

TOWNSHIP OF UPPER ST. CLAIR
2003 EXECUTIVE REPORT ON DEER MANAGEMENT INITIATIVES

April 26, 2004

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I. Background & Scope of Deer Problem

a. Nature and Extent of Problem

It is well established that communities across Pennsylvania are struggling to achieve a balance between emotion and practicality in addressing the issue of deer management. Each breeding season, the problems caused by a growing deer population escalate. Like many other suburban communities, the Township of Upper St. Clair is also experiencing a burgeoning whitetail deer population. In spite of the various deer management initiatives instituted by the Township's Commissioners some years previously, the number of deer-vehicle collisions within the Township continues to be relatively high. Specific problem areas include the section of Route 19 from Orr Road to Chapelwood, and from Boyce Road to the Township line. Proliferating deer populations and increasing traffic volume, in general, indicate that the problem will only worsen in the near future.

The potential for serious injury or death resulting from deer-vehicle collisions, in addition to the damage caused by such collisions, warrants a re-evaluation of current measures as well as a closer look at options previously dismissed as being politically sensitive. As anthropologist Richard Nelson, author of 'Living with Deer,' writes, "We have to come to grips with the biological reality that we have created an environment that nurtures a very high population of deer, and it's our responsibility to do something about that." Accordingly, this report examines the efficacy of the Deer Management Program in Upper St. Clair. It also attempts to determine the next step in the Program in order to contend with the issue of public safety raised by the high incidence of vehicular collisions.

b. Status of Actions Taken

In 1998, the Upper St. Clair Board of Commissioners adopted a motion identifying several deer management initiatives they believed were appropriate for the social and environmental conditions of Upper St. Clair (See Appendix I for original motion). A majority of these initiatives have since been implemented and are briefly listed below:

- Wildlife biologist
- Development of communication program and library materials
- Investigation/installation of deer warning and crossing signs
- Test installation of Strieter-Lites
- Consideration of a deer population survey
- Controlled Archery Hunts
- Evaluation of a PZP deer birth control program

Wildlife Biologist

Since 1998, the Township has worked briefly with two biologists. Susan Bernatas, a wildlife biologist initially affiliated with AirScan Inc. in Titusville Florida, and Dr. Paul Curtis, a wildlife biologist at Cornell University who specializes in human-animal interface. Dr. Curtis gave a presentation in the Township dealing with the issue of deer management. In particular, he spoke about non-lethal deer control mechanisms such as deer contraception, repellents, and fencing. Dr. Curtis was of the opinion that fencing was appropriate in areas where deer damage was moderate to heavy, while repellents could be used in areas where the damage was light to moderate. However, he pointed out that at \$6.50 per

linear foot, fencing was not a very cost-effective option because deer have been known to jump over fences as high as 8 feet.

Development of Communication Program and Library Materials

The Township website www.twpusc.org contains a host of information pertaining to the deer management program. There are also several links to sites providing helpful information on deer-resistant yard plantings. In addition, the Township Library has compiled a list of resources on this topic for the benefit of the residents.

Investigation/Installation of Deer Warning and Crossing Signs

The Township in conjunction with PennDOT increased deer warning and crossing signs on State Route 19 in order to make motorists aware of deer crossing routes. Deer crossing signs have also been posted throughout the rest of the Township in those areas where deer have often been sighted.

Test Installation of Strieter-Lites

In May 1999, the Township installed Strieter-Lites for .9 miles along Route 19 from Chapelwood to the Washington County line. These reflector devices, designed to create an unnatural moving light when hit by a car's headlights, were intended to deter deer from crossing a roadway until the vehicle had passed. Unfortunately, the test installation of Strieter-Lites failed to have the desired result. An analysis of deer-vehicle accidents within that specific stretch of Route 19 revealed that in the sixteen months prior to installation, there were 16 reported incidents, between the hours of 7PM and 7AM. In the eight months following installation roughly the same number of incidents were reported in the nighttime hours. This trend continued throughout 2000, 2001, and 2002 (using the base data of one deer kill per month for the sixteen months prior to installation.) Accidents involving deer in the Strieter-Lite corridor during this period represented 159%, 125%, and 175%, respectively of the base line average. During the same interval, the rate of whitetail road kill within the Township did not increase appreciably. Eventually, the Strieter-Lites were removed in August 2003 when it was determined that they had not been effective in reducing deer-vehicle collisions.

The exact reason for the failure of these lights is not known. Perhaps it was due to the sloping topography of the adjoining highway. Deer in this area may also have become desensitized to lights, and therefore, were not affected by the unnatural light the reflectors produce. Whatever the reason, the cost of maintenance and replacement seemed to clearly outweigh the worthiness of the reflectors along this particular section of the road. Moreover, the staff believes that there was a sufficient trial period to determine the effectiveness of the lights.

Consideration of a Deer Population Survey

AirScan Inc. of Titusville Florida has conducted three infrared aerial surveys within the Township in order to establish a deer census for Upper St. Clair. The results of these surveys are given below.

UPPER ST. CLAIR DEER CENSUS		
YEAR	NO. OF GROUPS	NO. OF DEER
2000	71	250
2001	54	155
2002	-	190

The surveys were conducted using a Cessna 337 two-engine aircraft operated from Allegheny County Airport. The survey technique used has a deer detection rate of approximately 90 percent for those animals present on the night of the survey. The use of an infrared sensor and TV camera on a twin engine fixed wing airplane has distinct advantages over other methods including safe and quiet operation, and the creation of permanent records of the count and the habitat on video for future reference.

The Township did not have an aerial survey done for the year 2003 because there appeared to be no appreciable correlation between the size of the deer herd (pre-birth) identified by the survey and the number of deer-vehicle collisions in a given year. In other words, a decline in the total number of deer in the year 2001 for example, did not correspond to a decline in deer-vehicle collisions.

Controlled Archery Hunts

The basic purpose and philosophy of Whitetail Management Associates South (WMAS) is wildlife management in urban areas that are experiencing problems due to whitetail deer overpopulation. The WMAS has been conducting controlled archery hunts on the Boyce-Mayview property since 1998. The Township, in conjunction with WMAS, developed a number of strict regulations to ensure the safety of the residents of Upper St. Clair. For example, any potential member previously convicted of any state game law violation or any felony criminal conviction is considered ineligible for membership. All applicants have a background test conducted by the Upper St. Clair Police Department. Archers may join the program only after successfully completing a proficiency test. To increase safety, hunting is permitted from elevated stands only. In 2003, the WMAS archery season resulted in a total harvest of 34 deer. Of these, 28 were antlerless and 6 were antlered. For an overall synopsis of the progress made by WMAS since 1998, please refer to section II b.

The Township continues to see a high number of deer-vehicle collisions despite the controlled archery program at Boyce-Mayview. The limited impact of the archery program may be attributed to the fact that approximately three-quarters of the Township cannot easily avail of the archery culling approach adopted at Boyce-Mayview.

Evaluation of a PZP Deer Birth Control Program

In March 2000, the Upper St. Clair Board of Commissioners and Township Management met Dr. Jay F. Kirkpatrick, an authority on deer contraception to try and determine whether Upper St. Clair would be a suitable test site for a PZP program. In order to be able to conduct an experiment using PZP, approval from the Humane Society of the United States (HSUS), FDA, and the Pennsylvania Game Commission is mandatory. The Pennsylvania Game Commission gave the Township a “qualified approval” for an experimental program subject to HSUS and FDA approval. However, the HSUS backed away from this

approach and determined this option to be impractical for Upper St. Clair due to the free-ranging nature of the herd.

It should be noted that there were significant concerns associated with PZP darting. First, over 75 percent of the females needed to be treated in order to bring about a herd stabilization. In order to achieve that rate, significant activity on private property would have been required. Second, a strict boosting schedule needed to be maintained that could cost anywhere from \$250 - \$500 per deer each year for labor, equipment and bait. Third, there were concerns regarding the possibility of ingestion of bait by non-target wildlife. Fourth, US-FDA considers all contraceptive vaccines to be experimental drugs. As such each treated deer needs to have ear tags forbidding consumption of the animal. This only serves to raise the cost of the undertaking. Taking into account these limitations, the use of PZP in the Township would not appear to be a feasible deer control option regardless of HSUS support.

c. *Alternative Approaches*

Some deer-control options not previously employed by the Township are briefly listed below. This section attempts to analyze these alternatives, as well as the impact of a status quo option.

Fencing & Repellents

The application of fencing and/or repellents can only be justified economically when the financial gain yielded by protection is equal to or greater than the cost of implementation. Typically, the cost associated with such an alternative runs fairly high. Secondly, site-specific damage control efforts such as fencing often redirect pressure elsewhere and do not address the underlying cause of the problem i.e. too many deer. Personal and aesthetic considerations also restrict the use of fencing techniques to more cost-effective applications. Thus, the use of fencing along Route 19 (identified as a “hot spot” for deer, especially in 2003) would appear to be unfeasible.

Controlled Culling

In general, controlled culling has been shown to be the most efficient and relatively least expensive technique for removing deer. In particular, it has proven to be an effective deer management tool in the Borough of Fox Chapel, PA. Controlled culling increases the likelihood that deer populations will be maintained at desirable levels compatible with local biological and social needs. This may be achieved by manipulating the size and sex composition of the harvest, season type, season timing, season length, number of permits and land access policies. The implication of such a program for the Township of Upper St. Clair would be an increase in human safety resulting from a decline in deer-vehicle collisions. In addition, the Township would derive certain ecological benefits from a reduction in the deer herd. These benefits include mitigating the environmental impact of over browsing, and maintaining healthy, viable deer populations within the Township for the benefit of current and future generations.

Status Quo

In the year 2003, the number of deer accidents rose to 157 from 136 the previous year. Meanwhile, the number of deer harvested in 2003 decreased from 44 in 2002 to 34 in 2003. These numbers indicate that status quo is not the best option for the Township. If the Township were to do nothing further by way of deer management, it would be safe to assume that the deer herd would most likely increase to levels

unsustainable by the local habitat in the long run. Moreover, the safety of the residents would be jeopardized by the steady increase in auto collisions along Route 19.

d. Recommendation

The steadily increasing number of deer-vehicle collisions along Route 19 coupled with a modest area specific success of the archery program in Boyce-Mayview indicate a need for stronger deer control mechanisms than have been previously employed. The cost of alternatives such as PZP (if permitted), and fencing appear to be prohibitively high. As such, the Commissioners should contemplate supplementing current deer control efforts with a controlled culling (sharpshooting) program along the lines of the one instituted by the Borough of Fox Chapel. If instituted, all culling should take place between the hours of 12 am and 6 am. The deer culled would be distributed to food kitchens. In the interest of resident safety, the Township should ensure that prospective deer control agents meet all requirements and background checks imposed by the Police Department. Alternatively, the sharpshooting could be restricted to one or several Upper St. Clair police officers as is done in Fox Chapel. Please refer to Appendix A for a summary of the results of the deer management program in Fox Chapel.

II. Deer Management Analysis

a. Deer-vehicle Collision Report 1999-2003

Figure 1 below shows an upward trend in deer-vehicle collisions within the Township between 1994 and the year 2003. A look at the chart reveals a 67% increase in the number of deer related accidents from 94 in 1994, to 157 in the year 2003.

Figure 1: Township of Upper St. Clair Deer-Vehicle Collisions 1994-2003

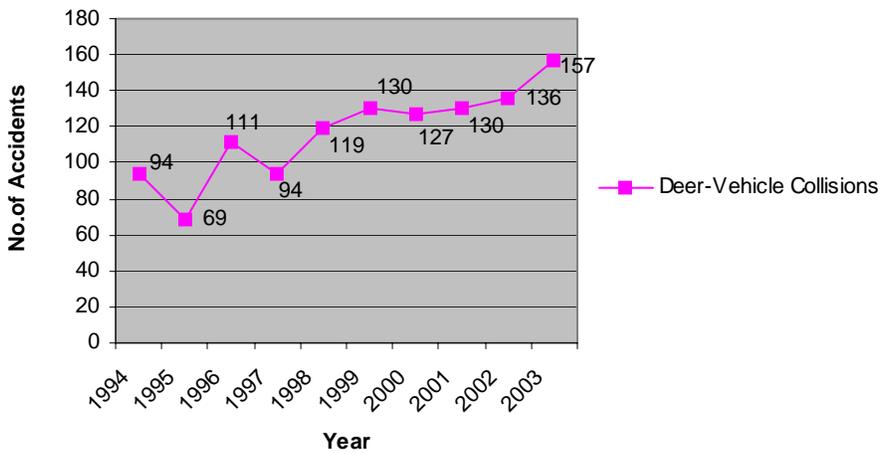


Figure 2: Township of Upper St. Clair Deer-Vehicle Collisions 1999-2003

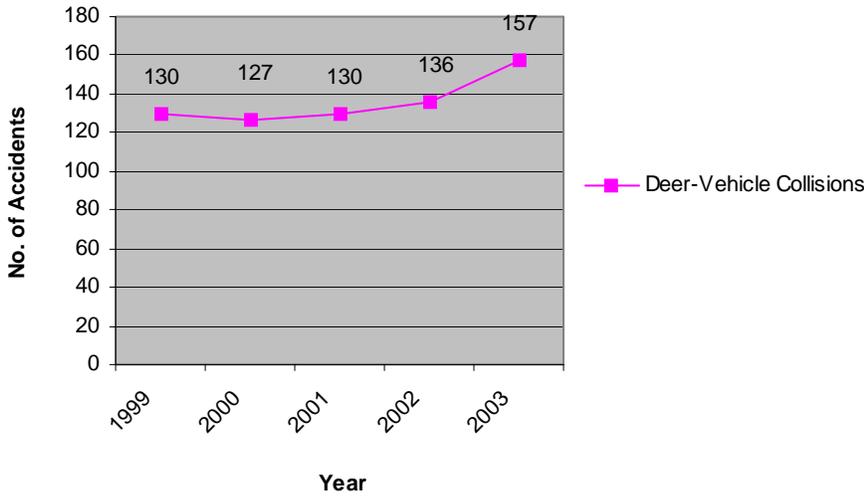


Figure 2 shows the deer-vehicle collision trend over the last five years. We can see from Figure 2 that 15.4% of the 20% increase in deer collisions since 1999 took place in 2003 alone indicating a drastic increase in deer related accidents over the last year. While none of the accidents resulted in fatalities, the potential for future fatalities exists.

Figure 3: Township of Upper St. Clair Deer/Vehicle Collisions Annual Monthly Comparison 1999-2003

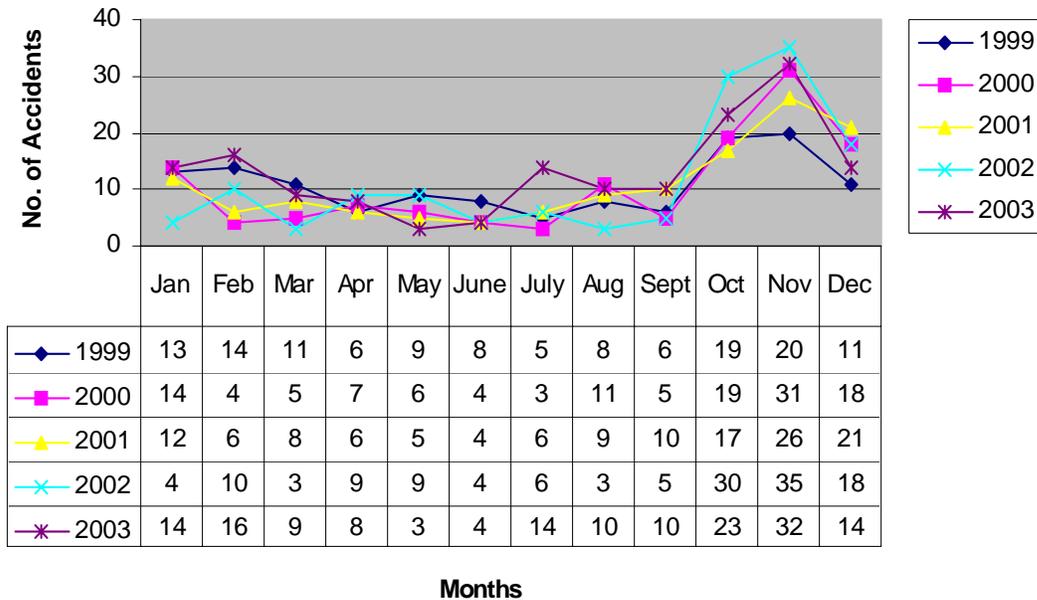


Figure 4: Township of Upper St. Clair Deer-Vehicle Collisions Annual vs. October-December Totals

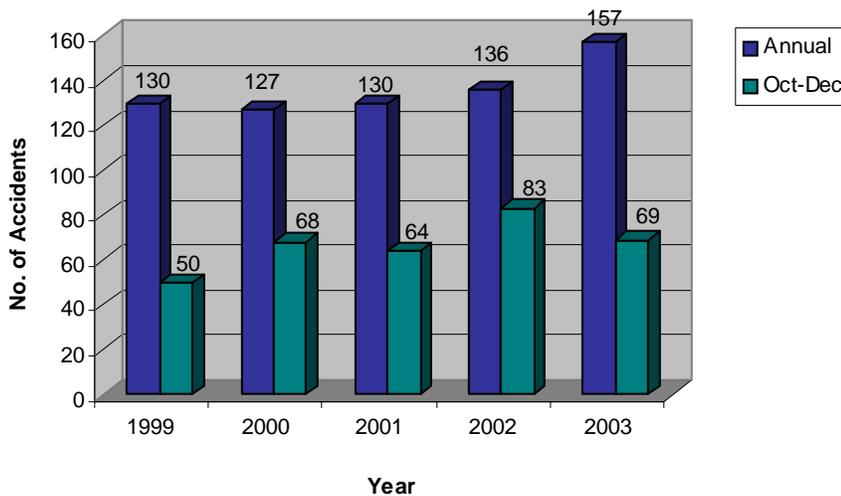


Figure 3 gives a monthly break down of deer-vehicle collision data. November is noticeably the peak month although the count remains high from October through February. A comparison of annual accident data with data covering the period October through December in Figure 4, shows that a little over fifty percent of the accidents every year occur between the months of October and December.

Appendixes C through G are GIS maps that provide a closer look at deer “problem areas” within the Township for the last five years. A look at the maps clearly highlights that Route 19 is consistently the main site for deer-vehicle collisions.

Figure 5 below shows the trend in the number of deer collisions along Route 19 specifically.

**Figure 5: Township of Upper St. Clair
No. of Collisions on Route 19**

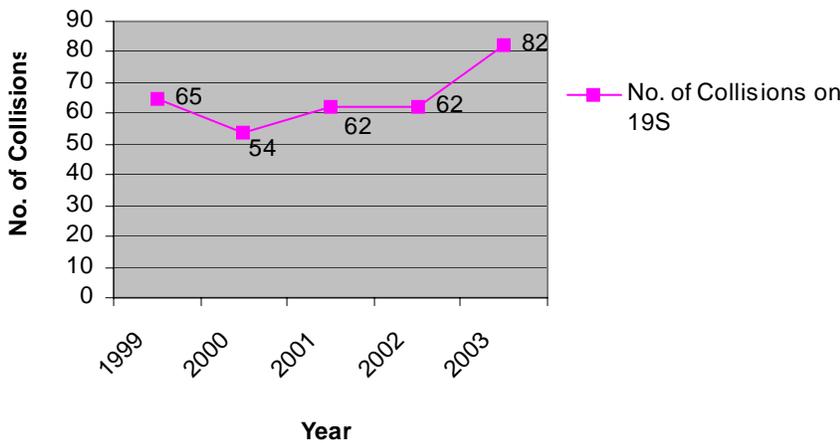


Table 1: Township of Upper St. Clair Deer-Vehicle Collisions on Route 19

Year	Total No. of Accidents	No. of Accidents on Route 19	Route 19 as % of Total
1999	130	65	50
2000	127	54	43
2001	130	62	48
2002	136	62	46
2003	157	82	52

We can see that on average approximately forty-eight percent of deer collisions occur along Route 19 every year.

b. Whitetail Management Associates – A Synopsis

Whitetail Management Associates have been conducting archery seasons in the Township of Upper St. Clair since 1998. A summary of the total number of deer harvested through archery is given in the following table.

**Whitetail Management Associates South
Township of Upper St. Clair
Harvest Report 1998-2003**

Year	No. of Antlerless	No. of Antlered	Total
1998-1999	32	5	37
1999-2000	61	6	67
2000-2001	47	6	53
2001-2002	41	6	47
2002-2003	40	4	44
2003-2004	28	6	34
Total	249	33	282

A look at the harvest report shows that the archery program at Boyce-Mayview is achieving a modest success in the Boyce-Mayview corridor. The impact of deer reduction in this area, however, has little or no impact on deer-vehicle collisions along Route 19. As previously noted, archery culling success (primarily restricted to Boyce-Mayview) has declined somewhat in each successive year. Refer to Appendix H to review the harvest log completed by Whitetail Management Associates archers for the year 2003.

c. Proposed Future Control Areas Within the Township

Appendices C through F are GIS Maps showing deer-vehicle collisions within the Township for the last five years. It is clear from the maps that Route 19 is the main deer concentration area, and the primary area of concern regarding deer management. Between 2002 and 2003 there has been a 32 percent increase in the number of collisions along Route 19 from 62 in 2002 to 82 in 2003. The increase is particularly dramatic along certain segments of Route 19 such as from the Cloverleaf to Chapelwood Drive. The number of collisions along this segment of 19 increased from 14 in 2002 to 31 in 2003 – a 121% increase. In light of the fact that Route 19 has been and continues to be a problem spot, staff is requesting that the Township Commissioners consider the option to allow controlled culling of deer in Gilfillan Park. It is the belief of Township officials that by allowing culling of deer within the pasture area in the center of Gilfillan, some headway can be made in reducing vehicular collisions along certain segments of Route 19. Recently, the Township received a telephone call from a resident of Warwick Drive. She was concerned about the number of deer in her yard. She stated that on the night of January 21, 2004, there were 20 deer in her yard where she usually has only five to seven. Most relevantly, the caller’s yard abuts Gilfillan Trail. The Township has received other calls from the area abutting Gilfillan with similar observations.

The next section deals with the mapping requirements of the Pennsylvania Game Commission for a special culling permit.

III. Mapping Requirements for Application to PA Game Commission for Special Culling Permit

a. Boundaries of Area Being Considered

The area under consideration is in the heart of Gilfillan Park. The dimensions of the area proposed for culling are 192 yards by 198 yards. Please refer to the map overleaf for details.

b. Land Use within Area

Gilfillan Park consists of a nature trail surrounding vacant land. It is bordered by residential housing that is zoned R1 or single family residential.

c. Cover Types

The park consists of currently unused cattle and sheep pastures, orchard, and a wooded area in the northwest. The proposed control area is mainly pasture. The area of Gilfillan north of Gilfillan House is the wooded portion of Gilfillan Park and has a variety of large white and black oaks, dominating overstory, medium mix trees, grapevines, and vining on trees. Certain sections of this wooded area also have abundant poison ivy, jewel weed, and heavy high undergrowth.

d. Huntable Areas

The area designated for culling within Gilfillan Park covers a large section that provides ample space for safe culling activity. Boyce-Mayview is another area within the Township that could potentially lend itself well to controlled culling.

e. Deer Concentration Areas

Appendix C, showing a GIS map for the year 2003, reveals that the main area of conflict between the deer and humans is along Route 19. Despite the fact that an aerial survey of the Township in 2002 did not highlight Gilfillan as being a “hot spot” for deer, recently, several concerned calls from residents living along Warwick Lane (along the perimeter of Gilfillan Park) point to Gilfillan as a deer concentration area.

f. Safety zones

The map on the next page outlines the distance between each corner of the proposed deer control site, and the nearest dwelling. The minimum distance between the proposed site and a residential dwelling is approximately 155 yards, which is compliant with the 150-yard minimum distance specified by the Pennsylvania Game Commission.

g. Proposed Control Areas

Management recommends that the Commission consider a single control area within Gilfillan as a test site. Should the culling prove effective, other areas within the Township may be included. Accordingly, a site in the center of Gilfillan Park has been chosen as shown by the red rectangle in the center of the map.

IV. Conclusion

Deer affect the habitat and well-being of many species in the same manner that humans do. Deer management programs, therefore, attempt to balance the needs of deer, humans, and other wildlife and plants. Currently in Upper St. Clair, ecological, economic, and most importantly human safety considerations all indicate a need to augment the means currently in place to control a growing deer population. Managed culling applied successfully by the Borough of Fox Chapel uses a selection process to identify qualified culling agents. It also restricts the devices and methods used to take deer and the times and locations deer can be culled. As such, managed culling might be less objectionable to some, because culling would be undertaken only by entrusted agents. (Please refer to Appendix A for a synopsis of the 2002 Deer Report for the Borough of Fox Chapel.) By continuing the already extensive efforts in the realm of deer management and supplementing those efforts with direct management techniques such as a managed culling program, the white-tail deer population in Upper St. Clair can be brought to levels that everyone affected can tolerate.

Appendix A:

Synopsis of 2002 Deer Report Borough of Fox Chapel

This appendix summarizes the 2002 annual report related to the white-tailed deer management program within the Borough of Fox Chapel. The Fox Chapel Police Department has maintained records on the number of vehicle collisions with deer since the inception of the program. These provide key data for evaluating the deer management program. According to Dr. Ernie P. Wiggers, the Borough's wildlife biologist, the deer management program has prevented some 413 collisions between deer and vehicles in the Borough since 1993 saving the citizens some \$619,500. In 2002, the number of collisions declined 29% from 2001 levels, the lowest recorded since 1992. Assuming that each collision results in an average of \$1500 in damage to the automobile, it can be said that the management program has saved the Borough residents an additional \$12,000 in property damage in 2002, and more than \$619,000 since 1992. These numbers are based on the assumption that the number of deer-vehicle collisions would have remained constant at 81 in the absence of a deer management program. Mr. Wiggers is of the opinion that the total savings would likely be substantially greater because the number of collisions would have increased as the size of the deer herd grew. Also, these savings do not take into account the savings accruing from a reduction in the destruction of landscaping and other property.

The main goal of the deer management program at Fox Chapel is to manage deer numbers at a level where negative interactions between people and deer are kept at a tolerable and acceptable level. The Borough attempts to maintain this level through the use of archery hunting and sharpshooting. Mr. Wiggers believes that sharpshooting is a necessary and very complimentary supplement to archery hunting because not all areas of the Borough lend themselves well to archery. In addition, sharpshooting may be done at selected sites to remove particular nuisance deer. The table below shows the number and percentage of antlered (mature males) and antlerless (females + fawns) whitetail deer harvested in Fox Chapel Borough by archery hunters, sharpshooters, and trapping.

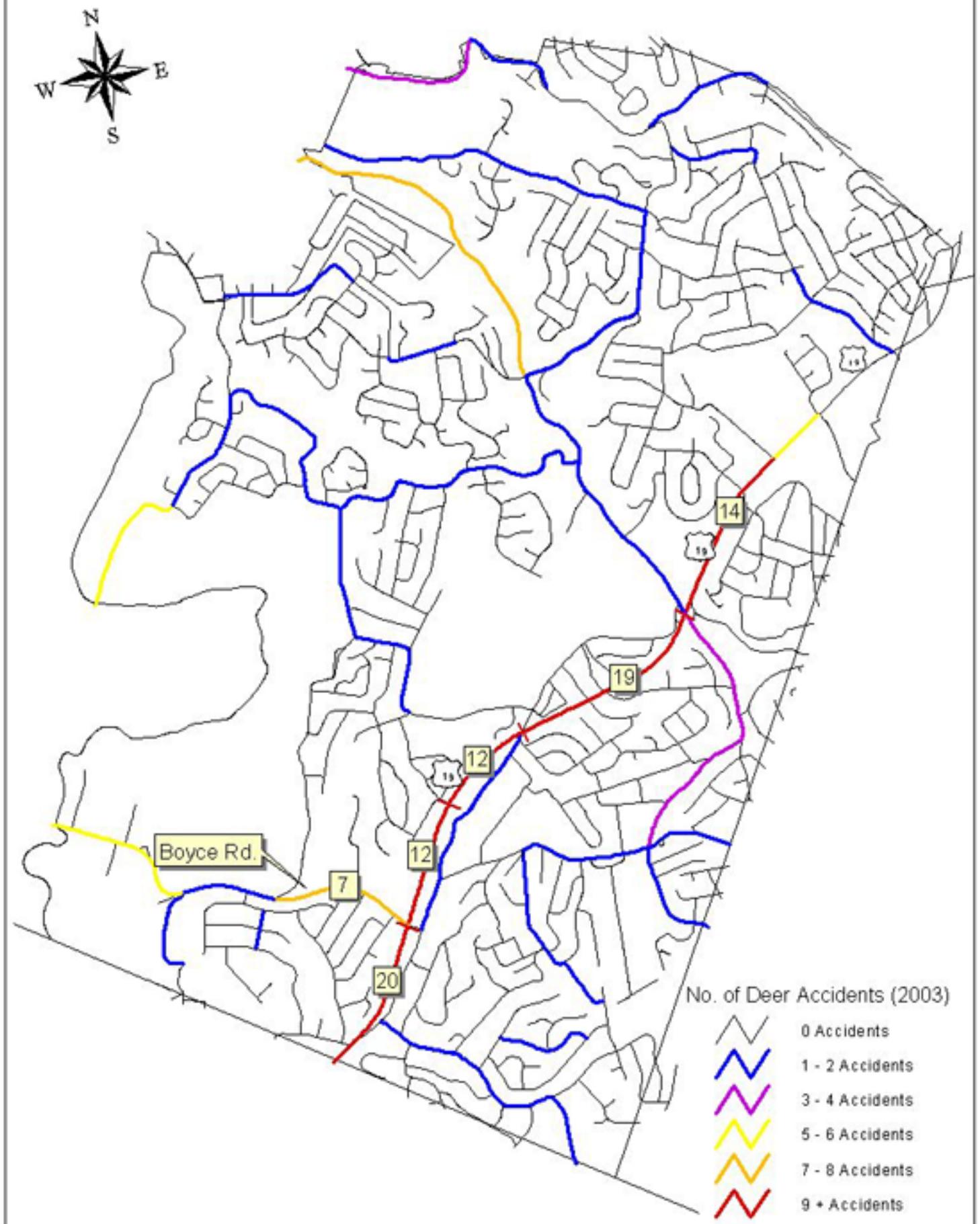
Year	Antlered	%	Antlerless	%	Total
1993	36	28	92	72	128
1994	21	11	164	89	185
1995	36	16	205	89	230
1996	26	10	226	90	252
1997	20	9	202	91	222
1998	28	14	166	86	194
1999	24	13	154	87	178
2000	27	14	164	86	191
2001	32	13	223	87	255
2002	30	20	122	80	152
Total	280	15	1718	86	1987

According to Mr. Gordon, the Borough Manager, there has been on average a fifty-percent reduction in deer-vehicle collisions from approximately eighty in 1993 (pre-deer management program).

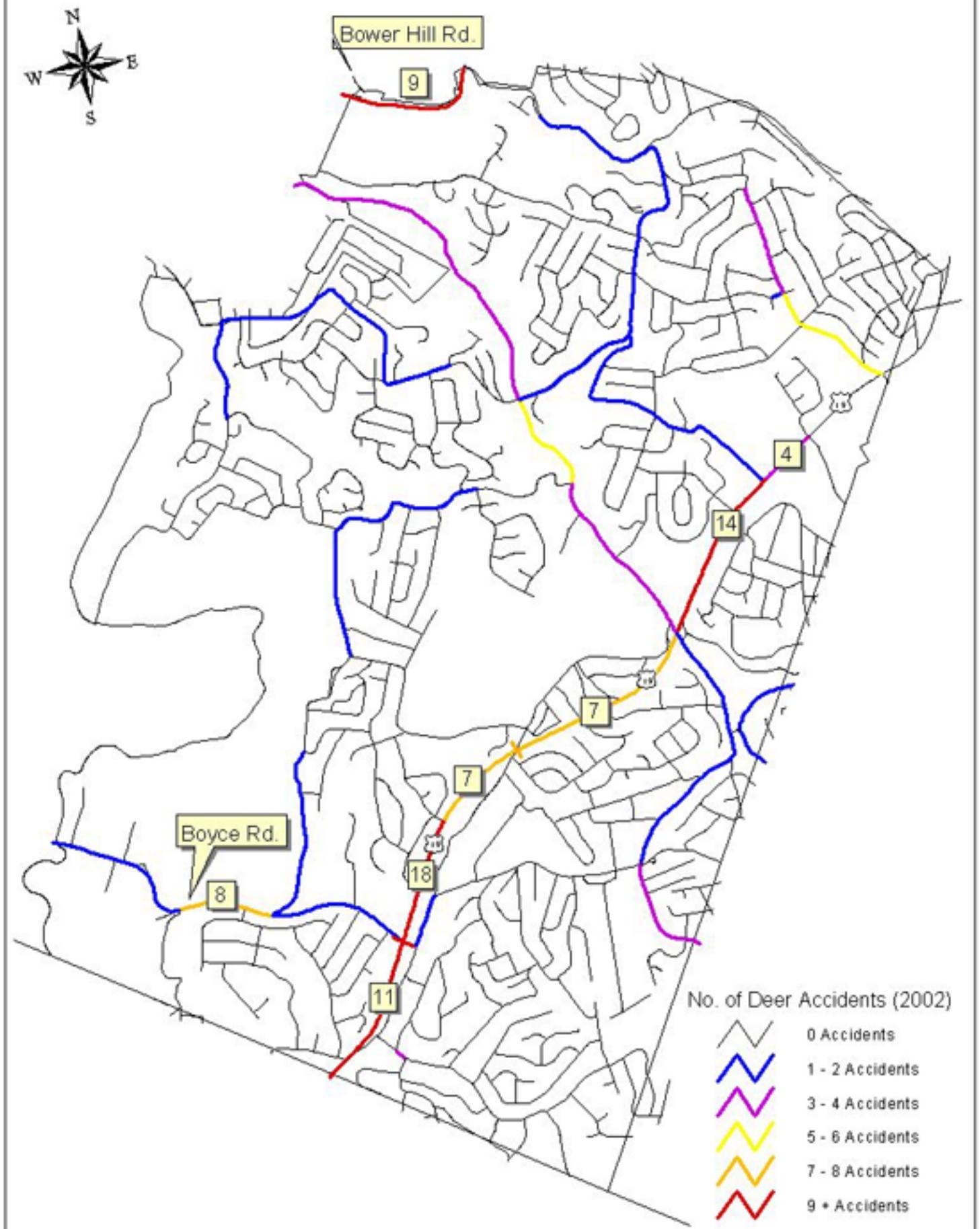
Appendix B: Whitetail Management Associates South
Upper St. Clair Township
Harvest Report 1998-2003

Year	Antlerless	Antlered	Total	% Antlered
1998	32	5	37	14%
1999-2000	61	6	67	9%
2000-2001	47	6	53	11%
2001-2002	41	6	47	13%
2002-2003	40	4	44	9%
2003-2004	28	6	34	18%
Totals	249	33	282	12%

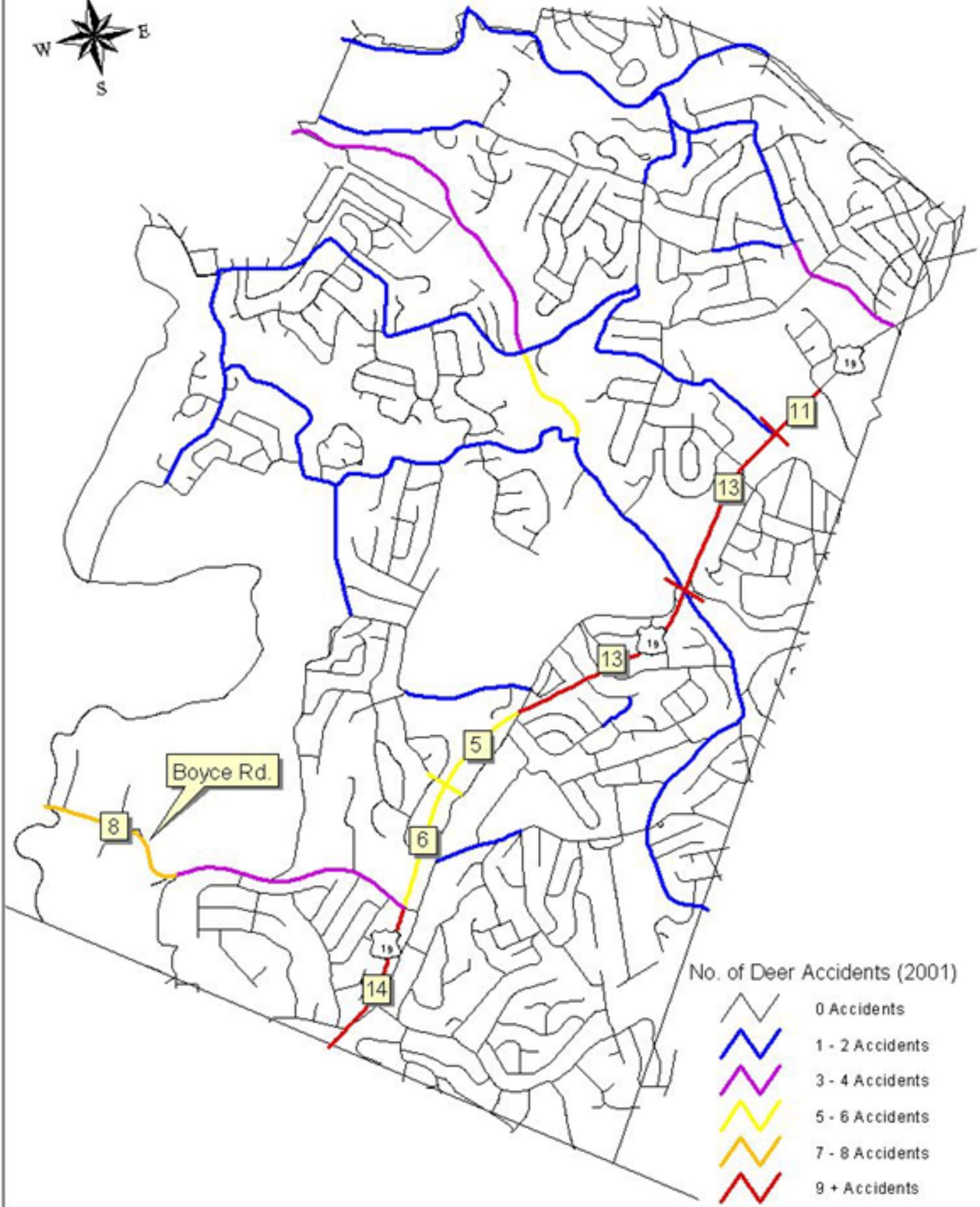
Appendix C: Deer-Vehicle Collisions - 2003



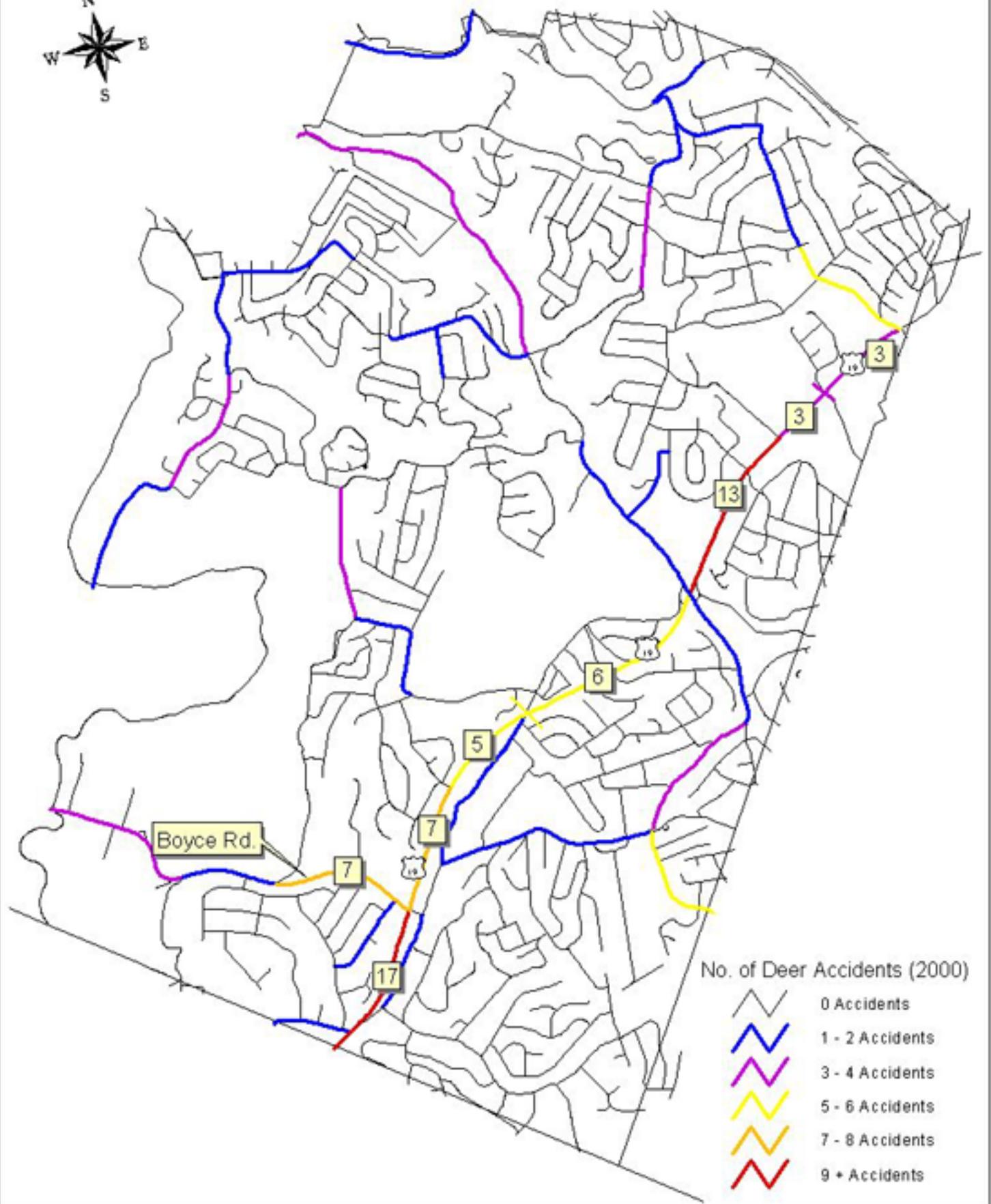
Appendix D: Deer-Vehicle Collisions - 2002



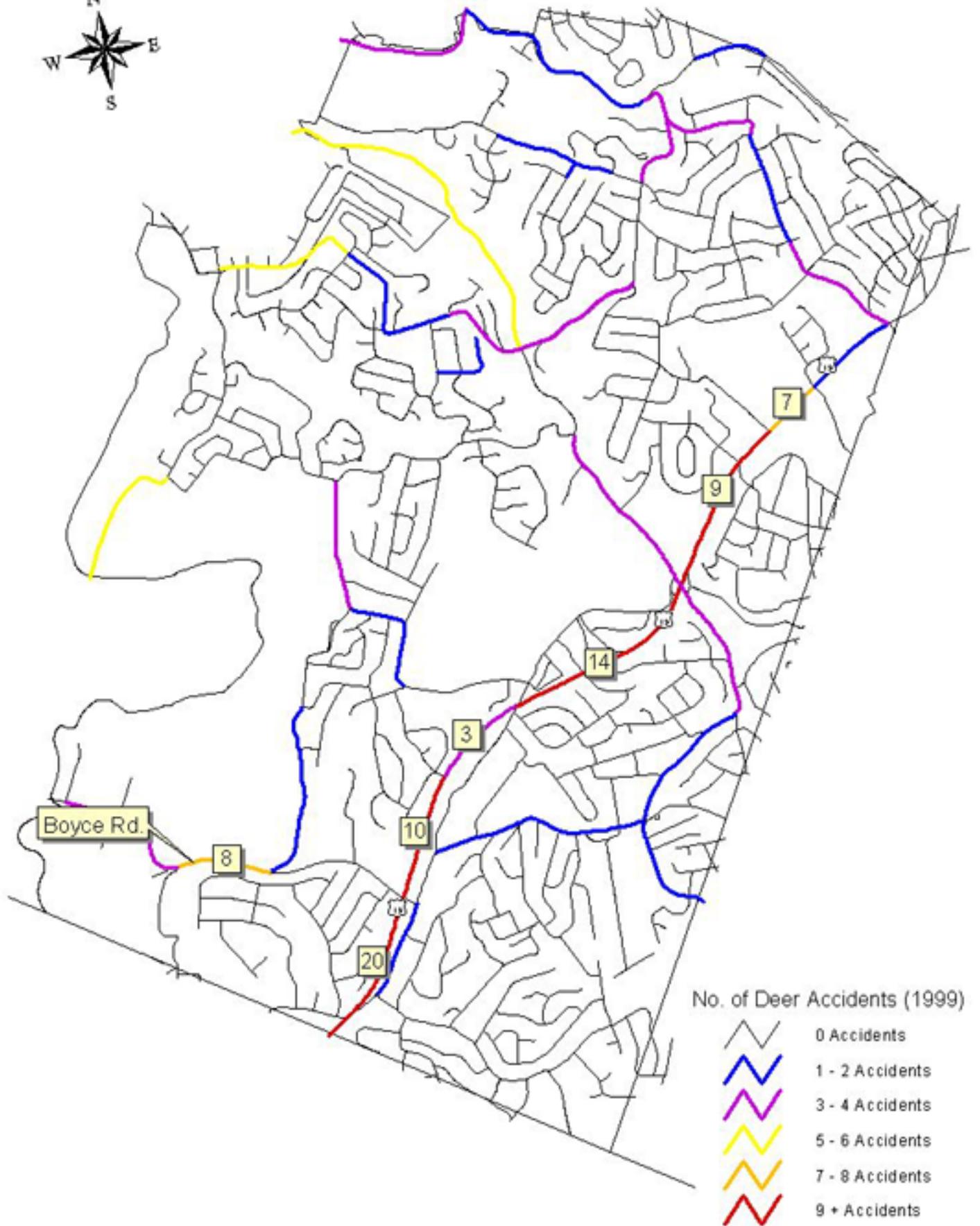
Appendix E: Deer-Vehicle Collisions - 2001



Appendix F: Deer-Vehicle Collisions - 2000



Appendix G: Deer-Vehicle Collisions - 1999



Appendix H:

**Whitetail Management Associates
Upper St. Clair Township Harvest Report Form**

NO.	NAME	HUNT AREA	DATE HARVESTED	TIME HARVESTED	ANTLERLESS	ANTLERED	EST.WT/AGE
1	Don	7	10/4/2003	6:00 AM	X		80
2	Lee	12	10/4/2003	6:00 AM		8 Points	175
3	Jim	2	10/9/2003	10:30 AM	X		85
4	Todd	6	10/11/2003	8:30 AM	X		90
5	Todd	6	10/18/2003	6:30 PM	X		90
6	Frank	A1	10/20/2003	8:30 AM	X		200
7	Mark	13	10/23/2003	6:15 PM	X		80
8	Mark	13	10/23/2003	6:40 PM	X		120
9	Eric	13	10/23/2003	6:00 PM	X		110
10	Eric	13	10/23/2003	6:30 PM		8 Points	150
11	Rich	2	10/23/2003	6:30 PM		9 Points	150
12	Gus	12	10/25/2003	8:00 AM	X		130
13	Gus	12	10/25/2003	9:10 AM	X		130
14	Kirk	3	11/1/2003	9:00 AM	X		100
15	Todd	5	11/1/2003	4:00 PM	X		100
16	Jim	2	11/1/2003	4:30 PM		7 Points	120
17	Kirk	3	11/7/2003	8:30 AM	X		80
18	Mark	13	11/8/2003	11:30 AM	X		110
19	Rich	1	11/11/2003	8:30 AM		9 Points	140
20	Jim	2B2	11/11/2003	4:50 PM	X		90
21	Todd	8	12/6/2003	9:30 AM	X		
22	Rich	2	12/6/2003	12:30 PM	X		
23	Rich	2	12/6/2003	12:30 PM	X		
24	Todd	8	12/12/2003	1:45 PM	X		120
25	Dave	8	12/27/2003	11:10 AM		X	
26	Tom	8	12/27/2003	11:00 AM	X		
27	Tom	5	1/3/2004	11:00 AM	X		
28	Rich	11	1/3/2004	1:30 PM	X		85
29	Jerry	12	1/3/2004	2:00 PM	X		50
30	Todd	4	1/10/2004	1:00 AM	X		
31	Tom	4	1/10/2004	1:00 PM	X		
32	Tom	4	1/10/2004	1:45 AM	X		
33	Bill	11	1/10/2004	1:00 PM	X		
34	Eric	6	1/10/2004	5:00 PM	X		70

Appendix I: Motion

LET IT BE MOVED THAT THE BOARD OF COMMISSIONERS ADOPTS THE FOLLOWING:

1. In addition to archery hunting, the Township shall evaluate all hunting or culling options allowed by the Pennsylvania Game Commission.
2. The details of the deer reduction program shall be implemented by the Township Manager and appropriate staff.
3. The program shall be administered in the field by a selected outside group (i.e. Whitetail Management Associates).
4. The Township Manager and appropriate staff shall also implement a deer management program, including the consideration of:
 - Engagement of wildlife biologist
 - Test installation of Streiter-Lites
 - Investigation/installation of deer warning and crossing signs and line-of-sight clearing
 - Installation of fence enclosure to evaluate deer exclusion effect on vegetation
 - Development of communication program and library materials
 - Consideration of a deer population survey*

All at a cost not to exceed \$15,000 annually.

5. The Township Manager would be directed to explore with the State Game Commission the establishment of Upper ST. Clair as a designate site for a PZP deer birth control immunization pilot study. For this pilot study, the Township Manager will seek the participation of the General Assembly of Pennsylvania, Penn State University, and the University of Pennsylvania as partners to the pilot study.*
6. The responsibility for the review of the overall program effectiveness shall be delegated to an existing Committee of the Board of Commissioners.
7. The Township Manager and his delegated representatives are directed to develop for the Board consideration the appropriate Township Code revisions necessary to implement the above measures.

**These two items were addenda to the original motion.*