The Deer Management Program in The Galena Territory

Prepared by
The GTA Greenspace Committee
February 2007

The Deer Management Program in The Galena Territory
February 2007

1. Introduction

Whitetail deer are one of the more familiar features of the natural environment in the Galena Territory. Everyone enjoys seeing the deer, and many people would like to see them more often. It is important to recognize, however, that the deer are part of a larger environment. The deer are linked to other animals, plants and the people who share the Territory with them. Achieving a balance among these connected elements is fundamental to the health and sustainability of the environment into the future as well as to the enjoyment of nature we find here. The need for balance is dramatically illustrated by the serious consequences that occur when these relationships go awry.

Across the United States, many communities have established an appropriate population range for the deer. At The Galena Territory, the deer management program was initiated as a result of massive overpopulation of the deer. This imbalance resulted in deer starvation, destruction of a great deal of the environment and landscaping through over browsing, and an increase in deer/auto accidents. The GTA Board of Directors and Management began studying the problem in 1986 and implemented the deer management program in 1991. The program objectives are:

- Maintain the number of deer/vehicle accidents at less than 20 per year
- Maintain deer browsing of native plants at less than 20%
- Maintain deer damage to ornamental plantings such that 75% of residents are satisfied
- Promote an understanding of the need for management in the community
- Continue to monitor and reduce the herd as needed to achieve approximately 20 deer per square mile.

This article briefly reviews the behavior of whitetail deer in this area, the history of the management program, the information used to make decisions on desired population levels, and the present approach used for the management program.

2. The Galena Territory Environment

The Galena Territory is part of the unique “Driftless Area” of Illinois, Iowa, Wisconsin, and Minnesota. This area of 15,000 square miles escaped the continental glaciers of the Pleistocene Epoch. The end result is the highest elevation of bedrock in Illinois, rising to heights of 1000 to 1200 feet. Due to the high hills, sharp ridges, sweeping slopes, and narrow valleys, we are living in some of the most picturesque topography in Illinois. Nowhere else in Illinois is the bedrock elevation so high, nor is the bedrock so close to the surface. Ravines and valleys crisscross the land, and their slopes form the dominant feature of the landscape.

The Driftless Area has a myriad of streams and rivers located in the v-shaped valleys. Because of the generally steep slopes and thin soils, the water moves off the land fairly

quickly. This results in a landscape with no natural lakes and a low amount of wetlands (about 3% of the land cover). The water that does not eventually evaporate or find its way to a river or stream will percolate through faults in the bedrock to the underlying aquifers. We draw upon these aquifers for our water supply. The Galena Territory has a typical continental climate with cold winters (Jo Daviess County is the coldest county in Illinois) and hot summers. The steep ridges and valleys contribute to local differences in climate. The north and south slopes of the ridges generally have different average temperatures and retained moisture because of the difference in exposure to the sun and prevailing winds. In a few isolated areas in the Driftless area, there are north facing limestone slopes where ice persists for most of the summer. As might be expected, the differences in local climate can lead to substantially different biota on the north and south facing slopes.

We all know the Galena Territory in Jo Daviess County is one of the most beautiful and varied landscapes in northern Illinois. The varied landscape results in an exceedingly rich diversity of plants and animals. The following data about the Driftless Area of Illinois illustrate the tremendous diversity of species in this part of the state, comprising only 1.7% of the state's total land area. The topographic complexity and diversity of habitat, as well as our location near the Mississippi flyway, results in 271 bird species; this represents almost 90% of the birds that regularly visit Illinois. Mammals and other animal species are abundant; 78% of the state's mammal species occur here. The area contains 42% of Illinois native plant species.

The area that is now The Galena Territory was largely agricultural land. The native plants of the prairies and savannas are not adapted to the disturbance associated with agriculture. Few prairie species survived the plow, except in isolated corners or rocky hillsides that could not be turned under. Most of the native savanna flowers and grasses could not survive grazing by cattle, horses, sheep and pigs brought by the settlers. In contrast, the alien grasses and weeds which were intentionally or inadvertently introduced by the settlers were well adapted to the disturbance associated with human settlement, and have since replaced most of the herbaceous native plants.

Fortunately, there are a number of areas in the Galena Territory that have retained much of their original character. In 1997-98, a survey was performed of 28 ecologically significant areas of the Greenspace. (These are areas that escaped destruction by human activity.) The survey identified 365 plant species, ranging from common to endangered. (A total of 915 plant species have been identified in the Driftless area.) On steep south-facing slopes, dry prairie species were able to persist due to a combination of difficulty of access to grazing animals and the ability of dry-soil species to compete effectively against alien weeds. Also the bur, white, and black oak savanna trees remain in place in many areas of The Territory, a testimony to the savannas of the past. Though it is difficult to estimate the age of these trees, many of them are undoubtedly over 200 years old. The majority of the "natural" sites in the Territory are the forests, although a few, rare prairie remnants have also been found.

The acres of land in the Territory designated as Greenspace will remain constant. But, the number of people - residents and visitors, vehicles, and structures - has increased since the early development of the Territory. Since 1992 The General Golf Course has been built and about 1,000 homes have been added. This growth has reduced the area available as habitat for deer. We monitor the success of our management strategy yearly and in the future we may need to reduce our goal number of deer per square mile to accommodate this change in the available habitat for deer.

3. Deer as Part of The Environment

Whitetail Deer are the only species of deer in the Territory, or Illinois. A large white flag waving back and forth and disappearing into the woods indicates a Whitetail Deer is on the move and a loud whistling "snort" from the woods means a deer has scented you. Their behavior is determined by three key items: food, temperature and sex. Deer inhabit wooded areas. The Territory is attractive habitat for deer with miles of woods and "edge" supplying nearby food and shelter. Their home range is seldom more than a mile across.

Deer are large, hoofed mammals with the mature bucks weighing from 150 – 200 pounds and the does weighing from 100 – 150 pounds. Antlers on bucks consist of a main beam with prongs issuing from it; the antlers are shed and replaced annually. They tend to increase in size and number of points with increasing age. Deer can run as fast as 35-40 miles per hour and jump 30 feet horizontally and 81/2 feet vertically! They may live up to 16 1/2 years in the wild. In summer deer are a reddish color, and in winter they appear more gray/brown.

Deer are known as browsers, as opposed to grazers, which means they eat a varied diet of grasses, forbs (non-grass herbaceous plants), and woody plants. Although deer do feed on grasses, they much prefer broadleaf forbs even after the forbs have died and dried. In the fall, acorns, when available, are the favorite whitetails' food. There are times when acorns comprise 80% of the diet with a decided preference for white oak acorns. The deer will also eat young saplings, particularly maple and oak saplings, as well as fallen leaves. Also, they are cud-chewers and usually require a secluded spot to re-chew the material they have browsed on earlier. They rely on their fat to help sustain them over the winter months, but they will eat almost anything if they are hungry. Most of the time, deer remain hidden in the woods, but come out to feed at regular times during the day. In general, deer are crepuscular animals, that is, their periods of greatest activity are at dawn and dusk when they feed. However, deer have become much more nocturnal than in centuries past because of pressure from humans.

In Illinois deer tend to remain together in family groups, consisting of an adult female, a yearling female offspring of the adult, and the adult's fawns, usually two in number. The deer congregate in groups of up to 25 in winter and only two or three in summer and fall. Males are polygamous and are thus not associated with females except at breeding time. Adult females become secretive and seek seclusion at the beginning of the fawning season and this behavior may last from May to August. Family groups will form again at that time. Fawns are born in April. Most does will hide deep in the woods during birth

and stay at the edge of the woods while the fawns are small. From birth to early June the does forage heavily to produce enough milk for their young. By the end of June the fawns are weaned. Given good habitat and a lack of predators, a deer herd will almost double its numbers every year. More typically, a deer herd will increase in numbers by 35 - 40% per year. Bucks begin to grow their antlers in August and by early October they "rub" the velvet off. The bucks use trees to shed the velvet which often results in damage to the bark of the tree. Deer mate or "rut" in mid October to December.

Deer are identified as a "key stone" species; that is their presence and numbers have a significant impact on the rest of the environment. Their influence is due to their large size as well as the great amount and diverse nature of the vegetation they consume. If their numbers are allowed to get out of balance with the rest of the environment, they will end up reducing or eliminating existing plants and animals. When too many deer are browsing, they can cause damage to landscaping plants as well as to our native woodland wildflowers and understory plants and trees. They can negatively affect birds and animals by reducing food sources and nesting sites for these species. For example, before the management program was implemented and the deer population was out of control, there were not any rabbits or fox in the Territory.)

The deer have the capability of changing the entire composition of the forest areas they inhabit. In Wisconsin it was estimated that the whitetail deer were crippling or eliminating over 600 million tree seedlings every year. Coupled with their consumption of acorns in the fall, the regeneration of the forest trees, particularly the oaks, has been prevented. In addition, the understory plants are also greatly reduced or eliminated. This represents a loss of habitat for many birds and animals, and hence they are also eliminated from the environment. The top prey animals, such as hawks lose their food supply, so their numbers are eventually reduced. Specific deer population densities where these effects are observed are given in Section 5.

4. A Brief History of Deer in The Galena Territory

Most of the area of the Territory, prior to incorporation, was tilled or grazed farmland. Wooded areas, which were not farmed, provided habitat for the deer at that time. The population of the deer was undoubtedly controlled through annual hunting. After the formation of the Territory hunting was prohibited. Without any predators, the local deer population skyrocketed. In the 1980's the Territory Board and Management recognized that the deer population needed to be controlled. After about four years of research and discussion, agreement was reached on a specific deer management program, which was initiated in 1991.

In February of 1991, the Illinois Department of Conservation conservatively estimated that more than 900 deer were living in the Galena Territory (a population of 82 deer per square mile). At that population, trees and bushes were eaten up to the "browse line", which is the height the deer can reach to eat foliage, generally six to eight feet high. Photos showing the browse line from 1991 are shown in Figure 1. It should be noted that when deer browse on red cedars they are in a starvation mode. There is little nutritional content in the cedar boughs but they fill the stomach and relieve hunger. If cedar

browsing does not occur until late winter, the deer can survive off their body fat until Spring.

Figure 1. – 1991 Photos showing deer browse line

In 1991 there were 30 automobile collisions with deer in the Territory. Other concerns with overpopulation of the deer are damage to planned landscaping and spread of Lyme disease. Lyme disease is spread through tick bites, and the deer are carriers of the disease. Humans get infected with Lyme disease through a tick bite from a tick that has bitten a carrier deer. An example of the large number of deer that were observed in 1991 is shown in Figure 2. Each dark spot on the photo, taken near the Property Owners'

Club, is a deer. The photo reveals that there are too many deer because of the unusually high number of deer, 25-30, in one location. The fact that the deer are out in the open in the middle of the day (when they are typically in the woods during the day) and that they are eating grass (when they prefer broad leaf plants) indicates that they are mal-nourished.

Figure 2. – Photo showing the large number of deer in 1991

Following discussions with the Illinois Department of Conservation, the desired population level was established at 12 - 20 deer per square mile (132 - 220 for the entire Territory). Section 5 below for further discussion on establishing the correct number of deer. The method selected for controlling the deer was a sharpshooter, and David Shuey, Chief of Security for The Galena Territory at that time, was brought on as the first sharpshooter on this project. Section 6 provides additional information on the pros and cons of alternative deer control methods.

When the program was first initiated, each deer that was shot was tested for disease and was evaluated on the Kistner Scale. The Kistner Scale ranges from zero to 100, with zero being "completely emaciated" and 100 being "excellent health". For the 1991-92 program, the average rating for the entire number of deer harvested was 25, "poor health", confirming that the deer population had an inadequate supply of food. By the next year, the average level had risen to 65, "good health", reflecting the greater abundance of food available given a reduced number of deer. All deer that were shot were sent to a meat processing plant, and all the meat was donated to local charity food distribution centers such as the Salvation Army and the Galena Food Pantry.

5. Assessing the Right Number of Deer for The Galena Territory

Limits on deer population can be assessed by considering "carrying capacities" of the environment. There are three types of carrying capacities.

1. The Biological Carrying Capacity (BCC). This is the point where births and deaths balance without any outside intervention, including predators and hunters.
2. The Cultural Carrying Capacity (CCC). This is the point that the human population decides that it can accept as the deer population level. It is very difficult to identify the CCC since there are often many opinions on acceptable deer population size. These considerations do become important well before the BCC is reached, however.
3. The Ecological Carrying Capacity (ECC_{lim}). At the ECC_{lim}, herbivores, although having some browsing impact, do not determine the structure and species composition of the plant community. In many areas of the United States, this is not a factor, because there is no longer any real bio-diversity to protect. It is a factor here because the Territory is blessed with a large number of plant and animal species. The ECC_{lim} relates to the goals and objectives for the environment of the Territory, developed by the Greenspace Committee and approved by the GTA board.

The BCC is set by the weather conditions throughout the year and the amount of available food source. This is the point where all available food sources are being exploited and where the deer births are offset by deaths that are largely due to disease and starvation rather than old age. The Territory was at this level prior to initiating the deer management program, with an estimated population density of about 100 deer per square mile. At this point the deer population is also prone to population crashes, if for example, there is a severe winter.

The CCC depends on the preferences of people in the local community and it is difficult to find a population density estimate in the literature that establishes an acceptable CCC population density. Factors that go into establishing a CCC include damage to landscaping, frequency of deer/auto accidents, and transmission of diseases carried by deer, such as Lyme disease. In the case of Virginia, areas identified as exceeding the carrying capacity contained more than 25 deer per square mile. It is evident, however, that deer populations in farm-forest landscapes will far exceed levels associated with conflicts (reduced biodiversity, increased agricultural damage, and frequent vehicle collisions with deer) before reduced births (productivity) become apparent.

There is some evidence of population densities where the ECC_{lim} is reached. Here are some examples of research results.

In the oak forests in central Massachusetts, deer populations of 25 to 44 deer per square mile interrupted the process of understory reinitiation and prevented regeneration. In areas of the forest where deer numbers have been limited to 8 to 15 deer per square mile, understory vegetation is abundant and diverse. A ten year study in Northwestern Pennsylvania (2003) demonstrated that species richness, abundance, and height of saplings declined significantly once deer densities exceeded 21 deer per square mile. The bird community which uses this intermediate foliage canopy exhibited significant reduction in species richness and abundance when the deer population exceeded 21 per square mile, and five songbird species were no longer observed on study sites. Species

richness and abundance of shrubs and herbaceous plants were negatively affected when deer density exceeded 10 per square mile. Finally, a deer browse survey was conducted in 2002 in The Galena Territory by the Illinois Department of Natural Resources. The differences in plant species and numbers in browsed and non-browsed areas were compared. The report concluded, "… that the past reductions in deer population levels have improved the condition of the woody vegetation at Galena Territory. It is apparent, however, that deer continue to impact the vegetation at GTA, and that the deer removal program will need to continue at least at the existing intensity to maintain the level of recovery observed to date."

All these results for the ECC_{lim} are consistent with the original goal of 12 to 20 deer per square mile. However, there appears to be some evidence that even at 20 deer per square mile there is damage to biodiversity. The information is scanty, and therefore, a revision downwards in the goal population is not justified at this time. New results should be monitored as they become available.

6. Choosing The Control Method

The original method chosen for controlling the size of the deer herd in The Galena Territory is to employ a sharpshooter. This section reviews possible approaches to deer control to determine whether any other method is suitable at this time. Several recent reports from state and local organizations were reviewed.

The possible approaches to deer control are:

- No active control - let nature take its course
- Capture and relocation
- Fertility control
- Predator introduction
- Parasite and disease introduction
- Hunting
- Sharpshooter

The conclusions of all the reports are essentially identical. Letting nature take its course has been shown to lead to eruption and collapse cycles due to death by starvation or disease. This approach puts the problem out of mind for humans, but the animal suffering is real. In the process, the rest of the environment can also be significantly damaged. Capture and relocation programs can lead to a high percentage of deaths due to the stress of handling and relocation (25-85%). In addition, there are no areas that will accept white tail deer.

There are several approaches to fertility control including surgical sterilization, hormone therapy, immunocontraception, and oral contraception. Surgical sterilization is effective but cost prohibitive and impractical. So far limited success has been achieved with hormone therapy which is a spin off of the (birth control) "pill". Multiple injections are needed, but in controlled herds, some success has resulted from the attempts. Immunoconception (Vaccination) for the female requires two doses and possibly boosters on an annual basis. This method may improve in time, and such products for dogs are

much nearer to licensing. There is also work on an anti-sperm vaccine for the male. Oral contraception work is in the early stages of development. Fertility control has been tested by the Humane Society of the United States, but has been found to be expensive and difficult, especially with regard to the distribution of contraceptives in the field, control of dosages, and impacts on other species. Due to the difficulty in marking deer, the Humane Society is not yet conducting studies of free-ranging deer such as those in the Territory. Therefore, this is not a practical short-term solution, but there may be some hope for the long term.

Predators, with few exceptions, rarely control the numbers of animals on which they prey. In fact the opposite is true: it is the prey base that determines the size and health of the predator population. In addition, local farmers are concerned about predation of their livestock. The risks and uncertainties associated with parasite or disease introduction make it impractical. This is not a humane approach, and regulatory agencies would not likely permit such an activity.

The remaining two options, hunting and a sharpshooter are the ones universally employed for deer population control. The Michigan Humane society has evaluated these approaches and selected sharp shooting as being more humane compared with standard hunting practices. Another possibility is bow hunting, which would allow hunting closer to Territory homes since the range of the bow and arrow is significantly less than a rifle. Bow and arrow hunting is more difficult than rifle hunting, and as a result success is modest. This year (2006-07) Davenport, Iowa initiated a program that uses local archers to control deer along Rock Creek Parkway, an area that includes public hiking trails. Local hunters underwent training by the Iowa DNR and had to pass a proficiency test in order to be certified for this program. While no injuries have been reported, it would be difficult to implement this program at GTA because we do not have skilled archers on staff and homeowners would not likely endorse bringing in non-staff archers to conduct the harvest. Most telling of all however is that the result has been disappointing: Some 100 certified archers have only harvested 29 deer in the ten weeks of hunting so far.

In conclusion, employing a sharpshooter is still the most effective option available. We will continue to monitor other means of deer control and, if and when it is determined that an alternate method is both more effective and humane, the program may be modified.

7. The Present Program

Every year a count of the GTA deer is performed with Illinois Department of Natural Resources participation. An accurate count requires that there be sufficient snow cover on the ground to provide contrast to the drab winter color of the deer. This usually occurs in late December or sometime in January or February. This count is adjusted to reflect reductions due to subsequent deer harvesting and additions due to the spring birthing. The result is an estimated deer population. The Greenspace Committee then takes the estimated population and compares it to the population goal, then recommends to the GTA Board the number of deer to be harvested the following year. After Board approval,

a permit is requested from the IDNR to harvest the approved number of deer during the next winter season. The permit is usually good for a 90-day period.

We have two IDNR-qualified sharpshooters on staff that are assigned to the actual harvesting. In previous years they have conducted the harvest in January, February and March, on limited weekdays (Tuesday, Wednesday and Thursday) to avoid periods when large numbers of people are in the Territory. Some property owners have requested that harvesting not be carried out within 100 yards of their home, so these areas are removed from actively harvested sites. Samples from the first 25 deer are sent to a lab to be tested for Chronic Wasting Disease. We have never had a positive test, but all carcasses are held until the results of these tests are received. With negative test results, the carcasses are sent to a processing plant and the resulting meat is distributed to local food pantries.

8. The Role of Property Owners

All property owners are impacted in some way by the presence of deer. There are a number of things that everyone can do to insure our deer herd remains healthy into the future and that minimize potential harmful effects.

- Monitor individual lots for signs of damage to plants and trees by the deer. From time to time, the GTA sends out survey forms to identify whether or not such damage has occurred. Deer damage can be minimized by selecting plants that the deer tend to avoid. Please check with the GTA office if you would like a list of these plants.
- Cases of Lyme disease have occurred in the Territory. Check yourselves and pets for ticks after you are out hiking in the warm weather. Pets can be further protected by using flea and tick collars or a flea and tick skin application.
- To avoid deer/car collisions, always be on the lookout for deer near the sides of the road. Their most active times are near dawn and dusk. Be particularly careful during rutting season in October and November.
- Do not put out food or salt licks for the deer. Such deer congregation points can increase the spread of disease. There is a state ban on the feeding of wild deer and other wildlife in areas where wild deer are present, which includes The Galena Territory. The ban was enacted in 2002 as part of the state's continuing effort to limit the spread of chronic wasting disease (CWD) in the Illinois wild deer herd.
- To facilitate the deer harvesting, property owners are urged to allow harvesting within 100 yards of their sites. The dates when harvesting takes place is limited to mid-week and mid-winter when the fewest number of people are present. If you have any questions or concerns, please contact the GTA office.

The deer are a natural resource that everyone enjoys. With your help, we will continue to enjoy them into the foreseeable future.

References

1. Neil Diboll and Joel Trick, Report On The Galena Territory Greenspace Inventory Program Of 1997 And 1998, 1998
2. P. Bishop, J. Glidden, M. Lowery, and D. Riehlman, "A Citizen's Guide to the Management of White-tailed Deer in Urban and Suburban New York," New York State Department of Environmental Conservation, Revised 1999: Bureau of Wildlife – Deer Team
3. "Population Management Plan for White-tailed Deer in Pennsylvania (2003-2007)," Bureau of Wildlife Management, Pennsylvania Game Commission, June 2003
4. "Howard County Department of Recreation and Parks Comprehensive Deer Management Plan," Howard County, Maryland 2002
5. Environmental Quality Advisory Council, Fairfax County, Virginia, "Annual report on the Environment 2000," Chapter IV Deer Management in Fairfax County
6. Illinois Department of Natural Resources, Chronic Wasting Disease Information, http://dnr.state.il.us/cwd/
7. A.R.E. Sinclair, "Carry Capacity and Overabundance of Deer – A Framework for Management," The Science of Overabundance – Deer Ecology and Population Management, Edited by W. McShea, H. Underwood, and J. Rappole, Smithsonian Institution Press, Washington (1997), p. 380
8. "Goals and Objectives of the Greenspace," approved 2000
9. W. Palmer, G. Storm, R. Quinn, W. Tzilkowski, and M. Lovallo, "Profiles of Deer under Different Management and Habitat Conditions in Pennsylvania," The Science of Overabundance – Deer Ecology and Population Management, Edited by W. McShea, H. Underwood, and J. Rappole, Smithsonian Institution Press, Washington (1997), p. 151
10. W. Knox, "Historical Changes in Abundance and Distribution of Deer in Virginia," The Science of Overabundance – Deer Ecology and Population Management, Edited by W. McShea, H. Underwood, and J. Rappole, Smithsonian Institution Press, Washington (1997), p. 27
11. W. Healy, "Influence of Deer on the Structure and Composition of Oak Forests in Central Massachusetts." The Science of Overabundance – Deer Ecology and Population Management, Edited by W. McShea, H. Underwood, and J. Rappole, Smithsonian Institution Press, Washington (1997), p. 249
12. D. Decalesta, "Deer and Ecosystem Management," The Science of Overabundance – Deer Ecology and Population Management, Edited by W. McShea, H. Underwood, and J. Rappole, Smithsonian Institution Press, Washington (1997), p. 267
13. Stephan B. Horseley, et al., "White-tailed Deer Impact on the Vegetation Dynamics of a Northern Hardwood Forest," Ecological Applications. Vol. 13, No. 1, 2003, pp98-118
14. Leonard Lee Rue III, The Deer of North America, Lyons & Burford, Publishers, New York, 1997
15. Letter and report from Doug Dufford (IDNR) to D. Jansen, May 25, 2001