FOREST PRESERVE DISTRICT OF WILL COUNTY

POPULATION MANAGEMENT PROGRAM

FOR

WHITE-TAILED DEER

2010

DRAFT

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EXECUTIVE SUMMARY

The Forest Preserve District of Will County prepared this Draft Deer Management Plan to assess the need to management deer populations within the forest preserve system, evaluate the feasibility of known management options, and evaluate the suitability of existing preserves for implementing different management options. Following public review and comment on the Draft Plan, the District will develop and implement strategies to manage white-tailed deer.

White-tailed deer (*Odocoileus virginianus*) are an important component of the biodiversity within our region and are found in every habitat type in Will County. Over the past few decades, rapid growth and development of open space and agricultural areas have eliminated and fragmented remaining suitable deer habitat. Deer populations have been concentrated into increasingly smaller areas, resulting in an over-abundance of deer that is out of balance and beyond the ability of habitats to sustain them without significant consequences to the health and quality of our natural ecosystems, to the health of the deer and to human safety.

The impacts caused by over-abundant deer have been widely studied and the need to reduce deer herd sizes is a generally accepted best management practice. As excessive deer numbers reach their upper limit within a habitat and increase the browse pressure, the diversity and vigor of the vegetation decline, in turn reducing the ability of the vegetation to sustain the same number of deer, in turn reducing the health and the survivorship of the deer. Studies have shown that excessive browsing by deer result in negative impacts to the vegetation and the habitat by the loss of ground layer vegetation, altering species composition, and impacts to other wildlife that require a diverse forest understory for forage, nesting and cover. Overabundant deer also result rate in higher rates of vehicle-deer collisions, and may also increase the rates of spread and occurrence of diseases that affect deer or people such as chronic wasting disease and tick-borne lyme disease, respectively.

Beginning in the early 1990s District staff began to notice deer browse lines in several forest preserves. In 1993 the District began to document the number of deer in the forest preserve system using aerial surveys. These preliminary results indicated a higher deer density than the generally accepted density of 20 deer per square mile. The District also wanted to determine if higher deer numbers actually resulted in impacts to the vegetation within the affected habitats. As early as 1996, several studies were initiated to study the impacts of deer browsing on woodland vegetation and individual plant species by using paired exclosures (sampling vegetation protected from deer browsing and comparing to control plots not protected from browsing). In all of the studies, overbrowsing by deer was shown to negatively impact a variety of habitat features including the loss of shrub species, growing predominance of small maples in direct relation to the loss of oaks which are a preferred food source, and the loss of flowering and seed reproduction in various ground layer plant species.

Based on studies completed to date on Will County forest preserves, research indicates that many sites have excessive deer densities and are experiencing negative impacts from the browse pressure. This suggests that deer populations in Will County forest preserves need to be pro-actively managed and maintained at population levels compatible with healthy and diverse ecosystems, and human safety. Taking a pro-active approach to deer management is aligned with one of the District's core purposes - to steward its public lands. Good stewardship means

comprehensively managing the viability and sustainability of the ecosystems under the District's charge. To this end, the goal of the District's deer management program is to establish and maintain white-tailed deer populations that allow for a sustainable relationship between biological diversity and habitat structure through comprehensive research, monitoring, education, and effective management.

At the start-up of the deer management program, the initial target deer density would be based on the best general scientific information, which currently identifies 20 deer per square mile as the maximum number that an area can support without changes to the composition and structure of the habitat. Program objectives specify tasks that will determine deer densities, assess vegetation conditions, define the extent of deer management needed to accomplish the goal at a given preserve and identify public information efforts to enhance understanding of the need to manage deer.

The District evaluated eight options to reduce and control deer herd, including: no action; repellents; fencing; relocation; fertility control; predator reintroduction; public hunting; and sharp shooting. Based on this analysis, sharpshooting and public hunting were determined to be the most feasible management options with the highest potential to meet the District's deer management program goal.

An analysis was completed to identify preserves most suitable for a deer management program and using the most feasible culling methods, sharpshooting and a public hunting program. All existing forest preserves were evaluated based on six criteria (ownership, compatible use, annexation status, acreage, suitable adjacent land use buffer and deer density). This analysis identified 24 forest preserves that are not suitable for deer management, 16 preserves that are suitable for sharp shooting, 14 preserves suitable for archery hunting and 8 preserves suitable for firearms hunting. This is a dynamic preserve list that will change as more information becomes available or as the status of preserve management, ownership or resource management goals change.

The District identified operational considerations in administering a deer management program utilizing both public hunting and sharpshooting with public safety as the top priority. With respect to the public hunting program, considerations include property size and layout, number of hunters that can be safely accommodated, weapon type, deer densities, and any other local factors that could affect public safety or program success. With respect to sharpshooting, the intent is to implement it in preserves where hunting is not feasible or prohibited, or where deer densities are substantially high and hunting alone is not able to reduce deer herd populations. The number of preserves that are managed for deer in the inaugural year will depend on the culling methods approved and implemented within the available staff and budget resources.

Once the management program has been in effect for a few years, the target deer density per square mile is expected to change as a result of ongoing monitoring that will collect and assess data on deer population levels, habitat recovery, and deer management program effectiveness. The results of the monitoring program will be used to modify and adapt management strategies and targets to existing conditions and insure the ongoing effectiveness of the deer management program.

INTRODUCTION

The white-tailed deer (*Odocoileus virginianus*) is the largest mammal commonly found in a variety of natural and human-modified habitats throughout Will County. Like populations across North America, white-tailed deer (deer) were nearly extirpated in this region in the early 20th century. At that time conservation measures were enacted to protect deer and throughout its range, populations have recovered from these historic lows.

By the latter half of the 20th century, the loss of most natural predators, reduced hunting pressure and the deer's naturally high reproductive capacity have allowed populations to increase. The continued conversion of open space for agricultural, residential and commercial uses to meet growing human needs have decreased suitable deer habitat and have concentrated deer into smaller areas. Combined, these changes have resulted in an over-abundance of deer that is out of balance and beyond the ability of habitats to sustain them without significant consequences to the health and quality of our natural ecosystems, to the health of the deer and to human safety.

Impacts resulting from over-abundant deer populations have been studied extensively by numerous researchers and the need to reduce deer herd sizes is widely accepted (Szafaoni, 1990, Storm, 2002, and Keyser, 2005). Excessive deer browsing can exert significant influence on ecosystems, often causing undesirable shifts in, or adverse impacts on a site's ecology. Research has shown deer browsing can affect plant species composition and recruitment (the replacement of individuals in a population), reduce the diversity of woody and herbaceous plants or natural communities, alter community structure, and reduce habitat availability for other animals.

In the absence of active intervention, excessive deer numbers will result in potentially irreversible changes to existing habitats, many of which represent the last remaining remnants of the natural ecosystem types and plant communities that once covered the Will County landscape. Additional impacts include elevated occurrences of vehicle on deer collisions, increased transmission of parasite and disease to other deer and humans, economic losses in agricultural operations, and destruction of ornamental landscaping and residential garden plantings.

Areas particularly vulnerable to deer browse impacts exist where deer numbers have increased unchecked, and suitable habitat is limited across a fragmented landscape. This situation exists in many northeastern Illinois forest preserves, especially in highly urbanized or rapidly developing areas such as Will County. Since 1993, information gathered from several studies conducted within Will County forest preserves indicate that many sites have excessive deer densities and are experiencing negative impacts from the browse pressure. This suggests that deer populations in Will County forest preserves need to be pro-actively managed and maintained at population levels compatible with healthy ecosystems and human safety.

The purpose of this deer management plan is to:

- Review the natural history and ecology of deer with respect to browse impacts and associated population management principles;
- Review of research studies documenting deer impacts;
- Propose goals and targets for the deer management and monitoring program;
- Identify different techniques/options for managing deer populations;

- Provide a detailed analysis for the preferred deer management options;
- Conduct a suitability analysis for implementing deer management within the Forest Preserve District of Will County's (District) preserve system; and
- Provide public information strategies that foster an understanding of the need to reduce deer populations and create a favorable environment for implementing a deer management program.

FOREST PRESERVE DISTRICT MISSION

The District was established in 1927 to "acquire…and hold lands containing one or more natural forests or parts thereof or land or lands connecting such forests or parts thereof, or lands capable of being forested, or capable of being restored to a natural condition; for the purpose of protecting and preserving the flora, fauna, and scenic beauties within such district, and to restore, restock, protect, and preserve the natural forests and such lands together with their flora and fauna, as nearly as may be, in their natural state and condition, for the purpose of the education, pleasure, and recreation of the public" (70ILCS805/5).

The District's mission supports this statutory mandate: to protect, conserve, enhance, and promote Will County's natural heritage for the educational, recreational, and environmental benefit of present and future generations. This is accomplished by acquiring, managing, restoring, developing and interpreting a well-balanced system of forest preserves that is governed by various ordinances and policies adopted by the Forest Preserve Board of Commissioners (Board) including, but not limited to General Use Ordinance 124 and the Preserve Planning and Land Use Policy.

One of the District's core functions is to steward its public lands. Good stewardship means taking a holistic approach to the overall health and sustainability of the ecosystems under the District's charge. This is best accomplished by conserving the diversity of native flora and fauna through the management, restoration, or reconstruction of natural habitats and natural plant communities on District preserves. These exist in District-owned dedicated Illinois nature preserves and District sanctuary or resource areas that include natural plant communities and habitats that harbor endangered or threatened species, or physical features and species that are uncommon, rare, or unique to Will County. The District's natural resource management program applies standard accepted techniques designed to protect, maintain, or restore the natural processes that sustained our ecosystems at the oldest documented benchmark in time – just prior to European settlement. Although today's environmental conditions may no longer support all of the ecosystems that were originally present, the presettlement time frame serves as a valuable reference point that shapes restoration and management goals and actions.

KEY CONCEPTS AND DEFINITIONS

Most conservationists acknowledge that protecting ecosystems by acquiring and setting aside land is not enough to preserve intrinsic natural features; some form of active management is necessary to sustain ecosystems and biological diversity over time. This is especially relevant to

small areas or preserves that persist as isolated remnants or islands surrounded by a "sea" of cultural landscapes that have been intensively modified to meet human needs. Most of these preserve "islands" harbor indigenous species that cannot survive in the surrounding modified landscape. Management is both the process and action involving some degree of intervention or manipulation of natural resources to achieve defined end results.

There are many ecological and resource management terms appearing throughout this document, and are defined below to insure consistency in usage and understanding.

An **ecosystem** consists of an assemblage of biological organisms (plants, animals and microorganisms) within a given area, the physical environment that sustains it and their interactions. Ecosystems have three fundamental attributes: composition, structure and function. Composition includes the components or elements (e.g. species) that inhabit the ecosystem. Structure is the spatial arrangement or pattern of the components. Function refers to the dynamic interactions between components, and result in transfer of energy and cycling of nutrients within and that sustain an ecosystem. A **landscape** consists of a mosaic of two or more ecosystems that exchange organisms, energy and nutrients.

A closely related concept to ecosystem function is **ecological processes or functions.** These include the functions described above, but also include natural disturbances (such as fire or wind throws) that create different habitat patches allowing utilization by a wider variety of organisms, or unique physical substrates that provide habitat for rare or highly specialized species.

A **natural community** is the sum total of the biotic organisms within their physical environment. For example a forest ecosystem may have several natural communities such as upland forest and floodplain forest, each of which may occur on different substrates such as sand, gravel, bedrock or silt loam. A **plant community** is an assemblage of representative plant species requiring similar habitat conditions within a specific area. For example an upland forest natural community may have several plant communities, such as red oak-white oak, white oak-hickory or sugar maple-basswood. **Habitat** refers to the dwelling place of an organism or community that provides the requisite conditions for its life processes.

Biological diversity or biodiversity encompasses the composition, structure and function of nature. It is the diversity of life in all its forms, and at all levels of organization including genetic, species, communities and ecosystems. It is the richness, abundance and variability of plant species, animal species, communities, and ecosystems (biotic environment) in relation to the ecological processes and interactions that link them with one another and with physical features such as air, soil and water (abiotic environment).

Ecosystem integrity or **authenticity** encompasses the level of biodiversity present and reflects the number of species, natural communities or ecosystem types as well as the quality of these features (see below). Integrity also encompasses the degree to which ecological functions are intact and are resilient to external disturbance or influence to sustain an ecosystem over time. As a result there is a close relationship between management and the functional attributes of ecosystems, with important implications in how they are managed for "naturalness" and "natural variability".

Ecological or natural community quality is assessed by the presence or absence of characteristic plant species that respond in predictable ways to disturbance type, frequency and intensity. All ecosystems and natural communities thrive on some amount of natural disturbance intrinsic to its function and persistence over time. Ecosystem degradation, damage or destruction results when an external disturbance exceeds natural intrinsic disturbance levels in terms of the scale, intensity or frequency. Disturbances such as clearing, farming, browsing/grazing, draining or ditching outright destroy natural habitat. If the disturbance is less intense or less frequent, a natural community may survive intact but with altered or impaired functions or structure. The result is a loss of plant species, as a higher number of disturbance intolerant species are replaced by a lower number of disturbance tolerant species. High quality natural communities have a low level of disturbance, intact ecological functions, and a high degree of ecological integrity characterized by high biodiversity, including rare or uncommon species.

Native plants or animals are indigenous to this region. **Non-native** or **exotic** plants or animals are not indigenous to the region or more typically to North America. Exotics thrive in disturbed habitats, displace native species, and provide poor to unsuitable habitat conditions for wildlife. **Conservative** species are typically a measure of ecological quality because these species are only found in intact, high quality natural communities, are intolerant of disturbance, and cannot persist in human-modified habitats.

Ecological restoration is the process of assisting the recovery of an ecosystem altered, damaged or degraded either directly or indirectly by human activities, or by extreme natural agencies such as wildfire, floods, or storms. It is an intentional action that initiates or accelerates ecosystem recovery with respect to its health, integrity and sustainability.

NATURAL HISTORY AND ECOLOGY OF WHITE-TAILED DEER

The white-tailed deer is native to most of North America, Central America, and South America as far south as Peru. In the United States, it is most common east of the Rocky Mountains. Based on the fossil record, white-tailed deer have been in existence for approximately 4.5 million years. Although historic deer numbers are not known, the National Park Service estimates that between 23 million and 40 million deer inhabited North America prior to European settlement.

Commercial exploitation, unregulated hunting and poor land use practices such as deforestation depressed the U.S. white-tailed deer population to about 300,000 by 1930; populations in Illinois were nearly extirpated by the early 20th century. At that time conservation measures, including prohibitions on commercial exploitation and regulated hunting programs, were enacted to allow populations to recover to sustainable levels. Recent estimates put the current U.S. population at around 30 million.

Deer are generalists and can adapt to a wide variety of habitats. While often thought of as a forest animal, deer can equally adapt to prairie, savanna, and woodland habitats, frequently utilizing edges between habitat types. Urbanization is the single greatest threat to deer habitat since the ice age.

Male deer (buck) in North America usually weigh between 150 to 300 pounds. The female (doe) usually weighs between 100 to 200 pounds. Deer can live for ten years or more, and females typically reach reproductive maturity at around two years old. Females can reach sexual maturity earlier at very low population densities. Females normally enter estrus ("rut") in late October or early November. Bucks will attempt to copulate with as many females as possible. Females give birth to one to three young (fawns) in mid to late spring.

Deer are ruminants with four chambered stomachs. Each chamber has a specific function allowing consumption of a variety of foods throughout the seasons. Deer commonly forage on legumes, tree leaves and stems, grasses, acorns, fruits, and corn, and are known to preferentially select certain more palatable and readily digestible food types and species.

Deer communicate in several ways. Bucks use their antlers to strip bark off of small diameter trees to mark territory and polish their antlers. Bucks also use their front hooves to scrap the ground down to bare soil, often occurring in patterns known as scrape lines. These behaviors are typically used in conjunction with the placement of secreted scents or urine to mark territories. Both does and bucks will snort, often to signal danger to other members of the herd. Grunting produces a low, guttural sound used to attract the attention of other deer in the area.

Studies have shown that excessive browsing by an overabundance of deer can result in: reduced diversity of woody and herbaceous plants or natural communities (Augustine 1997); modified vertical structure in the forest understory (Keyser 2005); extirpation of palatable plant species (Marquis and Brenneman 1981, Rooney and Waller 2003); reduced reproductive potential in rare plants (Anderson 1994); negative impacts to other fauna that require the forest understory or complete community composition for forage, nesting and cover (deCalesta 1994); and a decline in deer herd health as a result of competition for decreasing food resources (Etter 2001, Williams and Miller 2003). Collectively these impacts contribute to a decline in ecosystem function, biological diversity and ecosystem integrity in natural areas, ecologically sensitive areas and the surrounding landscape.

Other conservation organizations have recognized the need to manage deer populations. Chicago Wilderness (CW), a regional conservation alliance of 250 public agencies and organizations in the Chicagoland area, has identified overabundance of deer as a major factor negatively effecting biodiversity. As a result, CW is developing a position statement on white tailed deer management that supports reducing herd sizes and public involvement in the management effort. This position statement will be considered for formal adoption by CW in the coming months. In 2005, the Illinois Nature Preserves Commission approved guidelines for reducing white-tailed deer populations in dedicated nature preserves acknowledging the adverse impacts caused by high deer densities.

DEER POPULATION MANAGEMENT PRINCIPLES

The maximum population size that the environment can support in a given area is limited predominantly by food, habitat and water availability. This number is generally referred to as the biological carrying capacity (BCC) and varies by species. BCC is virtually impossible to

estimate and will vary regularly depending on food availability. With respect to deer populations, the BCC can be accurately determined only after it has been exceeded (DePerno et al. 2000). Habitat conditions are already in decline even before the BCC is reached. Managing at the BCC for one species will allow it to exist at high levels to the detriment of the habitat and other species inhabiting the same area. This approach is incompatible with the District's mission.

Cultural carrying capacity (CCC) is a similar concept, but one which acknowledges the desire to maintain a balanced species composition and habitat structure within a given ecosystem. Deer densities at the CCC are less than densities at the BCC. Establishing target deer densities at the CCC can be influenced by many perceived needs, including hunting and viewing opportunities, economic losses, public safety issues, and the impacts deer have on habitats and ecosystems (Missis and Peyton 1995).

Many land management agencies utilize a density of 20 deer per square mile or less as their target. For example, the Lake County Forest Preserve District uses a goal of 15 deer per square mile in their management program, and the DuPage County Forest Preserve District had reduced their deer densities to an average of less than 20 per square mile by 2009 at the 11 preserve areas at which they manage deer populations. The National Park Service identified a target density of 15 deer per square mile in the environmental impact statement for the deer management plan at the Indiana Dunes National Lakeshore area. The U.S. Department of Agriculture Animal and Plant Health Inspection Services recommended removing as many deer as possible from the Robert B. Gordon Natural Area in Pennsylvania, acknowledging that a density of even 5 deer per square mile posed a threat to the 150 acre site.

The ideal approach to managing an over abundant deer population is using two phases. The first or reduction phase is focused on removing large numbers of deer from a given population to reduce it to the identified target density. The second or population maintenance phase involves long term control activities to prevent the population from expanding significantly above the target density. A target density can be static or adjusted based on site or population management goals. Research has shown that culling <28% of a suburban deer population in one year was insufficient for maintaining the target density the following year due to the high reproduction and survival rates and the low dispersal levels of the local population (Etter et. al. 2001). Therefore, following the initial reduction phase, at least 28% of the deer population should be culled annually to maintain target densities.

SUMMARY OF DEER IMPACT STUDIES

District staff began a deer monitoring program after observations of increasing deer populations and browse pressure, and the desire to correlate deer numbers with changes in vegetation quality and rising deer-human interactions. What follows is a detailed summary of relevant studies, either conducted by District staff, allied researchers, or professional ecologists hired by the District to document deer impacts in Will County forest preserves.

The overabundance of deer creates public safety concerns with respect to deer vehicle accidents. Included in this section is a summary of deer-vehicle collision data for Will County.

Aerial Surveying

Aerial counts are widely considered the most effective method to estimate deer populations and have been completed during the winter months most years since 1993. The number of preserves surveyed annually has varied over the duration of the monitoring.

Staff counted deer from a helicopter most years between 1993 and 2008 at altitudes between 200-600 feet. Survey crews of two or more persons counted deer December through March ideally when the snow is less than three days old and at least three inches deep, and the absence of foliage allowed better visibility. Survey boundaries include District owned or managed preserves and adjacent properties containing contiguous habitat between which deer are known to travel based on trails and observed movement patterns. Staff coordinated their counts while flying in a series of transects enumerating deer on one side of the helicopter while the pilot maintained altitude and followed pre-designated equally spaced transects. Property boundaries observed from the air were confirmed on aerial photographs and used to calculate the area (square miles) surveyed. Deer density for a given area was estimated by dividing the number of deer counted by the area surveyed.

Conclusions: The number of deer counted at a given preserve over the monitoring period has fluctuated, increasing at some sites while remaining relatively consistent at others, but rarely decreasing significantly. Fluctuations between counts are expected due to differences in mortality and reproductive success, or to differences in survey effort and effectiveness. Poor visibility and limitations associated with helicopter operation, particularly the need to refuel, do influence the survey data and may result in less or more area being surveyed from year to year.

With the exception of the Forsythe Woods portion of the Forked Creek Greenway (surveyed only once), all of the preserves and greenway systems surveyed have an average deer density well above the widely accepted maximum of 20 deer per square mile over the history of the survey. Many sites consistently show a density that is two, three or more times greater than this preferred maximum. The recent population trends (the average of the last three survey events) compared to the average of all those completed previously, indicate that deer populations in most District preserves (79%) is increasing or has remained relatively consistent, but at high densities. For those preserve areas showing a decreased density in recent years, only one (Laughton Preserve) has an average density considered to be sustainable without causing negative plant community impacts. However, this preserve has not been surveyed since 2000 so current conditions may not be accurately reflected in the data.

Sites: Survey boundaries were subject to change over time due to development, land acquisition, pilot and funding availability, and suitable weather conditions. Below is a table summarizing the documented deer densities at priority sites with currently known browse concerns. See Appendix A for the complete population monitoring data compiled to date.

Table 1. Average Density of White-tailed deer per square mile

Area	Average of All Surveys*	Average of Last 3 Surveys**
Plum Valley Greenway	63	74
Raccoon Grove Preserve	39	33
Thorn Creek Woods Preserve	63	71
Upper Spring Creek Greenway	39	65
Hickory Creek Preserve	41	47
Braidwood Dunes and Savanna Preserve	22	24
Sandridge Savanna Preserve	74	50
Lockport Prairie Preserve	67	68
Romeoville Prairie Preserve	44	54
McKinley Woods Preserve	134	153

*1993-2008 **2000-2008

Browse Studies

Following are summaries of five studies that were designed either to assess general vegetation changes over time or to assess specific impacts of deer browse at the level of individual species or plant communities.

1. *Woody Vegetation Changes in Four Will County, Illinois Forest Preserves*

Timeline: 1976, 1997
Purpose & Process: Bowles et. al. (1997) studied four high quality woodland preserves to assess changes in woody vegetation over an interval of twenty years. Preserves were sampled to investigate if an apparent increase in shade tolerant species (e.g. maples), a decline of oak trees, and loss of understory species was having a negative impact on biodiversity.

Sites previously sampled during the 1976 Illinois Natural Areas Inventory (INAI) were re-sampled using the same methods (transects and equally spaced sampling points). Data from the two years was compared to determine if any significant changes in basal area, tree density or understory tree and shrub density had occurred which could alter the future composition and structure of these communities and complicate management efforts to maintain the oak dominated stands.

Conclusion: The results showed different patterns of change in tree basal area and stem densities across the different stands, but a consistent change in stem densities associated with a decline in mid-size oaks, loss of shrub species, and an increase in smaller sized maples. The researchers concluded that the likely reduction of disturbance regimes intrinsic to ecosystem function (such as fire, selective clearing) allowed the forest canopy to close and become more favorable for shade tolerant species such as maple, and less favorable for shade intolerant species such as oaks. Over browsing by deer has contributed to these shifts by reducing the abundance and diversity of tree and shrub species.

Sites: Messenger Woods Nature Preserve, Raccoon Grove Nature Preserve, Thorn Creek Woods Nature Preserve, and Pilcher Park (owned by the Joliet Park District) were included in the study.

2. Woody Vegetation Changes and Groundlayer Species Richness in Northeastern Illinois Upland Forests

Timeline: 1976, 1997

Purpose & Process: Similar to the "Woody Vegetation Changes in Four Will County Preserves" study, but expanded to include woodland stands throughout Northeastern Illinois. The purpose was to quantify the changes and processes affecting the composition and ground cover in regional upland forests.

Twenty-eight locations were sampled; comparisons were made of maple and oak stands and the understory vegetation that were originally identified and classified during the 1976 Illinois Natural Areas Inventory. Sampling was done in plots nested within the tree stand boundaries and two random transects were created at each site with twenty equally spaced sampling points. In 1997, at each point overstory trees were sampled for basal area and canopy density. Understory trees and shrubs were measured using density and diameter of stem measurements at alternating points along transects.

Conclusion: Bowles et. al. (1998) concluded that the quality of each site had declined and was supported by evidence of the loss of structural and biological diversity, canopy reduction and soil degradation and erosion. Maple stem densities and basal area increased in both lower and upper size classes in maple and red oak stands. Substantial declines occurred across all stands for density and basal area of mid-size oaks, and for density and species richness of shrub layer vegetation. Maple stands had the lowest total and plot herbaceous species richness, with white oak stands having values almost twice those of maple stands, while red oaks stands had intermediate values. The authors suggested that three major causes were behind the observed changes; ecological succession, changes in the fire regime and over-browsing by white-tail deer. The authors recommended further monitoring, re-evaluating fire management regimes to represent a more natural or historical process and monitoring and managing white-tail deer populations in order to prevent the heavy over-browsing.

Sites: The study sites were located as follows: 8 sites in Lake county; 4 sites in Kane County; 4 sites in Cook County; 4 sites in DuPage county; and 4 sites in Will Co.

3. Thorn Creek Woods Nature Preserve Exclosure Study

Timeline: 1996, 2004

Purpose & Process: Observations of dramatic differences between shrubs, saplings and herbaceous plants within and outside of deer exclosures originally constructed by Bowles et. al. in 1996 prompted this study. Thirteen small exclosures and two large exclosures in two different areas were used for the original study. In 2004, the same areas were re-sampled using $1m^2$ plots inside and outside the exclosures to quantify the effects of deer browse over the eight year period (Haulton 2004).

Conclusion: The results show that deer have negatively impacted the height and abundance of herbaceous and woody species at Thorn Creek Woods. In general, herbaceous species were more abundant and taller inside exclosures than outside. Five species were found only in deer exclosures including blue phlox and woodland sunflower. Inside the exclosures, ten shrub species were observed flowering, while only three species were found flowering in the open plots. In the area with the two large exclosures, eight herbaceous species were significantly more abundant inside the exclosures. None of these species were found flowering outside exclosures, while all but two were observed flowering inside exclosures during sampling. Deer also appear to be impacting the recruitment of woody seedlings (< 1ft) into the sapling size class (1 – 6 ft). Only two saplings of a single species were found in open plots compared to 243 saplings of twelve species inside the exclosures.

Site: Thorn Creek Woods Nature Preserve

4. District Browse Study

Timeline: 2006 - 2008

Purpose & Process: Previous studies showed that excessive browse pressure from high deer densities resulted in undesirable changes within a few District sites. This study was initiated to expand the investigation to additional sites being impacted by deer browse and to confirm earlier findings through a systematic approach across all subject sites. The study was designed to identify the specific deer impacts, such as species preferential browsing and the influence on reproductive success.

Browse pressure was monitored using $6m^2$ exclosures protected from deer by chain link fencing six feet in height. Each exclosure was paired with a nearby reference plot of identical size that remained open to deer browse. Fencing allowed free passage of small and medium sized animals such as rabbits so that any observed differences associated with browsing could be attributed strictly to deer. Sixty-six deer exclosures were installed at seven District preserves. Data were collected from exclosures and reference plots in the summers of 2006, 2007, and 2008, and analyzed to assess impacts within site and between sites. Baseline conditions were considered to be from 2006 as the exclosures were constructed during the previous winter during the dormant season.

Conclusion: Results suggest that after only three years of reduced deer browse, many of the exclosures demonstrated statistically significant improvements in herbaceous and woody vegetation health, but are not yet fully recovered from many years of high deer browse pressure (AECOM 2010). Some general findings show that certain woody species including oaks, hickories, and dogwoods were browsed preferentially within the preserves, with seedlings occurring only within the exclosures in some cases. The data also showed that as deer density increases, there is a concomitant increase in saplings less than one foot high, but a decrease in woody stems greater than one foot in height (i.e. few individuals are allowed to grow larger than one foot). When considered along with the preferential browse results, the study demonstrated that with high deer densities, few desirable native trees grow to be large enough to escape deer browse and eventually replace older trees in the canopy of the woodland. Instead, less desirable tree species such as ash and maple, which are not heavily browsed, are becoming more

prominent. This is evidence that a shift in the tree species composition is underway, which if continued, will alter the habitat structure since different species provide different branching patterns, canopy coverage and other characteristics.

Despite the relatively short duration of the study, herbaceous ground layer vegetation also experienced significant changes from deer browse. In most cases the ratio of flowering to non-flowering plants decreased in the reference plots and increased within the exclosures over the course of the study. This confirms that herbaceous plants inside the exclosures generally exhibited greater reproductive success than those subject to deer browse. This study also found that browse preference often differs among locations, but there are some plant species experiencing greater browse pressure than their abundance would suggest at nearly every site on which they were found. For example, orange jewelweed was preferentially browsed at every area it was found and side-flowering aster was preferentially browsed at all but one of the woodland sites it was found. The data indicate several species of aster and enchanter's nightshade are being significantly depressed while other species including clustered black snakeroot, woodland smartweed and honewort are showing increasing dominance throughout the woodlands because they are among the least browsed species.

While not enough time has elapsed to document statistically meaningful results related to species diversity, trends in the data suggest that as browse pressure continues, the groundlayer vegetation will continue to transition from diverse conservative species to a small number of common and less palatable species, and a decline in the intermediate shrub layer. The ongoing changes in species composition will alter the vegetation structure and limit the availability of resources for deer and other wildlife to survive. Specific examples include reductions in mast production (e.g. acorns and fruit) and preferred forage species; reductions in flower availability and diversity for pollinating insects which places more stress on those populations; reductions in nesting habitat for mid-level nesting forest interior birds such as the Wood Thrush; and increased colonization by invasive species through reduced competition. Conversely, if browse pressure is reduced, ecosystem recovery is likely.

While the findings described above are common to the study sites, there were many site specific observations too numerous to discuss here. These site specific differences reflect variations in plant community types, plant species composition and diversity, and other characteristics that make each ecosystem unique.

Sites: Braidwood Dunes and Savanna Nature Preserve; Goodenow Grove Nature Preserve; Hickory Creek Preserve; Messenger Woods Nature Preserve; Raccoon Grove Nature Preserve; Sandridge Savanna Nature Preserve; and Thorn Creek Woods Nature Preserve.

5. Messenger Woods Large-flowered Trillium Herbivory Study

Timeline: 2001-2007

Purpose & Process: Large-flowered Trillium is a highly conservative long-lived perennial of moist woodlands. In response to observations of a significant population decline, three study units around high density populations of Large-flowered Trillium were identified in 2001 to assess the impacts of deer herbivory on plant flowering and reproduction rates.

Within each of the three study units, ten $1m^2$ exclosures and ten $1m^2$ open plots were distributed randomly. Data were sampled annually from all sixty plots from 2002 to 2007 during the estimated peak-bloom in late April and/or early May. In each plot the height of flowering and non-flowering individuals was measured and the number of flowering and non-flowering adults, juveniles, and the herbivorized individuals tallied.

Conclusion: Monitoring activities show deer herbivory is affecting large-flowered trillium populations at Messenger Woods Nature Preserve (Haulton 2007). The most dramatic evidence was observed during the 2007 season when no flowering trillium were observed in the open plots of units 1 and 2, while flowering trillium abundance in closed plots remained unchanged. Over the entire course of the study, significant declines in flowering trillium were observed in the open plots of Units 1 and 3, while significant increases were observed in the closed plots of Units 1 and 2. Furthermore, in Unit 1 declines were observed in the abundance of adult trillium (flowering and non-flowering individuals) in open plots but not in closed plots. Results from this six year study agree with the findings of other research on large-flowered trillium and woodland forbs which showed a shift towards shorter individuals with lowered flowering rates when exposed to excessive deer browse pressure (Anderson 1994, Augustine and Frelich 1998).

Site: Messenger Woods Nature Preserve

Deer-Vehicle Collisions

Improved public safety is another consideration supporting the development of a deer management program. Between 1997 and 2007 (except 2006), the Illinois Department of Transportation reported that Will County has ranked among the top seven counties in Illinois for total number of vehicle on deer collisions, ranging from 405 in 1998 to 601 in 2006 (2008 and 2009 data not yet available). When adjusted to account for the county population size over this same time period, Will County has ranged between 8.1 to 9.9 collisions per 10,000 people. When compared to other northeastern Illinois counties (Cook, DuPage, Kane and Lake), only Kane county has averaged more collisions per capita. It is interesting to note that of these counties, those that have implemented a deer control program (Cook and DuPage) have averaged 1.6 and 2.4 collisions per capita respectively over the same time period. While many factors come into consideration when assessing the frequency and rate of vehicle on deer collisions, it is reasonable to assume that implementing a deer management program would only reduce this risk and improve public safety.

In 2008, the Joint Task Force on Deer Population Control, as created by House Joint Resolution 65 of the 95th Illinois General Assembly, submitted a report containing recommendations on ways to manage the Illinois deer population, primarily to reduce the number of vehicle on deer collisions. Their recommendations focused on increasing the number of deer harvested through legal hunting activities. Some of the specific recommendations included extending deer hunting seasons, making hunting permits more readily obtainable, and providing support for improving hunter access to private lands.

MANAGEMENT PROGRAM GOAL AND OBJECTIVES

The District's management program goal reflects the accepted deer management principles previously reviewed, and acknowledges the need to address known and potential adverse browse impacts to District ecosystems, natural communities, and sensitive species populations. These impacts are specific to the vegetation because this is the fundamental ecosystem attribute that supports food chains and habitat suitability for all other organisms.

This District's deer management program goal is to:

> Establish and maintain white-tailed deer populations that allow for a sustainable relationship between biological diversity and habitat structure through comprehensive research, monitoring, education, and effective management.

Meeting this goal requires Staff to establish a measure, in this case, a target deer number and associated deer density for District preserves. These target numbers will be influenced by several factors including but not limited to natural area quality or vulnerability, presence of rare or vulnerable plant or animal populations, preserve size, extent of habitat types preferred by deer, and potential for adverse impacts to site management efforts.

At the start-up of the management program, the initial target deer density would be based on the best general scientific information, which currently identifies 20 deer per square mile as the maximum number that an area can support without changes to the composition and structure of the vegetation from excessive browsing. Once the management program has been in effect for a few years, the target deer density could be modified based on site specific data; this is because vegetation recovery will take several years after reducing deer browse pressure. This target deer density should be sustained and in balance with the site's cultural carrying capacity.

The program objectives specify tasks that will determine deer densities, assess vegetation conditions, and define the extent of deer management needed to accomplish the goal at a given preserve. The objectives also identify public information efforts to enhance understanding of the need to manage deer, and insuring staff remains aware of the current science to conduct the program in the most effective and efficient manner possible.

The District's management program objects are to:

1. Utilize aerial deer population surveys to regularly monitor the density of deer residing within a given preserve.
2. Complete regular floristic surveys at the community and/or population levels to determine current conditions and allow for an assessment of change from previous conditions.
3. Conduct deer browse studies utilizing exclosures or other methods to assess the extent to which the current conditions and differences from previous conditions can be attributed to browsing pressure from white-tailed deer.
4. Maintain a current understanding of potential management techniques that can be used to efficiently and effectively achieve target deer densities.

5. Provide information to stakeholders on aspects of natural area and deer ecology, including management options, economic aspects and recreational opportunities.
6. Ensure that all necessary resources are available to support the proper management of deer in District preserves.

POPULATION MANAGEMENT OPTIONS

The District is at a critical juncture in regard to deer management. Research strongly suggests the need to reduce deer herd sizes within District preserves to restore and sustain healthy and diverse ecosystems and natural communities. Staff's professional opinion is that the District needs to develop a comprehensive deer management program.

There are a variety of management options, both non-lethal and lethal, currently in practice across the United States to reduce and control deer herds. Each of these options achieves different levels of population control, has applicability in different environmental situations, and has an associated cost/benefit. To better inform, evaluate and select the most effective option(s) in meeting the District's deer management goal, the following is an overview of all available management options regardless of feasibility.

No Action Option

There are ecosystem impacts and costs associated with the "no-action" approach to deer management. In the absence of balanced predator-prey relationships or active management, deer herds will increase until they reach the upper limit at which they can be sustained by local habitats. Herds at the upper density limit are in relatively poor health and prone to cyclic population fluctuations including local herd decimation. As browse pressure on the vegetation increases and degrades the habitat, the ability of the vegetation to continue to support the same number of deer (and other species) declines which in turn reduces the health and the survivorship of the deer. When restoring natural communities and habitats, significant resources are invested by planting large quantities of desirable plants. Deer can easily overwhelm the site and prevent the establishment of planted material, reducing the success of the restoration efforts and the loss of invested resources.

Adopting a "no-action" policy is in conflict with resource management goals focused on the maintenance and restoration of natural areas, providing sustainable wildlife populations and habitats, and is often not compatible with human land-use practices and values (New England Chapter of the Wildlife Society 2008). Some significant implications of a no action approach to deer management include:

- The creation or maintenance of an unnecessary public safety risk through high rates of vehicle on deer collisions;
- Excessive damage to agricultural crops;
- Increased rates of spread and occurrence of diseases that affect deer or people such as chronic wasting disease, tick-borne lyme disease, blue-tongue disease (epizootic hemorrhagic disease), and Babesiosis (malaria-like disease);
- Loss of rare plant species due to overbrowsing; and
- Reduced wildlife populations due to changes in habitat suitability.

The "no-action" alternative is only appropriate if monitoring indicates that current deer densities are not in conflict with site management or land use goals. For example, the goals on some public lands focus narrowly on recreational use or aesthetics. Under these circumstances, active deer management may not be necessary to achieve site goals (Angelo 2009).

Repellent Option for Deer Management

Effective repellent programs have limited utility. They require frequent applications because rapidly growing shoots quickly outgrow protection and repellents weather rapidly. Spray repellents can only be applied effectively during mild weather, so their value during winter months is restricted. Repellents can create plant damage concerns, often have legal restrictions limiting application, can cause equipment problems (heavy binding agents and repellent slurries often clog equipment), and can create concerns associated with noxious and/or unaesthetic product residues.

Repellents would be cost prohibitive for use in most natural areas. Repellents vary in cost from $25 to $45 per gallon, which would treat approximately 200 small trees or shrubs. Repellents are usually not recommended for field crops because of their high cost, limitations on use, and variable effectiveness. Repellent performance seems to be negatively correlated with deer density since repellents can perform well under moderate browse pressure or at small scales, but may be ignored by deer when alternative food resources are scarce or the area to be protected is too large to allow for appropriate application.

Repellents may reduce deer impacts on a particular area, but they do not address deer population abundance. As a consequence, they are best employed within the context of a comprehensive deer management program. District use of repellents would be most appropriate on very small areas to temporarily protect landscape plantings until established or demonstration and educational project sites in the vicinity of facilities and program locations.

Fencing Option for Deer Management

Fencing can provide effective and long-term protection against deer browse impacts but is often not feasible. This method prevents the ingress of deer and could aid with local population control measures, but also interferes with or prevents the movement of other wildlife. Additionally, many people would perceive fencing as a distraction from the aesthetic values of their natural areas. Other difficulties include road, stream, and utility right's-of-way that traverse the proposed fence line and make the creation of a reliable barrier extremely difficult.

The cost to install miles of fencing to protect all of the natural areas of concern is extremely high. When used, the most effective design includes chain link or high-tensile woven wire fencing six to eight feet in height and well bolstered to discourage deer from pushing through or jumping over the fence. Use of less durable fencing material is more prone to failure. Contractors bidding on recent District fencing projects have charged around $12 per linear foot to construct chain link fences. At a larger scale, costs could easily exceed $50,000 a mile. Costs increase if fence lines require clearing, which is not compatible with most site management goals. Unless regular inspections and maintenance activities are performed (which also generate

ongoing costs) any breach in the fence would allow deer to enter the protected area and reverse any progress that has been made toward habitat recovery .

The use of fencing to manage deer impacts within the Forest Preserves is not considered a feasible solution for most areas. It would be most appropriate for use only on very small areas (less than one acre) to temporarily protect newly planted trees and shrubs until established, or around demonstration project sites and educational program locations where deer browse could have concentrated impacts on very small areas of greater concern or value (Creacy 2006).

Deer Relocation Option

This option involves deer capture by trapping, netting or immobilizing, and relocating to another site. This technique's popularity results from the public's perception that it poses no risk to human safety and is a legitimate non-lethal solution to deer overabundance problems. Contrary to this perception, deer often experience physiological trauma during capture and transportation, and relocation frequently results in high mortality rates for deer (Jones and Witham 1990, Ishmael et. al. 1995). Mortality after relocation within the first year has ranged from 25-89% (Jones and Witham 1990) from a wide range of causes. O'Bryan and McCullough (1985) found that only 15% of radio-collared black-tailed deer that were live-captured and relocated from Angel Island, California, survived for one year after relocation.

Numerous studies have shown that live-capture and deer relocation is expensive relative to other options, very time consuming, and generally inefficient (O'Bryan and McCullough 1985, Jones and Witham 1990, Ishmael et al. 1995). A chemical capture method (via darts) requires specialized training and skill, and has a limited range (less than 40 yards) at which deer can be effectively hit. Thus, chemical capture is far less efficient, more labor intensive, and much more costly than lethal removal with rifles.

The identification of suitable receptor sites for deer in urbanized areas and the resolution of the liability concerns associated with relocation are extremely difficult. Many relocated deer will settle in suitable suburban or agricultural habitats and create nuisance problems for those communities and landowners. Relocated deer are likely to move over great distances as they attempt to find available habitat or avoid competition with resident deer herds. These movements would require frequent crossings of roadways and increases the risk associated with vehicle on deer collisions. Studies have shown that vehicle on deer collisions is one of the most frequent causes of mortality in relocated deer. High mortality rates of relocated deer, combined with the manner in which many of these animals die, make it difficult to justify relocation as a humane and responsible alternative to other control methods. Most conservation agencies discourage relocating deer because of the stress to the animal, poor survival rates, potential for disease transfer, and difficulties in adapting to new locations or habitats.

Fertility Control Option

The use of contraceptives to regulate deer populations is in an experimental phase and would be subject to regulatory approval. State and federal regulatory authorities have not approved chemical or biological agents for deer contraception use, nor will the Illinois Department of Natural Resources (IDNR) issue permits to harvest deer using contraceptive techniques.

Deer contraceptive measures can be grouped into four categories: surgical sterilization, oral contraception, hormone implantation, and immunocontraception (the use of contraceptive vaccines). Sterilization could be accomplished through surgical procedures (vasectomy, castration, and tubal ligation), chemosterilization, and gene therapy. Surgeries need to be conducted by licensed veterinarians and carries a high potential for mortality resulting from infection. Contraception could be accomplished through hormone implantation (synthetic steroids such as progestins), immunocontraception (contraceptive vaccines), and oral contraception (progestin administered daily). Most of these techniques require that individual deer receive multiple or possibly daily treatment to successfully prevent conception.

Using current contraceptive technology as a deer management tool has extremely limited feasibility because it does not effectively treat a wide-spread, highly mobile, free ranging population; it requires treatment of a large number of individual animals. Currently, a one shot treatment does not exist so effective treatment requires multiple or potentially dangerous treatments. These requirements place considerable logistic and economic constraints on the use of reproduction control technologies.

Predator Reintroduction Option

Coyotes (*Canis latrans*), bobcats (*Lynx rufus*), and black bears (*Ursus americanus*) are currently the principle deer predators within most of the eastern United States. Coyotes and bobcats already occur in Will County, although in the case of bobcats, at very low population levels. While these predators are undoubtedly important sources of annual fawn mortality, research has shown that predation is not sufficient to reduce high population densities. This is further evidenced by the fact that coyote populations have increased and expanded their range during the past 20 years, but deer populations have also increased in these same areas.

The excessive deer populations occurring throughout most of Will County and the resulting decline in ecosystem integrity demonstrate that the current levels of natural predation alone are insufficient to be an adequate control mechanism. Predators such as wolves (*Canis sp.*) and mountain lions (*Puma concolor*) which historically had ranges in Illinois are more effective at controlling population densities of large ungulates. However, reintroduction of these predators within suburban areas is not feasible because of unsuitable habitat availability and human safety concerns.

Regulated Hunting Option

For centuries, deer hunting by Native Americans contributed significantly to deer population control. In recent decades, regulated hunting has proven to be an ecologically sound and fiscally

responsible method of managing deer populations. As deer overabundance issues have become more common, controlled hunts have been successful in several protected areas across the United States. Controlled hunting sometimes results in lower deer harvest rates when compared to other deer control measures. However, this technique has also been shown to increase deer wariness toward humans, possibly alleviating some nuisance problems (Sage et al. 1983, Kilpatrick and Lima 1999). Hunting is the only method with potential to generate revenue for landowners or communities. Costs associated with controlled hunts (support staff wages, administration, and equipment) usually range from $75 to $100 per harvested deer in Texas, which can be recovered with hunter fees.

Current Status of Hunting in Will County

Deer hunting occurs on both private and public lands. While no data exist exclusively for Will County, a recent IDNR report ("Summary of Hunter and Land Owner Survey, Information Relevant to Public Access to Private Land, August 27, 2009") provides limited information. Typically, local farmers may provide hunting opportunities on private lands in Will County to immediate family, relatives and friends rather than the general public. Local farmers may also keep their farm closed to hunting for reasons of safety and security. The closer farmers were to urban areas, the less likely they were to permit any hunting on their property.

In Will County deer hunting is allowed on 10,000 acres of federal and state public land in three locations: the Des Plaines State and Fish Wildlife Area; the Des Plaines Game Propagation Center; and the Midewin National Tallgrass Prairie (Illinois Department of Natural Resources, Illinois Digest of Hunting and Trapping Regulations 2009 – 2010).

Data provided by IDNR demonstrate a great interest in deer hunting opportunities among Will County residents. For 2009, IDNR reported 7,315 hunting licenses sold to Will County residents for deer, turkey, waterfowl and other game. Of those licenses sold in 2009, 6,905 (94%) were for deer firearms and 289 (4%) were for deer archery. The 10-year average of deer firearm licenses sold to Will County residents is 5,878 while the 10-year average of deer archery licenses is 252. What is not known is whether those Will County residents with hunting licenses hunted within Will County. IDNR's data do not indicate if the demand for licenses among Will County residents exceeded the supply of available licenses that IDNR was willing to issue any given year. If this limitation existed, it has been remedied because IDNR recently made changes to their permitting system to allow the issuance of more licenses.

Table 2. IDNR Deer Hunting Licenses Issued to Will County Residents

	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Deer Firearm	4,406	4,592	4,485	5,213	5,926	6,549	6,630	6,970	7,111	6,905
Deer Archery	218	211	239	219	267	283	240	278	284	289

IDNR also tracks annual archery and firearm harvests for each county. Between 2000 and 2008, Will County hunters harvested an average of 1,253 deer during firearm (359) and archery (894) seasons combined. The longer duration of the archery season accounts for the greater number of deer harvested as compared to firearms.

Archery season typically begins on October 1 each year and continues on up to 3.5 months. For 2009, the season ran from October 1, 2009 to January 17, 2010 or 109 days. The reported preliminary 2009 archery harvest was 956; an average of 8.7 deer/day. Firearm season is much shorter and more effective for reducing local deer herd populations. In 2009, there were 19 days in October, November, December and January for firearm opportunities including handgun, shotgun, muzzleloader and youth firearm days. The reported preliminary 2009 firearm harvest was 398; an average of 20.9 deer/day. The following table illustrates the number of deer harvested in Will County by both archery and firearm.

Table 3. Will County Archery and Firearm Harvest 2000-2009

Year	Archery	Firearm	Total
2000	812	269	1081
2001	836	261	1097
2002	805	260	1065
2003	934	272	1206
2004	984	346	1330
2005	922	460	1382
2006	894	510	1404
2007	952	443	1395
2008	911	414	1325
2009	956	398	1354

Through regulated hunting, IDNR biologists strive to maintain deer populations at desirable levels or to adjust them in accordance with biological and social needs. This is done by manipulating the size and sex composition of the harvest through hunter bag limits and the issuance of antlerless permits, season type, season timing, season length and the number of permits issued.

Regulated Hunting Program Considerations

Before planning and implementing a hunting program within suburban areas, several factors need to be addressed including safety considerations, competing land-use priorities, legal constraints, and social values. These factors will influence the hunting techniques employed. Considerations include property size and layout, number of hunters that can be safely accommodated, weapon type, deer densities, and any other local factors that could affect the success of the program or public safety. Regardless of weapon type, elevated hunting stands are commonly used so that the ground is used as a backstop for the projectile (DeNicola et al. 2000). Archery hunting has been the preferred method within many residential areas due to the weapon's limited shooting range and relative silence (Lund 1997, Ver Steeg et al. 1995), however, it is commonly perceived to result in higher wounding losses and increased travel distances before deer succumb to their injury (Kilpatrick and Walter 1999). This could lead to possible conflicts with nearby residents and should be considered prior to implementing this technique. Shotgun hunting is another alternative to high-velocity rifles, due to the weapon's limited effective range (Kilpatrick et al. 2002). Hunter success can be improved with this method by employing rifled gun barrels with sights or scopes (DeNicola et al. 2000).

Sharpshooting Option

A typical sharpshooting program involves the systematic culling of deer by skilled marksmen who are highly trained professionals or other individuals who satisfy the marksmen standards as certified through IDNR. A sharpshooting program is useful in urban and suburban areas that have insufficient open space to support traditional regulated deer hunting programs and where local municipal ordinances prevent the discharge of firearms.

IDNR has regulated deer population control for the past 20 years. This program is conducted on a relatively localized basis under authority of special Deer Population Control Permits (DPCPs). DPCP permits are issued separately from annual individual hunting season permits. DPCPs authorize deer control by non-traditional methods, and are issued to agencies, organizations, associations and municipalities, but not to individual landowners. DPCPs are issued for a maximum of 90 days, although time extensions are possible. There is no limit on the number of deer that can be taken, but the proposed number must be justified and documented.

The application process for DPCPs requires submission of a deer management proposal documenting the need for deer herd reduction by nontraditional means such as sharpshooting. Prevailing objectives for current deer control programs under DPCPs are to: reduce deer damage to crops, ornamental vegetation, natural plant communities or ecosystem restoration projects; reduce number of deer-vehicle accidents on area roadways or active taxiways/runways; or reduce deer damage complaints from residents or neighbors.

All sharpshooter candidates must be tested and seasonally-approved by IDNR prior to program implementation. There is no limit on the number of sharpshooters, but all sharpshooters, who are Illinois residents, must also have a valid Illinois Firearms Owner's Identification (FOID) card. The permit applicant can elect to take deer at bait stations via sharpshooters. To insure public safety, all proposed shooting or bait sites must be viewed and approved by IDNR prior to their use.

Techniques authorized under DPCPs require that the resulting deer carcasses are suitable for human consumption. The permittee is required to have all usable deer carcasses processed at a State or Federally-licensed meat processing facility and to donate the processed venison to a bonafide charitable organization. Unusable deer carcasses must be disposed of in accordance with the Illinois Dead Animal Disposal Act. Since deer collected under DPCPs must be used for human consumption, most DPCP programs take place during the cooler late fall and winter months (November to March).

DPCPs will not authorize the use of archery equipment, handguns, muzzle-loading rifles, etc. Only modern rifles or shotguns will be permitted for sharpshooting programs. DPCPs will not be issued for experimental techniques (e.g. sterilization or immunocontraception) or for the live-capture and translocation of deer. The permittee must return all unused tags along with a deer removal summary within 30 days after permit expiration. The removal summary must list the tag number, location, sex, age and physical condition of each animal collected; the total amount of processed venison donated; and the names of the charities receiving the donated meat. The permittee is responsible for all costs associated with the deer control program.

Management Options – Conclusion

Of the management options presented, Staff considers both sharpshooting and public hunting as the most viable management tools with the highest potential to achieve the District's deer management program goal.

PRESERVE SUITABILITY ANALYSIS

A Preserve Suitability Analysis was developed and completed by District staff to determine preserves that are most suitable for a deer management program and the most suitable methods, including a culling by sharp shooters and a public hunting program. All existing forest preserves were evaluated based on six criteria that categorize sites into one of the two management protocols and to identify those preserves in which deer management would not be permitted due to public safety concerns. The criteria include ownership, compatible use, annexation status, acreage, suitable adjacent land use buffer and deer density. In some cases the criteria were adjusted to narrow the focus of the evaluation and to aid categorization of preserves. This analysis results in dynamic list of preserves conforming to the criteria in each category. As more information becomes available or the status of preserve management, ownership or resource management goals change, the lists may adapted to move preserves from one category to another. In general, preserves fall into four program categories as follow:

Restricted Sites

- Regional Trails
- Preserves less than 30 acres
- Preserves in which the District does not have full ownership and/or are restricted by easement, lease, license or management agreements from conducting wildlife management
- As a result of this analysis 24 preserves, or portions of preserves, fell into this category

Management Sites – Sharp Shooting Program

- Preserves greater than 30 acres
- Preserves lying within municipalities
- Preserves with sensitive natural resources that could be impacted by off trail use or which contain elements which could be dangerous off trail.
- Preserves with established or estimated deer densities exceeding the established program goal.
- As a result of this analysis 16 preserves, or portions of preserves, fell into this category

Management Sites – Archery Hunting Program

- Preserves greater than 70 acres
- Preserves lying outside of municipalities or within municipalities that allow archery hunting (Channahon, Joliet, Park Forest, Plainfield and Shorewood). Preserves with established or estimated deer densities exceeding the established program goal.

- As a result of this analysis 14 preserves, or portions of preserves, fell into this category

Management Sites – Firearm Hunting Program

- Preserves greater than 70 acres
- Preserves lying outside of municipalities or within municipalities that allow the discharge of a firearm for hunting (Shorewood).
- Preserves with established or estimated deer densities exceeding the established program goal.
- As a result of this analysis 8 preserves, or portions of preserves, fell into this category

Preserve Categorization

Restricted Sites

Preserves were restricted from the program based on three criteria; ownership, incompatible use and size or property configuration as defined below:

Ownership: Potential management sites must be owned by the District. Leased and managed lands are not owned by the District, cannot be guaranteed to be in its control, and cannot be recommended for deer management without further review and concurrence of the land owner. In addition, properties pending acquisition are restricted because they are currently under negotiation or are under contract, but they are not owned by the District; and, conservation easements are restricted since they are not owned by the District nor does the District typically have wildlife management rights.

Incompatible Use: Regional trail systems where public access is difficult to control.

Size/Configuration: Properties less than 30 acres is size and those where a minimum 100 yard interior property boundary cannot be established are restricted from deer management activities. The 100 yard buffer is based on IDNR safety zones for bow and arrow hunting and is intended to protect adjacent property owners from being impacted by deer management activities and to provide a visual screen to adjacent owners or roadways.

Table 4 shows all preserves that are unsuitable for including in the deer management program because of restrictions based on any of the above criteria. Highlighted cells indicate criteria which are met, and cells that are not highlighted indicate criteria which eliminated preserves from consideration.

Table 4. Restricted Sites

	Preserve	Criteria		
		Ownership	Use	Acreage
	A site needs to meet all these criteria.	Owned	Compatible	> 30
	Alessio Prairie	Owned	Compatible	12.43
	Black Walnut Creek Preserve (part)	Pending	Compatible	37.58
	Centennial Trail	Leased	Incompatible	285.46
	Hammel Woods (part)	Pending	Compatible	9.40
	Hastert-Bechstein Preserve	Owned	Compatible	18.39
	Heritage Trail	Leased	Incompatible	90.64
	Isle a la Cache Preserve (part)	Leased	Compatible	5.94
	Joliet Junction Trail	Owned	Incompatible	52.51
	Kraske Preserve	Owned	Compatible	3.30
	Lake of the Woods	Owned	Compatible	11.00
	Lily Cache Wetlands	Pending	Compatible	144.03
	Lockport Prairie Nature Preserve	Leased	Compatible	326.98
	Old Plank Road Trail	Owned	Incompatible	132.21
	Operations & Law Enforcement Facility	Owned	Compatible	7.10
	Prairie Bluff Preserve	Leased	Compatible	628.01
	Romeoville Prairie Nature Preserve (part)	Leased	Compatible	116.38
	Runyon Preserve	Owned	Compatible	20.88
	Teale Woods	Owned	Compatible	13.96
	Thorn Creek Woods (part)	Managed	Compatible	711.24
	Thorn Grove Preserve	Pending	Compatible	20.99
	Vermont Cemetery	Owned	Compatible	25.87
	Vincennes Trail	Owned	Incompatible	6.09
	Wauponsee Glacial Trail	Owned	Incompatible	298.18
	Wolf Creek Preserve	Owned	Compatible	16.00

Management Sites – Sharp Shooting Program

Preserves were categorized into a District Administered Sharp Shooting Program based on six criteria; ownership, annexation status, size and property configuration and deer density and natural resource management activity as defined below:

Ownership: Potential management sites must be fully or partially owned by the District. Some preserves have small portions that are leased or managed which will require additional agreements with owners or restrictions on deer management

Annexation Status: Most Will County municipalities have restrictions on the discharge of fire arms by the public within their jurisdictions however they do allow removal of

deer associated with a nuisance wildlife program. Preserves entirely within a municipality will need to be managed through a District Administered Culling Program. Preserves with a majority of acreage within a municipality or where un-annexed portions are not easily accessible will be included in the culling program as well.

Size: Properties greater than 30 acres are included in this category

Configuration: Properties require a minimum 100 yard interior property boundary to protect adjacent property owners from being impacted by deer management activities and to provide a visual screen to adjacent owners or roadways.

Deer Density & Impacts – Properties where deer impacts have been observed and recorded or deer density exceeds the District's established target of 10-20 deer per square mile based on aerial census data.

Active Management – Properties that the District is actively engaged in management or restoration of natural resources included wetland, prairie, savanna and woodland management or restoration sites.

Preserves assessed by the criteria for a District Sharp Shooting Program are shown in Table 5. Highlighted cells indicate criteria which are met, and cells that are not highlighted indicate criteria which eliminated preserves from consideration. Any preserve which did not meet all six criteria is considered ineligible for the Sharp Shooting Program. Any preserve which did meet all criteria is shown in bold type for easier recognition.

Table 5. Management Sites – Sharp Shooting Program

Preserve	Criteria					
	Ownership	**Annexation Status**	**Acreage**	**100yd Buffer**	**Deer Density & Impacts**	**Active Management**
A site needs to meet all these criteria.	Owned	Jurisdiction	≥ 30	Y	Y	Y
Birds Junction Marsh	Owned	County	56.87	Y	Unknown	Y
Black Walnut Creek Preserve (part)	Owned	County	63.31	Y	Unknown	N
Braidwood Dunes Nature Preserve	**Owned**	**County**	**309.51**	**Y**	**Y**	**Y**
Briscoe Mounds	Owned	Channahon	34.81	Y	Unknown	N
Caton Farm Preserve	Owned	Various	35.00	Y	Unknown	N
Colvin Grove	Owned	Joliet	173.13	Y	Y	N
Deer Creek Preserve	Owned	County	34.25	Y	Y	N
Donohue Grove	Owned	County	194.69	Y	Unknown	N
DuPage River Confluence Preserve	Owned	Various	439.28	Y	Unknown	N
Evans Judge Preserve	Owned	County	176.50	Y	Unknown	N
Fiddyment Creek Preserve	Owned	Homer Glen	270.89	Y	Unknown	N
Forked Creek Preserve	Owned	Various	781.68	Y	N	N
Goodenow Grove Nature Preserve	**Owned**	**County**	**893.55**	**Y**	**Y**	**Y**

Table 5. Management Sites – Sharp Shooting Program (continued)

Preserve	Criteria					
	Ownership	Annexation Status	Acreage	100yd Buffer	Deer Density & Impacts	Active Management
A site needs to meet all these criteria.	Owned	Jurisdiction	> 30	Y	Y	Y
Hadley Valley Preserve	Owned	Various	679.87	Y	Unknown	Y
Hammel Woods (part)	Owned	Various	407.27	Y	Unknown	N
Hickory Creek Preserve	**Owned**	**Various**	**1515.99**	**Y**	**Y**	**Y**
Hunters Woods	Owned	County	40.86	Y	Unknown	Y
Hyuck's Grove	Owned	County	491.99	Y	Unknown	N
Isle a la Cache Preserve (part)	**Owned**	**Romeoville**	**87.63**	**Y**	**Y**	**Y**
Jackson Creek Preserve	Owned	County	372.94	Y	Unknown	Y
John Wesley Preserve	Owned	County	269.34	Y	Unknown	N
Joliet Iron Works Historic Site	Owned	Joliet	54.74	N	Unknown	N
Kankakee Sands Preserve	**Owned**	**County**	**524.49**	**Y**	**Y**	**Y**
Keepataw Preserve	**Owned**	**Various**	**237.34**	**Y**	**Y**	**Y**
Lambs Woods	Owned	County	72.22	Y	Unknown	N
Lake Chaminwood	Owned	County	120.85	Y	Unknown	N
Lake Renwick Nature Preserve	Owned	Plainfield	452.14	Y	Unknown	Y
Lake Renwick Preserve	Owned	Various	497.49	Y	Unknown	Y
Laughton Preserve	Owned	County	495.00	Y	N	N
Lily Cache Wetlands (part)	Owned	Various	49.90	Y	Unknown	Y
Lockport Prairie East	Owned	Lockport	31.04	Y	Unknown	Y
Lower Rock Run Preserve	Owned	Various	369.34	Y	Unknown	N
McKinley Woods	**Owned**	**Various**	**486.90**	**Y**	**Y**	**Y**
Messenger Marsh	**Owned**	**Homer Glen**	**610.65**	**Y**	**Y**	**Y**
Messenger Woods Nature Preserve	**Owned**	**Various**	**436.18**	**Y**	**Y**	**Y**
Moeller Woods	Owned	County	160.80	Y	Unknown	N
Monee Reservoir	Owned	County	252.31	Y	N	Y
O'Hara Woods	Owned	Various	52.92	Y	Unknown	N
Plum Valley Preserve	**Owned**	**County**	**451.02**	**Y**	**Y**	**Y**
Plum Valley Ravines	**Owned**	**County**	**805.59**	**Y**	**Y**	**Y**
Potowatomi Woods	Owned	County	121.51	Y	Unknown	Y
Prairie Creek Preserve	Owned	County	119.00	Y	Unknown	N
Raccoon Grove Nature Preserve	**Owned**	**County**	**211.17**	**Y**	**Y**	**Y**
Riverview Farmstead	Owned	Various	71.38	Y	Unknown	Y
Rock Run Preserve	Owned	Various	317.93	Y	Unknown	Y
Rock Run Rookery	Owned	Joliet	199.67	Y	Unknown	N

Table 5. Management Sites – Sharp Shooting Program (continued)

Preserve	Criteria					
	Ownership	Annexation Status	Acreage	100yd Buffer	Deer Density & Impacts	Active Management
A site needs to meet all these criteria.	Owned	Jurisdiction	> 30	Y	Y	Y
Romeoville Prairie Nature Preserve (part)	**Owned**	**Various**	**314.06**	**Y**	**Y**	**Y**
Sand Ridge Savanna Nature Preserve	**Owned**	**County**	**494.00**	**Y**	**Y**	**Y**
Sugar Creek Administration Center	Owned	County	159.58	Y	Unknown	Y
Sugar Creek Preserve – Zalar Woods	Owned	Various	295.58	Y	Unknown	N
Sauk Trail Reservoir	Owned	Frankfort	222.84	Y	Unknown	Y
Theodore Marsh	Owned	Various	282.23	Y	Unknown	Y
Thorn Creek Headwaters	Owned	Various	420.57	Y	Unknown	N
Thorn Creek Woods Nature Preserve (part)	**Owned**	**Various**	**271.40**	**Y**	**Y**	**Y**
Thorn Grove Preserve (part)	**Owned**	**County**	**130.00**	**Y**	**Y**	**Y**
Veterans Woods	Owned	County	77.17	Y	Y	N
Walnut Hollow	Owned	County	203.26	Y	Unknown	N
Wayne Lenert Preserve	Owned	County	80.00	Y	Y	N
Whalon Lake Preserve	Owned	Various	210.77	Y	Unknown	Y

Management Sites – Archery Hunting Program

Preserves were categorized in the District Administered Archery Hunting Program based on six criteria; ownership, annexation status, size and property configuration, deer density and natural resource management activity as defined below:

Ownership: Potential management sites must be fully or partially owned by the District. Some preserves have small portions that are leased or managed which will require additional agreements with owners or restrictions on deer management

Annexation Status: Most Will County municipalities have restrictions on the use of bow and arrow or discharge of fire arms by the public within their jurisdictions however they do allow removal of deer associated with a nuisance wildlife program. Preserves entirely within a municipality will need to be managed through a District Administered Culling Program. Preserves outside of municipalities or within the City of Joliet or Villages of Channahon, Park Forest, Plainfield and Shorewood which allow the use of bow and arrow for hunting and may be considered for a Public Archery Hunting Program
Size: Properties greater than 70 acres are included in this category

Configuration: Properties require a minimum 100 yard set back from an occupied dwelling to comply with State of Illinois hunting guidelines for archery hunting. The

District has modified this set back to a 100 yards from any property boundary for the archery hunting program to protect adjacent property owners from being impacted by deer management activities and to provide a visual screen to adjacent owners or roadways.

Deer Density & Impacts – Properties where deer impacts have been observed and recorded or deer density exceeds the District's established target of 10-20 deer per square mile based on aerial census data.

Active Management – Properties that the District is actively engaged in management or restoration of natural resources including wetland, prairie, savanna and woodland management or restoration sites.

Preserves assessed by the criteria for a District Archery Hunting Program are shown in Table 6. Highlighted cells indicate criteria which are met, and cells that are not highlighted indicate criteria which eliminated preserves from consideration. Any preserve that did not meet all six criteria is considered ineligible for the Archery Hunting Program. Any preserve which did meet all the criteria is shown in bold type for easier recognition.

Table 6. Management Sites – Archery Hunting Program

Preserve	Criteria					
	Ownership	Annexation Status	Acreage	100yd Buffer	Deer Density & Impacts	Active Management
A site needs to meet all these criteria.	Owned	Jurisdiction	> 70	Y	Y	Y
Birds Junction Marsh	Owned	County	56.87	Y	Unknown	Y
Black Walnut Creek Preserve (part)	Owned	County	63.31	Y	Unknown	N
Braidwood Dunes Nature Preserve	**Owned**	**County**	**309.51**	**Y**	**Y**	**Y**
Briscoe Mounds	Owned	Channahon	34.81	Y	Unknown	N
Caton Farm Preserve	Owned	Various	35.00	Y	Unknown	N
Colvin Grove	Owned	Joliet	173.13	Y	Y	N
Deer Creek Preserve	Owned	County	34.25	Y	Y	N
Donohue Grove	Owned	County	194.69	Y	Unknown	N
DuPage River Confluence Preserve	Owned	Various	439.28	Y	Unknown	N
Evans Judge Preserve	Owned	County	176.50	Y	Unknown	N
Fiddyment Creek Preserve	Owned	Homer Glen	270.89	Y	Unknown	N
Forked Creek Preserve	Owned	Various	781.68	Y	N	N
Goodenow Grove Nature Preserve	**Owned**	**County**	**893.55**	**Y**	**Y**	**Y**
Hadley Valley Preserve	Owned	Various	679.87	Y	Unknown	Y
Hammel Woods (part)	Owned	Various	407.27	Y	Unknown	N
Hickory Creek Preserve	**Owned**	**Various**	**1515.99**	**Y**	**Y**	**Y**

Table 6. Management Sites – Archery Hunting Program (continued)

Preserve	Criteria					
	Ownership	Annexation Status	Acreage	100yd Buffer	Deer Density & Impacts	Active Management
A site needs to meet all these criteria.	Owned	Jurisdiction	>70	Y	Y	Y
Hunters Woods	Owned	County	40.86	Y	Unknown	Y
Hyuck's Grove	Owned	County	491.99	Y	Unknown	N
Isle a la Cache Preserve (part)	Owned	Romeoville	87.63	Y	Y	Y
Jackson Creek Preserve	Owned	County	372.94	Y	Unknown	Y
John Wesley Preserve	Owned	County	269.34	Y	Unknown	N
Joliet Iron Works Historic Site	Owned	Joliet	54.74	N	Unknown	N
Kankakee Sands Preserve	**Owned**	**County**	**524.49**	**Y**	**Y**	**Y**
Keepataw Preserve	**Owned**	**Various**	**237.34**	**Y**	**Y**	**Y**
Lambs Woods	Owned	County	72.22	Y	Unknown	N
Lake Chaminwood	Owned	County	120.85	Y	Unknown	N
Lake Renwick Nature Preserve	Owned	Plainfield	452.14	Y	Unknown	Y
Lake Renwick Preserve	Owned	Various	497.49	Y	Unknown	Y
Laughton Preserve	Owned	County	495.00	Y	N	N
Lily Cache Wetlands (part)	Owned	Various	49.90	Y	Unknown	Y
Lockport Prairie East	Owned	Lockport	31.04	Y	Unknown	Y
Lower Rock Run Preserve	Owned	Various	369.34	Y	Unknown	N
McKinley Woods	**Owned**	**Various**	**486.90**	**Y**	**Y**	**Y**
Messenger Marsh	Owned	Homer Glen	610.65	Y	Y	Y
Messenger Woods Nature Preserve	**Owned**	**Various**	**436.18**	**Y**	**Y**	**Y**
Moeller Woods	Owned	County	160.80	Y	Unknown	N
Monee Reservoir	Owned	County	252.31	Y	N	Y
O'Hara Woods	Owned	Various	52.92	Y	Unknown	N
Plum Valley Preserve	**Owned**	**County**	**451.02**	**Y**	**Y**	**Y**
Plum Valley Ravines	**Owned**	**County**	**805.59**	**Y**	**Y**	**Y**
Potowatomi Woods	Owned	County	121.51	Y	Unknown	Y
Prairie Creek Preserve	Owned	County	119.00	Y	Unknown	N
Raccoon Grove Nature Preserve	**Owned**	**County**	**211.17**	**Y**	**Y**	**Y**
Riverview Farmstead	Owned	Various	71.38	Y	Unknown	Y
Rock Run Preserve	Owned	Various	317.93	Y	Unknown	Y
Rock Run Rookery	Owned	Joliet	199.67	Y	Unknown	N
Romeoville Prairie Nature Preserve (part)	**Owned**	**Various**	**314.06**	**Y**	**Y**	**Y**
Sand Ridge Savanna Nature Preserve	**Owned**	**County**	**494.00**	**Y**	**Y**	**Y**

Table 6. Management Sites – Archery Hunting Program (continued)

Preserve	Criteria					
	Ownership	Annexation Status	Acreage	100yd Buffer	Deer Density & Impacts	Active Management
A site needs to meet all these criteria.	Owned	Jurisdiction	>70	Y	Y	Y
Sugar Creek Administration Center	Owned	County	159.58	Y	Unknown	Y
Sugar Creek Preserve – Zalar Woods	Owned	Various	295.58	Y	Unknown	N
Sauk Trail Reservoir	Owned	Frankfort	222.84	Y	Unknown	Y
Theodore Marsh	Owned	Various	282.23	Y	Unknown	Y
Thorn Creek Headwaters	Owned	Various	420.57	Y	Unknown	N
Thorn Creek Woods Nature Preserve (part)	**Owned**	**Various**	**271.40**	**Y**	**Y**	**Y**
Thorn Grove Preserve (part)	**Owned**	**County**	**130.00**	**Y**	**Y**	**Y**
Veterans Woods	Owned	County	77.17	Y	Y	N
Walnut Hollow	Owned	County	203.26	Y	Unknown	N
Wayne Lenert Preserve	Owned	County	80.00	Y	Y	N
Whalon Lake Preserve	Owned	Various	210.77	Y	Unknown	Y

Management Sites – Firearm Hunting Program

Preserves were categorized in the District Administered Firearm Hunting Program based on six criteria; ownership, annexation status, size and property configuration, deer density and natural resource management activity as defined below:

Ownership: Potential management sites must be fully or partially owned by the District. Some preserves have small portions that are leased or managed which will require additional agreements with owners or restrictions on deer management

Annexation Status: Most Will County municipalities have restrictions on the discharge of fire arms by the public within their jurisdictions however they do allow removal of deer associated with a nuisance wildlife program. Preserves entirely within a municipality will need to be managed through a District Administered Culling Program. Preserves outside of municipalities or within the Village of Shorewood which allow the discharge of firearms may be considered for a Public Hunting Program

Size: Properties greater than 70 acres are included in this category

Configuration: Properties require a minimum 300 yard set back from an occupied dwelling to comply with State of Illinois hunting guidelines for firearm hunting. The District has modified this set back to a 300 yards from any property boundary to protect adjacent property owners from being impacted by deer management activities and to provide a visual screen to adjacent owners or roadways.

Deer Density & Impacts – Properties where deer impacts have been observed and recorded or deer density exceeds the District's established target of 10-20 deer per square mile based on aerial census data.

Active Management – Properties that the District is actively engaged in management or restoration of natural resources including wetland, prairie, savanna and woodland management or restoration sites.

Preserves assessed by the criteria for a District Firearm Hunting Program are shown in Table 7. Highlighted cells indicate criteria which are met, and cells that are not highlighted indicate criteria which eliminated preserves from consideration. Any preserve that did not meet all six criteria is considered ineligible for the Firearm Hunting Program. Any preserve which did meet all the criteria is shown in bold type for easier recognition.

Table 7. Management Sites – Firearm Hunting Program

Preserve	Criteria					
	Ownership	**Annexation Status**	**Acreage**	**300yd Buffer**	**Deer Density & Impacts**	**Active Management**
A site needs to meet all these criteria.	Owned	Jurisdiction	> 70	Y	Y	Y
Birds Junction Marsh	Owned	County	56.87	N	Unknown	Y
Black Walnut Creek Preserve (part)	Owned	County	63.31	N	Unknown	N
Braidwood Dunes Nature Preserve	**Owned**	**County**	**309.51**	**Y**	**Y**	**Y**
Briscoe Mounds	Owned	Channahon	34.81	N	Unknown	N
Caton Farm Preserve	Owned	Various	35.00	N	Unknown	N
Colvin Grove	Owned	Joliet	173.13	N	Y	N
Deer Creek Preserve	Owned	County	34.25	N	Y	N
Donohue Grove	Owned	County	194.69	N	Unknown	N
DuPage River Confluence Preserve	Owned	Various	439.28	N	Unknown	N
Evans Judge Preserve	Owned	County	176.50	N	Unknown	N
Fiddyment Creek Preserve	Owned	Homer Glen	270.89	N	Unknown	N
Forked Creek Preserve	Owned	Various	781.68	N	N	N
Goodenow Grove Nature Preserve	**Owned**	**County**	**893.55**	**Y**	**Y**	**Y**
Hadley Valley Preserve	Owned	Various	679.87	N	Unknown	Y
Hammel Woods (part)	Owned	Various	407.27	N	Unknown	N
Hickory Creek Preserve	Owned	Various	1515.99	N	Y	Y
Hunters Woods	Owned	County	40.86	N	Unknown	Y
Hyuck's Grove	Owned	County	491.99	Y	Unknown	N
Isle a la Cache Preserve (part)	Owned	Romeoville	87.63	N	Y	Y
Jackson Creek Preserve	Owned	County	372.94	N	Unknown	Y
John Wesley Preserve	Owned	County	269.34	Y	Unknown	N

Table 7. Management Sites – Firearm Hunting Program (continued)

Preserve	Criteria					
	Ownership	Annexation Status	Acreage	300yd Buffer	Deer Density & Impacts	Active Management
A site needs to meet all these criteria.	Owned	Jurisdiction	>70	Y	Y	Y
Joliet Iron Works Historic Site	Owned	Joliet	54.74	N	Unknown	N
Kankakee Sands Preserve	**Owned**	**County**	**524.49**	**Y**	**Y**	**Y**
Keepataw Preserve	Owned	Various	237.34	N	Y	Y
Lambs Woods	Owned	County	72.22	N	Unknown	N
Lake Chaminwood	Owned	County	120.85	N	Unknown	N
Lake Renwick Nature Preserve	Owned	Plainfield	452.14	N	Unknown	Y
Lake Renwick Preserve	Owned	Various	497.49	N	Unknown	Y
Laughton Preserve	Owned	County	495.00	Y	N	N
Lily Cache Wetlands (part)	Owned	Various	49.90	N	Unknown	Y
Lockport Prairie East	Owned	Lockport	31.04	N	Unknown	Y
Lower Rock Run Preserve	Owned	Various	369.34	N	Unknown	N
McKinley Woods	**Owned**	**Various**	**486.90**	**Y**	**Y**	**Y**
Messenger Marsh	Owned	Homer Glen	610.65	N	Y	Y
Messenger Woods Nature Preserve	Owned	Various	436.18	N	Y	Y
Moeller Woods	Owned	County	160.80	N	Unknown	N
Monee Reservoir	Owned	County	252.31	N	N	Y
O'Hara Woods	Owned	Various	52.92	N	Unknown	N
Plum Valley Preserve	**Owned**	**County**	**451.02**	**Y**	**Y**	**Y**
Plum Valley Ravines	**Owned**	**County**	**805.59**	**Y**	**Y**	**Y**
Potowatomi Woods	Owned	County	121.51	N	Unknown	Y
Prairie Creek Preserve	Owned	County	119.00	N	Unknown	N
Raccoon Grove Nature Preserve	**Owned**	**County**	**211.17**	**Y**	**Y**	**Y**
Riverview Farmstead	Owned	Various	71.38	N	Unknown	Y
Rock Run Preserve	Owned	Various	317.93	N	Unknown	Y
Rock Run Rookery	Owned	Joliet	199.67	N	Unknown	N
Romeoville Prairie Nature Preserve (part)	Owned	Various	314.06	N	Y	Y
Sand Ridge Savanna Nature Preserve	**Owned**	**County**	**494.00**	**Y**	**Y**	**Y**
Sugar Creek Administration Center	Owned	County	159.58	N	Unknown	Y
Sugar Creek Preserve – Zalar Woods	Owned	Various	295.58	N	Unknown	N
Sauk Trail Reservoir	Owned	Frankfort	222.84	N	Unknown	Y
Theodore Marsh	Owned	Various	282.23	N	Unknown	Y
Thorn Creek Headwaters	Owned	Various	420.57	N	Unknown	N

Table 7. Management Sites – Firearm Hunting Program (continued)

Preserve	Criteria					
	Ownership	**Annexation Status**	**Acreage**	**300yd Buffer**	**Deer Density & Impacts**	**Active Management**
A site needs to meet all these criteria.	Owned	Jurisdiction	>70	Y	Y	Y
Thorn Creek Woods Nature Preserve (part)	Owned	Various	271.40	N	Y	Y
Thorn Grove Preserve (part)	Owned	County	130.00	N	Y	Y
Veterans Woods	Owned	County	77.17	N	Y	N
Walnut Hollow	Owned	County	203.26	N	Unknown	N
Wayne Lenert Preserve	Owned	County	80.00	N	Y	N
Whalon Lake Preserve	Owned	Various	210.77	N	Unknown	Y

DETAILED ANALYSIS OF DEER MANAGEMENT OPTIONS

Regulated Public Hunting Option

The District researched and evaluated the feasibility of operating a deer hunting program to assist in achieving resource management goals and outcomes by reducing deer numbers and browsing impacts in select preserves. For the purposes of this analysis, regulated hunting is defined as controlled deer hunts.

District staff researched Forest Preserve Districts, Conservation Districts, and Park and Recreation Departments to identify and evaluate those land management agencies providing hunting opportunities to the public. Research revealed that none of the Forest Preserve Districts permit hunting on District properties. Sharpshooters perform all deer culling activities in Forest Preserve Districts where deer management programs are in place. Only two Conservation Districts, Boone and McHenry County, in Northeastern Illinois offered hunting opportunities as well as Lake County Park and Recreation Department (Indiana). The following table provides a summary of research.

Table 8. Comparison of Counties

County	**Population** *(2008 estimates)*	**Land Area – Square Miles** *(2000 Census)*	**Persons/ Square Mile** *(2000 Census)*	**Status of Hunting in Forest Preserve Districts**	**Public Hunting Opportunities in the County**
Will	681,097	836.94	600.1	FPD does not provide hunting opportunities.	Midewin National Tallgrass Prairie DesPlaines State FWA DesPlaines Game Propagation Center

Table 8. Comparison of Counties (continued)

County	Population *(2008 estimates)*	Land Area – Square Miles *(2000 Census)*	Persons/ Square Mile *(2000 Census)*	Status of Hunting in Forest Preserve Districts	Public Hunting Opportunities in the County
Cook	5,294,664	945.68	5,683.7	FPD does not provide hunting opportunities.	
DuPage	930,528	333.61	2,707.1	FPD does not provide hunting opportunities. They do offer archery instruction however.	
Kane	507,579	520.44	777.20	FPD does not provide hunting opportunities.	
Kendall	103,460	320.58	169.9	FPD does not provide hunting opportunities.	Silver Springs S.P.
Grundy	47,958	419.90	89.4	No FPD.	Braidwood State FWA Goose Lake Prairie – Heideke Lake
Kankakee	112,524	676.75	153.40	FPD does not provide hunting opportunities.	Kankakee River S.P. Momence Wetlands Land and Water Reserve Each year in November, the IDNR hosts an Annual Physically Challenged Archery Hunt in the park.
Lake, Indiana	493,800	496.98	975.0	Parks Department provides hunting opportunities and training courses. Dove, deer, & waterfowl at Grand Kankakee Marsh County Park.	Beaver Dam Wetland Conservation Area LaSalle State FWA Badal Trust Area Conrad Savannah N.P. Kankakee Sands (TNC)
Newton, Indiana	13,933	401.85	36.2	No Park/Rec Department.	Willow Slough State FWA
Lake	712,453	447.56	1,438.3	FPD does not provide hunting opportunities.	Chain O' Lakes S.P.
McHenry	318,641	603.51	430.6	Conservation District provides hunting opportunities.	Moraine Hills S.P.
Boone	54,142	281.27	148.70	Conservation District provides hunting opportunities.	
DeKalb	106,321	634.16	140.3	FPD does not provide hunting opportunities.	
LaSalle	112,474	1,134.92	98.2	FPD in question.	Starved Rock S.P. Matthiessen S.P.
Livingston	37,681	1,043.76	38.0	No FPD or Conservation District.	
Ford	14,050	485.90	29.3	No FPD or Conservation District.	
Iroquois	30,285	1,116.43	28.1	No FPD or Conservation District.	Iroquois County State Wildlife Area

Statute and Ordinance Review

The ability of an agency such as the Forest Preserve District, to provide hunting opportunities is governed in either the organization's Statue or by Ordinance. District staff first reviewed the Downstate Forest Preserve District Act to determine if the act would prohibit the establishment of a deer-hunting program in the District. Staff also consulted the District's legal counsel, Kavanagh, Grumley & Gorbold, LLC.

Forest Preserve Districts are established by State statute. The Forest Preserve District of Will County is governed by 70 ILCS 805/Downstate Forest Preserve District Act of Illinois. Only the Cook County Forest Preserve is governed by a different statute, 70 ILCS 810/Cook County Forest Preserve District Act. Conservation Districts are governed by 70 ILCS 410/Conservation District Act.

In summary, legal counsel's review of the Downstate Forest Preserve Act as well as the District General Use Ordinance No. 124, did not reveal any provisions that would limit the ability for the District to have a deer hunting program on District property.

The Downstate Forest Preserve Act, 70 ILCS 805/8, provides that the Board of the District shall have the authority to pass and enforce all necessary ordinance, rules and regulations for the *management* of the property of the District. It is counsel's opinion that the provision to allow for the management of the property of the District would allow a deer-hunting program for the management of the population of the same.

Although the General Use Ordinance does not address this type of program, certain elements of the ordinance would require amendment to accommodate this type of activity.

Liability and Risk Management

The District is currently a member of the Park District Risk Management Agency (PDRMA). As the District's risk management agent, PDRMA is committed to seeking risk management solutions without limiting or excluding any recreational activities that are lawful and can be managed to an acceptable degree of risk. PDRMA has experience with managing hunting program risks because the McHenry County Conservation District (MCCD) is a PDRMA member that manages and operates an active hunting program.

District staff contacted PDRMA to inquire about risk management recommendations related to the District's consideration to offer controlled public hunting on District property. PDRMA's written response recommends the District consult with the Illinois Department of Natural Resources (IDNR) and MCCD to attain guidance on:

1. Managing the potential user group conflicts and safety issues that will arise with public hunting.
2. Developing specific safe distances for hunting zones away from other user groups, recreational, residential and commercial areas.
3. Developing and implementing hunting safety and educational programs as a minimum requirement for participation.

Additionally, PDRMA recommended adopting the various hunting program risk management controls used by the McHenry County Conservation District including the types of hunting allowed; establishment of specific hunting zones; participant selection process; hunting orientation and safety training requirements; and execution of waivers.

If a public hunting program is approved, the District will develop and implement hunting program risk management controls based on the recommendations of PDRMA and the MCCD.

District Preserves Potentially Suitable for Public Hunting - Archery and Firearm

Using the criteria established in the Preserve Suitability Analysis, fourteen (14) preserves are potentially suitable for archery deer hunting and eight (8) preserves are potentially suitable for firearm deer hunting. Please consult the Preserve Suitability Analysis section for complete details.

Table 9. Preserve Suitability Analysis for Archery and Firearms Hunting

Preserve	Public Access?	Suitable for Archery*	Suitable for Firearm*
Braidwood Dunes Nature Preserve	Y	x	x
Goodenow Grove Nature Preserve	Y	x	x
Hickory Creek Preserve	Y	x	
Kankakee Sands Preserve	N	x	x
Keepataw Preserve	Y	x	
McKinley Woods	Y	x	x
Messenger Woods Nature Preserve	Y	x	
Plum Valley Preserve	N	x	x
Plum Valley Ravines	N	x	x
Raccoon Grove Nature Preserve	Y	x	x
Romeoville Prairie Nature Preserve (part)	N	x	
Sand Ridge Savanna Nature Preserve	N	x	x
Thorn Creek Woods Nature Preserve (part)	Y	x	
Thorn Grove Preserve (part)	N	x	

*For setbacks and other program requirements see Hunting Programs Parameters Section below.

Program Scope – Inaugural Year

Pending Board approval, the District could implement both firearm and archery deer hunting in 2010. While there are ample opportunities throughout the District's preserve system for deer hunting (14 preserves suitable for archery and 8 preserves suitable for firearm), the District will not be able to accommodate deer hunting in every suitable preserve due to current levels of staffing and reduced resources in the current year's budget.

If a hunting program is approved, Staff will develop and apply a new set of criteria to the 14 preserves to determine the top ranking sites for program implementation. Staff will bring the

final criteria, the proposed hunting sites, and the proposed 2010 deer hunting program back to the Board for approval in May.

Criteria could include:

1. The need to reduce deer herd.
2. The ability of the preserve to offer the best and the safest configuration of hunting zones.
3. The proximity of the preserve to communities, homes, schools and regional trails.
4. The ability to provide ample deer hunting expressed in terms of high deer densities.
5. The ability of preserve to accommodate the greatest number of hunters.
6. The seasonal visitation to the preserve.

Hunters will be restricted to specific dates, times, and zones within identified preserves. Hunting will be single-point, from stands erected within zones and not by roaming through zones or preserves. To ensure the highest level of safety and reduce risk, the District must consider preserve closure during hunting activities. All hunters will be required to check in and check out with Law Enforcement during all specified hunting days to ensure safety and guarantee compliance with hunting limits and with established rules and regulations.

Hunting Program Parameters

Should the District implement a hunting program, several factors need to be addressed. Considerations include property size and layout, number of hunters that can be safely accommodated, weapon type, deer densities, and any other local factors that could affect the success of the program or public safety.

Regardless of weapon type, elevated hunting stands are commonly used so that the ground is used as a backstop for the projectile (DeNicola et al. 2000). Archery hunting has been the preferred method within many residential areas due to the weapon's limited shooting range and relative silence (Lund 1997, Ver Steeg et al. 1995), however, it is commonly perceived to result in higher wounding losses and increased travel distances before deer succumb to their injury (Kilpatrick and Walter 1999). This could lead to possible conflicts with nearby residents and should be considered prior to implementing this technique. Shotgun hunting is another alternative to high-velocity rifles, due to the weapon's limited effective range (Kilpatrick et al. 2002). Hunter success can be improved with this method by employing rifled gun barrels with sights or scopes (DeNicola et al. 2000).

Safety

Safety should be the top priority of any hunting program offered by the District and should not be compromised. PDRMA has recommended that the District consult with the IDNR and McHenry County Conservation District (MCCD) to assist in developing safe practices. Specific recommendations include:

1. Developing specific **safe distances** for hunting zones away from other user groups, recreational, residential and commercial areas.

a. Properties require a minimum 100 yard set back from an occupied dwelling to comply with State of Illinois hunting guidelines for archery deer hunting. The District has modified this set back to 100 yards from any property boundary for the deer archery hunting program to protect adjacent landowners from being impacted by hunting activities and to provide a visual screen to adjacent landowners or roadways.
b. Properties require a minimum 300 yard set back from an occupied dwelling to comply with State of Illinois hunting guidelines for firearm hunting. The District has modified this set back to a 300 yards from any property boundary to protect adjacent property owners from being impacted by hunting activities and to provide a visual screen to adjacent owners or roadways.

2. Managing the potential **user group conflicts** and safety issues that will arise with public hunting.
    a. The criteria that will be applied to the 14 preserves suitable for archery or hunting, or both will address (1) the proximity of the hunting activities to schools, and businesses and (2) the preserve visitation during the established hunting season.
    b. The District will establish a hot line in which the public can report illegal hunting, injured deer, or other emergencies.
    c. The District will develop a public information program for property owners adjacent to preserves in which hunting may be permitted. The program will include meetings, fact sheets, special notifications, and evaluations.
    d. The District will need to close preserves and post appropriate signage.

3. Developing and implementing **hunting safety and educational programs** as a minimum requirement for participation.
    a. As per IDNR regulations, all hunters born on or after January 1, 1980, must show proof that they have successfully completed the Hunter Education Course provided by the IDNR or show previous year's hunting license.
    b. Pending program approval, the District will establish a mandatory hunter orientation meeting for all program participants. The 2-hour program will be administered by the District's Law Enforcement Department.

4. Establishing and formalizing the **types of hunting allowed**.
    a. If approved, the District could provide both firearm and archery deer hunting in 2010.
        i. As it pertains to firearms, the IDNR permits shotguns, muzzleloading rifles and revolvers/handguns. The specific regulations are presented below. The District expects that it would permit only shotguns and muzzleloading rifles prohibiting revolvers or handguns due to their increased range.
            1. Shotguns, loaded with slugs only, not larger than 10 nor smaller than 20 gauge, not capable of firing more than 3 consecutive slugs.
            2. Single or double barreled muzzleloading rifles of at least .45 caliber shooting a single projectile through a barrel of at least sixteen inches in length.

3. Centerfire revolvers or centerfire single-shot handguns of .30 caliber or larger with a minimum barrel length of four inches.

ii. As it pertains to archery, the IDNR permits bows. The specific guidelines are presented below. The District expects that is would follow the IDNR guidelines.

1. Long, recurve, or compound bows with a minimum pull of 40 pounds at some point within the 28-inch draw. The minimum arrow length is 20 inches and broadheads must be used.
2. Crossbow devices are illegal except for permanently disabled persons as defined by law and/or persons age 62 and older.

5. Establishing specific **hunting zones** within each preserve.
   a. If a hunting program is approved, the District will prioritize the list of preserves suitable for archery and firearm deer hunting. During that process, Staff will review each preserve and identify hunting zones that lie within each preserve. Staff will apply the same criteria for setting zones used by the MCCD.
      i. For archery deer hunting, zones will be set so that they remain at least 400 feet away from any occupied dwelling. The State statute distance is 300 feet.
      ii. For firearm deer-hunting, zones will be set so they remain at least 1,000 feet from any occupied dwelling. The State statue distance is 900 feet.
   b. As per MCCD regulations, a stake will be set at the center of each zone. Stands will be required to be set up within a District-determined number of feet from the center stake of each zone. All hunting will take place from elevated stands. Hunters must provide their own stands. Each zone will be limited to one participant, expect for adults hunting with youth. Participants may request that two adults share a zone for mentoring/teaching purposes.

6. Implementing a **participant review and selection** process.
   a. Once preserves and zones are identified and approved and the hunting season (dates/times) is set, Staff will be able to determine the number of hunting permits that it can issue in 2010. Staff expects that the demand could outweigh the supply. Therefore, hunter selection will be made by **lottery**.
   b. All interested hunters may enter the lottery. The District will randomly draw names to fill the available number of hunting permits. First preference will be given to Will County residents.
   c. Hunters selected by lottery must then complete a hunting permit application and provide their Illinois Hunting License Number, their Firearm Owner Identification Card (FOID) Number (for firearm deer permit only), their IDNR Deer Tag Numbers, their Hunter Safety Education Certificate Number, and submit an application fee. In addition, hunters selected by lottery must sign a release permitting the District to conduct a **background check**. Staff are proposing a fee of $10 to $15/application to offset the administrative costs associated with reviewing applications and conducting background checks of hunters selected by lottery.
   d. All archery hunters will be required to **qualify** during a test of skill is they have been selected in the lottery prior to receiving their archery deer hunting permit.

Hunters will be encouraged to complete a certified Bowhunter's Education course.

7. Develop and implement a Hunting **Waiver and Release form**.
    a. Upon Board approval of a public hunting program, Staff will develop a waiver and release form for attorney review and approval. All hunters will be required to sign and submit their waiver prior to any hunting permit issuance.

Establishing a Hunting Season

While the District's hunting season does not need to be the same as the season established by the IDNR, its season must fall within those established hunting dates. Since chronic wasting disease (CWD) has not been reported in Will County, the District is not permitted to allow hunting under the special CWD deer season.

Table 10. IDNR Hunting Season

Type	2009-2010 Season	Hours	Limit
Deer Firearm (Handgun, Muzzleloader and Shotgun)	November 20-22 December 3-6	½ hour before sunrise and ½ hour after sunset	1 Deer per Firearm Permit
Deer – Muzzleloading rifles only	December 3-6 December 11-13		1 Deer per Muzzleloading Rifle Permit
Special CWD Deer Season	December 31 – January 3, 2010 January 15-17, 2010		1 Deer per Valid Deer Permit
Late-Winter Antlerless Deer (Handgun, Muzzleloader, and Shotgun)	December 31 – January 3, 2010 January 15-17, 2010		1 Antlerless Deer per Permit
Deer Archery	October 1 – January 17, 2010		1 Deer per Archery Permit
Youth Firearm Deer Season	October 10-11, 2009		1 Deer

In this conceptual phase, the District would offer the traditional two weekends in November and December for firearm deer hunting during the inaugural year. The District would also offer deer archery hunting but would most likely limit the season to one month in the inaugural year. Depending upon the success of the program and District resources, the District could consider expansion of hunting opportunities in subsequent years. However, in conversations with MCCD, they recommended that the District operate the program for 3 years prior to any major expansion.

Hunting Program Coordination and Administration

As with the establishment of any program, there is often a high degree of program coordination and administration at an operational level. Establishing a hunting program will require a commitment of resources. That commitment varies depending upon the number of preserves in the hunting program, the length of the hunting season, and the number of hunters permitted.

Furthermore, this program, once implemented, may grow in response to public demand. Regardless of the type of program or the audience, the District strives to offer the highest quality experience to its program participants. As such, this program would be monitored for its popularity, cost effectiveness, and quality. Participants would be encouraged to assist the District in identifying programmatic improvements and enhancements.

Should the Board approve the establishment of a hunting program, Staff will immediately move into the program planning phase to develop the program scope, rules and regulations, fees, areas of responsibility among departments, forms and waivers, and marketing materials. The following list is a preliminary identification of tasks that will serve as a framework for developing the District hunting program. The tasks also help to visualize the program coordination that occurs at the staff level.

Task Identification

Amend 2010 Annual Fee Schedule
Develop and Produce Lottery Entry Form
Develop Informational Fact Sheets
Develop and Print Hunting Brochure
Post Hunting Information on Web Site
Process Lottery Entry Forms and Hold Lottery
Develop Hunter Notification Card
Notify Hunters of Lottery Results via Mail
Develop Hunter Application Long Form
Conduct Background Checks and Verify FOID
Develop and Issue Hunting Permits
Mail Hunting Permits and Information Packet
Determine Hunting Program Rules and Regulations
Determine Scope of 2010 Hunting Program
Develop Waivers, Information Sheets, Maps, Evaluations, Etc.
Develop Signage Plan for Regulatory and Safety Signage
Fabricate Regulatory and Safety Signage
Fabricate Perimeter/Boundary Signs
Develop PR/Postcards/Etc. to Notify Public of Hunting and Preserve Closures
Print and Mail Postcards
Materials - Tags, Clipboards, Flags, Zone Markers
Develop Survey and Evaluation for Hunters following Program
Administer Survey and Evaluation to Hunters following Program
Develop the Qualifying Test for Archery Hunters
Administer the Qualifying Test for Archery Hunters
Set Up Registration for Hunter Orientation Classes in Active Net System
Design Class Flyer and Registration Form

Develop and Prepare for Orientation Classes
Teach Hunter Orientation Classes
Prepare Orientation Class Final Report and Recommendations
Install Advance Notification Signs
Mark zones and boundaries identified in Boundary Plan
Install Hunting Signs
Establish and Staff Hunter Check Points on Firearm Hunting Days
Establish and Monitor Hunter Check Points on Archery Hunting Days
Run Trails and Clean Up following Hunting Days
Prepare Hunting Program Report, Analysis and Recommendations for 2011

Revenue Potential for a Public Hunting Program

Hunting program revenue could come from two main sources; the application fee and the hunting fee. In addition, the District should consider adding a processing fee for hunters that do not take their deer.

All hunters would be required to submit an application and associated application fee. The application fee would be non-refundable. Staff is proposing a $10 to $15 application fee to offset the administrative time required to process each application, conduct a background check and verify the hunters FOID and deer-hunting license.

Hunting fees are variable depending on the type of hunting permitted. Since the firearms deer-hunting season is shorter, the hunting permits are less costly. Archery deer hunting permits are typically more costly because the season can last for several months.

Table 11. Comparative Fee Research

		Firearms Deer Hunting Fee		**Archery Deer Hunting Fee**	
	Application Fee	**Resident**	**Non-Resident**	**Resident**	**Non-Resident**
McHenry County Conservation District	$10	$75/zone	$150/zone	$400/zone for 3 month; $100/zone for one time, one zone*	$-800/zone for 3 month; $200/zone for one time, one zone*
Boone County Conservation District	$0	$20	$40	$20	$40
Lake County (Indiana) Parks and Recreation Department	$0	$15/license type/season	$15/license type/season	$15/license type/season	$15/license type/season

*Special Deer Reduction Program: One Time; One Zone; $100/zone-resident; $200/zone-non-resident; Fee refunded if five or more deer are removed from one zone.

Not all hunters will take their deer and the District may have to cover the cost of processing the venison and then donate the processed meat to a local food pantry. Cost estimates for deer processing are approximately $1.25/pound. At $1.25, a 200-pound deer would cost $250 to process. The District could establish a $200 processing fee (due at the time of permitting) for hunters that do not take their deer. The District could also require hunters to take all deer either for processing or for donation through the Illinois Sportsman Against Hunger (ISAH) program. Initiated in 1989, the ISAH program has coordinated the donation of more than 467,000 pounds of venison, providing more than 1.8 million meals for families and individuals in need. Hunters can donate a whole deer to the program, which coordinates the donation and processing of venison provided to food banks, food pantries, and charitable organizations throughout the state. The IDNR and the Illinois Conservation Foundation encourage hunters to, if they wish, make a tax-deductible $50 contribution through the ICF to help cover the cost of processing the deer into ground venison. Hunters may donate deer to the program without making an additional monetary contribution as well.

Opportunities for Volunteerism

District programs lend themselves to volunteerism by providing opportunities for program support. Many of the tasks associated with coordination and administration of the hunting program could be of interest to current and new volunteers. Perhaps the most interesting opportunity for volunteers in the hunting program would be to staff the various check points on the established hunting days. Also, volunteer opportunities may exist to conduct patrols and clean up following hunting events, to assist with hunter orientation classes, and to assist during hunter qualification days for archery hunters.

Should the Board approve the establishment of a public hunting program, Staff envision volunteer involvement in 2010, primarily with staffing hunter check points on hunting days. Volunteer opportunities would expand in subsequent years.

Opportunities for Sponsorships, Donations and Grants

District programs also lend themselves to sponsorship, donations and grant programs. As with any public program, the hunting program would become part of the District's package for sponsorship and donation opportunities. Additionally, once the foundation is established, the District may qualify for special outdoor recreation grants from the State or Federal government or from businesses. Staff has not yet explored the variety of grants that may be available to support hunting efforts and programming.

Sharpshooting Option

A typical sharpshooting program involves the systematic culling of deer by skilled marksmen who are highly trained professionals or other individuals who satisfy the marksmen standards as certified through IDNR. A sharpshooting program is useful in urban and suburban areas that have insufficient open space to support traditional regulated deer hunting programs and where local municipal ordinances prevent the discharge of firearms.

To implement a sharpshooting program, the District must apply for a Deer Population Control Permit (DPCP) from the Illinois Department of Natural Resources (IDNR). The IDNR regulates white-tailed deer populations through the issuance of DPCP's to agencies, organizations, associations and municipalities, but not individual landowners.

Several local Forest Preserve and Conservation Districts currently manage white-tailed deer populations or are developing related programs. The following table identifies which Districts in northeastern Illinois engage in deer population management.

Table 12. Deer Management Activities by County

Forest Preserve District or Conservation District	**Population** *(2008 estimates)*	**Land Area – Square Miles** *(2000 Census)*	**Persons per Square Mile** *(2000 Census)*	**Currently Engaged in the Reduction of Deer Population**
FPD Will	681,097	836.94	600.1	No
FPD Cook	5,294,664	945.68	5,683.7	Yes
FPD DuPage	930,528	333.61	2,707.1	Yes
FPD Kane	507,579	520.44	777.20	Under development
FPD Kendall	103,460	320.58	169.9	No
FPD Kankakee Valley	112,524	676.75	153.40	No
FPD Lake	712,453	447.56	1,438.3	Yes
CD McHenry	318,641	603.51	430.6	Yes
CD Boone	54,142	281.27	148.70	Yes

Of those listed, Cook, DuPage, and Lake Counties have DPCP's and utilize sharpshooters. In addition, McHenry County Conservation District is currently considering adding a sharpshooting component in the near future.

For the winter of 2007-08, Cook and DuPage Counties accounted for 66% of the deer collected through DPCP permits, accorded to Marty Jones, IDNR Project Manager. Other counties using DPCPs are Lake, Winnebago, Piatt, and JoDaviess. Costs associated with DuPage County Forest Preserve District's deer management under the DPCP program have ranged from $219 to $282 per deer removed, including the costs for sharpshooter wages, staff time, equipment, animal processing services, and aerial helicopter surveys completed as part of the population monitoring activities.

Reasons for requesting DPCPs generally fall into one or more of the following categories: excessive deer damage to native plant communities and ecosystem restoration projects, excessive numbers of deer-vehicle accidents on area roadways or active taxiways/runways, or numerous deer damage complaints from residents. The District's deer research as presented, clearly demonstrates excessive damage to native plant communities and excessive numbers of deer-vehicle accidents. As part of the application process, the District must develop a deer management proposal documenting the need for deer culling by nontraditional means such as sharpshooting.

If approved, DPCPs are issued for a maximum of 90 days (time extensions are possible). There is no limit on the number of deer that can be taken, but the number proposed to be collected must be justified and documented.

Lethal techniques authorized under DPCPs must be such that the resulting deer carcasses are suitable for human consumption. The District would be required to have all usable deer carcasses processed at a State or Federally-licensed and inspected meat processing facility and to donate the processed venison to a bonafide charitable organization. Unusable deer carcasses must be disposed of in accordance with the Illinois Dead Animal Disposal Act. Since deer collected under DPCPs must be used for human consumption, most DPCP programs take place during the cooler late fall and winter months (November to March).

If the District elects to take deer at bait stations via sharpshooters, all sharpshooter candidates must be tested and seasonally-approved by IDNR prior to deer program implementation. There is no limit on the number of sharpshooters, but all sharpshooters, who are Illinois residents, must also have a valid Illinois Firearms Owner's Identification (FOID) card. To insure public safety, all proposed shooting or bait sites must be viewed and approved by IDNR prior to their use.

DPCPs will not authorize the use of archery equipment, handguns, muzzle-loading rifles, etc. Only modern rifles or shotguns will be permitted for sharpshooting programs. DPCPs will not be issued for experimental techniques (e.g. sterilization or immunocontraception) or for the live-capture and translocation of deer. The permittee must return all unused tags along with a deer removal summary within 30 days after permit expiration. The removal summary must list the tag number, location, sex, age and physical condition of each animal collected as well as the total amount of processed venison donated, as well as the charity's the meat is donated to. The permittee is responsible for all costs associated with the deer control program.

Operational costs associated with sharpshooting programs are reported to range from $200/deer up to $600/deer. Urban deer control programs conducted in New Jersey cost between $200 and $350 per deer removed. A town in Connecticut contracted a sharpshooter who removed 80 deer in 4 nights at an estimated cost to the community of $646 per deer removed. Sharpshooting programs in Maryland have averaged $200 - $450 per deer removed (New England Chapter of the Wildlife Society 2008). This variability is largely due to the scale or complexity of the program and differences in regional costs among professional sharpshooters. Hiring contractual sharpshooters can be cost prohibitive. However, during meetings with Marty Jones, IDNR Urban Deer Project Manager, the District learned that the IDNR could qualify and approve District law enforcement staff as sharpshooters providing a substantial cost savings to the District.

The District believes that there is interest among law enforcement staff to perform sharpshooting for the District. Involvement in the program would be voluntary and officers would be compensated at their hourly rate for such services. In addition, the District intends to develop a volunteer position and solicit for volunteers with hunting credentials who could qualify as sharpshooters providing even greater cost savings for the District.

If the District utilized volunteer sharpshooters, over time there could be almost no expense to the District in terms of personnel. The main expense for the sharpshooting program would then be the processing of the venison. Cost estimates for processing venison are around $1.25/pound.

However, the District may be able to reduce this cost in several ways. The District may qualify for a volume discount from processors. The District may be able to offset processing costs with donations and sponsorships given that the venison must be donated to a charity.

District Sites Potentially Suitable for Sharpshooting

Using the criteria established in the Preserve Suitability Analysis, sixteen (16) preserves are potentially suitable for a sharpshooting program. These are preserves greater than 30 acres, preserves lying within municipalities, preserves with sensitive natural resources that could be impacted by off trail use or which contain elements which could be dangerous off trail, and preserves with established or estimated deer densities exceeding the established program goal. Please consult the Preserve Suitability Analysis for complete details.

List of preserves potentially suitable for a sharpshooting program:

1. Braidwood Dunes Nature Preserve
2. Goodenow Grove Nature Preserve
3. Hickory Creek Preserve
4. Isle a la Cache Preserve (part)
5. Kankakee Sands Preserve
6. Keepataw Preserve
7. McKinley Woods
8. Messenger Marsh
9. Messenger Woods Nature Preserve
10. Plum Valley Preserve
11. Plum Valley Ravines
12. Raccoon Grove Nature Preserve
13. Romeoville Prairie Nature Preserve (part)
14. Sand Ridge Savanna Nature Preserve
15. Thorn Creek Woods Nature Preserve (part)
16. Thorn Grove Preserve (part)

Program Scope – Inaugural Year

In addition to implementing a public hunting program, the District expects to implement its sharpshooting program in 2010. Sharpshooting is intended to be a companion program to a public hunting program and will be implemented primarily in sites where hunting is not feasible or prohibited. In addition, sharpshooting will take place in preserves where deer densities are substantially high and where hunting alone is not able to reduce deer herd populations. The District will not be able to initiate sharpshooting in every suitable preserve due to current levels of staffing and reduced resources in the current year's budget. Staff will develop and apply criteria to the 16 preserves to determine the top ranking sites for program implementation. Staff will bring the final criteria, the proposed sharpshooting sites, and the proposed 2010 deer culling program back to the Board for approval in May.

Criteria could include:

1. Restrictions by local municipalities or Illinois Nature Preserves that prohibit public hunting, leaving sharpshooting as the most viable option.
2. The need to reduce deer herds beyond the amount of deer harvested during a public hunting season.

Sharpshooting Program Coordination and Administration

The type and level of coordination and administration of a sharpshooting program is different than the hunting program which involves public participation. Sharpshooting activities primarily would be coordinated by Natural Resource Management and Law Enforcement. Public Affairs' involvement would be essential in the notification process for adjacent landowners as well as preparing general information (brochures, fact sheets, postcards) about deer management activities. The following list is a preliminary identification of tasks that will serve as a framework for developing a sharpshooting program. The tasks assist in visualizing the program coordination that occurs at the staff level.

Task Identification

Develop Informational Fact Sheets on Culling Program

Develop Deer Management Brochure

Print Deer Management Brochure

Post Deer Management Program on Web Site

Determine Scope of 2010 Culling Program

Develop Notification Letter/Postacard for Culling Activities

Print Postcards

Mail Postcards

Schedule Test and Administer Sharpshooter Qualification Test

Develop Volunteer Job Description, Support Documents, Waivers for Volunteer Sharpshooters

Schedule and Administer Sharpshooting Days

Coordinate Processing of Venison and Deliver

Prepare Program Report, Analysis and Recommendations for 2011

MONITORING

Deer Population and Habitat Monitoring

The District's deer management program goal is to allow for a sustainable relationship between deer numbers and biological diversity and habitat structure. In the first few years of the deer management program, the initial target deer density would be based on the best general scientific information, which currently identifies 20 deer per square mile as the maximum number that an area can support without changes to the composition and structure of the vegetation from excessive browsing.

Once the management program has been in effect for a few years, the target deer density per square mile is expected to change as a result of ongoing monitoring that will collect and assess data in three basic categories: deer population levels, habitat recovery through vegetation status, and deer management program effectiveness. This process of monitoring and modifying management strategies and targets is called adaptive management

Preserves will continue to be aerially surveyed regularly to track deer population levels and densities. Ideally all preserves in the deer management program would be surveyed annually, however, many factors will influence the survey frequency for a given site. Among these, suitable survey conditions and pilot availability are perhaps the most influential.

Conducting aerial surveys requires certain weather and snow cover conditions. Pilot visibility, wind speed, duration since last snow cover, and short daylight periods in the winter months can all reduce the opportunities available to conduct deer surveys or influence which sites can be counted in any given year. Pilot availability is also a significant factor that can limit the opportunities to conduct deer surveys. There are a limited number of helicopter pilots available for hire to conduct this type of work and great competition for those that do exist among the various land management agencies that conduct deer surveys. Further, because survey dates typically cannot be determined well in advance due to suitable snow cover conditions and the pilot's unwillingness to reserve flight time that could be lost at the last minute, it often becomes a first come, first served type of scheduling priority. Therefore, it is unusual that deer surveys can be completed annually at all the desired preserves. As a result, priority is given to those sites with the longest duration since the last survey and/or those with the greatest level of management concern.

Floristic assessments based on vegetation sampling are time consuming activities. Funding and staffing limitations typically restrict the number of preserves and the level of detail that can be sampled in a given year. Annual sampling is not always efficient at documenting vegetation changes because vegetation typically requires several years of recovery after reducing the deer browsing pressure to be detected. Plant species inventories and quality assessments conducted at a frequency of five to ten years should be adequate to monitor a site for general trends, significant shifts in species diversity and other parameters at the community level.

Sampling of small or confined populations of rare and sensitive species can be completed more readily. Annual or biennial monitoring is practical for sites in which the status of threatened or endangered plant species is a greater management priority than overall site quality or community status. When species level management priorities are used to develop deer management goals, those goals can be adjusted faster than when site or community level priorities are used.

The effectiveness of deer management in supporting natural resource management goals can be monitored most effectively through the use deer exclosures and paired reference plots. Deer are the most numerous herbivore in woodland and most other habitat types, and the only one capable of significant impacts to woody vegetation taller than one foot. Deer exclosures protect vegetation from deer browse pressure but allow other herbivores access to the protected area; reference plots are vulnerable to browse pressure from all herbivores. By sampling both areas and comparing the results, the effect of the deer browse can be determined. Exclosures and

reference plots can be used to examine both community and population level response to deer browse.

Effective deer management should decrease the differences between exclosures and reference plots to the point that there are little to no meaningful differences between them, suggesting the entire area should be capable of recovering at the same rate and to the same extent observed within exclosures. Following the initiation of deer management, the point at which the exclosure and reference plot data show no significant differences after a few sampling events indicates that the deer densities have reached the level of the cultural carrying capacity and should allow for site management goals to be accomplished. The deer management goal at that preserve will then be accomplished through the maintenance of acceptable deer densities over time.

While exclosure and paired reference plots may be the most effective methods for monitoring the effectiveness of deer management efforts, they are not the only techniques available. Additional techniques could include random and/or fixed quadrat or line transect sampling (note: a quadrat is a plot, variable in size, from which data are collected; a plot can be located randomly through a habitat each year, or fixed so that the exact same location is sampled from year to year; a series of plots can also be located along a line or transect that is located either randomly or is fixed). These techniques offer the advantage of requiring less maintenance to protect against design failure and biased data (exclosures require that the fencing be maintained to prevent deer access), but there are disadvantages associated with these techniques. The absence of a control area (i.e. an area protected from deer browse) eliminates the possibility for comparisons with data which have not been influenced by deer browse. This makes drawing conclusions about the degree to which deer have impacted plant diversity, reproduction, recruitment and other parameters impossible and therefore do not serve as a useful tool for assessing when deer management has accomplished stated goals.

When done in conjunction with exclosure and reference plot sampling, quadrats and line sampling could be useful for monitoring vegetation response once deer densities have reached desired levels. Results obtained from areas managed at acceptable deer densities can then serve as the baseline data for future comparisons. If subsequent sampling indicates findings similar to the baseline data or show ongoing vegetation recovery, then it can be inferred that browse pressure has remained within an acceptable range and sampling of exclosures and reference plots could be halted. Quadrat or line transects along with occasional site-wide floristic inventories and community quality assessments can then be compared to deer population survey results and used to complete long term monitoring of deer management effectiveness.
Regular vegetation sampling at all sites where deer are managed is not necessary to establish target deer densities. Correlation of vegetation sampling results between sites could be used to reduce the number of sites sampled directly. Browse study results obtained from a given preserve under known deer densities can be used to extrapolate those results to similar plant communities in other preserves. When vegetation sampling and deer population monitoring demonstrate that the deer management goal has been accomplished at one site, that deer density can be applied to other preserves in the absence of direct vegetation sampling. Occasional site wide inventories and quality assessments can be used to verify the effectiveness of site specific deer management at creating a sustainable relationship between deer population size and biological diversity and habitat structure.

Deer Program Administration Monitoring

The initial target deer density for the first several years of the program would be based on the best general scientific information, which currently identifies 20 deer per square mile as the maximum number that an area can support without changes to the composition and structure of the vegetation from excessive browsing. Each year, as the District implements deer management, working towards a target deer density, it will evaluate the success of such deer management activities. Success can be measured in terms not only of biological data that supports vegetation recovery or a decrease of deer-vehicle collisions, it can be measured in terms of it success in program coordination and administration. Key staff will review not only scientific data, but will review ongoing public input and comment. Public input about deer management activities can alter how the District may choose to make programmatic improvements or alter the administration of a program whether it is hunting, sharpshooting or a combination of both. Should the District implement a public hunting program, evaluations by participants enrolled in the hunting program will shape the program from year to year. Another factor that staff will consider is program effectiveness measured against operational expense. The District would expect to make the necessary programmatic changes to the deer management program to maintain cost effectiveness and ensure long-term sustainability. Finally, as deer density targets are reached over time, there will be a need to evaluate and adjust management activities so they align with program goals.

Public Information Campaign

Any effort to reduce deer populations will require a successful information campaign. The District can learn from years of experience from other organizations that have engaged in deer management. Many agencies have benefited from informing the public and seeking out its comments. The choices we make in this regard can assist stakeholder perceptions, and ultimately our efforts.

The more the public understands the facts, the greater it will support sound decisions. As proposed, this public information campaign will be based on sharing the facts, and messages that consistently align with the District's mission. Staff would also recommend that such a campaign investigate public opinion.

The campaign objectives are to foster an understanding of the District's need to reduce deer populations for the well-being of natural areas, and create a favorable environment for deer management, built on public education.

The campaign strategies are to proactively educate staff and the public as to the need for removing deer from forest preserves, how the deer removal program is part of a larger natural resources management program which is in keeping with the District's mission, and to seek input from stakeholders through public meetings.

The general guidelines that will be adopted during the campaign are as follows:

1. Strive to inform the public.

2. Provide messages that are consistent both internally and externally.
3. Connect all efforts and messages back to the District's mission and our environmental ethic.
4. Document and promote public support.

The deliverables or expected outcomes of the campaign are to:
1. Develop a clear, concise and consistent message or theme.
2. Provide factual information in an effort to educate the public and to combat misinformation.
3. Proactively inform and work cooperatively with the media in regard to promoting the deer management program.
4. Facilitate communication with stakeholders.
5. Organize a public comment period.
6. Continue to be responsive to requests from the public.

The common messages in all materials or programming throughout the campaign will include the following:
1. A deer management program is needed, and aligns with the District's mission.
2. Public concern is understandable. (It is important that we acknowledge that the public may have concerns, including possibly those individuals who are fundamentally in support of a plan to manage deer.)
3. Public safety is #1.
4. The District is acting proactively.
5. Preserves will remain as available as possible.
6. The program will never pose a threat to the existence of deer in Will County.
7. The District wants to provide opportunities for dialogue in the form of public meetings. (The public needs to know that its opinions count.)

Specific tasks that need to be implemented for the public information campaign include:
1. Provide talking points for Commissioners and District Staff about the deer management program.
2. Keep internal stakeholders informed through e-mails, and updates in internal newsletters.
3. Host public meetings to share information with the public and seek out comment.
4. Post information on the District Web site to inform our visitors.
5. Produce a deer management program brochure, and publish articles in *The Citizen* to help educate our readers and promote the program.
6. Post information at our facilities to promote visitor awareness.

In the end, the ultimate goal is to have strong, clear messages which are utilized consistently by all involved to educate and elicit buy-in.

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APPENDIX A

DEER POPULATION SURVEY DATA

Appendix A-1. Deer Population Counts from Aerial Surveys by Preserve Unit and Year

Preserve & Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2005	2006	2007	2008
PLUM VALLEY GREENWAY		**385**	**382**	**293**		**272**	**115**	**402**	**355**			**577**		**330**
Lower Plum		**115**	**131**	**121**		**122**	**40**	**154**	**149**			**227**		**163**
Lower Plum Area 1 (Old Post to Steger Rd.)		75	98	56		99	8	101	93					87
Lower Plum Area 2 (Old Post to Exchange)		40	33	65		23	32	53	56					76
Lower Plum (2006, Burville to Steger)												227		
Middle Plum		**40**	**49**	**44**		**55**	**30**	**69**	**55**			**74**		**57**
Middle Plum (Burville to Exchange)		0	0	4		0								13
Middle Plum Area 5		40	49	40		55	30	69	55					
Middle Plum 2006												74		44
Goodenow Grove and Plum Grove Area		**196**	**161**	**117**		**83**	**44**	**143**	**115**			**169**		**110**
Goodenow Grove		164	123	83		80	39	143	88					80
Plum Grove		32	38	34		3	5		27					30
Goodenow Grove (2006, includes Plum Grove)												169		
Balmoral Race Track Area (a.k.a. Book Property)		**34**	**41**	**11**		**12**	**1**	**36**	**36**			**107**		
RACCOON GROVE PRESERVE AREA	**133**	**115**	**99**	**94**	**58**	**65**	**58**	**55**	**63**		**64**		**88**	**10**
Raccoon Grove Preserve (includes Mavon Corp. Farm)	106	89	60	47	33	44	39	30	54		58		52	0
Raccoon Grove Farm (E. side of Egyptian Trail)	0	0	3	25	12	12	19	23	4		3		14	10
Heatherbrook Estates Area (N side Pauling Road)	27	6	23	9	12	6	0	0	5		3		4	
Thompson Winery Area (N side Pauling Road, W of Rt. 50)	0	14	0	0	0	0	0	2	0		0		18	
Monee Reservoir		6	13	13	1	3	0	0	0		0		0	0
THORN CREEK WOODS PRESERVE AREA	**237**	**199**	**411**	**320**	**110**	**181**	**174**	**247**	**252**		**327**		**373**	**99**
Main Preserve (E side Monee Road to Western)	140	178	175	127	74	116	87	113	167		170		213	0
West Preserve (W side Monee Road to Crawford)	10	4	10	16	19	19	19	26	30		40		53	0
Pine Lake	16	10	36	48	17	29	33	60	3		43		56	17
Thorn Grove Area	6	5	13	2		9	27	37	48		29		43	56
Deer Grove Area		2	7	13		8	8	11	4		5		8	26
Sauk Trail Woods	65		170	114							40			
Wayne Lehnert Preserve						**12**	**0**	**0**	**10**					

Appendix A-1. Deer Population Counts from Aerial Surveys by Preserve Unit and Year

Preserve & Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2005	2006	2007	2008
SPRING CREEK GREENWAY	**22**		**48**	**62**		**59**	**4**	**76**	**173**	**116**		**139**		**160**
Messenger Woods	22		30	40		42	4	41	50	27		89		101
Messenger Marsh South	0		11	11		15	0	26	51	38				41
Messenger Marsh North			2	11		0	0	5	26	17				18
Messenger Marsh (2006, includes Ganford Grove)												47		
Homer Trails			5	0		2	0	4	8	0		3		0
Hadley Valley														
Adjacent residential and ag properties									38	34				
HICKORY CREEK PRESERVE AREA		**119**	**159**	**92**	**38**	**94**	**40**	**75**				**155**		**200**
East Unit (Rt. 45 to LaPorte Access)		30	49	20	10	27								
LaPorte Road Area (N side creek & W to Wolf Road)			13	22	0	3								
Van Horne North, South & ELC		0	12	5	3	11								
Hickory Creek Barrens (Wolf Road W to ROW)		53	45	23	13	26								
Hickory Creek Barrens (ROW W to Schoolhouse Road)		36	28	22	12	27								
Schoolhouse Road E side, N side of creek			12											
East Unit (Rt. 45 to Wolf Road)							9	33				106		109
West Unit (Wolf Road to Schoolhouse)							31	42				49		91
LAUGHTON PRESERVE AREA		**40**	**38**			**10**	**14**	**11**						
W side Rt. 52		0				3	3	2						
Main Preserve		29	23			7	11	9						
E side of Preserve		11	15			0	0	0						
KANKAKEE SANDS PRESERVE AREA			**53**			**39**	**28**	**84**		**81**			**150**	**112**
Braidwood Preserve Area			**24**			**16**	**2**	**30**		**14**			**37**	**31**
Braidwood Main Preserve			13			16	2	30		14			23	31
Braidwood Strip Mine (N side of Rt. 113)			11										14	0
Sandridge Preserve Area			**29**			**23**	**26**	**54**		**67**			**113**	**81**
Sandridge North (N of Rt. 113)										35			77	36
Sandridge South (S of Rt. 113)			29			23	26	54		32			32	45
Area 3 (between Braidwood and Sandridge NP)													4	

Appendix A-1. Deer Population Counts from Aerial Surveys by Preserve Unit and Year

Preserve & Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2005	2006	2007	2008
Lockport Prairie			**44**			**8**	**25**	**38**	**41**			**29**		**24**
Main Preserve (Rt. 53 E to River, S of Rt. 7)								38				29		
South Unit			17			5	11		30					15
North Unit			27			3	14		11					9
Romeoville Prairie			**18**			**0**	**42**	**30**	**47**			**54**		**28**
Main Preserve (N of 135th St.)			18			0	42	30	31					21
Isle a la Cache (S of 135th St.)									16					4
Prairie and Isle a la Cache												50		
Adjacent properties (S of 135th St.)												4		3
Keepataw Preserve			**16**			**15**	**10**	**36**				**34**		**4**
Veterans Woods Preserve								**14**				**15**		**16**
Main Preserve														7
Adjacent properties														9
Main Preserve including adjacent properties								14				15		
MCKINLEY WOODS PRESERVE AREA						**79**	**66**	**92**					**180**	**122**
Main Preserve						79	66	92					180	110
FREEC														0
Conroy Island														12
ROCK RUN GREENWAY							**30**	**15**						**7**
County Farm Road Access							30	15						7
FORKED CREEK GREENWAY								**3**						
Forsythe Woods								3						

Appendix A-2. Deer Density Estimates (number of deer per square mile) by Preserve Unit and Year

Preserve & Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2005	2006	2007	2008
PLUM VALLEY GREENWAY		**71**	**71**	**54**		**50**	**22**	**74**	**67**			**82**		**73**
Lower Plum		**70**	**79**	**73**		**74**	**24**	**93**	**90**			**95**		**99**
Lower Plum Area 1 (Old Post to Steger Rd.)		74	102	58		103	8	105	97					91
Lower Plum Area 2 (Old Post to Exchange)		58	48	94		33	46	77	81					110
Lower Plum (2006, Burville to Steger)												95		
Middle Plum		**45**	**56**	**50**		**63**	**41**	**95**	**75**			**61**		**42**
Middle Plum (Burville to Exchange)		0	0	27		0								87
Middle Plum Area 5		45	56	55		63	41	95	75					
Middle Plum 2006												61		36
Goodenow Grove and Plum Grove Area		**131**	**107**	**78**		**55**	**29**	**84**	**77**			**80**		**73**
Goodenow Grove		121	91	61		59	29	84	65					59
Plum Grove		213	253	227		20	33		180					200
Goodenow Grove (2006, includes Plum Grove)												80		
Balmoral Race Track Area (a.k.a. Book Property)		**25**	**30**	**8**		**9**	**1**	**26**	**26**			**78**		
RACCOON GROVE PRESERVE AREA	**100**	**89**	**57**	**31**	**19**	**21**	**19**	**18**	**20**		**37**		**52**	**9**
Raccoon Grove Preserve (includes Mavon Corp. Farm)	212	178	120	94	66	88	78	60	108		116		104	0
Raccoon Grove Farm (E. side of Egyptian Trail)	0	0	9	26	13	13	20	24	4		12		56	9
Heatherbrook Estates Area (N side Pauling Road)	135	120	115	25	33	17	0	0	14		13		20	
Thompson Winery Area (N side Pauling Road, W of Rt. 50)	0	47	0	0	0	0	0	4	0		0		62	
Monee Reservoir		19	39	18	1	4	0	0	0		0		0	0
THORN CREEK WOODS PRESERVE AREA	**51**	**57**	**82**	**64**	**41**	**51**	**49**	**70**	**72**		**80**		**106**	**28**
Main Preserve (E side Monee Road to Western)	75	95	94	68	25	62	47	60	89		91		114	0
West Preserve (W side Monee Road to Crawford)	19	8	19	31	37	37	37	50	58		77		102	0
Pine Lake	57	36	129	171	61	104	118	214	11		154		200	61
Thorn Grove Area	11	9	25	4		17	51	70	91		55		81	106
Deer Grove Area		6	22	41		25	25	34	13		16		25	81
Sauk Trail Woods	44		116	78							71			
Wayne Lehnert Preserve						**92**	**0**	**0**	**77**					

Appendix A-2. Deer Density Estimates (number of deer per square mile) by Preserve Unit and Year

Preserve & Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2005	2006	2007	2008
SPRING CREEK GREENWAY	**11**		**22**	**28**		**29**	**2**	**37**	**65**	**53**		**53**		**88**
Messenger Woods	11		27	35		42	4	41	50	27		58		133
Messenger Marsh South	0		31	31		42	0	72	109	81				114
Messenger Marsh North			5	30		0	0	14	55	46				49
Messenger Marsh (2006, includes Ganford Grove)												62		
Homer Trails			15	0		6	0	12	24	0		10		0
Hadley Valley														
Adjacent residential and ag properties									95	170				
HICKORY CREEK PRESERVE AREA		**50**	**65**	**39**	**16**	**40**	**17**	**32**				**48**		**62**
East Unit (Rt. 45 to LaPorte Access)		38	61	25	13	34								
LaPorte Road Area (N side creek & W to Wolf Road)			45	76	0	10								
Van Horne North, South & ELC		0	40	17	10	37								
Hickory Creek Barrens (Wolf Road W to ROW)		177	150	77	43	87								
Hickory Creek Barrens (ROW W to Schoolhouse Road)		54	42	33	18	40								
Schoolhouse Road E side, N side of creek			120											
East Unit (Rt. 45 to Wolf Road)							7	24				55		56
West Unit (Wolf Road to Schoolhouse)							32	43				37		69
LAUGHTON PRESERVE AREA		**43**	**46**			**10**	**13**	**10**						
W side Rt. 52		0				30	30	20						
Main Preserve		55	43			11	17	14						
E side of Preserve		37	50			0	0	0						
KANKAKEE SANDS PRESERVE AREA			**22**			**38**	**27**	**81**		**45**			**38**	**36**
Braidwood Preserve Area			**12**			**24**	**3**	**44**		**21**			**28**	**23**
Braidwood Main Preserve			33			24	3	44		21			28	37
Braidwood Strip Mine (N side of Rt. 113)			7										28	0
Sandridge Preserve Area			**81**			**64**	**72**	**150**		**60**			**43**	**47**
Sandridge North (N of Rt. 113)										47			68	32
Sandridge South (S of Rt. 113)			81			64	72	150		89			53	75
Area 3 (between Braidwood and Sandridge NP)													4	

Appendix A-2. Deer Density Estimates (number of deer per square mile) by Preserve Unit and Year

Preserve & Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2005	2006	2007	2008
Lockport Prairie			**102**			**19**	**58**	**88**	**95**			**52**		**56**
Main Preserve (Rt. 53 E to River, S of Rt. 7)														
South Unit			106			31	69		188					94
North Unit			100			11	52		41					33
Romeoville Prairie			**30**			**0**	**69**	**49**	**71**			**60**		**31**
Main Preserve (N of 135th St.)			30			0	69	49	51					34
Isle a la Cache (S of 135th St.)									320					80
Prairie and Isle a la Cache												76		
Adjacent properties (S of 135th St.)												17		13
Keepataw Preserve			**32**			**30**	**20**	**72**				**62**		**7**
Veterans Woods Preserve								**93**				**100**		**43**
Main Preserve														35
Adjacent properties														53
Main Preserve including adjacent properties								93				100		
MCKINLEY WOODS PRESERVE AREA						**116**	**97**	**135**					**214**	**110**
Main Preserve						116	97	135					214	131
FREEC														0
Conroy Island														150
ROCK RUN GREENWAY							**176**	**88**						**41**
County Farm Road Access							176	88						41
FORKED CREEK GREENWAY								**17**						
Forsythe Woods								17						