# Sifton Bog White-tailed Deer

## Final Report of the Community Steering Committee

**February 2003**

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Redmond's Pond is at the centre of Sifton Bog.

## The Deer Issue

The Upper Thames River Conservation Authority (UTRCA) and the City of London began to receive a number of calls from residents of the Sifton Bog community during the summer of 2000. Residents were reporting frequent sightings of White-tailed Deer. The deer were moving from the Sifton Bog onto private residential properties and feeding on ornamental plantings and causing costly landscaping damage. Over the course of the winter of 2000 and into the spring of 2001, the UTRCA and the City continued to hear from residents concerned with the impact of the deer. Concerns centred around losses of shrubs and plants but also included questions related to what was perceived to be an alarming increase in deer population. Residents were expressing the view that more deer meant a greater potential for deer-vehicle collisions. Would the increase in the deer population cause damage to the vegetation in Sifton Bog? Would an increased number of deer mean an increased risk of transmission of Lyme disease?

The UTRCA and the City of London convened a community meeting in June 2001. The purpose of the meeting was to provide community residents with information about White-tailed Deer in the Bog and potential deer management options, as well as to discuss future directions.

## Sifton Bog

Sifton Bog is an Environmentally Significant Area (ESA) and a Provincially Significant Wetland located in west London. At the centre of this wetland is open water surrounded by bog. Around the bog is a swamp, which in turn is encircled by upland forested areas, most of which are surrounded by the residential neighbourhoods next to this natural area. One parcel of land to the southwest of the Bog is currently used for agriculture but will be developed for residential use later in 2003.

Sifton Bog is publicly owned and is managed by the Upper Thames River Conservation Authority (UTRCA) in partnership with the City of London.

Looking northeast across Sifton Bog.

## The Sifton Bog White-tailed Deer Community Steering Committee

The Sifton Bog White-tailed Deer Community Steering Committee formed as a result of the June 2001 community meeting. The Committee is comprised of interested volunteer neighbours and representatives of community groups and organizations, as well as representatives from the City of London, Ontario Ministry of Natural Resources (OMNR), and Upper Thames River Conservation Authority.

The role of the Steering Committee is to work on behalf of the Sifton Bog community to provide the agencies (City of London, UTRCA, OMNR) with a recommendation regarding the long term management of White-tailed Deer in Sifton Bog. The members agreed to work to reach consensus on issues and are committed to a collaborative effort. The Committee members recognized that they are dealing with an extremely complex issue that has no short-term answer. In addition, the Committee noted that conclusions reached by this Committee may influence how problems of a similar nature would be handled at other natural areas within the City of London.

The Steering Committee decided that once a recommendation was produced, it would be presented to the members of the Sifton Bog community and then directed to the City of London and to the Upper Thames River Conservation Authority for action.

The Committee met on the following occasions:
- July 10, 2001
- August 8, 2001
- September 6, 2001
- October 10, 2001
- November 7, 2001
- November 2001 - distributed a Newsletter and Community Survey to 800 households within the community
- January 9, 2002
- January 21, 2002
- February 21, 2002
- June 20, 2002
- October 9, 2002
- December 4, 2002
- January 15, 2003
- February 20, 2003

In terms of communications, the Committee members were responsible for communicating to their neighbourhood and organization stakeholders the role of the Committee, technical information gathered to date and the progress of the Committee. City of London, UTRCA and OMNR staff communicated the progress of the Committee to their councillors, board members, ministry representatives and fellow staff. Committee members also brought forward issues from the community. The Steering Committee

produced and distributed a newsletter in the fall of 2001 and regularly posted information on a website.

In terms of internal communication, the minutes of each Committee meeting were distributed to the members for their review and comment. After comments were received and any necessary changes made, the minutes were publicly posted on the UTRCA website at www.thamesriver.on.ca under Natural Areas, Sifton Bog. This allowed interested members of the community to follow the Committee's progress and also allowed Committee members who were unable to attend any specific meeting to remain informed.

## The Steering Committee Work Plan

The Steering Committee decided to review existing data gathered regarding White-tailed Deer biology and the population dynamics of deer in Ontario. They then set out to complete a review of each of the impacts of deer as raised by the community, including deer and Lyme disease, deer-vehicle collisions and browsing. They noted that the deer are considered a problem to many people living close to Sifton Bog for a number of reasons. The Committee members recognized that some of these problems may be "perceived" rather than "actual" and that it would be necessary to fully investigate their validity. The Steering Committee then moved on to researching and discussing the benefits and disadvantages of different approaches and options to deer management.

The Committee reviewed the results of the community survey along with the conclusions of the management options review. A recommendation was prepared for presentation to the community in February of 2003.

## Background Information Reviewed and Discussed by the Sifton Bog White-tailed Deer Community Steering Committee

The Committee investigated and discussed published information and presentations from wildlife experts from the Ontario Ministry of Natural Resources. Below is an overview of the information reviewed and discussed by the Committee members.

### *White-tailed Deer in Ontario*

White-tailed Deer have increased steadily in abundance since the early 20th century (McCabe and McCabe 1984) and currently occupy a larger geographic range than any other terrestrial mammal in North America (Pagel et al. 1991). There are many reasons why deer populations have increased during the last 20 to 30 years.

- **The highly adaptable behaviour of deer enables them to effectively exploit new situations and habitat created by humans in suburban residential areas.** It has been shown that deer become increasingly approachable and less fearful of humans in urban and suburban areas with repetitive close contact, the absence of harassment, and supplemental feeding (Witham and Jones 1987, Swihart et al. 1991).

- **The absence of mechanisms to regulate the deer population, such as natural predators, combined with the naturally high reproductive rate of deer (Haugen 1975, McCullough 1979) has led to lower annual mortality rates, a rapid increase in survivorship and higher population growth rates for suburban deer.** Suburban environments provide year-round protection from hunters and natural predators. The low mortality rate for adult deer and the favourable habitat conditions for reproduction mean that suburban deer herds can double in size every two to five years. Lack of hunting-induced mortality can result in a strong skew toward older age classes (Witham and Jones 1992).

- **Expanding suburban communities have created excellent deer habitat with an abundance of food for deer, including ornamental shrubs and garden plants.** Being a forest edge rather than a forest interior species, deer thrive in transitional areas and suburban landscapes (McCaffery 1987). Deer populations will likely remain abundant due to the preservation of open spaces in the form of parks, nature preserves, natural areas and conservation areas that function as sanctuaries and important foraging sites for deer and other wildlife. In addition to providing aesthetic and recreational value to urban environments, refuges for native plants and animals, and remnant examples of pre-settlement assemblages of plants and animals, most of these areas are also potential deer habitat. This trait is evident in Sifton Bog, where deer trails radiate out from the dense black spruce stands on the edge of the sphagnum mat toward the outer ring of hardwood trees and shrubs that surround the residential houses. Since deer are relatively large, highly mobile and highly adaptable in their behaviour, they become very familiar with their home range and seldom leave it if they are able to fulfill all their requisites of life (Thomas et al. 1964, Beier and McCullough 1990, Nixon et al. 1991, VerCauteren and Hygnstrom 1998, Cornicelli 1992, Bertrand et al. 1996, Kilpatrick and Spohr 2000).

- **The patchy distribution of suitable deer habitat surrounded by unsuitable areas restricts local movements and can lead to deer activity being concentrated in isolated pockets of habitat (Witham and Jones 1992).** This isolation is augmented by berms constructed along major traffic arteries, numerous municipal parks, nature centres and minimally developed private and commercial holdings as sound and visual

barriers. The increase in suburban feeding sites,such as fields and lawns, interspersed with wooded areas may reduce the movements needed to meet daily energy requirements. It is believed that the deer at Sifton Bog were displaced from the nearby Thames River valley into the Bog as a result of increased habitat fragmentation and will remain in the Bog because of the high quality of feeding sites.

- **Supplemental feeding by urban residents throughout the winter as well as the planting of ornamental trees and shrubs for screening or aesthetics may increase survival by increasing the food supply.** In the winter, the deer in Sifton Bog appear to be using the conifers at the edge of the Bog for cover and moving out to feed on the hardwood edge at night, with ornamental white cedar hedges and fruit trees of the local residences being the principle food sources. Committee members are aware that some people living close to the Sifton Bog and to other natural areas are feeding the deer. The Committee discussed the need to educate the residents about the detrimental effects of feeding wildlife in an effort to change this behaviour. With the exception of some light browsing on maple saplings, there appears to be little impact of winter browsing on the native Sifton Bog species.

Some urban residents use hoppers to feed deer.

## *White-tailed Deer in Sifton Bog*

White-tailed Deer populations are organized into matrilineal (female led) groups in which related females are accompanied by their immediate offspring (Hirth 1977). Deer often travel in family groups. Female deer often remain in the area where they were born (natal range), with young females establishing home ranges that overlap the home range of their mothers (Marchinton and Hirth 1984, Porter et al. 1991, Marchinton and Jeter 1966, Nelson and Mech 1984, Tierson et al. 1985, Nixon et al. 1991). Males tend to disperse from their mother's home range (Kammermeyer and Marchinton 1976, Holzenbein and Marchinton 1992, Nixon et al. 1994). The minimum home range size for suburban deer is approximately 80 hectares (200 acres) (Cornicelli 1992, Bertrand et al. 1996, Grund 1998, Kilpatrick and Spohr 2000). Does and their family groups are regularly seen on properties neighbouring the Sifton Bog.

Mating behaviour occurs primarily from mid-October through December. Deer have a high reproductive potential: yearling does typically produce one fawn; adults 2.5 years of age and older commonly produce twins and even triplets when conditions are favourable (Verme and Ullrey 1984). Since sex and age ratios are often skewed in favour of older females, deer populations can increase rapidly (McCullough 1979, 1984). It has been estimated that the deer herd within Sifton Bog has the potential to replenish itself annually at a maximum rate of 60%.

In much of Ontario, deer annually migrate from summer ranges to winter concentration areas that have suitable winter cover and food. These areas are called "yards". Yarding is an important behaviour that has evolved because it helps deer survive winter conditions. Yarding is only prevalent where snow persists during the winter (OMNR Guidelines for Feeding, 2). Yarding behaviour accounts for the increased population of deer found in the Bog during the winter.

## *Carrying Capacity*

Carrying capacity is defined as the number of deer that an area of land can support over an extended period of time. The number of deer that can be sustained in a given area is a function of food resources and the availability of cover. When deer numbers exceed the carrying capacity, they have a negative impact on the habitat quality and the physical condition of the herd declines, increasing the likelihood of winter mortality due to poor nutrition and/ or disease (Eve 1981, Swihart et al. 1998). When over-browsing persists, a long term reduction in the carrying capacity can occur. Neither the herd health nor the habitat quality will improve unless deer densities are reduced.

Initial population surveys recognized that there are presently more deer living in the Bog than the Ontario Ministry of Natural Resources' (OMNR) guidelines suggest the habitat can support. According to the OMNR, in the general Ontario landscape the population of wild deer is 4 or 5 deer per square mile. In good habitat ranges this increases to 10 to 12 deer per square mile or .05 deer per hectare. For comparative purposes the Committee agreed to look at the Bog and neighbouring area frequented by the deer as being approximately 55 hectares in size (140 acres, .21 square mile). This estimate includes all lands in public ownership and those that are undeveloped but that currently are privately owned and are being frequented by the deer. Using the .05 deer per hectare or 12 deer per square mile, the Bog would be expected to be able to support a resident population of 3 deer.

The Committee discussed biological carrying capacity and cultural or social carrying capacity. According to the OMNR,

the biological carrying capacity of the Bog is 3 deer. The Committee recognized that the community enjoyed the chance encounter with deer and did not want to decrease the number of deer to a point where residents would not be able to see the deer from time to time. They also recognized that some level of impact was acceptable to the residents. The Committee agreed to a cultural carrying capacity of 6 to 8 deer for the Bog. This way residents would have the special opportunity to see the deer occasionally and the numbers of deer would not be sufficient to cause severe environmental impacts.

A baseline population estimate for deer in Sifton Bog is difficult to determine, expensive to obtain and changes seasonally. It is sufficient to estimate the minimum or approximate size of the herd.

During the winter of 2000, Tom Purdy, Acting Superintendent, Pinery Provincial Park, Ontario Ministry of Natural Resources, carried out a fecal pellet count in the Bog. As a result, he estimated more than 20 deer were living in Sifton Bog.

In August of 2001 the Committee organized a summer deer count. Volunteers counted 23 deer in the Bog during their count. The majority of the deer were seen in the privately-owned bean field located just adjacent to the Bog proper. The Committee members discussed how this summer population may relate to a winter season. The population was expected to increase as the Bog became a yarding area for the deer.

In the fall of 2002, over 45 deer were observed in another Bog count. The deer were again seen in the agricultural field, just west of the Bog proper. This count demonstrated that the number of deer in the Bog changed seasonally and annually. It is important to note that whatever the number, the deer were now treating properties of adjacent landowners as being part of the Bog. The deer do not recognize the "public" property boundary of the Bog. The deer will continue to move into private yards that contain "preferred species" of food regardless of the number of deer. The Committee recognized that for the landowners being affected, there are too many deer in Sifton Bog.

# Impacts of Deer

## *First Community Meeting Results*

Following are the real or perceived issues raised by the community at, before, and since the June 2001 public meeting:

- Lyme disease/wildlife diseases
- Vehicle accidents caused by collisions with deer
- Damage to the vegetation within the Sifton Bog
- Property damage
- Health of the herd
- Population - how many deer? Are they resident or moving in and out of the Bog? Is there a corridor for movement of the deer?
- Are White-tailed Deer a problem in other areas of the City?
- Deer behaviour

## *Potential Transmission of Disease and Parasites*

There is a concern that a large deer population would increase human exposure to diseases such as Lyme disease, encephalitis and parasites. An increase in deer populations and resulting faeces in neighbourhood yards was a concern to homeowners whose yards are frequented by deer. The Committee recognized that this concern, especially around children should be noted. Deer as wildlife can be a means of transferring wildlife diseases to households and pets.

Lyme disease is caused by a spirochete (*Borrelia burgdorferi*) that uses the deer tick (*Ixodes dammini*) as its vector and is a threat to human health. A dense deer population in close contact with humans may facilitate the spread of Lyme disease among residents and their pets if ticks and the disease are common. The Committee decided that more information about the probability of transmission of Lyme disease was needed to place these risks in the proper context.

Information regarding deer and Lyme disease was presented by a representative from the Middlesex-London Health Unit. The Steering Committee found that ticks carrying Lyme disease are rare in Ontario except in Long Point, Point Pelee and Rondeau Parks. There have been only 12 people with Lyme disease reported in the Middlesex-London area since 1988 and all but one were demonstrated to have been infected outside of this area. In Middlesex-London, Lyme disease is not currently a concern. The Health Unit prepared detailed information for the Committee regarding Sifton Bog deer and human health. This information was posted on the website with the Committee minutes and is provided below.

### Questions and Answers on Deer in Sifton Bog and Lyme Disease

***What is Lyme disease?***

Lyme disease is an infection caused by the bacteria *Borrelia Burgdorferi* that is transmitted by the bite of a tick called *Ixodes scapularis*, also known as the Black-legged or Deer Tick. If infection occurs, 80% of people will have a red, slowly expanding "bull's-eye" rash (erythema migrans) appear around or near the site of the bite three to 31 days after the bite. If left untreated, complications involving the joints, heart and nervous system can develop.

***Is Lyme disease a concern in the Sifton Bog?***

Ticks carrying Lyme disease are rare in Ontario except in Long Point, Point Pelee and Rondeau Parks. There have

been only 12 people with Lyme disease reported in the Middlesex-London area since 1988 and all but one were demonstrated to have been infected outside of this area. Between November 1988 and December 1998, 274 cases of Lyme disease were reported in Ontario; 46% of those were felt to have been acquired in Ontario.

***Do deer carry Lyme disease?***
The bacteria that causes Lyme disease are found in certain ticks. These ticks need to feed on mammals to complete their life cycle, resulting in the spread of the bacteria. Deer and rodents are the mammals most likely to be fed on by these ticks. The spread of Lyme disease requires not only a mammal host such as deer and rodents but also the ticks and the presence of the bacteria.

***Will an increase in the number of deer in an area increase the risk of Lyme disease being found in this area?***
The Lyme disease bacteria and the ticks that transmit them would have to be in the area as well as a mammal host such as deer for Lyme disease to become a problem in and around the bog. Deer are just one part of the equation. In Middlesex-London, Lyme disease is not currently a concern.

***If it is not a concern in the Sifton bog, when should I be concerned?***
Anyone who travels to areas on the north shore of Lake Erie such as Long Point, Rondeau Park, Point Pelee needs to be aware of ticks if they are in wooded or grassy areas. In addition, many areas in the northeastern and mid-Atlantic States are endemic for Lyme disease.

***How can I protect myself if I travel to the affected areas?***
- Avoid entering areas that are likely to be infested with ticks, particularly in spring and summer.
- Wear light coloured clothing, which makes it easier to see ticks.
- Wear long pants and a long sleeved shirt.
- Wear closed footwear and socks. Tuck your pants into your socks.
- Use an insect repellent that contains DEET on exposed skin.
- A product called permethrin can be sprayed onto clothing to deter tick attachment.
- Search your body and the bodies of children and pets daily for ticks. Ticks attach to the skin and feed for days. Disease can be transmitted from infected ticks if the tick is not removed within 24 to 48 hours.

***What should I do if I find a tick?***
If a tick is removed within 24 hours of becoming attached, the risk of infection is substantially reduced.
- Grasp the tick as close to the skin as possible. Pull it straight out with a slight twisting motion, gently but firmly. Use tweezers if possible. If tweezers are not available, use fingers shielded with rubber gloves or facial tissue. Wash hands after removing the tick, and cleanse the area with an antiseptic.
- Don't squeeze the tick. Squeezing can speed up infection.
- Don't try to burn the tick off or put anything on it.
- Save the tick in a clean, covered jar if you can. Contact your local health department to arrange to have the tick identified.

Remember, there are other diseases that can be transmitted by an insect bite. People travelling, hiking, camping or working in areas where biting insects are active should always take steps to protect themselves from being bitten. For more information please see the Middlesex-London Health Unit's website at www.healthunit.com.

## *Deer-Vehicle Collisions*

Deer-vehicle collisions are a threat to human safety and are one of the predominant causes of deer mortality. In past studies, the number of deer-vehicle collisions has been correlated to both traffic volume (Bryant 1992) and greater deer abundance (Blouch 1984, Etter et al. in press). Recognizing that deer ranges are largest in winter and early spring (Cornicelli 1992), there is a greater chance of a collision during these periods.

The Committee reviewed information from the City of London from 1998 and 1999 regarding deer-vehicle collision incidents and found that although there had been accidents within City, none had occurred during 1998/99 in the vicinity of the Sifton Bog. The City of London had collected the information for 1998 and 1999 from police incident reports for the purpose of determining locations for deer crossing warning signage. No similar information was available for 2000, 2001 or 2002. The 1998/99 City of London information highlighted natural corridors that the deer were following in and out of the City. If the deer are able to move north/south and east/west within a river valley or corridor, they are less likely to be involved in a collision with a vehicle.

The Committee decided to ask the Middlesex Detachment of the Ontario Provincial Police for deer-vehicle collision statistics. The Middlesex Detachment reported the following statistics:
- 2000 - 221 deer/vehicle collisions
- 2001 - 270 deer/vehicle collisions
- 2002 - 273 deer/vehicle collisions

The detachment reported a total of 26 collisions to date (February) in 2003.

The Committee also learned that the Huron County OPP detachment had reported dramatic increases in deer-vehicle collisions during the fall and winter of 2002 and up to 4 or 5 collisions were being reported daily.

The Committee recognized that as the deer population in the Sifton Bog increases, the risk of deer-vehicle collisions will also increase.

### *Browsing*

The most widespread problem in metropolitan areas in terms of nuisance and economic loss is the damage caused by browsing to ornamental plants, shrubs and vegetable gardens in parks and around houses. Deer are generalist herbivores and winter dietary diversity is important for maintaining body mass and nutritional health (DelGiudice et al. 1989). The increased plant diversity in suburban areas provides high quality foods in the form of gardens, ornamental plantings and fertilized lawns, while nearby woodlands offer daytime shelter (Swihart et al. 1995). Higher plant species richness in residential areas (Swihart et al. 1995) means that suburban areas may actually provide improved deer habitat. The deer respond to these changes by broadening their diet to include these species.

Over-browsing and intensive foraging on preferred plants can compromise the long-term efforts of ecosystem preservation and restoration efforts in remnant natural areas by altering the composition and structure of flora (Witham and Jones 1992). While high deer densities in remnant natural areas have been shown to virtually extirpate rare or endangered plants (Miller et al. 1992), reduce the abundance, cover, density, vigour and diversity of native plant species (Strole and Anderson 1992, Witham and Jones 1992, Tilghman 1989, Healy 1997) and possibly provide a competitive edge to exotic plant species, it appears that the amount of deer browsing in Sifton Bog is not threatening the bog habitat. However, browsing activity in the bog should be monitored since the loss of native plant species, such as certain spring ephemerals, affects the health and diversity of the forest community and can negatively impact other wildlife species that depend on this plant life for reproduction, food and cover (McShea and Rapploe 1992, deCalesta 1994).

## *Community Survey*

The Committee decided that a survey, sent to the residents living in close proximity to the Bog, would be one way of determining the extent of deer damage to private landowners.

INSIGHTS, a research firm, was contracted to design a survey to investigate whether residents feel that the deer are a problem, whether deer are visiting private properties, the level of concern with a number of issues relating to deer in an urban area and to identify the types and extent of property damage being experienced. This survey was distributed with a newsletter to approximately 800 households surrounding the Sifton Bog on November 8, 2001. A sample of the newsletter and the survey results are available on the Web at www.thamesriver.on.ca.

Of a total of close to 800 surveys mailed, 255 surveys were returned from households in the area immediately surrounding the Sifton Bog. The survey did not represent a random sample. People with strong points of view were more apt to have responded.

The Community Survey found that just over half of the respondents indicated that they never saw deer on their property, 23% reported rare sightings, and 24% said that deer visited their yards quite often (15%) or very often (9%). However, fully two-thirds of those who backed directly onto the Sifton Bog (and 20% of respondents had properties that did adjoin the Bog) indicated that deer often frequented their yards, compared to14% of those whose yards did not back onto the Bog. The highest concentration of deer sighting was reported from the residential area to the west of the bog, extending back to Santa Monica Road.

It was unusual for people to see large groups of deer; just over half of those who had deer in their yards said that the maximum number of deer they had seen at any one time was three or less. The average size of the larger groups of deer reported on a property was 4 animals.

Deer activity appeared to be inhibited by dogs and fenced yards. People who had fruit trees or bird feeders tended to have slightly more extensive deer sightings.

About one in five households had made some attempt at deer proofing, typically as a reactive rather than proactive measure. Most were not enthusiastic about the success of their attempts.

The community felt that the deer population was static (31%) or growing (67%), and the majority felt that deer represented a problem for their community even if they, themselves, had not been affected. Specifically:

- 61% felt that deer presented a problem for their community today and 69% thought that they would be a problem over the next year;
- 28% indicated that deer were currently a problem for them personally, and 41% expected them to be a personal problem during the next twelve months.

The health of the Sifton Bog was the top rated concern relating to deer in the community; 81% of all respondents and 87% of those who often saw deer in their yards gave high scores to this item. Those who frequently experienced

deer placed damage to vegetation next on their list of concerns (64% highly concerned), while this was near the bottom of the list for the community at large (28% highly concerned). Health and safety issues were high on the list for both groups (and particularly, the health of the deer), and damage to structures was of relatively least concern.

Overall, 37% of the respondents (and 95% of those who often saw deer on their property) had experienced some type of deer related property damage. Specifically, about a quarter of respondents overall had experienced damage to shrubs (27%) or flowers (25%); these numbers were much higher (80% and 71%) for the subset who often saw deer in their yards. In rank order, the next most frequently damaged property items were cedar hedges and other hedges, groundcover, lawns, and trees (reported by 13-19% of the population, and 41-55% of those who often saw deer). Vegetable gardens, fences and structures had the lowest incidence of deer damage.

The Community Survey helped the Committee to determine that the majority of the survey respondents felt that deer represented a problem for their community even if they, themselves, had not been directly affected. The health of the bog, and the health of the deer were the greatest concern for the community, followed by human health and safety issues.

The Committee invited representatives from the Ontario Ministry of Natural Resources and Canadian Wildlife Service (CWS) to provide the Committee with some information on their deer management experiences. Mr. Gary McCullough, a biologist with the Canadian Wildlife Service, spoke about experiences at Long Point National Wildlife Sanctuary. Mr. Dan Elliott, Aylmer Area Manager from the Ontario Ministry of Natural Resources (OMNR) explained actions taken at Rondeau Provincial Park and Mr. Tom Purdy, Acting supervisor of Pinery Provincial Park with the OMNR presented the Pinery Provincial Park experience.

All presenters noted that in each example, the agency, with the community's involvement, had decided to move forward with controlled deer hunts. This decision came as a result of environmental damage being done to the vegetative communities within the park system. Each agency had gone to great lengths, expense and time, to provide proof that the deer were detrimentally affecting the health of the ecosystem that the park had been created to protect. In the case of Pinery Provincial Park, the deer were regularly moving into the agricultural properties that surround the park each evening and were creating large economic losses to the adjacent farms.

The Committee reviewed the information from the Community Survey and from the OMNR and CWS representatives. The Committee recognized that to prove the deer were affecting the Bog's vegetation may take years of study. By this time the deer population would be out of control and damage done to the Bog. The Committee members knew that with the potential for the Bog's deer population to increase by 60% per year, the deer's impact on adjacent landowners would increase and the Bog's vegetation was most likely to be affected. Committee members felt that waiting for further studies would be irresponsible and that management actions need to take place soon.

## *Future Development*

The Steering Committee members discussed the impact of the deer on the Bog and on the surrounding community in the future, when the lands currently in agriculture at the corner of Oxford Street and Hyde Park Road are developed for residential use. The development of this property may impact what management action is taken by the community since increasing development may cause changes in deer movement and may encourage deer to continue or begin to visit adjacent private property.

Committee members noted that the municipality may need to consider a subdivision management program for all stakeholders, including deer. Committee members felt that it was important to make the City aware that the Committee members are concerned about the impacts of development on the deer and deer behaviour. A letter was sent from the Committee to the City planner involved asking that the development have regard for the deer.

Committee members reported that the deer are becoming much more accustomed to human interaction. Will the

offspring of the current population be even more socialized to human contact? What kind of problems will this have for homeowners in the future?

The Sifton Bog White-tailed Deer Community Steering Committee concluded that the deer were indeed a problem within the Sifton Bog and that management options should be reviewed. The Committee based this decision on the following:

- the population of deer in the Bog is increasing due to an absence of mechanisms to regulate the deer population, such as natural predators, and their naturally high reproductive rate.
- the biological carrying capacity of the Bog would support 3 deer. The Committee is aware that populations of deer in the Bog were fluctuating from a summer population of 23 to a fall population of 45. The deer are very familiar with the Bog and will not leave it if they are able to fulfill all their requirements.
- homeowners living adjacent to the bog are experiencing some type of deer related property damage.
- as the deer population increases, so will the risk of deer-vehicle collisions, of impacts on the health of the bog vegetation and on the health of the deer.

# Deer Management Options

## *Non-Lethal Methods*

### *Live Capture and Relocation*

i) Methods

- Deer can be live-captured in a single gate Clover trap, modified Stephenson box traps, netted cage traps, drive nets, drop nets, rocket nets or corral traps. In residential areas, the traps are placed out of sight from public roads and neighbouring houses in areas of high deer activity (usually feeding areas adjacent to woody cover). The traps are typically installed in late fall before the ground freezes to ensure they are anchored and are ready for an early winter. Sites are pre-baited with a combination of shelled corn and apples to survey for deer presence, and the traps are baited and left open to condition deer to enter. Since winter is the only season when trap capture is feasible, traps are run during the season of snow cover with midday temperatures consistently below freezing.
- Animal welfare groups participate in the planning, preparation, construction and baiting of traps and in the actual capture and handling of the animals. Wildlife agency personnel and veterinarians trained in wildlife medical care and in safe capture and handling techniques are also involved. These professionals are essential to a successful urban deer capture project. The deer are sedated, transferred to transport crates, ear tagged, loaded onto a pickup or flatbed truck with a boom truck or crane lift and driven to release sites (either rural sites or sold to licensed deer farms).

ii) Benefits

- Capture and release is often the most socially-acceptable option for herd management since it is non-lethal. It is more palatable to elected officials and various constituency groups and is a very selective method of removing deer.

iii) Disadvantages

- Capture and release is a more expensive and less effective option when compared to lethal control methods (Ishmael and Rongstad 1984) and has been demonstrated to be impractical since it is stressful to the deer. Rather than extending the lifespan of an individual animal, it may result in a high post-release mortality of relocated deer. Mortality rates of radio-tagged translocated deer were more than twice that reported for ear-tagged deer not moved during the same period (Bryant 1992). There are several reasons for this high mortality. First, translocated deer had a tendency to maintain their tameness, establishing new home ranges near or in residential areas and causing nuisance problems in their new range (Bryant 1992, O'Bryan and McCullough 1985, Witham and Jones 1990). Second, they cannot recognize hazards that were not encountered in their previous habitat and therefore tend to react inappropriately (Jones and Witham 1990, Bryant and Ishmael 1991, Jones et al. 1997, Cromwell et al. 1999). Third, most deer that are relocated were already stressed and emaciated in their previous habitat before transfer and, therefore, cannot withstand the transfer.
- Trapping success is limited and there is often great difficulty in capturing adequate numbers of deer to reduce the urban population. There is also the problem of finding release sites willing to accept deer since relocated deer continue to breed and increase in population, causing property damage near release sites (Bryant and Ishmael 1991, O'Bryan and McCullough 1985, Witham and Jones 1990, Bryant 1992). Translocation programs require release sites capable of receiving deer. As well, there is the threat of the spread of wildlife disease in some areas of North America associated with translocation.

*Discussion*

Committee members recognized that initially this option would appear more socially acceptable to the community at large. The Committee felt that this perception would only continue until people became aware that in reality, this option is ineffective and to some members of the committee, is inhumane. Live capture and release is stressful to the deer and results in high post-release mortality of relocated deer. Many deer that are relocated cannot withstand the stress of the transfer. The relocated deer do not recognize hazards that were not encountered in their previous habitat and they tend to react inappropriately. In addition, the committee recognized that the capture and relocation option assumes that some property or property owner exists that would accept the relocated deer.

The discussion highlighted the need for the Committee to communicate the facts about the different management options to the members of the community. The Committee recognized the need to clearly outline the supporting evidence regarding capture and relocation to facilitate the communication efforts.

The Committee members agreed that they would **not** support live capture and relocation as a management option.

## *Chemosterilization*

i) Methods
- Employ physical sterilization or birth control to keep the population from increasing. Can use traps (see capture and release methods) or sharpshooting (see sharpshooting methods).

ii) Benefits
- MGA transplants sterilize female deer up to five years.
- Public accepts this method.

iii) Disadvantages
- An effective antifertility program for controlling free-ranging deer does not exist and it is unlikely that a safe and cost-effective fertility control method will be available for managing deer populations in areas larger than a few square miles within the next five years. One reason is that implantation requires animal restraint and is stressful, time consuming and costly (Eagle et al. 1992, Garrott et al. 1992) since deer must be captured and ear tagged for identification. As well, a large proportion of the females (70-90%) must be treated in order for this option to be effective in reducing population growth (Rudolph et al. 2000).
- Since drugs are delivered using dart rifles or biobullets, restrictions of firearms in suburban areas often limits practical delivery of drugs to free-ranging deer. Antifertility agents for wildlife are not commercially available as they are still experimental drugs and presently no orally active, nonsteoroidal antifertility agent is available. Orally delivered steroids have shown limited success (Matschke 1980, Roughton 1979). Additional problems with oral contraception in deer include dosage control, absorption of active agents and ingestion of bait by non-target organisms. The limited life expectancy of implants, the expense involved in treatment and the difficulty of treating an adequate portion of the herd all suggest that large-scale implant programs would be impractical, although it may have some value in controlling small, isolated deer herds.
- This method does not control population growth in populations already at the crisis level (McCullough in press). At this point the cost and efficiency of a sterilization program and federal/provincial approvals are all unknown.

*Discussion*

The Committee discussed the potential use of birth control to stop the deer population from increasing. Committee members recognized that this option would appeal to the community as a management option that would not harm the deer. The Committee members decided that this option is not realistic for the deer in the Bog at the present time for all of the reasons outlined above. This technique is experimental, its effectiveness has not been proven, it is expensive, artificial and is considered inhumane by some groups (Dr. Dave Ankney, University of Western Ontario).

An anti-fertility program for controlling free-ranging deer is at present at the research level. Committee members discussed that it was highly unlikely that the Bog's deer population would be used as a research population to experiment with new methods. The project would require that an accredited research facility take on the project and obtain all of the necessary permits, follow protocols, etc.

The Committee members agreed that they would **not** support chemosterilization as a management option.

## *Supplemental Feeding*

i) Methods
- Private landowners and public agencies supply additional food.

ii) Benefits
- Public accepts this method.
- Temporally improve the health of individual deer to alleviate winter starving and sustain an unnaturally high population density and draw deer away from specific problem areas.

iii) Disadvantages
- Supplemental feeding contributes to an artificially high deer population, especially during harsh winters when natural food sources are in short supply. The supplemental food will have to constantly increase to account for the unnaturally high population densities. Therefore, it becomes increasingly costly to continually provide winter feed. Supplemental food also encourages deer to congregate in sensitive areas (Doenier et al. 1997), restricts deer movements and makes deer more tolerant of people. Food provisioning can lead to deer crowding and increased susceptibility to diseases (Davidson and Nettles 1997).

*Discussion*

The Committee members discussed the fact that supplemental feeding contributes to an artificially high deer population and that the food would have to constantly increase to account for the high population densities. Providing food for the deer could lead to deer crowding and increased susceptibility to diseases. Supplemental feeding is undertaken in other areas of the province as a

method for maintaining deer herds for recreational hunting purposes. Members expressed the opinion that feeding the deer did not address the problem of the rising deer population.

The Committee members agreed that they would **not** support supplemental feeding as a management option.

### *Aversive Conditioning*

i) Methods

- Based on the belief that urbanization is a learned habit for deer, there must be the potential for discouraging uninitiated new comers to a neighbourhood through aversive conditioning such as removing food or scare tactics. Emphasis is on vegetation damage abatement techniques (such as the use of commercially available chemical repellents), frightening techniques (whistles, strobes, sirens, water sprays, dogs, etc.), fencing (barrier and/or electrical) and plants that are prickly or poisonous (e.g. daffodils and foxgloves) to drive the deer off the properties.
- Provide training or information on defensive driving tactics to reduce the probability of deer-vehicle collisions, reduce traffic speeds, establish unpalatable vegetation along roadsides and construct fence barriers, roadside reflectors, wildlife warning whistles, roadside warnings and fencing at frequent deer crossings.

ii) Benefits

- Public acceptance and some alleviation of problems on specific properties. Although deer are generalist foragers, they do have preferences for certain plant species. Selecting less palatable herbaceous and woody plants can minimize deer browsing to ornamental plants (Cummings et al. 1980, Fargione et al. 1991, Craven and Hygnstrom 1994, Curtis and Richmond 1994). Careful plant selection for home landscapes, combined with selective use of repellents, may minimize damage if deer feeding pressure is low to moderate.
- Fencing can be used to address site-specific problems but not as a community based deer management solution. Larger areas will often require more substantial fencing to achieve the level of protection similar to small areas. Fencing is also subject to local ordinances and policies.

iii) Disadvantages

- Limited effectiveness and short-lived relief, impractical and high costs. The methods work at specific sites but not at a community-wide scale since they were designed to supplement and not replace deer population management. Changing the food to unpalatable species or adding fences will not remove the problem, but will just concentrate the deer in a smaller area in the same neighbourhood. The real problem is increased deer population in the area.
- Fences must be at least 8 to 10 feet high to effectively keep deer out.
- Few ornamental plant varieties are classified as rarely damaged by deer and application of this technique is limited in areas with high deer densities.
- Repellents are best suited for use in orchards, nurseries, gardens and on ornamentals or other high value plants. Repellents are more effective on less palatable plant species than on those that are highly preferred (Swihart et al 1991). Effectiveness also depends on the availability of alternate forage (Conover 1987, Conover and Kania 1988, Andelt et al. 1991) and repellent performance seems to be negatively correlated with deer density. High application cost, label restrictions on use and variable effectiveness (many weather poorly and only protect the foliage to which they are applied) make most repellents impractical.
- Deer often habituate to novel frightening tactics (Craven and Hygnstrom 1994, Curtis et al. 1995). While dogs can effectively scare off deer, they would have to patrol the area day and night. Free running dogs are not advisable and are illegal.
- Few techniques used to reduce deer-vehicle collisions have been documented to be consistently effective and some have no measurable effect on deer behaviour.

*Discussion*

The Committee members reviewed discussions regarding aversive conditioning to discourage the deer such as the use of scare tactics, planting unpalatable plant species or removing food. These methods were found to have limited effectiveness and provided only short-lived relief. The results of the Community Survey support this belief. Some Committee members felt that some of the suggested methods were impractical and costly. Changing the food to unpalatable species was found to have the effect of concentrating the deer in smaller areas in the neighbourhood and did not address the problem of increased deer population. Deer habituate to frightening tactics. These methods would require 100% compliance by the people living adjacent to the Bog. Some of these methods may not be socially desirable for all property owners (too noisy, odd hours).

The Committee members discussed the effects of dogs that are allowed to run at large. The Upper Thames River Conservation Authority currently enforces the by-law that states that dogs must be on leashes within Environmentally Significant Areas of the City of London. The dogs rouse the deer and can chase the deer into traffic or into other dangerous situations. Rousing the deer in winter can force the deer to use their fat storage and, in time, affect their ability to survive the season.

The Committee members agreed that they would **not** support aversive conditioning as a management option.

### *Fencing*

With respect to erecting a fence between the Bog and the homes and properties adjacent to the Bog the Committee members provided the following comments. The fencing would stop deer access in and out of the Bog and would create a penned-in deer herd. In the Committee members' experience, fences would have to be 8 to 12 feet high to effectively keep the deer out. The fences themselves pose a risk to the deer. Fencing programs are considered very expensive to maintain and have been generally unsuccessful. The Committee members did discuss the need to research other cases regarding the effects of fencing but felt that again, the fencing would not address the problem of rising deer populations.

The Committee members agreed that they would **not** support fencing of the Bog as a management option.

### *Do Nothing*

i) Methods

- Leave the population alone and let it determine the carrying capacity without human interference.

ii) Benefits

- Natural approach.

iii) Disadvantages

- Deer will starve to death and cause much damage before reaching the carrying capacity. The idea that this is natural is questionable given the highly unnatural conditions in which the deer live (i.e. highly fragmented islands of natural areas surrounded by residential sites, lack of natural predators, more diverse food source, etc.). As well, populations will continue to cycle with periods of high densities.

*Discussion*

The Committee discussed that the option of doing nothing would not address the deer population problem. The deer would continue to affect private property and the Bog vegetation would not be protected. Committee members felt that by doing nothing the community would be ignoring a growing problem and would be ignoring the risks associated with the increasing deer population.

The Committee members agreed that they would **not** support a do nothing approach as a management option.

## *Lethal Methods*

After discussing and dismissing all of the non-lethal methods of deer management, the Committee initiated discussions around lethal methods of deer management in Sifton Bog

### *Deer Harvest*

#### a) Sharpshooters

i) Methods

- To justify a controlled limited hunt, the requirements and training programs for the sharpshooters must be very rigorous. Sharpshooters must be experienced, meet certain criteria (e.g. certified, have passed a shooting proficiency test, etc.) and follow strict rules and regulations (e.g. licensed, have attended a pre-hunt seminar, are local residents, etc.). Options include using police, government officials, hunting clubs, a private contractor, or professional sharpshooters in a controlled, limited setting. Human injury from protestors and media attention can be avoided by not publicly announcing hunting days.
- Sharpshooters use firearms fitted with suppressors, bait and elevated deer blinds to ensure that the bullet path/ trajectory is into the ground (to reduce injury from stray bullets or misses). However, hunting efficiency is increased by allowing sharpshooters to move from bait site to bait site in a limited and controlled hunt every fall, rather than remaining at a single location.
- Carcasses are immediately removed from the site and field dressed during which a postmortem assessment on the carcasses can be completed. This assessment could include an evaluation of sex, age class, whole body and eviscerated body weights, linear measurements (total length, right hind foot, chest girth), ovaries and kidney fat indices and Kistner score (Kistner et al. 1980). Reproductive status and physical anomalies could also be noted.

ii) Benefits

- Sharpshooting has proven to be an ecologically sound, socially beneficial and fiscally responsible method. Controlled, limiting hunting can be effective where firearms can be discharged safely and shooters are competent in all aspects of marksmanship and safety. The chances of human injury in a deer-vehicle accident is approximately 500 times greater than the chances of injury to a non-hunter by a stray buckshot pellet (Kuser et al. 1983).
- Contracting with marksmen is cost effective (relatively inexpensive when compared to nonlethal approaches), is quick (one of the few methods that is effective at controlling deer populations and efficiently reducing the population to manageable numbers with few man hours), humane (if done by professional marksmen the deer do not suffer), provides meat (donate carcasses suitable for human consumption to human charities) and provides opportunities to study the population dynamics and health

of the resident deer through necropsy and analysis of dead deer.

iii) Disadvantages
- There is strong opposition to the shooting of deer by local animal welfare advocates and the influence of animal welfare and animal rights groups on local political decisions through litigation or disruptive activities. There is a high potential for intervention and/ or interference by activist groups when hunters are used to manage locally overabundant deer populations.
- There is limited application in some suburban areas because of safety considerations, competing land-use priorities, legal constraints or social values. Concern about public safety and liability regarding the discharge of firearms in close proximity to human development means that there is a need for highly skilled marksmen/ police to ensure public safety in a heavily populated urban area. Efforts may be hampered by existing firearm discharge ordinances. As well, there is a lot of difficulty in securing cost-effective liability insurance coverage for sharpshooting activities.
- There are limited hours and locations available for shooting. In open or undeveloped sectors, sharpshooting has been effective in reducing deer populations. However, in residential areas, sharpshooting has been less effective than expected.
- There is a chance that some animals will be wounded. These animals will either die slowly, become permanently disabled or fully recover. As well, deer wariness increases more rapidly to shooting than to trapping.
- Sharpshooting creates noise that may drive wildlife onto adjacent properties.

*Discussion*
The Committee members were clearly uncomfortable with the thought of firearms being discharged within the Bog. Members recognized that although sharpshooting would be the most effective and humane method of decreasing the deer population within the Bog, it would seem to be socially unacceptable in such an urbanized area. In addition, members expected enormous difficulty in gaining the appropriate political permissions to move ahead with this option.

The Committee members agreed that they would **not** support sharp shooting as a management option.

Members did however note that other municipalities (Fairmont Park, Philadelphia) had used sharpshooters successfully and had decreased the deer population safely. The Committee reviewed information from the Pennsylvania Audubon Society. The Audubon Society has posted on their website (www.audubon.org/chapter/pa/pa/) the proceedings from a deer conference. Of most interest were the notes from Bob Wallis, the Co-Chair of the Deer Committee of the Friends of the Wissahickon, Philadelphia. Mr. Wallis presented insight into values and communications strategies that they had learned when working to preserve and protect the 3 square-mile Wissahickon Valley in Philadelphia's 15-square-mile Fairmount Park, the largest urban park in the U.S. He reported that during the spring of 1999 the Fairmount Park Commission, following the Friends' recommendations, conducted a deer cull with a sharp shooter to reduce the deer density to 20 per square mile. The herd was reduced by 43 deer, but an early spring abbreviated the cull. Mr. Wallis's presentation provided many useful reminders for the committee members regarding communications. He noted that the issues associated with over-population of White-tailed Deer in Pennsylvania are:
- loss of forest health especially severely diminished bio-diversity and propagation of new trees and bushes
- deer-vehicle collisions
- Lyme disease
- ornamental damage

In addition, the OMNR consistently recognizes the need to manage deer populations in Ontario through the use of harvest; it is an acceptable practice in Southwestern Ontario and the Upper Thames River Conservation Authority has allowed and coordinated controlled deer hunting on specific properties in the past.

## b) Live Capture and Shoot

i) Methods
- Deer can be live-captured in a single gate Clover trap, modified Stephenson box traps, netted cage traps, drive nets, drop nets, rocket nets, corral traps. In residential areas, the traps are placed out of sight from public roads and neighbouring houses in areas of high deer activity (usually feeding areas adjacent to woody cover). The traps are typically installed in late fall before the ground freezes to ensure they are anchored and are ready for an early winter. Sites are pre-baited with a combination of shelled corn and apples to survey for deer presence, and the traps are baited and left open to condition deer to enter. Since winter is the only season when trap capture is feasible, traps are run during the season of snow cover with midday temperatures consistently below freezing.
- Trapped deer are approached on foot and shot. Carcasses are immediately removed from the site and field dressed during which a postmortem assessment on the carcasses can be completed. This assessment could include an evaluation of sex, age class, whole body and eviscerated body weights, linear measurements (total length, right hind foot, chest girth), ovaries, kidney fat indices and Kistner score (Kistner et al. 1980). Reproductive status and physical anomalies could also be noted.

ii) Benefits
- Chance of injury from stray bullet is limited.
- Can be used in areas where there is a concern about the discharge of firearms or in areas with very high deer

densities to complement a sharpshooting program and is, therefore, a good method for removing deer that live near residential properties.

iii) Disadvantages
- Trapping is expensive, inefficient and highly visible.
- Method is perceived as inhumane since deer are stressed during the restraint phase of the capturing process (DiNicola and Swihart 1997).
- Trapping has only limited success since traps have to be set carefully to avoid being sprung by wind, heavy snow or freezing rain. Success of trapping depends on severity of winter and on food limitations. As well, some people tamper with the traps.

*Discussion*
The Committee discussed live capture and shoot and noted that this option combines some of the disadvantages of both capture and release and sharp shooting. The capture causes the deer to be stressed. The Committee members did not want firearms discharged in the Bog.

The Committee members agreed that they would **not** support live capture and shoot as a management option.

## c) Introduction of Natural Predators

i) Methods
- Reintroduce predators such as wolves to reduce deer density.

ii) Benefits
- Natural form of population control.

iii) Disadvantages
- Natural predators require a large natural area to fulfil all their life functions and also affect human safety.

*Discussion*
The Committee agreed that reintroducing natural predators such as wolves to the Bog would create public safety concerns. The committee members agreed that they would **not** support the reintroduction of the deer's natural predators to the Sifton Bog.

## d) Bow Hunters

i) Methods
- See sharpshooting methods.

ii) Benefits
- Although not as effective at reducing deer herd as sharpshootng, an archery deer hunt can contribute substantially to population reduction or maintenance goals. This method is often used to remove deer in suburban areas when firearm discharge is not permitted since it is relatively safe because of the limited shooting range for archery equipment. Bowhunting is a relatively discreet and silent activity.

iii) Disadvantages
- There is strong opposition to the shooting of deer by local animal welfare advocates and the influence of animal welfare and animal rights groups on local political decisions through litigation or disruptive activities.
- Highly skilled marksmen are needed to ensure public safety in a heavily populated urban area.
- There is a chance that some animals will be wounded. These animals will either die slowly, become permanently disabled or fully recover. Deer that are mortally wounded with an arrow can travel 100 yards or more before succumbing and in developed suburban areas this could result in fatally struck deer dying on adjacent properties.

*Discussion*
The Committee members discussed a study that was completed in Connecticut that evaluated methods to safely reduce large deer herd populations. It assessed cost, effectiveness, and deer recovery rates of a controlled archery hunt to reduce a herd of overabundant White-tailed Deer in a residential community in Connecticut. This community-supported archer hunt was implemented on community-owned conservation lands in 1996 and 1997. A rigorous hunter-selection process was used to select qualified archers. Guidelines, in addition to state hunting laws, were developed by the community to increase the safety and effectiveness of the hunt and minimize potential conflicts between user groups. The archery hunt reduced the local deer herd by 50% during the first years, and many residents subsequently experienced reduced deer damage to landscape plantings. Data from hunter surveys indicated that shooting accuracy experienced by archers under hunting conditions was 20% lower than shooting accuracy experienced during a prehunt shooting proficiency tests. No hunting accidents occurred, no conflicts between hunters and residents were reported, and no deer hit with arrows died outside the hunting area. The most significant cost to the community was additional law-enforcement personnel required to respond to potential conflicts with protesters. Researchers concluded that under controlled circumstances, a well-designed archery hunt with a rigorous hunter-selection process may be an effective tool to reduce urban deer herds.

The Committee members agreed that they could support a controlled archery hunt as a deer management option for the Bog. The Committee members felt that this method addressed:
- the need to decrease the deer population,
- the desire to minimize any suffering to the deer,
- the need to protect the safety of the community members and bog users.

## Recommendation of the Sifton Bog White-tailed Deer Community Steering Committee

The Sifton Bog White-tailed Deer Community Steering Committee recommends that the Upper Thames River Conservation Authority and the City of London conduct a controlled archery hunt within the Sifton Bog during the 2003 fall hunting season. The Committee recommends that the number of deer to be harvested be based on a fall population survey with the understanding that 8 deer are to be left in the Bog.

The Steering Committee expects the agencies to develop detailed implementation plans and to have regard for all safety precautions, including a rigorous hunter-selection process and communication with the surrounding community members and Bog users.

The Steering Committee also recommends that the controlled archery hunt be monitored to assess the effectiveness of the program and to make future decisions regarding management actions. The Committee recognizes the need for ongoing management of the deer population in the Bog.

## Next Steps

The presentation of the recommendation to the community on February 26, 2003 marks the completion of the Sifton Bog White-tailed Deer Community Steering Committee's charge. The recommendation moves forward to the Upper Thames River Conservation Authority and the City of London for consideration.

Black spruce surround the Bog's spaghnum mat.

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