White Buffalo Inc.
Conserving Native Species and Ecosystems

YEAR ONE
SUMMARY REPORT

2017 Deer Research Program

Ann Arbor, Michigan

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Submitted by:

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White Buffalo Inc.

INTRODUCTION

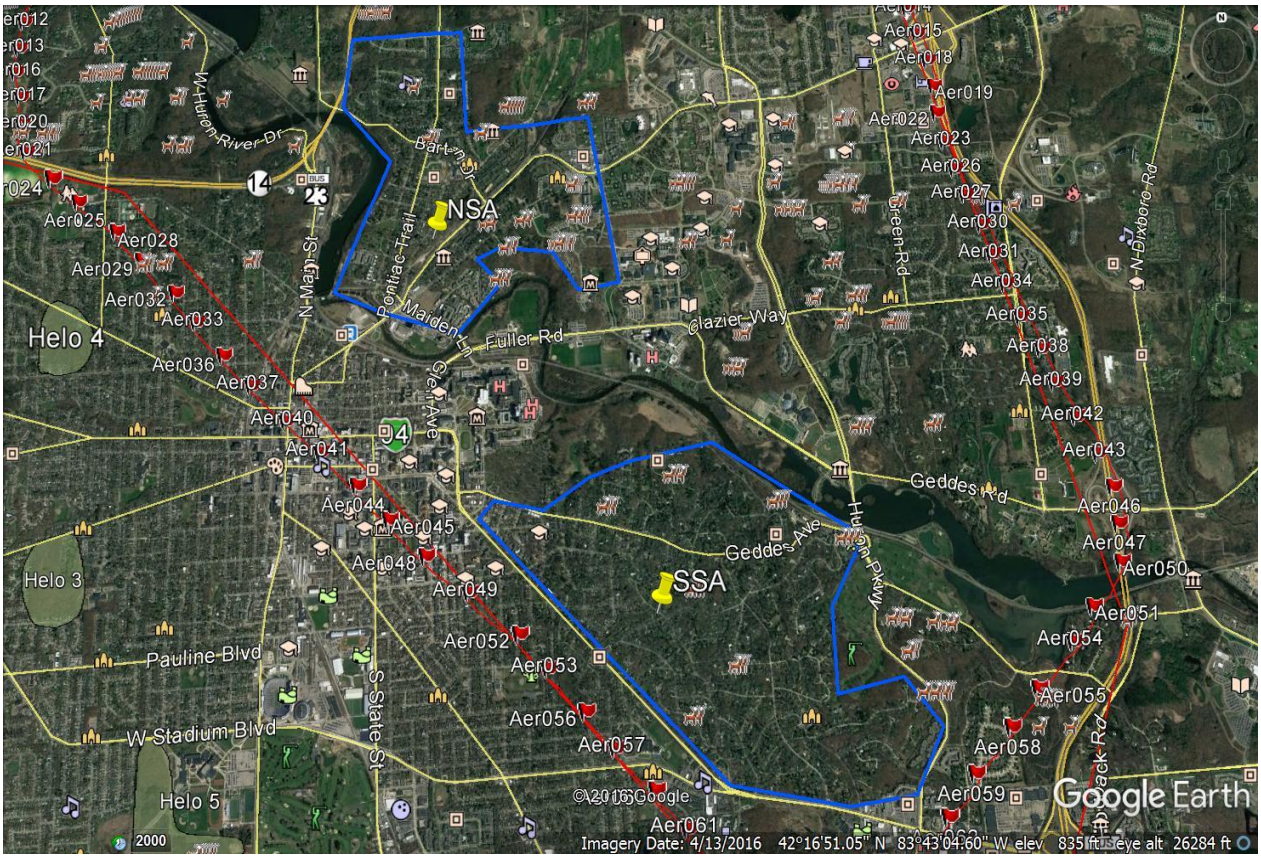
Ann Arbor is located in central Michigan and contains approximately 28 miles^2. About 40% of the total land area within the municipal boundaries contains deer habitat, primarily in Wards 1 and 2. The municipality represents one of the most challenging situations for deer managers. The community is nearing 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 certain areas of Ann Arbor suitable to conduct a surgical sterilization research project (MacLean et al. 2006); where firearm discharge constraints prevent sharpshooting methods from being deployed (i.e., 450' firearm discharge requirements and inability to obtain sufficient written permission from landowners).

In order to use a combination of methods to assess the relative impacts on the deer population in the community we obtained a Scientific Collector's Permit (#1600). The research objectives were guided by directives set by the City Council, these include improving forest health/regeneration in Natural Areas, reduction in DVCs, and achieving a 75% satisfaction level of the residents in the five Wards. This will require an adaptive process where annual data collection will direct future management decisions.

STUDY AREA

The areas of particular focus for sterilization activities, given the abundance of deer and density of housing, were: 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 (hereafter Southern Study Area - SSA), 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 (hereafter Northern Study Area - NSA) (Figure 1). The University of Michigan Arboretum and Huron Hills Golf Course and Nature Area served as proximate open space sharpshooting areas to the SSA. In the NSA, Cedar Bend Nature Area and Leslie Park Golf Course served as proximate open space sharpshooting areas. Additional open spaces that served as sharpshooting areas included Bird Hills Nature Area, Bluffs Nature Area and two additional University of Michigan properties.

Figure 1. Northern (NSA) and southern (SSA) surgical sterilization research areas in Ann Arbor, Michigan.



METHODS

Capture

Deer sterilization activities were conducted from 22 - 29 January 2017. We followed the operations protocol outlined in the proposal, contract, and Michigan Department of Natural Resources (MIDNR) Scientific Collection Permit #1600. Female white-tailed deer of all age classes were immobilized using projectors with 2 ml transmitter darts (Pneu-Dart Inc., Williamsport, PA, USA) to administer tiletamine/zolazepam (4.4 mg/kg) and xylazine hydrochloride (2.2 mg/kg). We approached deer in a vehicle on public roadways and private roadways/properties where permission was granted. We also darted deer over bait placed on private properties in the late afternoon. Once a dart was deployed and 15 minutes elapsed, the deer was located via radio-telemetry. Masks were placed over the eyes, and ophthalmic ointment was applied to prevent ocular desiccation. Deer were transported to a public property where a temporary veterinary surgical sterilization site was located.

Females were fitted with VHF radio-collars (n=19), containing 8-hour mortality sensors to facilitate future capture efforts and assess survival rates. We used radio-collars with a 5-year battery life that are 1/3 the size (150 grams) of traditional deer collars to lessen the physical burden on each deer (Advanced Telemetry Systems, Isanti, MN, USA). All captured deer were fitted with ear tags for individual identification. The back plate of each tag was labeled "Call Before Consumption 860-790-0224." We also collected data on weight, age, and general health of the deer. Incidentally captured male fawns were tagged at the capture location and released.

Surgical Procedure

Upon arrival at the temporary surgical suite, all deer were premedicated with flunixin meglumine at a dosage of 2 mg/kg IM and a long acting antibiotic (ceftiofur) at 4 mg/kg IM. To maintain anesthesia, supplemental doses of ketamine HCl (5-10 mg/kg) were given intravenously as needed. Females were sterilized with a routine prepubic ventral midline laparotomy exposing the uterine horns and ovaries. We perform bilateral ovariectomies using a combination of clamping, electrocautery, and excision for removal of the ovary, and electrosurgical vessel sealing (Ligasure) to prevent hemorrhage. Intraoperative splash blocks and direct injection of lidocaine and bupivacaine are used to give up to 8 hours pain relief in addition to the flunixin. Following ovariectomy, a routine three layer closure of the abdomen is performed to complete the procedure using absorbable suture.

All deer were returned proximate to the capture location, in areas with the lowest likelihood of human disturbance during recovery. The reversal agent tolazoline HCL (200 mg IV and 100 mg IM) was administered, and each individual was monitored during recovery.

Sharpshooting

Pre-baiting was conducted from 10-29 January 2017. Sharpshooting efforts were implemented from 30 January - 6 February 2017. We followed the operations protocol outlined in the proposal; 1) we used suppressed .223 caliber rifles, 2) we shot from elevated positions to ensure a steep angle of trajectory, and 3) all deer were shot following AVMA guidelines for euthanizing animals with firearms. Twelve sites were available throughout the area of operation.

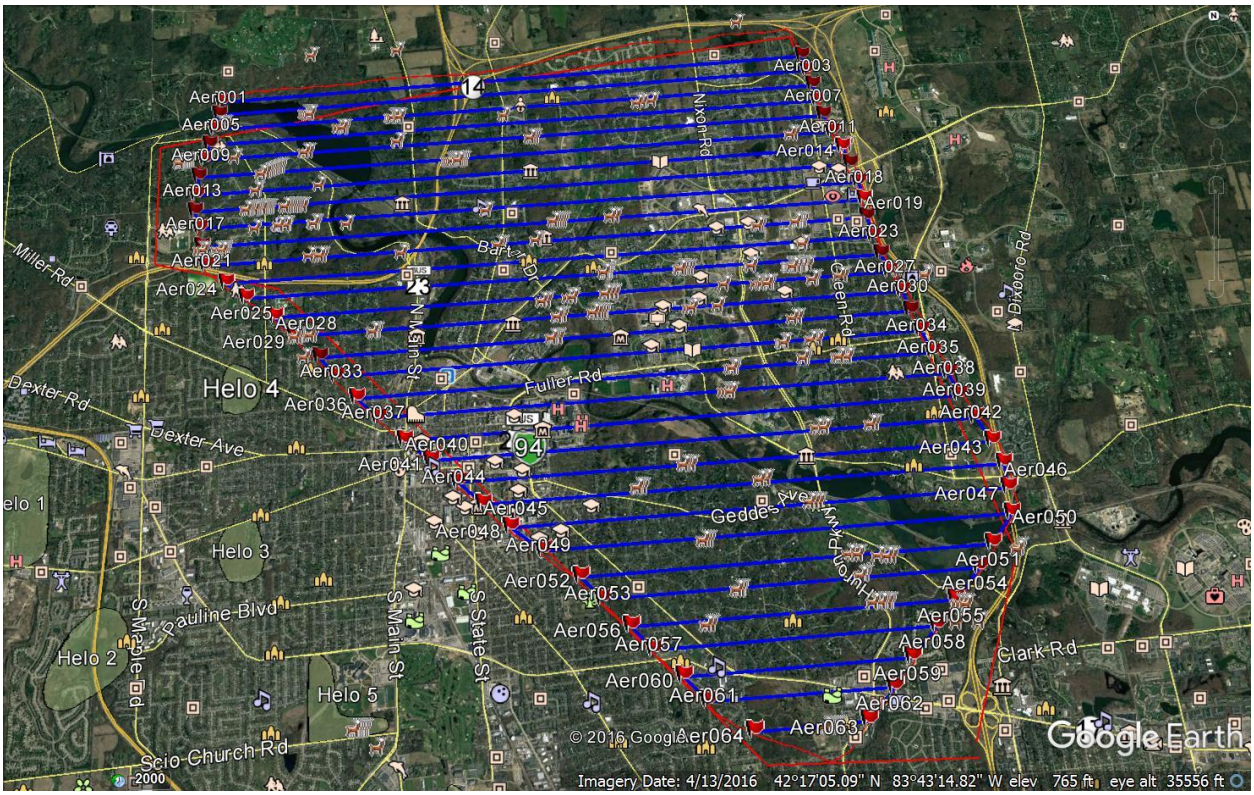
Helicopter Survey

Prior to initiating the survey, transects were delineated (East-West) and entered into a GPS moving map software (ExpertGPS)(Figure 2). Transects were spaced at 200 yd intervals, which resulted in a total of 63 flight lines. On 1 February 2017, a Robinson 44 helicopter was used to fly transects at an elevation of 200-300 feet above ground level and at an airspeed of

25-30 mph. Each observer counted all deer out to 100 yd from their respective side of the aircraft. There was a pilot and a navigator to ensure all transects were flown accurately. The navigator used a GPS system with a moving map to verify the accuracy of all transects. The number of deer detected were tallied as deer were detected along flight lines. In open forest areas, good conditions, the above methodologies produce an ~80% detection rate (Beringer et al 1997). Under less ideal conditions, often present in suburban landscapes, the detection rate can be significantly <50% (DeNicola, unpublished data).

The survey of the study area was flown in two legs separated by refueling. The first session was conducted starting at ~0930 h and there was still snow suspended in the vegetation (transects Aer001 – Aer025). During the second flight much of the snow had dissipated from the vegetation, increasing the detection rate (transects Aer025 – Aer063).

Figure 2. Helicopter transects flown on 1 February 2017 in Ann Arbor, Michigan.



Camera Survey

After capture and culling efforts were completed, a camera survey was conducted from 4 - 12 February 2017 to provide a population estimate in the SSA because the helicopter snow counts detected relatively few deer there. We used Moultrie White Flash cameras (Moultrie Feeders, Alabaster, AL, USA) set on motion activated single shot with a 5 minute delay to optimize capture rates. Camera coverage of 1/100 acres was used. The SSA was broken into six quadrants. One camera was allocated to each quadrant. Each camera was elevated 0.6 m and oriented north. Cameras were left operational for nine days before being collected to download the data. Each picture was closely studied, and all legible ear tag numbers were documented. We also recorded 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 was 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. We also used the same calculation method as Jacobson et al. (1997) to estimate population density and herd demographics. Finally, we used the camera data to determine the ratio of tagged to untagged females for the Lincoln-Peterson Estimator (LPE)(Curtis et al. 2009, Eberhardt 1969). In summary, we used four different methods to estimate the total deer population: Jacobson's buck:doe ratios (BDR) method, LPE, program NOREMARK, and population reconstruction.

RESULTS

Capture and Sterilization

We captured 57 deer with remote-injection tranquilizer darts (Appendix A). Of the deer captured 54 were females (46 adults and eight fawns) and three were male fawns. All males captured were misidentified as female fawns. All of the females captured were sterilized via ovariectomy. Females received white ear tags and males received yellow ear tags. We expended 391 person-hours for capture and surgical sterilization activities (5.2 person-hours per female deer captured), this does not include volunteer support hours.

Sharpshooting

Eight days of fieldwork were required to achieve the harvest of 96 deer. The entire data set generated from harvested deer is represented in the spreadsheet entitled "City of Ann Arbor - Deer Harvest: 30 January - 6 February 2017 (Appendix B). The overall harvest demographics are summarized in Table 1. Harvest by day is summarized in Table 2. Harvest breakdown based on location is summarized in Table 3. We expended 308 person-hours for the

sharpshooting activities (96 deer harvested) resulting in 3.2 person-hours per deer harvested.

Nine bait sites were utilized for sharpshooting as part of the 2017 Ann Arbor deer research program. Harvest results from specific sites ranged from a high of 27 deer to a low of one. The three University of Michigan sites were only available for four days, yet contributed to 40% of the total harvest. Cedar Bend Nature Area (CBNA) produced the highest removal numbers, accounting for 28% of the harvest. Three locations contributed 68 deer; 71% of the total harvested (i.e., Arboretum, CBNA, and Bird Hills).

Two sites were removed from the property list due to lack of deer activity (Kuebler Langford NA and Leslie Park Golf Course West) and two sites were contaminated affecting deer activity (placement of an odorous substance on our bait at Leslie Park GC). One site utilized resulted in no harvest (Bluffs Nature Area).

Diminishing returns and limited available sites rapidly reduced our efficiency after the fifth day (Table 2). Harvest results declined >50% on the second shooting session at each location, with two locations having no harvest.

Table 1. Sex of deer harvested in Ann Arbor, Michigan from 30 January - 6 February 2017.

AGE	# MALE (%)	# FEMALE (%)	# COMBINED
Yearling/Adult	21 (22%)	36 (37%)	57 (59%)
Fawns	22 (23%)	17 (18%)	39 (41%)
Total	43 (45%)	53 (55%)	96 (100%)

Table 2. Number of deer harvested by day during the 8 days of field operations.

Date	# Harvested	Date	# Harvested	Date	# Harvested	Date	# Harvested
1/30/17	13	2/1/17	21	2/3/17	17	2/5/17	4
1/31/17	18	2/2/17	16	2/4/17	2	2/6/17	5

Table 3. Deer harvest by location.

Location	# Harvested
Bird Hills	23
Cedar Bend	27
Huron NA/GC	6
Leslie GC	2
U.M. Aboretum	18
U.M. Other	20

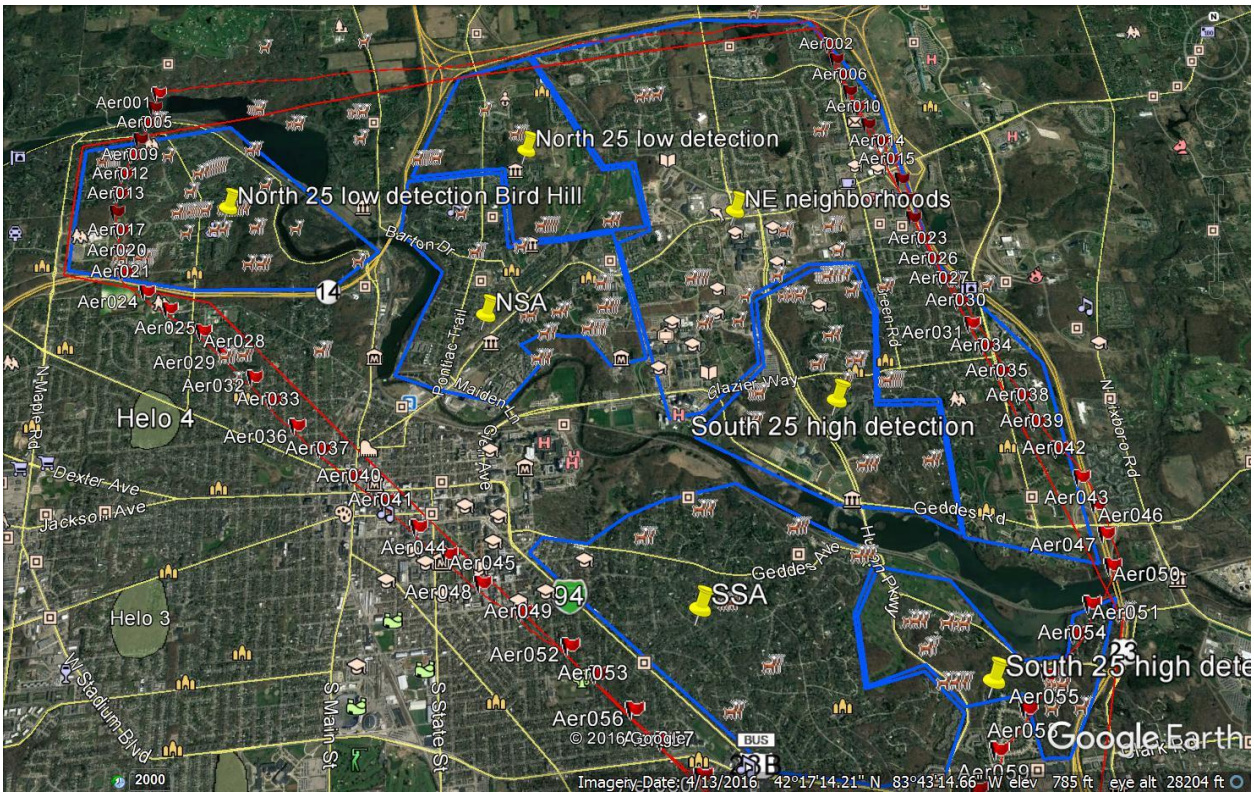
Helicopter Survey

The snow count detected 315 individual deer throughout the City (all five Wards). This is ~50% more than the highest count from previous years when a less intensive helicopter survey method was employed. We do not have any way to determine the detection rate, and associated population estimate, of the previous approach. The detection rate in the northern half of Wards 1 and 2 (north of Hubbard Road) was lower than the second flight after refueling, as the snow dissipated from the understory shrubs. We estimate the detection rate for the southern half to be ~60%, excluding the SSA, and it possibly decreased to 50-55% in the northern half. The southern half detection rate was roughly calibrated based on the number of deer counted versus captured and culled in Cedar Bend Nature Area. There were 21 deer counted and 27 deer killed, plus there were two tagged deer and their possible associates that were still remaining (#54 had two fawns with her, and #50 was with several antlerless deer when she was darted, and neither ever came to Cedar Bend sharpshooting bait site). This resulted in a best case estimate of a ~60% detection rate (19/31 = 61%); and this assumes we culled every deer in the area. We separated the sterilization study areas from other areas in the City surveyed given the very poor detection rates in the more dense neighborhoods (Figure 3). For example, there were 25 deer counted in the SSA and six in the NSA (north of Plymouth Road). We know of a minimum of 90 in the SSA and 15 in the NSA through counts of tagged adult female social groups. This results in a ~28% detection rate in the SSA and 40% in the NSA. We divided the remaining portions of Wards 1 and 2, where we had no other population estimation data, into separate zones based on habitat type (open woodlands vs more dense suburban development) and where they were found relative to the two flight legs with different detection rates (e.g., more wooded areas north of flight line 25: 50% detection, and south: 60% detection). We extrapolated the counts in the NE neighborhood area based on the detection rates of the NSA and SSA resulting a total of ~450 deer in Wards 1 and 2 (Table 4).

Table 4. Deer abundance determined during the helicopter survey, within delineated zones in Wards 1 and 2 with an incorporated Correction Factor (CF). See Figure 3.

North of transect Aer25 (east of river)	19 X 50% CF = 38 - 1 shot LPGC = 37
North of transect Aer25 (west of river)	67 X 50% CF= 134 - 23 shot BHP = 111
South of transect Aer25 (south of river) - HHNA	14 X 60% CF= 23 - 5 shot in HNA = 18
South of transect Aer25 (north of river)	44 X 60% CF= 73 - 6 shot UMGlazier = 67
NE neighborhoods	36 X 35% CF = 103 - 0 shot = 103
Bluff NA	~4 (minimum)
Cedar Bend NA	~5 (minimum)
Northern Study Area	~15 (minimum)
Southern Study Area	~90 (minimum)

Figure 3. Helicopter survey area covering Wards 1 and 2 in Ann Arbor, Michigan with delineated areas based on detection rates.



Camera Survey

We obtained a total of 1,340 pictures from the six baited camera sites, which included observations of 2,144 deer. There were 897 photos of tagged females as compared to 117 photos of males (Table 5). We observed 76% (29 of 38) of the tagged adult females in photos that were alive and present in the study area. We also observed six of eight tagged female fawns (75%).

Using the Jacobson's BDR method, we estimated 109 deer in the SSA; 5.5% adult males (n = 6) and 94.5% antlerless deer (46 tagged adult females, 4 untagged adult females, and 53 fawns = 103) (Table 6). When analyzing the pictures using the LPE (38 tagged adult females, 3 untagged adult females, and 44 fawns = 85 antlerless deer), and adding the number of individual antlered males identified in the Jacobson method (n = 6), the total estimate was 91 deer. There were an average of 19.5 photos per male as compared to 18.4 for adult females reflecting a negligible camera bias.

Table 5. Camera Survey data collected from 4-12 February 2017 in Ann Arbor, Michigan used for LPE, Jacobson, and NOREMARK estimators.

Site #	# Photos	Total Deer	Tag Adult Female	Untag Adult Female	Adult Male	Fawns
1	185	311	99	10	13	182
2	152	275	84	9	0	178
3	291	446	190	0	31	224
4	224	392	165	24	47	154
5	190	276	86	14	26	148
6	272	444	273	21	0	150
Total	1314	2144	897	78	117	1036

We ran program NOREMARK including all the tagged adult females observed in the area, whether or not the deer were observed on camera (n = 38). The adult female population (tagged and untagged) was estimated to be 41 (95% CI: 38-45), and the total deer abundance was 101 in the SSA. There projected to be 95 antlerless deer (95% CI: 81-113), composed of 41 adult females and 54 fawns, in addition to 6 adult males (identified in field/camera observations).

Using the population reconstruction method we projected a minimum of 90 deer in the southern study area; 38 tagged female deer alive at the time of the survey, 3 untagged adult females, 44 fawns (17 female fawns - eight tagged, 19 male fawns – 3 tagged, and eight of unknown sex), and 5 individually identified adult males. We estimate there to be 15 deer in the north zone; 6 adult females, 7 female fawns, and two male fawns. No adult males were detected in the NSA.

Using LPE, NOREMARK, and the population reconstruction methods to estimate the herd density, we found an average estimated density of ~94 deer per square mile (~1 square mile) (Table 6). We also determined that ~90% of the adult females (38 tagged adult females – two mortalities since capture efforts concluded - and approximately four untagged adult females) were sterilized upon completion of the camera survey.

Table 6. Deer population estimates using LPE, Jacobson, and NOREMARK estimators for the SSA in Ann Arbor, Michigan.

Estimation method	Estimated parameters
February 2017 survey	1314 photos
Buck:tagged doe ratio	1:7.67
Buck:untagged doe ratio	1:0.67
Tagged adult doe:fawn ratio	1:1.15
Number of antlered males	6
Ratio of tagged and untagged females in photos	897:78
Population estimates	
Buck:doe ratio method (Jacobson et al. 1997)	109
Bowden's ratio estimator (NOREMARK)(95% CI)	95 (81-113); 101 total*
Lincoln-Petersen Estimator	91
Population reconstruction (minimum number)	90

* Adult females and fawns, plus need to add 6 adult males, totaling 101

DISCUSSION

Year One Objectives

Our primary objective was to assess the complementary effect of lethal management in larger wooded areas proximate to sterilization efforts in dense suburban neighborhoods. We met the stated objectives for the first year of the five year project (i.e., cull ~100 deer and sterilize >90% of adult females in the study areas). There should be immediate impacts in some areas, with the start of longer-term population declines in others. We have collected sufficient data to allow the City Council to move forward with well-informed management decisions throughout the City, including a helicopter snow count, camera survey data, effort/cost projections, and demonstration of feasibility for the respective research actions.

Surgical Sterilization

We are aware of three adult females that we were not able to capture in the SSA. Based on field observations, we believe that the 40 adult does sterilized represents 90-95% of the adult females in this zone. We are unaware of any adult females that we did not capture in the NSA (100% capture of adult females). We estimate there to be 90 deer in the SSA and 15 in the NSA using population reconstruction through field observations over the 8 nights of intensive

observations. The limited number of unsterilized females in both study areas should greatly reduce the recruitment rate and contribute to potential population decline.

We experienced no direct mortalities this year during the capture process. One tagged individual (#32) was euthanized nine days after surgery due to poor condition. The necropsy examination showed no surgically related abnormalities and the health decline was likely the result of pre-existing conditions and not directly related to capture or surgical procedures (e.g., 2.5 years old and 96 lb). In addition, there were no complaints filed by members of the public during operations. This clearly demonstrates that these types of research actions are compatible with humaneness standards and human activities in a developed environment. Also, we trained a local veterinarian, veterinary technicians, and many local support volunteers.

Sharpshooting

Reduction in efficiency, lack of substantial deer activity at shooting locations, and the importance of opening the public parks early resulted in ending the program 7 days ahead of schedule (scheduled until 13 February). Localized impacts from removal efforts should be significant at some locations (e.g., CBNA, Bird Hills, The Arboretum).

Now that the 450' discharge restriction has been eliminated this will allow for sharpshooting methods to be viable in all areas of the City other than the existing surgical sterilization study areas. If this change is coupled with the use of private lands the potential for lethal management in more areas throughout the City greatly increases. For example, during the helicopter snow count numerous deer were sighted in the area encompassed by Geddes road to the south, Huron Parkway to the West, Plymouth Road to the North, and US 23 to the East. We were unable to sharpshoot deer in this area because of the 450' restriction. There is ample open space for safe sharpshooting operations if the Council decides to use this method in this area and private landowners cooperate.

Combined Method

We were able to successfully sharpshoot on the southern edge of the NSA in the CBNA. Sharpshooting was very advantageous at this interface, given there were several untagged antlerless deer with #50 and #54 when we captured them near CBNA. The CBNA would have been a difficult area to capture all the remaining female deer, and a high percentage capture rate was highly unlikely. However, we believe that we have lethally removed nearly all of the untagged female deer during the sharpshooting phase (27 total; 14 females, 9 adult males, 4 male fawns); greatly supporting the impact of the sterilization efforts in the NSA. We are not aware of any unsterilized adult females (100% of adult females sterilized) in the NSA. There were few deer detected during the snow count to the east in Leslie Park Golf Course, or the north, so these areas should not serve as a significant immigration risk.

In the SSA, we were able to sharpshoot on the western and eastern edges of the study area, University of Michigan Arboretum and Huron Hills Golf Course/Nature Area, respectively. We culled 18 deer in the Arboretum and 6 deer in the Huron Hills area. These efforts will support the impact of the sterilization efforts in this area. We suggest investigating sharpshooting in the County Park across Washtenaw Avenue next year to minimize potential immigration impacts from the south. There should be few deer remaining in the Arboretum and adjoining neighborhoods, but a more cohesive effort should be made in the Huron Nature Area next year. Without the 450' restriction we will be able shift the shooting locations into areas where we can control where the deer approach from making removal efforts significantly more effective. Of importance to note, no tagged deer were observed during sharpshooting operations in the Arboretum reflecting how small female deer home ranges are in suburban landscapes.

Populations Estimates - Helicopter Count and Camera Survey

Approximately 50% more deer were observed this year than last year (315 vs ~200). This does not necessarily reflect a 50% increase in deer abundance, but an increase in detection using adjusted methods. This method does not detect all deer present and therefore a correction factor (CF) needs to be determined to adjust the number of deer observed. We used CFs that were as balanced as possible given all the variables under consideration.

The combined camera survey estimates projected the population in the SSA to be 100 deer on average (109 - Jacobson, 101 - NOREMARK, and 91 - LPE). The Jacobson method slightly overestimated the number of tagged adult females based on the known number present (46 projected and 38 present). This error is likely due to the small number of individual antlered males in the study area at the time of the survey. Therefore, we placed more confidence/emphasis on the LPE, NOREMARK, and population reconstruction to estimate the number of deer present; average of 94.

Fawn Recruitment

The doe:fawn ratio in the research areas was 1.1 (48 adult females – includes 3 untagged in the SSA - and 53 fawns; we excluded #50 because we could not determine her social affiliations) in the research areas reflecting a good recruitment rate. This is consistent with the doe:fawn from the harvest data (36 adult females and 39 fawns = 1.1). We would expect to capture 15-20 females next year between the NSA and SSA based on the number of untagged females (n = 3) that will reproduce, and the approximate number of untreated female fawns (~16-20), while incorporating the anticipated mortality over the next year.

Given the estimated number of untreated adult female (~40% of 341 [450 total deer - 109 from sterilization areas] = 136 fertile adult females; see Table 4, and DeNicola et al. 2008)

and the recruitment rate (1.1 doe:fawn), we expect an additional ~150 fawns to be recruited/added to the population next fall in Wards 1 and 2.

Future Management Considerations

To best determine how many deer to allocate to lethal versus nonlethal methods in the future we will need to know the relative satisfaction of residents in the various Wards and how far we need to reduce the respective populations. These data need to be coupled with the desired deer densities for forest health in the Nature Areas. To help with the economic portion of the equation, ~$450/deer culled and $1,200/deer sterilized can be used for approximate calculations to determine the type and distribution of effort. Knowing that we will need to sterilize ~15-20 females in the existing sterilization study areas next year, Council can decide how many addition females to sterilize in other areas of the City relative to culling efforts when considering a total budget allocation. Finally, there are the many political considerations that will need to be integrated into the final decision-making process.

ACKNOWLEDGEMENTS

First and foremost, this project would not have been feasible without the support of the Ann Arbor City Council. In addition, we are grateful to the following individuals and organizations that provided critical support prior to and during the research project:

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- University of Michigan
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APPENDIX A. Deer capture data 22 - 29 January 2017 in Ann Arbor, MI.

Ear Tag #	Capture Date	Ear Tag Color	VHF Frequency	Sex	Age	Capture Location	Affiliation/ Notes
1	1/22/17	White	151.892	Female	5.5	Geddes Ave	#11, mf, ff
2	1/22/17	White	151.934	Female	3.5	Berkshire NA (Exmoor)	#3, ff
3	1/22/17	White		Female	0.5	Berkshire NA (Warwick)	#2, ff
4	1/22/17	White		Female	5.5	Arlington/Geddes	#5, #40, #12Y, mf
5	1/22/17	White	151.902	Female	3.5	Arlington/Geddes	#4, #40, #12Y, mf
6	1/22/17	White	151.963	Female	3.5	Arlington/Heather Way	ff, unknown fawn
7	1/23/17	White	151.982	Female	3.5	Hickory Lane	#10, #45, mf
8	1/24/17	Yellow		Male	0.5	Riverview	
8	1/23/17	White	151.974	Female	2.5	Devonshire/Aberdeen	2 mf
9	1/25/17	Yellow		Male	0.5	Riverview	#34
9	1/23/17	White		Female	5.5	Arlington/Kenilworth	#12, 15, mf
10	1/23/17	White		Female	0.5	Devonshire	#7, #45, mf
11	1/23/17	White		Female	1.5	Geddes Ave	#1, mf, ff
12	1/22/17	Yellow		Male	0.5	Geddes Ridge	#4, #5, 40, mf
12	1/23/17	White	151.864	Female	3.5	Arlington/ Kenilworth	#9, #15, mf
13	1/23/17	White		Female	0.5	Devonshire Park	#17, mf
14	1/24/17	White		Female	0.5	Bedford Rd	#19, 2 mf, ff
15	1/23/17	White		Female	1.5	Arlington/ Kenilworth	#9, #12, mf
16	1/24/17	White		Female	1.5	Lafayette	#18, mf
17	1/23/17	White	151.874	Female	4.5	Stratford Drive	#13, mf
18	1/24/17	White		Female	0.5	Lafayette/Concord	#16, mf
19	1/24/17	White	151.993	Female	3.5	Bedford Rd	#14, 2 mf, ff
20	1/24/17	White	151.882	Female	2.5	Rock Creek Drive	#23, 35, ff
21	1/24/17	White		Female	6.5+	Huntington	#22
22	1/24/17	White		Female	1.5	Rock Creek Ct	#21
23	1/25/17	White	151.924	Female	3.5	Riverview	#20, 35, ff
24	1/24/17	White	151.954	Female	6.5	Traver Rd	2 ff
25	1/24/17	White		Female	2.5	Traver Rd	ff
26	1/24/17	White	151.656	Female	4.5	Glendaloch	mf

27	1/25/17	White		Female	5.5	Burson Pl	#28, mf
28	1/25/17	White		Female	3.5	Hill/ Berkshire	#27, mf
29	1/25/17	White	151.584	Female	4.5	Burson Pl	2 unknown fawns
30	1/25/17	White		Female	4.5	Avalon Pl/Vinewood	#32, #33, mf
31	1/25/17	White		Female	1.5	Vinewood/Geddes	2 ffs
32	1/24/17	White		Female	3.5	Awixa/ Orchard Hills	#30, #33, mf
33	1/25/17	White		Female	1.5	Foxcroft Rd	#30, #32, mf
34	1/25/17	White	151.502	Female	3.5	Au Sable Pl	#9Y
35	1/25/17	White		Female	0.5	Riverview Dr	#20, 23, ff
36	1/25/17	White	151.524	Female	2.5	Traver Rd	mf
37	1/26/17	White		Female	2.5	Riverview Dr	#41, 2 ff, mf
38	1/25/17	White		Female	2.5	Berkshire NA (Warwick)	mf
39	1/26/17	White	151.493	Female	3.5	Traver Rd	3 ff
40	1/26/17	White		Female	0.5	Arlington	#5, #4, #12Y, mf
41	1/26/17	White		Female	1.5	Geddes Ave	#37, 2 ff, mf
42	1/27/17	White		Female	1.5	Devonshire/Belmont	Solo
43	1/25/17	White	151.513	Female	6.5	Belmont	#44, 53, AF, ff
44	1/26/17	White		Female	1.5	Belmont	#43, 53, AF, ff
45	1/27/17	White		Female	0.5	Devonshire/Belmont	#7, 10, mf
46	1/27/17	White		Female	3.5	Overridge	#48, 49, 51, 5 fawns
47	1/26/17	White		Female	2.5	Evergreen Pl	Solo
48	1/27/17	White		Female	2.5	Exmoor Rd	#46, 49, 51, 5 fawns
49	1/27/17	White		Female	3.5	Newcastle Rd	#46, 48, 51, 5 fawns
50	1/27/17	White		Female	1.5	Broadway St	W/multiple
51	1/27/17	White	151.534	Female	2.5	Exmore	#46, 48, 49, 5 fawns
52	1/27/17	White		Female	3.5	Avon Rd/ Stratford	mf
53	1/28/17	White	151.554	Female	1.5	Shannondale	#43, 44, AF, ff
54	1/27/17	White		Female	3.5	Cedar Bend Dr	mf, ff

APPENDIX B. City of Ann Arbor – Deer Harvest: 30 January – 6 February 2017

Date	Permit Tag#	CWD Tag #	Location Name	Sex
30-Jan-17	163888	519298	Leslie Golf Course	Female
30-Jan-17	163889	519299	UM - G	Female
30-Jan-17	163893	519306	UM - G	Female
30-Jan-17	163891	519308	UM - G	Female
30-Jan-17	163890	519309	UM - G	Female
30-Jan-17	163892	519307	UM - G	Male
30-Jan-17	163898	519301	UM - W. of H	Female
30-Jan-17	163896	519303	UM - W. of H	Female
30-Jan-17	163894	519305	UM - W. of H	Male
30-Jan-17	163800	519300	UM - W. of H	Female
30-Jan-17	163899	519350	UM - W. of H	Female
30-Jan-17	163897	519302	UM - W. of H	Male
30-Jan-17	163895	519304	UM - W. of H	Female
31-Jan-17	163811	519339	UM - Arboretum	Male
31-Jan-17	163803	519347	UM - Arboretum	Male
31-Jan-17	163818	519292	UM - Arboretum	Male
31-Jan-17	163816	519294	UM - Arboretum	Male
31-Jan-17	163806	519344	UM - Arboretum	Female
31-Jan-17	163809	519341	UM - Arboretum	Female
31-Jan-17	163819	519293	UM - Arboretum	Male
31-Jan-17	163813	519297	UM - Arboretum	Male

31-Jan-17	163804	519346	UM - Arboretum	Female
31-Jan-17	163802	519348	UM - Arboretum	Female
31-Jan-17	163807	519343	UM - Arboretum	Female
31-Jan-17	163805	519345	UM - Arboretum	Male
31-Jan-17	163808	519342	UM - Arboretum	Female
31-Jan-17	163801	519349	UM - Arboretum	Male
31-Jan-17	163814	519295	UM - Arboretum	Male
31-Jan-17	163812	519296	UM - Arboretum	Male
31-Jan-17	163817	519290	UM - Arboretum	Male
31-Jan-17	163821	519291	UM - Arboretum	Male
1-Feb-17	163815	519312	UM - W. of H	Male
1-Feb-17	163820	519310	UM - W. of H	Male
1-Feb-17	163887	519334	Huron Pkwy. Nature	Male
1-Feb-17	163876	519338	Huron Pkwy. Nature	Female
1-Feb-17	163877	519337	Huron Pkwy. Nature	Male
1-Feb-17	163878	519336	Huron Pkwy. Nature	Female
1-Feb-17	163879	519335	Huron Pkwy. Nature	Male
1-Feb-17	163875	519326	Cedar Bend Nature	Female
1-Feb-17	163864	519315	Cedar Bend Nature	Female
1-Feb-17	163865	519316	Cedar Bend Nature	Male
1-Feb-17	163866	519317	Cedar Bend Nature	Female
1-Feb-17	163868	519319	Cedar Bend Nature	Male
1-Feb-17	163869	519320	Cedar Bend Nature	Male
1-Feb-17	163822	519282	Cedar Bend Nature	Male

1-Feb-17	163853	519281	Cedar Bend Nature	Male
1-Feb-17	163870	519321	Cedar Bend Nature	Male
1-Feb-17	163871	519322	Cedar Bend Nature	Female
1-Feb-17	163872	519323	Cedar Bend Nature	Male
1-Feb-17	163867	519318	Cedar Bend Nature	Male
1-Feb-17	163873	519324	Cedar Bend Nature	Male
1-Feb-17	163874	519325	Cedar Bend Nature	Male
2-Feb-17	163860	519284	UM - G	Male
2-Feb-17	163861	519311	UM - G	Male
2-Feb-17	163863	519314	UM - G	Male
2-Feb-17	163862	519313	UM - G	Male
2-Feb-17	163856	519289	UM - G	Female
2-Feb-17	163855	519288	UM - G	Male
2-Feb-17	163825	519278	Bird Hills Nature	Female
2-Feb-17	163882	519329	Bird Hills Nature	Female
2-Feb-17	163827	519276	Bird Hills Nature	Female
2-Feb-17	163880	519328	Bird Hills Nature	Female
2-Feb-17	163885	519332	Bird Hills Nature	Male
2-Feb-17	163886	519333	Bird Hills Nature	Male
2-Feb-17	163823	519280	Bird Hills Nature	Female
2-Feb-17	163824	519279	Bird Hills Nature	Female
2-Feb-17	163881	519327	Bird Hills Nature	Female
2-Feb-17	163826	519277	Bird Hills Nature	Female
3-Feb-17	163831	519272	Cedar Bend Nature	Female

3-Feb-17	163828	519275	Cedar Bend Nature	Female
3-Feb-17	163832	519271	Cedar Bend Nature	Male
3-Feb-17	163833	519270	Cedar Bend Nature	Female
3-Feb-17	163830	519273	Cedar Bend Nature	Female
3-Feb-17	163854	519287	Cedar Bend Nature	Female
3-Feb-17	163835	519268	Cedar Bend Nature	Female
3-Feb-17	163829	519274	Cedar Bend Nature	Male
3-Feb-17	163841	519260	Bird Hills Nature	Male
3-Feb-17	163846	519251	Bird Hills Nature	Female
3-Feb-17	163845	519252	Bird Hills Nature	Female
3-Feb-17	163843	519259	Bird Hills Nature	Female
3-Feb-17	163851	519266	Bird Hills Nature	Female
3-Feb-17	163884	519331	Bird Hills Nature	Female
3-Feb-17	163883	519330	Bird Hills Nature	Female
3-Feb-17	163844	519258	Bird Hills Nature	Female
3-Feb-17	163852	519267	Bird Hills Nature	Male
4-Feb-17	163847	519254	Leslie Golf Course	Female
4-Feb-17	163834	519269	Huron Hills Golf	Female
5-Feb-17	163848	519261	Bird Hills Nature	Female
5-Feb-17	163849	519262	Bird Hills Nature	Male
5-Feb-17	163850	519265	Bird Hills Nature	Male
5-Feb-17	163810	519340	Bird Hills Nature	Female
6-Feb-17	163838	519257	Cedar Bend Nature	Female
6-Feb-17	163837	519264	Cedar Bend Nature	Female

6-Feb-17	163836	519263	Cedar Bend Nature	Male
6-Feb-17	163842	519256	Cedar Bend Nature	Female
6-Feb-17	163839	519253	Cedar Bend Nature	Female