Examining the Effectiveness of Surgical Sterilization and Sharpshooting as a Combined Approach for Managing Suburban White-Tailed Deer Populations

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Submitted by

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Introduction

White-tailed deer (*Odocoileus virginianu*s) overabundance and the associated conflicts are pervasive throughout the eastern US. Alternative management techniques (i.e., controlled hunting, sharpshooting, trap and relocation/euthanasia, 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, public safety, and ecological conflicts in suburban, corporate, and park environments. Many federal, state, and local agencies are struggling to address this ever-increasing problem. Most communities that are confronted with deer overabundance issues pursue a single dimensional approach to solve the problem. However, there are many situations where there are significant variations in development patterns that lend themselves to different solutions. We suggest that it is often optimal to use more than one method and tailor the management plan to the spectrum of potential scenarios present in a community.

In areas where hunting is not either legally or socially acceptable, but a more immediate population decline is preferred, sharpshooting methods are often chosen. Sharpshooting has been proven to be effective at rapidly reducing local deer populations and maintaining the lower densities long-term (DeNicola and Williams 2008). Sharpshooting, as defined by the use of trained professionals using culling techniques outside of permitted recreational hunting methods, can reduce local deer populations lower than what has been achieved historically using recreational hunters. Professional sharpshooting programs have been implemented throughout the US over the past 2 decades without a public safety incident. However, the effectiveness of sharpshooting can be hampered by restrictions on discharge distances from occupied dwellings, limiting access to local deer populations. In these situation trap and euthanasia or fertility control techniques have been used.

Fertility control technology has been shown to be effective for use on white-tailed deer and several other mammalian species. The general public has expressed considerable interest in this approach to managing deer, and it has promise for use on localized deer populations (Rutberg et al., 2013). The ultimate goal for this management approach is short- and/or long-term population management to minimize human-deer interactions or disease outbreaks in areas with high deer populations where hunting is limited, controlled, or prohibited and where other management tools are difficult or impossible to implement. However, when fertility control is used in isolation, it requires a longer timeframe to see significant population declines through natural attrition (Merrill et al 2003), and the cost per animal handled is 2-3 times the cost of other professional methods. Therefore, use on a larger landscape level (i.e., >2-3 miles^2) can often be cost prohibitive. In situations where lethal methods are not feasible or likely to be effective, we suggest evaluating surgical sterilization, versus vaccine technology, because it is safe for treated deer (Maclean et al. 2006, DeNicola 2013, DeNicola 2014) and is more cost effective than the all present vaccine technology in many situations (Boulanger et al. 2012, Evans et al. 2016).

In communities where there are great disparities in development density we have often recommended a combination of methods. However, deer management is very polarizing and local leadership typically votes in favor of lethal or nonlethal, rarely a combination. In a community like Ann Arbor, with a diverse development pattern, we would recommend combining methods across the community; nonlethal methods in the more densely developed areas and sharpshooting in larger undeveloped tracts. This approach should accelerate the rate of population decline, and then minimize long-term culling. To date, there are very few data on the empirical benefits of this proposed strategy. This research proposes to examine the benefits of sharpshooting and surgical sterilization in managing Ann Arbor's burgeoning deer population over a 5 year period.

Study Area

Ann Arbor officials have voiced concerns over increasing deer vehicle collisions, risks of chronic wasting disease (CWD), and impacts to landscape and native vegetation because of a locally abundant deer population. The potential for the furtherance of these conflicts has prompted municipal officials to again consider addressing the abundance of deer.

Ann Arbor is located in central Michigan and contains approximately 28 miles^2. About 40% of the total land area within the municipal boundaries contains deer habitat, primarily in Wards 1 and 2. The municipality represents one of the most challenging situations for deer managers. The community is nearing the point of being "built out" (as of the of 2010 census, there were 113,934 people, 45,634 households) with most of its land area covered by single family homes surrounded by wooded corridors. This provides excellent deer habitat and at the same time can be restrictive to the implementation of some deer management options. There is no hunting permitted within the community, and there are no non-human predators present that are capable of limiting a deer population. Given the favorable conditions, the deer population in the community has increased to a level that is incompatible with some local land uses. To date, limited management actions have been used to control the deer population; including a sharpshooting effort in winter 2016 that resulted in 63 deer culled. These site characteristics, along with deer approachability, make Ann Arbor a suitable site to conduct a combined sharpshooting/surgical sterilization research project; using sharpshooting methods in larger undeveloped properties and surgical sterilization in areas where firearm discharge constraints prevent sharpshooting methods from being deployed (i.e., it is not possible to obtain written permission from all landowners that would need to sign off to permit the discharge of a firearm). The areas of particular concern, given the abundance of deer and density of housing, regardless of whether the 450' discharge restriction is changed in the future, are: 1) the area bounded by the Huron River to the northeast, the University of Michigan Arboretum to the northwest, Washtenaw Avenue to the southwest, Huron Parkway to the east, and 2) the area bounded by Skydale Drive to the north, Route 23 and the Huron River to the west and south, and Black Pond

Woods Nature Area, Murfin Avenue/Upland Drive to the east. In these zones the housing densities are too high to either safely or effectively cull deer using sharpshooting methods.

There are limited data on the deer population size in the city limits of Ann Arbor. To date, Ann Arbor has conducted population estimates using helicopter counts over snow to assess local deer abundance. This approach can be accurate if conducted following very controlled methods with experienced personnel (Beringer et al., 1998). If the methods are not followed closely, and/or if the personnel do not have proper training and experience conducting such efforts, detection rates can drop precipitously. This can result in population estimates that are significantly lower than what is actually present. Another method for tracking deer population densities over time is through the use of indices of deer abundance. The most common indices that reflect population changes are DVCs, vegetation impacts to natural areas, and homeowner complaints. There is a direct correlation between DVCs and deer population density, and therefore, DVCs can be used as an accurate index of population changes (DeNicola and Williams 2008). If plant diversity and forest health are a priority, then a vegetation monitoring protocol should be developed and conducted annually. Some communities also actively engage the public using surveys to measure shifting perceptions relative to changing local deer densities. This research also will allow Ann Arbor to better understand population densities.

Objectives

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 or culled 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 capture and sterilization project in a densely developed suburban neighborhood, complemented with sharpshooting methods on adjoining open spaces, which will reduce abutting densities to minimize risks of immigration. We will quantify effort, cost, immigration/emigration rates in an open suburban population, and population size annually. Our null hypothesis is that a combine approach to managing deer in adjoining areas will not result in a greater population reduction.

Given the present restrictions on firearm discharge, and the 1000’ discharge buffer around schools for culling on public property, there are several large areas where lethal methods are not an option. These include:

1. The area bounded by West Huron River Drive to the north, North Maple Road to the west, Route 14 to the south, and Bird Hills Nature Area to the east.
2. The area bounded by Skydale Drive to the north, Route 23 and the Huron River to the west and south, and Black Pond Woods Nature Area, Murfin Avenue/Upland Drive to the east.
3. The area bounded by the Huron River to the northeast, the University of Michigan Arboretum to the northwest, Washtenaw Avenue to the southwest, Huron Parkway to the east.
4. The area bounded by Route 23 to the north and east, Omlesaad Drive, Tuebingen Parkway, Leslie Park Golf Course, and Murfin Avenue/Upland Drive to the west, and Huron River to the south.

The first three areas are relatively small. The first area is on the edge of the city limit and is exposed to very high deer densities to the west with no way to address the adjoining unmanaged population. Therefore, it is not a good fit for the initial research. The next two areas are good possible areas to start the pilot surgical sterilization research given that they are bounded by areas suitable for culling, and/or areas that do not harbor high deer densities. In the future, if the discharge statute is not changed, surgical sterilization should be considered in the fourth and largest area. Sharpshooting methods would be employed in the larger undeveloped tracts. If the 450' restriction is eliminated for professional culling (versus "hunting"), then the areas for the respective methods may need to be reconsidered. Therefore, we consider Year 1 a pilot year to assess a preliminary surgical sterilization effort in the two previously defined areas combined with sharpshooting in adjacent 6 - 10 larger open spaces.

Field Methods

YEAR 1

Site Visit, Planning and Permitting

We will conduct two separate site visits to ensure leadership is adequately informed about the research effort and to assess the areas where we will be working. We will partner with Municipal staff to coordinate public and, possibly, private property access to minimize inconveniences to residents. Private property access throughout the community will be invaluable to the success of this program given the limited amount of public land and the 450' restriction on firearm discharge. It would be beneficial to have access to all suitable public properties.

We will facilitate obtaining a Scientific Collector Permit from the Michigan Department of Natural Resources.

Pre-baiting and Site Selection

Deer will be drawn to select areas using bait for sterilization capture and sharpshooting. Bait is important during culling to maximize discretion and safety, because of high human activity and

fragmented private property access throughout much of the community. To have comprehensive access we will need ~3-4 bait sites/square mile to ensure thorough access to the entire local deer population. Any access less than this density will result in a relative reduction in harvest and capture. Access is preferably on private property to limit impacts on public land users and minimize the opportunities for those opposed to the program from interfering with field activities.

Bait should be placed out 3 weeks in advance of anticipated culling and capture efforts. All baiting should be done daily from the same vehicle at a consistent time in the late afternoon/evening. This acts as positive conditioning for the deer; they recognize the vehicle and person baiting and associate it with the appearance of food. Some vegetation that may obstruct shooting opportunities, if present, it will be thinned or pruned to ensure optimal removal conditions.

Capture

We will capture ≤80 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. We will capture deer over baited locations from one hour before sunset until 2 hours after sunset using stationary shooting methods (e.g., tree stand, blinds, decks, etc.). We will approach deer in a vehicle on public roadways and private roadways/properties where permission has been granted after 2100h. If possible, a police officer should accompany the capture professionals during mobile operations. 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 15 February 2017 to minimize difficulties of 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 opportunistically (after 2100 h) and through the use of bait at select locations.

One mature doe in each matrilineal group will be radio-collared (n = ~20) 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 female deer 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. Routine three layer closure of the abdomen will be performed to complete the procedure. In over 600 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.

Sharpshooting

White Buffalo Inc.'s approach to urban deer management is specifically designed to address and avoid the most common cause of failure; creating an "educated" population that is skilled in avoiding deer management activities. Well before the first deer is euthanized, we focus on how to meet the final objective. The defining strategic characteristic of every population control effort is the management team's singular focus on preventing the remaining deer from being educated to avoid humans even as the population is rapidly reduced. An urban deer management team must remove a high percentage of a population and repeat this process for years into the future, so maintaining the naïveté of the select population is strategically paramount, and is the most important means of reducing risk of failure and minimizing long-term costs. For this standard to be met, the team must possess superior technical ability (e.g., to shoot with precision in suboptimal conditions), field intuition (e.g., to determine whether animals encountered should be engaged), and discipline (e.g., to refrain from engaging if conditions are not conducive). In summary, the behavioral characteristics of the deer at low density, and the ability to subsequently harvest them, will be shaped by events unfolding from the first day of the management activities.

WBI's methods are humane and address concerns for animal welfare by following the American Veterinary Medical Association's stringent guidelines for humane euthanasia of animals (AVMA 2013). We have spent the last 20 years committed to improving both technology and techniques to maximize safety and efficiency for the management of white-tailed deer (i.e., ballistics testing, bullet development, baiting techniques, adaptation of other technologies for use in deer management, including night vision scopes and suppressors). We have the best available

equipment with numerous hours of hands-on use to ensure precise shot placement. This results in safe use of equipment and humane treatment of target animals. We have thoroughly tested and selected bullets, in addition to having developed specialized bullets. As a result of our extensive testing, we have found that no bullet fragments with significant size or inertia exit the target animal, therefore ensuring public safety. We have extensive experience in both lethally removing (>10,000 deer) and capturing deer (>3,000 deer) in a variety of human occupied environments without incident. We have used our discretion in the selection of shooting sites with complete satisfaction of both local/state officials and property owners. Finally, we have trained 6 law enforcement agencies how to professionally sharpshooting deer as part of State authorized deer management programs. In conclusion, although safety is the primary issue to be considered when implementing a program to reduce deer numbers, with the above precautionary measures and the expertise of White Buffalo Inc., it need not be a concern.

In summary, the management of deer in the City of Ann Arbor through a comprehensive applied research project will require a comprehensive effort by a very skilled and experienced group of wildlife control professionals. A strategic use of methods will be necessary to ensure that the deer are removed in a timely, safe, and humane manner. This initiative also will require full support from Municipal Administration through the authorization of diverse field methods and flexible timing of deer removal activities. Moreover, the plan will have to be adaptive to allow for methodological adjustments as deemed necessary during the project tenure.

Culling activities will be conducted over an approximate 2 week period between 1 January and 31 March 2017. Given the limited population data in the available open spaces we suggest harvesting approximately 100 deer in the first year until more detailed information can be made available.

We will use suppressed .223 caliber rifles or .22 caliber rimfire rifles for sharpshooting applications. All rifles are match-grade and specially designed for sharpshooting deer. We will shoot from elevated positions to ensure a steep angle of trajectory. All deer will be shot in the center of the brain (~95%) or the cervical spine (~5%). Cervical spine shots are taken only when there is an obstruction between the shooter and the deer's brain.

We have all the necessary equipment with years of hands-on use including several ATF registered, suppressed, match-grade firearms (using highly frangible projectiles), all necessary vehicles (including ATVs), and accessories (e.g., night-vision, spotlights, rangefinders, tree stands to create safe, elevated shooting positions, etc.).

Monitoring

Population estimation procedures and survival assessment will be conducted annually proximate to capturing efforts to ensure yearling/adult males still have their antlers. Camera surveys will be the primary method to estimate the annual population size in the respective treatment areas (Jacobson et al. 1997, Weckel et al. 2011). We will divide each treatment area into 8 equally sized sections by overlaying a grid of approximately 150-acre blocks. Eight infrared-triggered,

digital cameras (Moultrie M-880 infrared camera) will be deployed over bait piles on properties with a high probability of deer activity within each block. Camera sites will be pre-baited daily with shelled corn for several days prior to, and during, camera deployment in January 2017. Each camera will be elevated ~2 ft off the ground, oriented north to control exposure issues, and placed ~15 ft from the center of bait. The cameras will be set to run continuously for 24 hours per day, with a preset delay of 5 minutes between pictures. Every other day during the field survey, the memory cards in the cameras will be changed to confirm the cameras are functioning properly. Depending on deer density, it will require ~1-2 weeks to obtain enough deer images (>2000) to run the statistical analysis for population estimation. All pictures that contain deer will be sorted by site and numbered. Each picture will be closely studied, and any legible ear tag numbers will be recorded. We also will record the total number of deer, the number of unmarked deer, number of bucks, and the number of unidentifiable marked deer for each photo. From these photographic data, the total number of times each identifiable, marked deer was observed will be entered into the program NOREMARK (White 1996), along with the total number of unmarked deer, and the total number of marked deer known to be alive in the population during the survey. Having a high percentage of tagged deer will allow us to also use mark-resight estimators with the camera survey in addition to using the Jacobson method. Finally, we will determine the pre-treatment recruitment rate (doe to fawn ratio) to serve as a baseline. We also will use spotlighting surveys (three repetitions covering a predetermined spotlighting route) to assess; 1) assess the number of marked and unmarked deer, 2) determine the doe to fawn ratio, and 3) identify the sex ratio of adult deer.

If we achieve a high proportion of tagged female deer we will be able to more accurately estimate the deer population size and immigration rates in the community. Immigration will be determined by observing the number of unmarked females in the sterilization treatment area each year during capturing efforts. We also will assess survival and emigration rates by monitoring radio-collared females after each capturing phase. All incidental mortality or dispersal data will be recorded. Finally, 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. There is the option to expand into other developed neighborhoods based on data collected from Year 1 (e.g., #4 listed in the Objective Section).

Sharpshooting

Same as Year 1, with adjustments in access based on any possible changes to the 450’ firearm discharge restriction.

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.

Sharpshooting
Same as Year 1, with adjustments in access based on any possible changes to the 450' firearm discharge restriction.

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 Michigan Department of Natural Resources. All data will be made available upon request at any time to authorized agents of the State and/or municipality.

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 23 years. Dr. DeNicola's research interests include ecological approaches to control wildlife damage, control of introduced vertebrate species, and wildlife reproductive control.

Dr. Steven Timm graduated from the University of Minnesota, College of Veterinary Medicine in 1986. In addition to his training and expertise in soft tissue and orthopedic surgery, he has diverse experience in wildlife capture and disease investigation, to include experience with capture, restraint, tissue sampling, pathology, diagnostics and treatment of carnivores (Channel Island skunks, Channel Island foxes, Red foxes, multiple raptors), ungulates (White-tailed deer, Black-tailed deer, Fallow deer, elk, bison, Rocky Mountain and Desert Bighorn sheep) and feral species (feral cats, pigs, goats and wild horses). Dr. Timm and White Buffalo Inc. recently established a protocol for rapid ovariectomy and tubal ligectomy. He also has performed vasectomies on over 500 deer without complications or mortality associated with the procedure. This work involves the combined experience of the White Buffalo team of researchers and the surgical and field experience of Dr. Timm, and has established a technique to provide surgical (definitive) sterilization in a field environment. Currently, Dr. Timm lives in southwestern Wisconsin and provides mobile surgical services to companion animal clinics in southern Wisconsin.

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Proposed Budgets (2016 - 2017)*

Site Visit, Planning, Permitting (2016)

PERSONNEL
Senior Scientist

Site Visit and Setup	
1 person X 4 days (includes 2 round-trips) X $150/hr X 14 hr/day	$8,400

DIRECT COSTS
Travel

Flights (NY to MI)	$1,000
Rental car	$400
Hotel (4 nights X $200/night)	$800
Per diem (4 person-days @ $60/day)	$240
TOTAL	**$10,840**

*Budget is an estimate only

Capture and Sterilization Budget (2017)* **

PERSONNEL	
Senior Scientist	
Capture and sterilization	
1 person X 7 days (includes round-trip travel) X $150/hr X 14 hr/day	$14,700
Veterinarian	
Sterilization	
1 person X 7 days (includes round-trip travel) X $1,500/day	$10,500
Wildlife Biologists	
Capture and sterilization	
3 people X 7 days (includes round-trip travel) X $95/hr X 14 hr/day	$27,930
DIRECT COSTS	
Supplies Surgical supplies	$9,000
Radio-collars ($225 X 20)	$4,500
Travel	
Mileage (3,500 miles @ $0.60/mile) (CT to MI, and local travel)	$2,100
Hotel (32 room-nights X $200/night)	$6,400
Per diem (32 person-days @ $60/day)	$1,920
TOTAL	**$77,050**

***Assumptions:**

- Assumes ~40-60 deer handled
- Local law enforcement assistance/support for remote immobilization
- Assistance from Ann Arbor with baiting

**Budget is an estimate only

Sharpshooting Budget (2017)* **

PERSONNEL		
Wildlife Biologists		
Site Setup and Preparation		
1 person X 2 days (includes travel) X $95/hr X 12 hr/day		$2,280
Sharpshooting		
1 person (including travel) X 14 days X $110/hr X 12 hr/day		$18,480
1 person (including travel) X 14 days X $95/hr X 12 hr/day		$15,960
DIRECT COSTS		
Travel		
Mileage (3,000 miles @ $0.60/mile)(CT to MI)		$1,800
Hotel (30 nights X $200/night)		$6,000
Per diem (30 person-days @ $60/day)		$1,800
Miscellaneous		
($4.00/deer X 100 deer)		$400
	SUBTOTAL	**$46,720**
Carcass Processing		
(~$90/deer X 100 deer)		$9,000
	TOTAL	**$55,720**

***Assumptions:**

- Assumes ~100 deer handled
- Assistance from Ann Arbor with baiting

**Budget is an estimate only

Monitoring Budget (2017)* **

PERSONNEL

Wildlife Biologist	
Camera set up	
1 person X 2 days (includes round-trip travel) X $95/hr X 14 hr/day	$2,660
Photo review and report writing	
1 person X 7 days X $95/hr X 10 hr/day	$6,650

DIRECT COSTS

Travel	
Flight (CT to MI)	$500
Rental car	$200
Hotel (1 night X $200/night)	$200
Per diem (2 person-days @ $60/day)	$120
TOTAL	**$10,330**

***Assumptions:**

- Assistance from Ann Arbor with baiting and camera support

**Budget is an estimate only

Appendix A

Sharpshooting Protocol

Subsequent to a decision by the Community and the State wildlife management agency to implement a controlled deer reduction using White Buffalo Inc. the following procedures are used:

1) Prior to initiating any field activities the target area/s and surrounding properties are thoroughly surveyed using digital aerial images followed by field confirmation. By knowing the location of every occupied structure and areas of human use we are better able to work safely, discretely, and efficiently;

2) Bait sites are selected with the involvement of the landowner/s, local law enforcement, and the cooperating state agency. Each site is selected based on safety concerns, discretion, and deer activity;

3) We conduct field operations during hours of lowest human activity. In addition, during the removal operation we search intensively for people and non-target animals to avoid mishaps;

4) Deer of all ages and sexes are harvested, however, adult does are prioritized. Deer are shot over bait from an elevated position with a rifle during the day or at night. Night-vision equipment and suppressed firearms (only in states where they are legal to possess) are used to expedite field procedures and to ensure discrete operations;

5) During suburban deer reductions there will be continuous open communication between community members, municipality officials, and White Buffalo, Inc. to keep people well informed regarding field activities to avoid conflicts;

6) When in doubt, never shoot;

7) All deer carcasses are transported and dressed with the highest degree of discretion;

8) When desired, we are willing to be responsible for the disposal of all by-products and transport of deer carcasses to a USDA-inspected facility for processing and subsequent donation to the needy.

9) We collect all pertinent data related to herd health, advancements in management techniques, and other aspects of each removal program which will be included in scientific journals, professional conferences, or written reports submitted to the community/landowner and cooperating state agency.