).

Santa Cruz Island, California: Implemented in an island wide turkey eradication program. Turkeys were removed using trapping, as well as ground and aerial shooting (Nov – Dec 2006). Assisted in an island wide feral pig eradication program. Pigs were removed using trapping, as well as ground and aerial shooting techniques (May – July 2005).
Catalina Island, California: Participated in an island wide feral pig and goat eradication program. Feral goats were captured from the ground and from a helicopter using a net gun and dart rifle to serve as Judas goats. Pigs were live-trapped followed by euthanasia. Feral goats and pigs were removed using ground-shooting techniques (June - September 1998).

**POPULATION ASSESSMENTS**

WHITE BUFFALO INC. can conduct estimates of population size using helicopter snow counts, spotlight surveys (distance sampling), or mark/re-sight techniques.

**Bedford and Lewisboro, New York:** We conducted helicopter snow counts to determine deer densities in study sites as part of the USDA-ARS 4-poster Lyme disease research project (February 2001/February 2000/March 1999).

**Chatham, New Jersey:** Distance sampling estimates to determine deer densities (Jan. 2007).

**Dune Acres, Indiana:** We conducted a white-tailed deer population estimate using spotlighting techniques and consulted with the community regarding the feasibility of implementing a white-tailed deer population reduction program (December 1996).

**Helena, Montana:** Distance sampling estimates to determine deer densities (October 2009).

**Kingston, Rhode Island:** We conducted helicopter snow counts to determine deer densities in study sites as part of the USDA-ARS 4-poster Lyme disease research project (January 2001/February 1999).

**Manchester, Missouri:** We conducted distance sampling estimates to determine deer densities (March 2014).

**New Canaan, Connecticut:** We conducted a white-tailed deer population estimate using helicopter snow counts to determine deer densities throughout the community (February 2001).

**Old Lyme and Old Saybrook, Connecticut:** We conducted helicopter snow counts to determine deer densities in study sites as part of the USDA-ARS 4-poster Lyme disease research project (February 1999).

**Princeton Township, New Jersey:** A helicopter snow count was conducted to determine deer densities throughout the community (December 2002). We conducted distance sampling estimates to determine deer densities (February 2011, April 2014).

**San Jose, California:** We conducted distance sampling estimates to determine deer densities in a private association – The Villages Golf and Country Club (September 2010, October 2012).

**Sunset Hills, Missouri:** Distance sampling estimates to determine deer densities (December 2012 and January 2014).
Town and Country, Missouri: We conducted a white-tailed deer population estimate using spotlighting techniques. We also provided an assessment of deer management options for potential implementation in the community (February 1997, December 2010-14).

Town and Country, Missouri: We conducted a white-tailed deer population survey using spotlighting techniques. We estimated deer densities using Distance sampling methods and mark-recapture techniques (December 2009).

Upper Makefield, Pennsylvania: We conducted Distance sampling estimates to determine deer densities (March 2010).

Westport and Weston, Connecticut: We conducted helicopter snow counts to determine deer densities in 2 communities as part of a CDC Lyme disease research project (February 2000).

CONSULTATIONS, TRAINING, and HUNT MANAGEMENT

Initial consultations are conducted to provide site-specific cost and feasibility assessments for all management/research options. In addition, a comprehensive report can be prepared that details all organizational aspects (social, legal, and technical) necessary for implementation of any management technique. We design sharpshooting programs, specify equipment requirements, and train participants in sharpshooting methods. We also design, organize, and oversee suburban hunting programs.

♦ North Haven, Long Island, NY – August 2013
♦ Binghamton University, NY – January 2012
♦ Village of Cayuga Heights, NY – November 2011
♦ The Villages Golf and Country Club, San Jose, California – September 2010 and October 2012
♦ Hudson, Ohio – July 2010
♦ Warrensburg, Missouri – February 2009
♦ Town and Country, Missouri – July 2008
♦ Shawnee Mission Parks, Kansas City, Kansas – March 2008
♦ Locust Hill Association, Cincinnati, OH – January 2007
♦ Chatham, New Jersey – January 2007
♦ Milburn, NJ – August 2005
♦ Bryn Gwyled, Pennsylvania – April 2005
♦ Lake Metroparks, Concord Township, Ohio - March 2004
♦ Columbia Heights, Minnesota – November 2003
♦ Summit County Metroparks, Akron Ohio – July 2003
♦ Roanoke, Virginia – March 2003
♦ Bald Head Island, Wilmington, North Carolina – December 2002
♦ Ramsey County, Minnesota – November 2002
♦ Hamilton County Parks, Cincinnati, Ohio – July 2002
♦ Five Rivers Metroparks, Dayton Ohio – July 2002
♦ Biltmore Forest, North Carolina – May 2001 and July 2002
♦ Armand Bayou Nature Center, Houston, Texas - October 2000
♦ Maryland National Capital Park and Planning Commission - July 2000
♦ Barton Creek, Texas - June 2000
♦ Lakeway, Texas - June 2000
♦ Silver Springs, Maryland - February 2000
♦ Marinette, Wisconsin - January 2000
♦ George Reserve, Pinckney, Michigan - November 1999
♦ Goddard Space Flight Center, NASA, Greenbelt, Maryland - November 1999

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Iowa City, Iowa - August 1999
Massachusetts Water Resource Authority, Weston, Massachusetts - June 1999
Peaks Island, Maine - June 1999
Detroit Metroparks, Michigan - December 1998
Princeton, New Jersey - September 1998
Reeves-Reed Arboretum, Summit, New Jersey - September 1998
Amherst, New York - May 1998
Kinnelon, New Jersey - February 1998
Edina, Minnesota - December 1997
Gaithersburg, Maryland - November 1997
Darien, Connecticut - October 1997
Block Island, Rhode Island - August 1997
Groton Long Point, Connecticut - August 1996


Cleveland Metroparks, Cleveland, Ohio: Designed a deer population reduction program using sharpshooting techniques for the Cleveland Metroparks. Trained Park Rangers in field methods including shot selection and proper shooting techniques (December 1998/January 1999).

Duke Farms Foundation, Hillsborough, New Jersey: Designed, organized, and managed a controlled archery/shotgun hunt successfully reducing deer densities from >150 deer/mile squared to ~20 deer/mile squared (Fall 2005-present).

Island Conservation, Santa Cruz, California: Developed and administered a professional training program for biologists involved in wildlife population control, particularly non-native species eradication. (November 2009/February 2010).

Maryland National Park and Planning Commission, Maryland: Designed a deer population reduction program using sharpshooting techniques for the Park Commission. Trained Park personnel in field methods including shot selection and proper shooting techniques (October 2000/January 2001/September 2007).

Metroparks Serving Summit County, Akron, Ohio: Designed a deer population reduction program using sharpshooting techniques for the Metroparks serving Summit County. Trained park rangers in field methods including shot selection and proper shooting techniques (November 2003/February 2004).

North Haven, New York: Designed, organized, and managed a deer depredation program in a ~3 mile² community (Winter 2014).

Saint Elizabeth, Convent Station, New Jersey: Designed, organized, and managed a controlled archery hunt on a 180-acre private school campus (Fall 2009).

Shawnee Mission Park, Kansas: Designed a deer population reduction program using sharpshooting techniques for the Johnson County Parks. Trained Park and law enforcement personnel in field methods including shot selection and proper shooting techniques. We removed 313 deer in 3 nights using sharpshooting techniques (September/November 2009).
Tokyo and Hokkaido, Japan: Provided workshops and seminars on wildlife damage management techniques and advised on management options for sika deer. Conducted preliminary training for wildlife professionals on sharpshooting techniques and concepts. (July 2010).

Tuxedo Park, New York: Designed a deer population reduction program using sharpshooting techniques for the Village of Tuxedo Park. Trained law enforcement personnel in field methods including shot selection and proper shooting techniques. We removed 98 deer in 9 nights using sharpshooting techniques (February 2012).

EDUCATIONAL EFFORTS

♦ Presented at a deer management forum on surgical sterilization for the Village of East Hampton (NY) Preservation Society. July 2013
♦ Presented at the 46th Annual Northeast Deer Technical Committee Meeting. Suburban Hunter Education. September 2010.
♦ Participated in a workshop organized by the University of Nebraska, Lincoln focused on sharpshooting training. August 2010.
♦ Participated in the Wildlife Society’s summer field techniques course providing classroom lecture and field training in wildlife immobilization. June 2009 and May 2010.
♦ Provided a seminar on career development for high school students at Nonnewaug High School, Woodbury, Connecticut. April 2010.
♦ Presented for the Newtown, CT Lyme Disease Action Committee on deer management options and the potential effects on tick abundance. January 2010.
♦ Participated in a workshop organized by the University of Nebraska, Lincoln focused on immobilization and sharpshooting training. August 2009.
♦ Presented at Trinity College’s Senior Biology Major Seminar. Discussions focused on contraception technologies and career options for Biology Majors. September 2007.
♦ Presented 2 seminars at Texas State University that summarized management techniques and the human dimensions of suburban deer management. October 2006.
♦ Spoke at 3 lectures for the “Connections Committee” of Cedar Rapids, Iowa. Discussed urban deer management, and the development and application of fertility control. October 2004.


Spoke at a public forum to discuss the use of immunocontraception as a method of white-tailed deer population management. Princeton Township, NJ. March 2003.


Presented data from the 3-year urban raccoon study entitled “Den site selection and movement patterns of female raccoons following removal and exclusion from residences”, conducted in Hartford County, CT, at the Northeast Fish and Wildlife Conference held in Saratoga Springs, NY. April 2001.

Presented data from the 3-year urban raccoon study entitled “Den site selection and movement patterns of female raccoons following removal and exclusion from residences”, conducted in Hartford County, CT, at the Eastern Wildlife Damage Conference held at the University of Pennsylvania. October 2000.


Spoke at a town meeting to discuss deer biology and management. Alternative deer management options and techniques were presented and discussed. Westport, Connecticut. May 2000.


Presented data from the Monhegan Island, Maine eradication program at the Northeast Deer Technical Committee Meeting in Greenville, Maine. September 1999.


Supervised 2 Yale University graduate students during internships with White Buffalo Inc. Activities included contraceptive delivery, home range assessment using radio-telemetry equipment, and capture techniques. In addition, 11 deer were captured, radio-collared, and movements monitored as part of the USDA-ARS 4-poster research project in Old Lyme, Connecticut. September 1998 – June 2000.


Presented data from Long Island, New Hampshire, and Monhegan Island, Maine deer reduction programs at the Midwest Fish and Wildlife Conference held in Milwaukee, Wisconsin. December 1997.


Presented data from Long Island, New Hampshire reduction program at the Southeast Deer Study Group Meeting held in Charleston, South Carolina. March 1997.
Exhibit E:
Dr. Anthony J. DeNicola’s Curriculum Vitae
CURRICULUM VITAE

Anthony J. DeNicola
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Moodus, CT 06469
(860) 790-0224
wbuffaloinc@aol.com

Education

1996 Ph.D. Purdue University (GPA: 4.0/4.0)
Thesis: "Control of reproduction in overabundant white-tailed deer populations"

1990 M.E.S. Yale University School of Forestry (GPA: 3.5/4.0)

1988 B.S. Trinity College, Hartford, Connecticut (GPA: 3.3/4.0)

1986-87 Visiting student, University of Vermont (GPA: 3.2/4.0)

Experience

2013 Research Associate, University of Georgia
1999-present Certified Wildlife Biologist, The Wildlife Society
1997-present Research Associate, Denver Zoological Foundation
1995-present President, White Buffalo, Inc.
2003-2006 Adjunct Faculty Member, Rutgers University
1998-2004 Research Associate, University of Illinois
1995-2005 Visiting Faculty Member, Trinity College
1997-2003 Research Affiliate, Yale University

Honors and Awards

1995 The Honor Society of Agriculture, Gamma Sigma Delta
1994 Best Paper Award, Indiana Chapter of The Wildlife Society
1988 J. Wendell Burger Prize, Trinity College award for outstanding achievement in Biology
<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Project Description</th>
<th>Funding</th>
<th>Role</th>
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</thead>
<tbody>
<tr>
<td>2013-2016</td>
<td>The Villages Golf and Country Club, San Jose, CA</td>
<td>&quot;Experimental control of a partially enclosed suburban population of white-tailed deer using surgical sterilization&quot;</td>
<td>$180,000</td>
<td>Principal investigator</td>
</tr>
<tr>
<td>2012-2014</td>
<td>The Village of Cayuga Heights, NY</td>
<td>&quot;Experimental control of a suburban population of white-tailed deer using surgical sterilization&quot;</td>
<td>$185,000</td>
<td>Principal investigator</td>
</tr>
<tr>
<td>2012-2015</td>
<td>Center for Disease Control, NY</td>
<td>&quot;An Integrated and Individual Tick Management program to reduce risk of Lyme disease in a residential endemic area&quot;</td>
<td>$152,525</td>
<td>Co-principal investigator</td>
</tr>
<tr>
<td>2011-2014</td>
<td>Wildlife Rescue, Phoenix, MD</td>
<td>&quot;Experimental control of a suburban population of white-tailed deer using surgical sterilization&quot;</td>
<td>$95,000</td>
<td>Principal investigator</td>
</tr>
<tr>
<td>2005-2008</td>
<td>E. I. du Pont de Nemours and Co., Newark, Delaware</td>
<td>&quot;Experimental control of an enclosed suburban population of white-tailed deer using sharpshooting followed by GonaCon™ immunocontraceptive treatments&quot;</td>
<td>$108,000</td>
<td>Principal investigator</td>
</tr>
<tr>
<td>2005-2008</td>
<td>Giralda Farms, Madison, New Jersey</td>
<td>“Efficacy evaluation of GonaCon™ immunocontraceptive vaccine for white-tailed deer: A FDA pivotal field study”</td>
<td>$190,000</td>
<td>Principal investigator</td>
</tr>
<tr>
<td>2004-2006</td>
<td>Princeton Township, NJ</td>
<td>&quot;Experimental control of a suburban population of white-tailed deer using SpayVac®&quot;</td>
<td>$120,000</td>
<td>Principal investigator</td>
</tr>
<tr>
<td>2001-2006</td>
<td>Cleveland Metroparks, Cleveland, Ohio</td>
<td>&quot;Experimental control of an urban population of white-tailed deer using contraception&quot;</td>
<td>$542,150</td>
<td>Principal investigator</td>
</tr>
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</table>
1999-2000 Center for Disease Control, "Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at an urban Lyme disease focus", $20,960, Co-principal investigator

1999-2000 United States Department of Agriculture, "Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at a suburban Lyme disease focus", $30,000, Co-principal investigator

1998-1999 Center for Disease Control, "Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at an urban Lyme disease focus", $20,600, Co-principal investigator

1998-1999 United States Department of Agriculture, "Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at a suburban Lyme disease focus", $50,000, Co-principal investigator

1997-1998 Center for Disease Control, "Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at an urban Lyme disease focus", $20,000, Co-principal investigator

1997-1998 United States Department of Agriculture, "Control of the tick, *Ixodes scapularis* Say, on white-tailed deer at a suburban Lyme disease focus", $46,000, Co-principal investigator


1993-1996 Northern Indiana Public Service Company, "Efficacy of chemical contraception on female white-tailed deer", $51,236, Co-principal investigator

**Society Affiliations**

- National Animal Damage Control Association
- The Society of Conservation Biology
- The Wildlife Society

**Research Interest**

- Behavioral /Ecological approaches to wildlife damage control
- Control of introduced vertebrate species
- Wildlife reproductive control
Oral Presentations

2011  North American Deer Farmers Association Annual Conference

2010  National Wildlife Control Operators Association Conference
      Northeast Fish and Wildlife Conference
      University of Tokyo
      The Wildlife Society 17th Annual Conference
      46th Annual NE Deer Technical Committee Meeting
      George Wright Society

2009  Vassar College

2008  Northeast Fish and Wildlife Conference

2007  Northeast Fish and Wildlife Conference

2006  Texas State University

2004  Rutgers Animal Science Department Seminar Series

2003  The Wildlife Society 10th Annual Conference

2001  Northeast Fish and Wildlife Conference

1999  Joint Midwest and Northeast Deer Technical Committee Meeting
      Eastern Wildlife Damage Management Conference

1999  Northeast Deer Technical Committee Meeting
      Coe College Biology Seminar and Issues Discussion

1998  The Wildlife Society 5th Annual Conference
      Connecticut Nuisance Wildlife Control Operator’s Euthanasia Training Course

1997  Southeast Deer Study Group Meeting
      Northeast Fish and Wildlife Conference
      Midwest Fish and Wildlife Conference

1996  Northeast Fish and Wildlife Conference
      The Wildlife Society 3rd Annual Conference

1994  Indiana Chapter of The Wildlife Society
      American Society of Mammalogists, 75th Anniversary Meeting
      Sycamore Audubon Society
      Indiana Department of Natural Resources, Deer Advisory Committee

1993  Midwest Fish and Wildlife Conference

1992  Northeast Deer Technical Committee Meeting
Manuscripts In Print


Return to Proposal
Exhibit F:
Letter from Dr. Anthony J. DeNicola, President of White Buffalo, Inc.
29 November 2014

Re: Proposed Surgical Sterilization Project in Cincinnati Parks

To Whom It May Concern:

WBI is working in collaboration with the Deer Sterilization Working Group. If ODNR approves the proposal, we are prepared to move forward with the work either in February 2015 or fall 2015. We will work closely with ODNR on any remaining issues.

We understand various groups are putting forth proposals for sterilization and immunocontraceptives. While both methods are potentially viable alternatives to lethal population control, sterilization is the only option at present that is 100% effective and that does not require repeated treatments. Researchers are working on advancements in contraceptive agents and delivery technology that may make immunocontraceptives a better choice in the future. Until then, sterilization offers the most practical and most cost effective method of fertility control.

White Buffalo Inc.’s portfolio is attached to the proposal. Please note that we have been extensively involved in both immunocontraceptive and sterilization research programs.

Sincerely,

Anthony DeNicola, Ph.D.
President
White Buffalo Inc.
Exhibit G:
Letter from Dr. Randy Junge, Vice President of Animal Health at the Columbus Zoo and The Wilds
Committee members;

Thank you for contacting me about your proposed project involving surgical sterilization of white-tailed deer in Cincinnati, Ohio parks.

In way of background, I am a licensed veterinarian and a Diplomate of the American College of Zoological Medicine. I have been practicing zoo animal medicine for more than 25 years, previously at the St. Louis Zoo and currently as Vice President of Animal Health at the Columbus Zoo and Aquarium. Please note that the information offered here is from my personal experience and is not meant to represent Columbus Zoo.

I worked with White Buffalo Inc and Dr. DeNicola several years ago on a deer population management project in Town and Country, MO (St. Louis suburb). This project lasted 2 years and involved an extensive lethal cull (sharpshooting) as well as surgical sterilization of 130 does. Surgery was performed by me and Dr. Steve Timm, a veterinary surgeon from Wisconsin.

The White Buffalo crew is professional, efficient and conscientious. When providing lethal control they use utmost caution and sensitivity. For nonlethal control, they offer outstanding capture skills. In the St. Louis project, deer were located after dark by spotlighting, darted with a tranquilizer dart, tracked, retrieved and transported to our mobile surgery trainer for sterilization. Each doe was prepped, and surgically sterilized by removal of the ovaries. Animals were ear tagged for monitoring and 30 were radiocollared, then they were then released in the area where they were captured. Only a single animal died during this project (from capture stress, no evidence of surgical complications).

The surgical procedure, when done by experienced veterinarians, is a minimal risk. No evidence of postop infection or incision complications was noted. Depending on the capture rate and conditions, 2 surgeons can sterilize more than 10 individuals / night, so your population of 38 deer could be completed in a relatively short timeframe. While surgical sterilization of course offers permanent population control, immigration may bring new fertile females into the area and additional steps may be needed in the future.

Please feel free to contact me if I can offer additional information.

Randall E, Junge, DVM, DACZM
rejunge@hotmail.com
314 570 4552
Exhibit H:
Letter from Stephanie Boyles Griffin, Senior Director, Wildlife Response, Innovation, and Services, The Humane Society of the United States
December 10, 2014

Clifton Deer Sterilization Working Group
Attn: Bob Rack
724 Lafayette Ave. #1
Cincinnati, OH 45220

Re: White-Tailed Deer Fertility Control Project

Dear Sterilization Working Group:

As we discussed, I am the Senior Director of the Innovative Wildlife Management & Services Program of The Humane Society of the United States (The HSUS). I am based in Gaithersburg, MD where I lead a team responsible for identifying, developing and implementing technical and direct assistance and response programs that promote humane, innovative and sustainable wildlife management policies, practices and procedures. In addition to my role at The HSUS, I also serve as a Commissioner on the Maryland Wildlife Advisory Commission.

The HSUS is committed to animal protection and we believe in the need to create lasting, humane, and environmentally responsible solutions to conflicts with wild animals. We seek to work in a positive manner with government agencies, communities and municipalities to provide guidance and assistance with respect to decisions concerning humane alternatives to lethal deer management programs.

I want to congratulate you and the Cincinnati Parks Department on your decision to develop a non-lethal deer population control pilot program in several of Cincinnati’s parks. I understand that the Working Group is proposing the surgical sterilization of female deer. Since one of our program’s major priorities is advancing the use of effective, humane fertility control methods for managing wildlife populations in a variety of different settings and landscapes, we strongly support the Working Group’s proposal. Fertility control can be, over the long term, an effective and publicly acceptable way to deal with urban deer problems and several recent research projects have shown that surgical sterilization is 100% effective and can be used as a humane approach for managing deer populations in urban landscapes.


Celebrating Animals | Confronting Cruelty

2100 L Street, NW Washington, DC 20037  t 202.452.1100 f 202.778.6132 humanesociety.org
The HSUS is currently working with several federal and state agencies, as well as communities and municipalities, to develop and implement wildlife fertility control projects and would welcome the opportunity to partner with the Working Group and the City of Cincinnati on this sterilization project. I wish you success and look forward to hearing from you. I can be reached by telephone at 301-258-3147, or email sboyles@humanesociety.org.

Respectfully,

Stephanie L. Boyles Griffin, Senior Director
Innovative Wildlife Management & Services
The Humane Society of the United States
Exhibit I: Opportunities for Community Involvement
Opportunities for Community Involvement

In the first year of the Program, White Buffalo 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 other than law enforcement and 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, age estimates, and data collection
5) Final preparations for surgery including surgical site prep.

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.

Interested members of the community will be encouraged to participate as volunteers or donors. In addition, Clifton residents with property in the vicinity of the Clifton Parks will be given the opportunity to participate by allowing the capture team to enter their property if needed. The more residents who allow access to their properties, the more capture opportunities the team will have and the more efficient the program will be. White Buffalo provides complete indemnity to any landowner who permits access to private property (See Exhibit J).

Additional volunteer opportunities may include:

1) Preparing and serving meals and warm drinks to the capture, handling and veterinary team members;
2) Development of a Deer Sterilization Program web and social media presence to keep the community informed about the Program’s progress and of opportunities for involvement; and
3) Assisting the Working Group with fundraising efforts.

Return to Proposal
Exhibit J:
White Buffalo, Inc. Landowner Authorization Form
LANDOWNER AUTHORIZATION FORM

I, ___________________________________________, represent that I own the property located at ____________________________________________ ("the Property"). I hereby give permission to White Buffalo, Inc., by and through Dr. Anthony J. DeNicola, or his designee, to place bait and capture deer on my Property.

I understand that Dr. DeNicola will explain the baiting process to me and answer any questions that I may have in reference to the capture of deer from the bait site located on my Property. I further represent that the dates(s) and time(s) of such baiting and capture activities will be discussed with and agreed to by me in advance.

I further understand that no liability will be incurred by me as a cooperating landowner, as a result of the activities of White Buffalo, Inc. on my Property, and that any and all such liability will be the sole responsibility of White Buffalo, Inc., who will protect me from such liability.

_________________________________________  ______________________
LANDOWNER SIGNATURE                        DATE

_________________________________________  ______________________
LANDOWNER SIGNATURE                        DATE

_________________________________________
LANDOWNER ADDRESS                          PHONE NUMBER

_________________________________________
Anthony J. DeNicola
WHITE BUFFALO, INC.

DATE

Return to Proposal
Exhibit K:  
Program Budget
Budget Note

White Buffalo's proposed budget is a “turnkey” budget that assumes relatively little local infrastructural support for sterilization operations and staff. It does not include, for example, signs designating treatment areas during program operations, or the possible requirement to pay police officers to escort the capture teams. The Working Group hopes to reduce costs by providing meals and housing, and by seeking in-kind donations, including some materials and equipment from The Humane Society of the United States.
White-tailed Deer Population Control
Cost Proposal

Cincinnati, Ohio

Submitted by
Dr. Anthony J. DeNicola
White Buffalo, Inc.
29 November 2014
Sterilization Budget Year 1 – February 2015

WHITE BUFFALO, INC. EXPENSES - <30 females in the population

Senior Scientist

Capture, sterilization, and training

1 person X 5 days (includes travel) X $150/hr X 12 hr/day $9,000

Veterinarian

Sterilization and training

1 person X 4 days (includes travel) X $1,200/day $4,800

Technician

Capture and sterilization (assumes skilled field assistance w/deer transport-handling)

1 person X 5 days (includes travel) X $95/hr X 12 hr/day $5,700

DIRECT COSTS

Supplies (Radio-collars, immobilization drugs, misc.) $4,000

Travel

Mileage (1,200 miles X $0.54/mile) $648

Hotel (9 room-nights X $200/night) $1,800

Per diem (14 person-days @ $60/day) $840

TOTAL $26,788

Return to Proposal
Exhibit L:
White Buffalo, Inc. Research Proposal to Ohio Department of Natural Resources
WHITE-TAILED DEER FIELD
STERILIZATION PROPOSAL

Mt. Storm Park
Rawson Woods
Edgewood Grove

Cincinnati, Ohio

Submitted by
Dr. Anthony J. DeNicola
White Buffalo, Inc.

3 December 2014
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 whitetailed 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 mile². 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. 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 ≥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 (February 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 = ~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


Return to Proposal
Exhibit M:
Letter from Enid Feinberg, President of Wildlife Rescue, Inc.
November 28, 2014

Dear Clifton Deer Sterilization Working Group,

We greatly appreciate the efforts you are putting forth to investigate what is the best solution for both your Cincinnati, Ohio parks and the deer who live in them.

I am currently the President of Wildlife Rescue, Inc., an all volunteer non-profit organization that provides assistance to the public with wildlife emergencies through the rescue and rehabilitation of wildlife with the goal to release back to nature. We are dedicated to helping people find humane solutions for co-existing with wildlife.

After many years of researching non-lethal methods of deer population control, we chose deer sterilization as the most effective tool available for humanely controlling deer populations. In 2011, Wildlife Rescue launched the State of Maryland's first ever non-lethal deer sterilization program to reduce over abundant deer in an open suburban residential neighborhood in Phoenix, Maryland. We hired Dr. Anthony DeNicola, Ph.D., of White Buffalo, Inc. to design and implement the program and have worked with him closely as the program has proceeded. I have attached a summary report of our program and it's results, which I can only describe as exceeding all our expectations and very successful. As you can see in the report, we not only stabilized and shrunk our deer population, our community overwhelmingly supports its' continuation to manage the deer.

I will tell you that some of us, as individuals who have devoted ourselves to animal welfare, were initially very reluctant to work with Dr. DeNicola because of his reputation as a sharpshooter who has been engaged in jurisdictions around the country to cull deer. After speaking with and then meeting with him, he quickly overcame our reluctance. Dr. DeNicola now has our total respect as a wildlife biologist who understands deer and treats them very humanely when contracted to do so.

As a result of the success of our sterilization program, the Maryland Department of Natural Resources recently issued a permit allowing us to continue the program on a management basis. This recognition of sterilization as an accepted deer population management tool in Maryland is a testament to both the effectiveness of sterilization and the expertise of Dr. DeNicola.

We recommend Dr. DeNicola, his team and his sterilization methods to you without reservation or qualification.

Enid Feinberg, President
Wildlife Rescue, Inc.
wildliferescuemd@aol.com
www.wildliferescueinc.org
NON-LETHAL WHITE-TAILED DEER BIRTH CONTROL STERILIZATION SPAYING RESEARCH PROGRAM, Phoenix, Maryland

February, 2011 – Phase 1
• Experts were brought in (Dr. Steven Timm and Dr. Anthony DeNicola, Ph.D.) to provide surgical sterilization in the field. Under the guidance of these experts, local veterinarians were trained to provide the “rapid ovariectomy procedure” at this time and for subsequent years
• Initially a mobile rotunda device for coralling the deer from the U.S.D.A was utilized, but was not as safe and reliable as expected. We then switched to a remote immobilization darting technique that proved to be both safe and more effective for immobilizing deer
• 33 does were sterilized, preventing the birth of 300 fawns over the does’ eight-year reproductive life

February, 2012 – Phase 2
• Using the remote immobilization technique, the rapid ovariectomy procedure was performed on 17 more does over a few-day period
• This was accomplished with volunteer veterinarians, volunteer vet techs, and other volunteer assistants under the direct supervision of Dr. DeNicola and Dr. Timm
• Especially important in this phase was the training and expansion of volunteer staff to reduce the cost per doe of the procedure
• The community was able to confirm both a significant reduction in fawns and stabilization of the deer population

February, 2013 – Phase 3
• Again, only remote immobilization darting was used
• 9 more deer were sterilized
• Of every 10 does observed, only 2 could be darted because 8 had already been sterilized

February, 2014 – Phase 4
• Only remote immobilization darting was used
• 10 more does were sterilized, including one doe who had been shot with an arrow. The veterinarian was able to treat the doe’s significant infection with antibiotics and pain medication
• The contributions of the volunteers – veterinarians, vet techs, and other volunteers -- reduced the cost per doe to less than 40% of the cost for the first year.

Additional Information
• For the last phase of the study, the Maryland Department of Natural Resources required that Wildlife Rescue approach 50 homeowners who lived within a half-mile radius of the community where the sterilization has been taking place. Each homeowner was asked to sign if they supported, opposed or were indifferent to the sterilization project continuing in the community as a tool for managing the deer. In order for the project to continue, MD DNR required 30 of the homeowners had to support continuation. Forty-three out of 50 homeowners signed their
support for the continuation of the project. In fact, homeowners were quick to describe the deer browsing on their property had been significantly reduced, they were seeing less deer near their homes and there were less deer being hit by cars.

In Summary:
- Browsing is reduced because the need for additional caloric intake is eliminated since the deer are not pregnant for 7 months and they are not nursing fawns for 3 more months each year.
- The project area has experienced a reduction in deer/vehicle collisions.
- Surgical mortality rate is < 1%
- Annual mortality is ~10%
- Immigration 3-4 females/year
- The deer population is currently stable and reducing naturally

Costs

Year 1 - $1200 per deer
Year 2 - $750 per deer
Year 3 - $700 per deer
Year 4 - $480 per deer

Return to Proposal
Exhibit N:
Deer Sterilization Working Group Membership
and Contact Information
WORKING GROUP PRINCIPALS
CONTACT INFORMATION

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more local

Neighbors Chris Lottman, right, and Laurie Briggs are seeking a compassionate solution to thin the deer herd in their parks.

Women's target: Saving deer in our city parks

At risk of being tagged ‘Bambi lovers,’ activists try to find choices to hunting to thin herd’s numbers

“If you can be kind and compassionate and solve the problem, why would you not be?”

Once in a while, a story is better told backward. Laurie Briggs and Christine Lottman’s story is one of them. The quote above is the conclusion of their story. It is also a jumping-off point for a community conversation.

Lottman and Briggs, who are friends and Clifton neighbors, knew before they waded into the highly polarized issue of bow-hunt-

See DEER, Page A19

I give voice to people whose stories matter but are seldom told. Email me at kramsey@enquirer.com.

KRISTA RAMSEY

I cover the state of education in the Cincinnati area, and I teach at the University of Cincinnati.

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Student food banks can celebrate birthdays without food

At Burlington Elementary, food banks can include students’ birthdays in their celebrations. As of November, they can no longer serve ice cream. One solution is to bring in snacks that they can eat.

Burlington Elementary School is part of the Bexley school district, revising its food policy this year. Any birthday party food allowed must be nonfood-related.

Nonfood items: The idea is to limit the treat to pencils, erasers and other supplies. It’s one of several steps in making the morning more easy.

“We’re finding that the first” said a teacher at the school whose son goes to grade kindergarten. She is on the school’s food committee that works on the policy. “Parents who lead these efforts are coming up with policy, we hope it succeeds.”

Parents and schools have found that this is the obesity rates increase in children. It puts a bug in
Neighbors Chris Lottman, left, and Laurie Briggs walk Lottman’s dogs in Mount Storm Park on Friday. They’re trying to save the deer in overflowing herds, but also work with the city to find a smart, financially responsible, and humane solution.

**Duo seeks new ways to end deer dilemma**

Continued from Page A17

ing deer in Cincinnati parks they could be putting a target on their own backs.

Bambi lovers is what people who question the practice are often called. They’re dismissed as uniformed, unrealistic, or that worst word ever – emotional.

Briggs is an attorney who works with insurance companies on regulatory compliance. Lottman is an associate professor at the University of Cincinnati and a social worker. They regularly review research, have good heads for statistics, are informed about city issues, understand public policy, are particularly known for fair-mindedness, and can be trusted not only to grasp complex and thorny issues, but to resolve them in a collaborative and creative way.

They also live close to Mount Storm Park and Rawson Woods Nature Preserve, and they consider the deer within them to be both beautiful and emotionally inspiring. And they aren’t afraid to admit it.

Of the being-to-emotional issue, Briggs says, “The premise of a question like that is that emotion about our relationship with nature is inappropriate somehow. But humans have minds and hearts, and I don’t think there’s anything wrong with that. What would be problematic would be if we said we can’t bear the thought of killing the deer, but we don’t have any alternatives.”

So Briggs and Lottman have spent the last month researching alternatives.

After tracking down studies, investigating programs to manage deer populations, reviewing state regulations and talking to national experts, they’ve found two approaches they think show great promise for the two city parks that they live close to and are advocating for. They want city officials and the park board to revisit the issue of bow-hunting for those parks, and reconsider all alternatives seriously.

The first is a fertility control program in which deer are immobilized, surgically sterilized, tagged, given antibiotics and pain medication and then released. Because they remain in the environment, they reduce the number of new deer coming in, and the sterilizations slowly shrink the size of the herd.

The second is the use of IZP, a vaccine that causes infertility. It works best when a herd is fairly isolated geographically, and it requires booster shots, but medical advances are extending the time before they’re needed.

Nationally, these approaches come up in discussions of controlling deer herds and are often prematurely dismissed. But Briggs and Lottman have done sound research and they know that a responsible case can be made for them, that the science around them is growing, that their benefits are better documented and their limitations more accurately understood.

The women also know that any size deer herd can still present traffic dangers. They acknowledge that an uncontrolled deer population can wreak havoc on an ecosystem and be the source of its own demise. And they agree that both of their alternatives will take time, money and more patience than killing the deer with bow hunting – which is why they’re already strategizing how to raise funds and recruit volunteers to make those approaches work.

They also know some other things that can be dismissed by critics but are the essence of being both human and humane.

That, in the end it’s short sighted or insensitive – to think we can enjoy nature without having empathy for the living creatures in it. That deer in parks aren’t problems to be eliminated, but vulnerable animals caught through no fault of their own – in increasingly complex circumstances. That finding a gentler solution than killing them may be the mark of a both enlightened and practical community.

In the end, it circles back to Laurie Briggs’s simple, profound question. “If you can be kind and compassionate and solve the problem, why would you not be?”