

An Assessment of Effects of Urban Land  
Development on the Winnipeg Deer Herd

by

Daniel M. Bulloch

A Practicum Submitted  
in Partial Fulfillment of the  
Requirements for the Degree,  
Master of Natural Resources Management

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## ABSTRACT

The response of the Winnipeg deer herd to increased land development was assessed. This included analysis of habitat loss, optimal population size, supplementary feeding, and deer related damage. Management techniques used in other North American cities were documented.

There is 3490 ha of potentially manageable habitat within the study area, 2242 ha of which lie within the Perimeter Highway. Though Plan Winnipeg policy provides for development of 737 ha, or 33% of deer wintering habitat within the Perimeter by the year 2001, only 103 ha are expected to be lost. This is comprised of 87 ha of residentially zoned land and 16 ha of industrial land. The remaining 634 ha is zoned for industrial use.

Tripling of the Winnipeg deer population since 1975 has resulted in an increase of deer depredation and deer vehicle accidents. If deer are to be maintained as a beneficial resource, a long term management plan needs to be developed for the Winnipeg herd. To assure that urban values are reflected in such a plan, public input is essential. From this information it may be possible to design a sociological carrying capacity for the deer herd specific to Winnipeg's situation.

Habitat maintenance via leases or grants, regulation of deer numbers through continuation of the relocation program, and intercept feeding programs on manageable habitat, are recommended. To insure that individual residents do not bear the entire impacts of the deer population, damage prevention and compensation programs need to be implemented.

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## Chapter I

### INTRODUCTION

#### 1.1 PROBLEM STATEMENT

Within the City of Winnipeg, there is a white-tailed deer (Odocoileus virginianus) herd of approximately 500 (Koonz 1986). These deer are concentrated in areas west of the Winnipeg International Airport in Murray Industrial Park, St. Charles Rifle Range and Charleswood from Fort Whyte to Beaudry Provincial Park (Figure 1). Habitat which supports these deer has been reduced significantly in the past 60 years (Shoesmith and Koonz 1977) and indications are that the trend will continue. There are inherent problems with this situation which are primarily people-oriented. Unfavorable interactions including automobile collisions, damage to gardens, predation by dogs and interference on airport runways are increasing. However, there are significant educational, recreational and aesthetic benefits of having a properly managed deer herd. In order for benefits to be realized, resource managers must create a workable management plan for white-tailed deer within the City of Winnipeg.

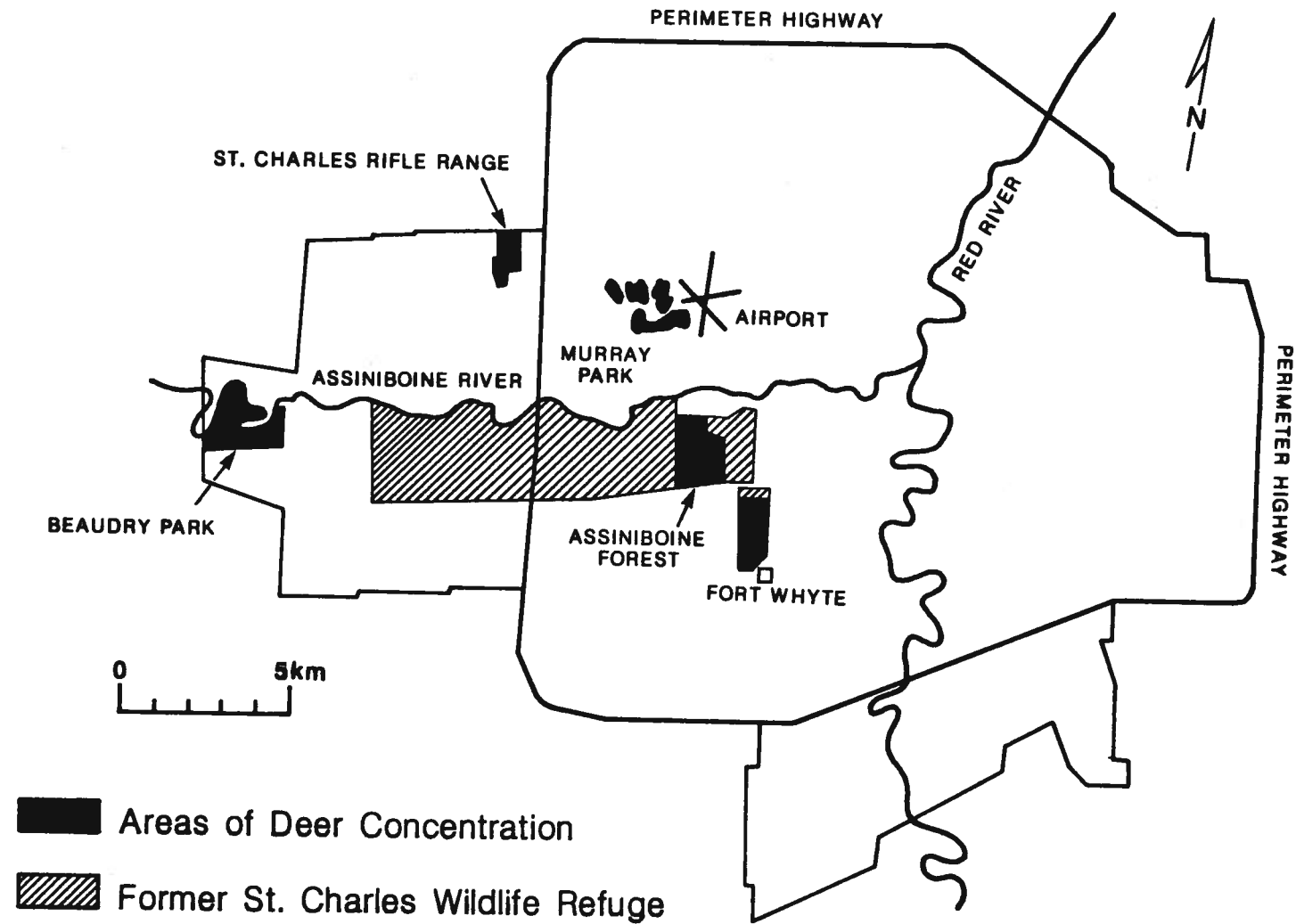


Figure 1: Urban Deer Study Area in Winnipeg, Manitoba (after Shoesmith & Koonz 1977)

## 1.2 OBJECTIVES

The primary purpose of this practicum was to assess the effects of urban expansion on the Winnipeg deer herd. Specific objectives were:

1. To identify present deer habitat and anticipated loss of habitat to various forms of development within the study area.
2. To document habitat management and deer management strategies used in other North American cities.
3. To identify factors to be used in determining an optimal deer population.

## 1.3 STUDY AREA

The area considered for the Winnipeg deer study defined Winnipeg beyond the City's Metropolitan Corporation boundary. Other landmarks, e.g. rivers and roadways, were used to delineate the study area so that Beaudry Provincial Park and all city-owned parks were incorporated.

Although Bird's Hill Provincial Park is close to Winnipeg, the deer range is not in close proximity to any urban residential or industrial development. Deer movement between Winnipeg and Bird's Hill Park is expected to be minimal, since management efforts to contain deer in the park appear to be successful.

#### 1.4 URBAN DEER HABITAT

Habitat is defined by Bailey (1984) as the kind of biotic community, or set of biotic communities, in which an animal or population lives. Habitat is not synonymous with cover. Suitable habitat provides all habitat requirements of a species for a season (e.g. wintering habitat) or year round, whereas cover is where animals find protection. Cover is defined as any structural resource of the environment that enhances reproduction and survival rates of animals by providing for any of the natural functions of the species (Bailey 1984).

Goulden (1985) described preferred deer habitat in Manitoba as areas of young forest growth with many openings scattered throughout. As an "edge animal", white-tailed deer find this the best combination of food, water, and shelter from the elements, and cover to escape from enemies. In summer, deer are found almost throughout their range including farm fields, fence rows, gardens and fringes of cities. Summer deer densities in southern Manitoba range from 2-4 deer per 2.6 km<sup>2</sup> (1 mile<sup>2</sup>) while winter densities can be expected to be higher. As deer "bunch up", wooded habitat densities can be expected to reach up to 50 deer per 2.6 km<sup>2</sup> (1 mile<sup>2</sup>) in areas with 50% or more wooded cover. Goulden (1985) states that winter and sport hunting are the chief causes of mortality for deer over 6 months of age in rural Manitoba.

Deer habitat in Winnipeg, as described in this practicum, is land that supports deer over winter, i.e. winter habitat. It is recognized that there is over 50 km of riverbottom forest as well as numerous woodlots and parks which can and do support deer at various times of the year. Deer also often survive on the habitat resources provided by residential properties. However, from a management perspective small private lots (e.g. less than 0.4 ha) cannot be considered as viable habitat. Properties in residential areas are generally subject to considerable damage when deer congregate to feed. Because of the close proximity of these lots, limiting deer movement to properties where they are welcome by owners is not feasible. As a result, developed property in residentially zoned areas (Plan Winnipeg zoning) were not part of the habitat inventory in this study. In addition, 2.0 km<sup>2</sup> of small, private land parcels between Assiniboine Forest and Beaudry Provincial Park (Figure 1), were excluded from the habitat inventory because regular winter use was not substantiated by MDNR surveys (Koonz 1980, 1981, 1984, 1985 and 1986). Therefore, only winter habitat, as described in Manitoba Department of Natural Resources (MDNR) censuses (Koonz 1980, 1981, 1984, 1985 and 1986), was analyzed for future land use development.

Urban growth and development are determined by legal rather than ecological boundaries. "Habitat" for future land use is described by property size, minus structures e.g.

buildings, parking lots. Properties identified as deer habitat were not defined by percentage of forest or vegetative cover. This is consistent with Bailey's (1984) definition of habitat, as non-forested land on properties listed provided other habitat components, e.g. food and water.

## Chapter II

### METHODS

The study was initiated with a review of information pertaining to urban wildlife and deer management. Sources included wildlife publications, MDNR reports, City of Winnipeg reports and personal communication. To evaluate the status of potential deer habitat, a combination of map and field analyses were used. Wooded areas over 0.4 ha in size were identified by use of a 1:50,000 topographic map of Winnipeg. Aerial photographs were used to update any changes, which was then followed by field verification (all areas were checked by car and/or on foot). Areas of deer concentration were initially identified by use of MDNR census reports (Koonz 1980, 1981, 1984, 1985, 1986), personal communication and observation. To analyze general urban development patterns with relation to the Winnipeg deer herd, city planning policies (e.g. Plan Winnipeg) were reviewed. From this information a modified zoning plan map was constructed.

Landowners in deer wintering areas were then contacted. The Winnipeg phone book, Henderson's Directory, City of Winnipeg Land surveys and Real Estate Department, Manitoba Land Titles Office and various real estate companies provided owner names and legal land descriptions of their properties.

Discussion with land owners personally or by phone was aimed at evaluating the future status of their land. Example questions include:

1. Do you plan any type of development that would significantly alter the landscape of your property, e.g. building, bush removal? If so, during what time period, i.e. year if known, or nearest five years if beyond 1995?
2. Do you anticipate moving or subdividing your property?
3. Do deer occur on your property at any time? If so, do you feed the deer?

Organizations who feed deer were also contacted so that areas of deer concentration and feeding could be identified.

Deer management techniques in other cities were determined through telephone discussion and literature review. Present and future strategies for urban deer management were documented with their relevance to the Winnipeg situation.

Data pertaining to land use and deer habitat were compiled into a series of maps and tables to illustrate habitat loss, urban development trends, areas of deer concentration and major deer feeding sites. This information, as well as personal communication with local residents and resource managers were considered so that factors for an optimal deer population could be determined.



## Chapter III

### URBAN DEER: ATTITUDES AND POLICIES

#### 3.1 PUBLIC ATTITUDES TOWARD URBAN WILDLIFE

In Canada and Manitoba, public perceptions and attitudes toward wildlife are generally positive (Filion et al. 1983).

The public has come to recognize wildlife as a valuable commodity (Shaw 1974). King (1966), described various types of wildlife values; commercial, recreational, biotic, scientific, philosophical and educational, aesthetic, social, and negative. Shaw (1974) pointed out that as human populations increase and wildlife habitat decreases, individuals put a higher value on wildlife. With the change in values has evolved an attitude of non-consumptive uses such as viewing or photography rather than consumptive uses, such as hunting (Shaw 1974).

Filion et al. (1983) found that wildlife-related activities were one of the most prevalent forms of recreation undertaken by Canadians in 1981. In that year, 84% of Canada's population participated in some form of indirect wildlife activity and spent an estimated \$4.2 billion in the process. Filion et al. (1983) also reported that 80% of the public value wildlife conservation. Non-consumptive wild-

life use by Manitobans at home or while travelling was approximately equal (within 1.5%) to the national average. Non-consumptive wildlife-related activities were undertaken largely by urban dwellers (70%), the largest single age group being 24-34 years. Residential wildlife-related activities engaged 12.3 million Canadians. These activities included feeding, watching and photographing or studying wildlife. Approximately 20% of Canadians purchased various types of feed specifically for wildlife. Maintaining plants or shrubs to provide food and shelter for wildlife was listed for 13% of the population. Study conclusions from Fillion et al. (1983) which were relevant to urban wildlife suggested that:

1. The difference between participation in wildlife-related organizations (6%) and those who indicated interest (43%) suggests "a large pool of potential participants for this form of wildlife related activity".
2. All provincial and national economies might benefit significantly by highlighting their wildlife resources in tourism advertising campaigns.
3. Favourable attitudes toward abundant wildlife populations suggest that the Canadian public is highly supportive of current policies and programs that promote these aspects.

### 3.2 DEER AND THE CITY OF WINNIPEG

Winnipeg is a city which has seen rapid growth during the 20th century. From 1901 the population of Winnipeg grew from 48,000 to present estimations of about 600,000. In an attempt to control urban growth problems in Winnipeg the Metropolitan Corporation of Greater Winnipeg (MCGW) was formed in 1961. The Corporation's goal was to draft a 25-year plan (1961-1986) to insure "development of this metropolitan area in an orderly, economic and aesthetic manner, making the urban community a pleasurable place" (MCGW 1963). With the implementation of Unicity in 1972, changes occurred regarding zoning, revenues and government structure (Ruta 1981). However the MCGW plan was maintained as a guideline to city development. More recently Plan Winnipeg (Figure 2 and Figure 3) has been created to update the MCGW while fulfilling the mandate of its predecessor. The Parks and Recreation Component of the plan states:

"The city shall preserve all woodlots and natural landscapes for neighborhood and community and regional open space purposes, that have major ecological, historical or geological features" (City of Winnipeg 1981).

Objectives of the Parks and Recreation Component include preservation of "woodlots or natural landscapes for visual relief, for outdoor education opportunities and as a landscape diversity in an urban environment". Acquisition of real estate for green space follows a hierarchical system for neighborhood, community, regional and urban provincial

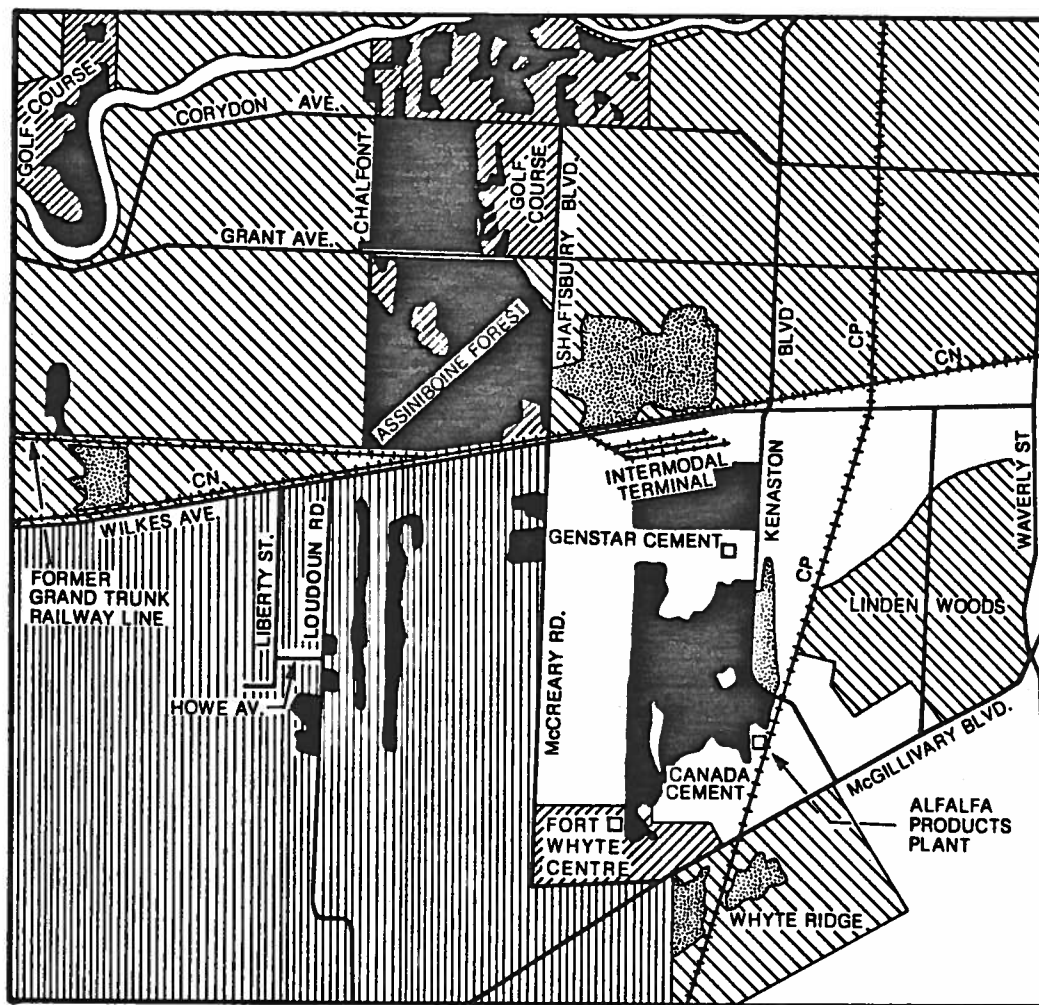


Figure 2: Plan Winnipeg Zoning in Charleswood/Fort Whyte

- Agricultural
- Residential
- Industrial
- Park
- Bush

Land will be developed by 1995



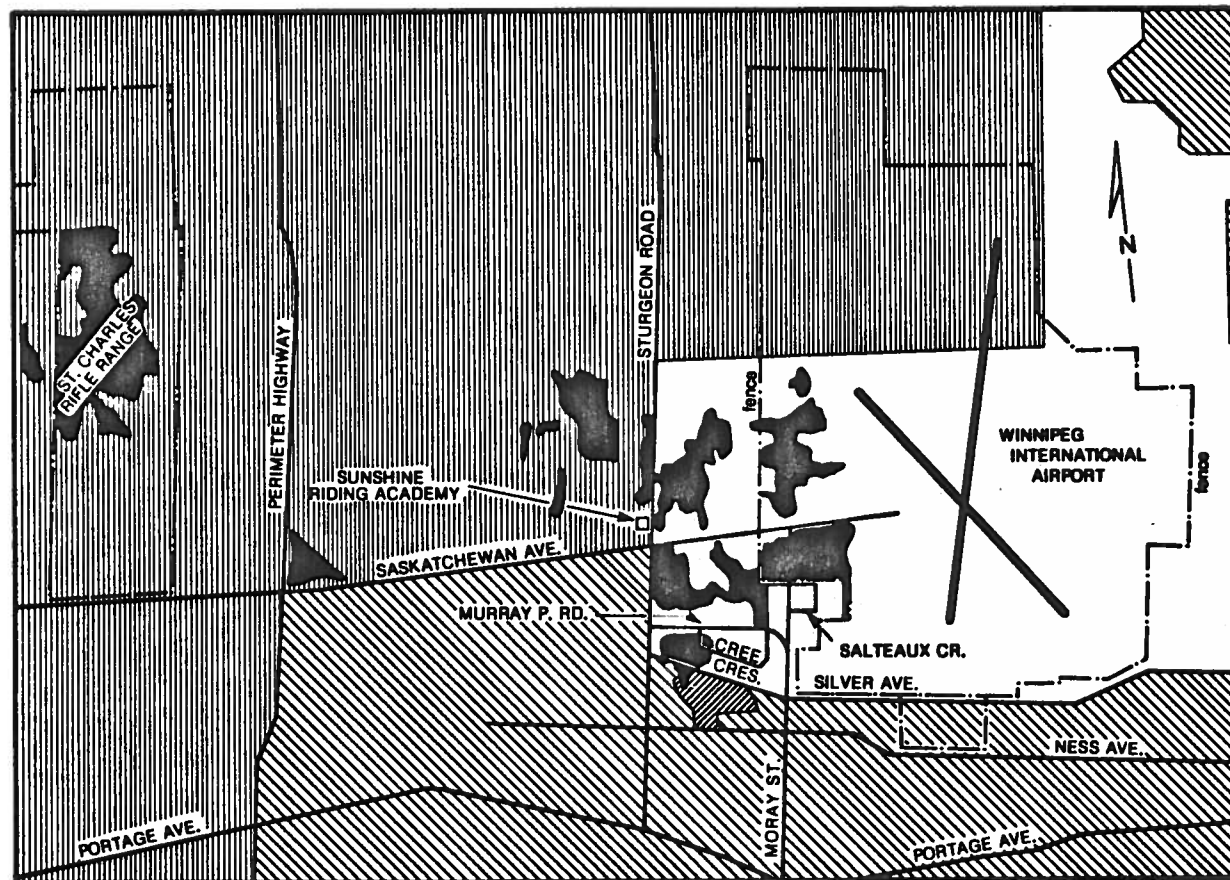


Figure 3: Winnipeg Zoning Plan - Murray Industrial Park



parks. The present priority of land purchase is riverbank property and potential parkland areas without adequate green space. Policies toward open green space make no direct reference to wildlife; however, the importance of natural landscapes and ecological features as described in the plan are not contrary to the presence of wildlife (City of Winnipeg 1981). Creation of the Assiniboine Forest as a Wildlife and Natural History Reserve (Ruta 1981, Richards 1974) indicate a tolerance if not a desire for urban wildlife, which may reflect the direction of city policies should they be established.

Policies dealing with deer, urban or otherwise, are under provincial jurisdiction and are implemented by the Department of Natural Resources. Department of Natural Resources policies are outlined in the Five-Year Plan (MDNR 1983) and the Natural Resources Roles and Missions Statements (MDNR 1985). These are consistent with Plan Winnipeg goals and include:

"Wildlife Branch manages the wildlife resource for the outdoor recreational opportunities that it provides to Manitobans and for the significant economic development and subsistence use benefits which it provides at the community and the regional level. Access to wildlife for scientific purposes and the educational benefit of Manitobans, and minimizing damage caused by wildlife are other important responsibilities of the Branch".

"To manage the wildlife resource and its habitat base in a manner which ensures that viable populations are preserved for the benefit of future generations".

"To allocate wildlife resources in a manner which attempts to optimize the long term social and economic benefits to Manitobans".

"To work cooperatively with other branches, departments, outside agencies and wildlife users in planning and managing wildlife programs" (MDNR 1985).

No agency exists in Winnipeg which deals exclusively with urban wildlife. The MDNR Southeastern Region office, Biological Services section, Winnipeg Parks and Recreation and Winnipeg Animal Control are all involved in urban wildlife management to various degrees. City officials, i.e. Winnipeg Animal Control, handle some emergency situations, but are not active in passive management or management planning. Winnipeg deer management is the responsibility of Manitoba's Southeastern Regional wildlife specialist and conservation officers. Though this agency is concerned with all of southeast Manitoba, officials spent much of their time dealing with complaints registered by Winnipeg residents (D. Robertson, W. Redlick, W. Banting, pers. commun.).

## Chapter IV

### URBAN DEER MANAGEMENT

#### 4.1 MANAGEMENT ISSUES

"If we are to have wildlife in the city we must be prepared to manage that wildlife" (Smith 1975).

It has become apparent that the need for management intensifies as interaction between wildlife and man increases (Witter et al. 1981). Shaar (1979), Witter et al. (1981) and Ashley (1982) were of the opinion that many of the wildlife problems resource managers must face are actually "people problems" requiring more than just a knowledge of wildlife.

Public participation into resource management decisions has increased in recent years. Through techniques such as advisory boards, ad hoc committees, public meetings, workshops, letters, opinion polls, editorials, petitions and surveys, the public is often able to voice their opinions on resource management issues. Hendee et al. (1977) recommended open meetings and publicly solicited written input as the two most effective methods for obtaining public opinion. Written comment allows for a deliberate commitment in a private thoughtful manner, while open hearings allow segments of the population not represented through other channels to hear the issues and be heard.



Whichever method is used, resource personnel are coming into increased contact with the public when making management decisions. To prepare for this, Leitch (1985) recommended that wildlife biologists be educated in communications, political science and economics for resource management in the 1980s.

When considering the applications of management techniques to wildlife issues, it is necessary to identify the problems to be addressed. Shoesmith and Koonz (1977) described the Winnipeg problem as overabundance of deer that are creating unfavorable interactions through vehicular accidents and property damage. This is further complicated by public reaction against population control measures.

#### 4.2 DEER IN WINNIPEG - BACKGROUND AND ECOLOGY

The white-tailed deer is not indigenous to Manitoba (Shoesmith and Koonz 1977). When Europeans began settling the prairies, mule deer (O. hemionus) were the only deer species found in the province. However, early agricultural practises altered the landscape creating unfavorable conditions for mule deer, while producing the early successional edge vegetation that could support white-tailed deer (Seton 1909, Smith 1975). Since that time white-tailed deer have thrived in the presence of man, while their predators have diminished. Wolves (Canis lupus), coyotes (C. latran), lynx (Lynx canadensis), and possibly cougars (Felis concolor) can

still be found in areas surrounding Winnipeg, but do not directly affect the urban deer herd. As a result, automobile collisions are the most significant mortality factor on an annual basis (Shoesmith and Koonz 1977). There are approximately 100 deer reported killed in traffic accidents per year, but the current number is believed to be in excess of 130 (W. Koonz, pers. commun.). These figures indicate that approximately 1 out of 5 deer in Winnipeg may be killed through traffic collisions.

Winnipeg deer are subject to some dog predation and poaching, but the extent of these activities is not known. Lowry and McArthur's (1978) suggestion that dog predation can significantly reduce deer populations does not seem to hold for the Winnipeg herd considering the herd's growth.

Bidlake (1975) concluded that disease also has negligible impact on deer in southern Manitoba. The impact of these factors may increase as deer populations become more concentrated. Though disease is rarely a mortality factor among Manitoba deer, the population density of the Winnipeg deer herd is significantly higher than in other parts of the province, and at least 1 parasite, Paraelaphostrongylus tenuis, shows a corresponding increase (Shoesmith and Koonz 1977). This is not terminal, but continued growth of the herd may well increase the possibility of serious diseases to infect the herd.

The Winnipeg Zoo provides a potential disease source for the urban deer herd. An outbreak of what is believed to be Besnoitia taranda has spread to several ungulate species (G. Glover, pers. commun.). Although this fatal, insect borne, disease has not been documented in white-tailed deer it is not known if they are immune (D. Robertson pers. commun.). There is concern that if Besnoitia can spread to the zoo's white-tailed deer, the free roaming herd may be threatened. Any factor, whether starvation, disease or behavior changes, that cause a high rate of mortality over a short period of time has the potential to create public relations problems for the MDNR when the general public and media observe dead or dying animals.

Habitat loss is generally considered to result in a corresponding decline in the number of deer (Milliken et al. 1975, Knudson 1978). This has not been demonstrated by the Winnipeg deer herd. While deer habitat in Winnipeg has been declining steadily, the deer population has tripled in the last 10 years (Figure 4). This is thought to be a result of relatively mild winters and increased food sources.

Deer movement into the city is relatively unrestricted. The Red, Assiniboine, and other rivers flowing through Winnipeg, all provide greenbelt corridors which are used by deer (Shoesmith and Koonz 1977). Though deer are sighted throughout the City of Winnipeg, chronic deer-related problems such as depredation and deer-vehicle accidents, occur

in regions which surround deer wintering areas. Residential properties, particularly west and south of Assiniboine Forest and west and south of Murray Industrial Park, are of major concern.

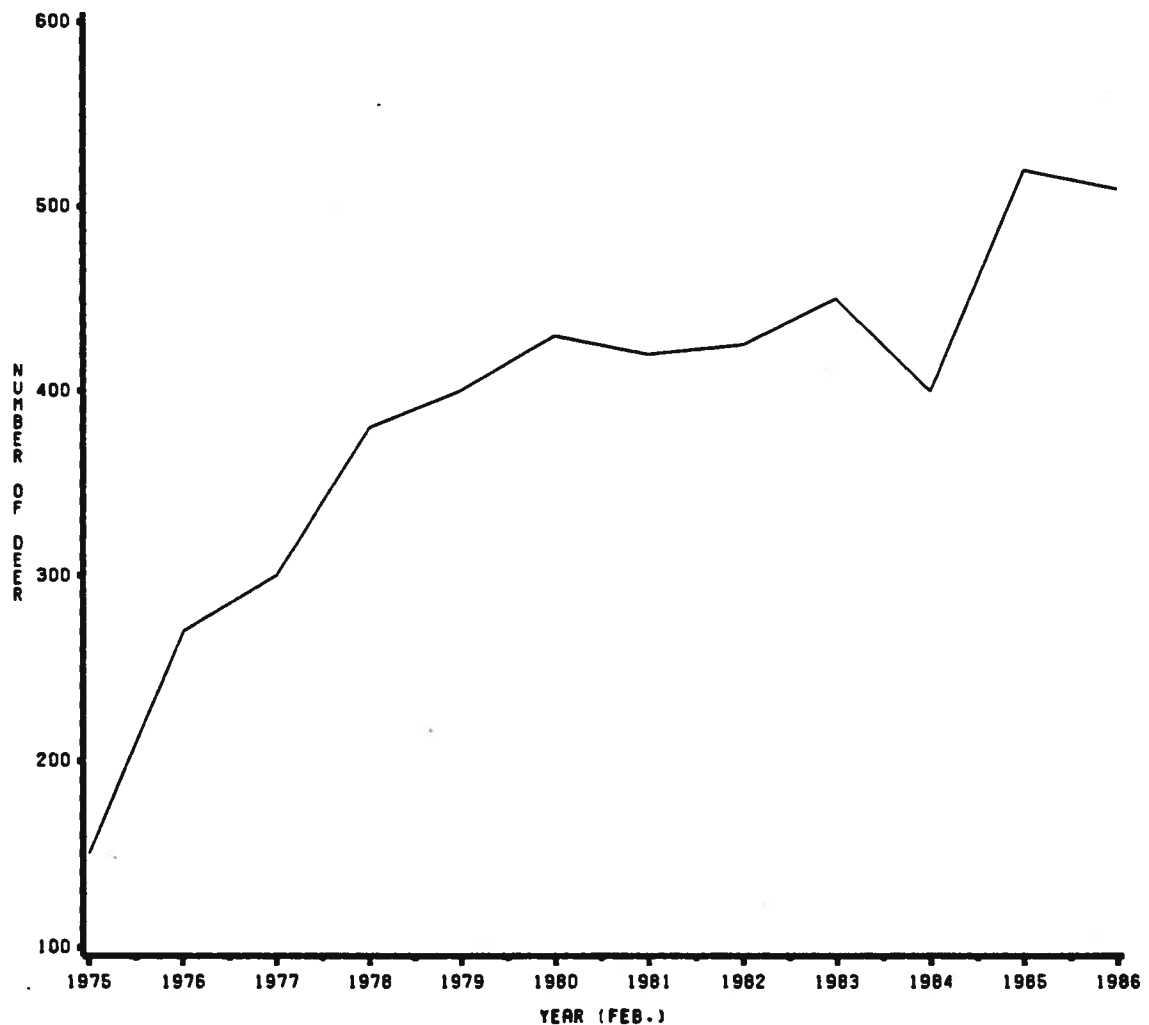


Figure 4: White-tailed Deer Population Trends in Winnipeg, 1975-1986 (after Dixon 1985, Koonz 1986)

White-tailed deer are described by some authorities as browsers (DeVos and Mosby 1971, Banfield 1981). However, Karns (1980) indicates that these deer rely less on browse species, e.g. dogwood (Cornus stolonifera), and more on field products, therefore defining white-tailed deer as grazers. Studies by Howe et al. (1974) and Garrod et al. (1981) show Winnipeg deer to eat a wide variety of plant types, though they have preference for certain plant species. Food preferences change seasonally as may be expected, but may also change from year to year for no apparent reason. MDNR Conservation Officers for the Winnipeg region, are of the opinion that foods which provide the staple for deer 1 winter may be shunned for other foods the following winter, and vice versa (W. Banting, W. Redlick, pers. commun.).

Presently, deer in Winnipeg feed primarily on agricultural crops, supplementing native browse in summer and rations from private feeders in winter. Garrod et al. (1981) determined that deer rely heavily on barley, wheat, sugar beets, alfalfa and oats. Native plant species which provide browse include snowberry (Symphoricarpos occidentalis), clover (Trifolium spp. & Melilotus spp.), dogwood, aspen (Populus tremuloides), rose (Rosa spp.), oak (Quercus macrocarpa) acorns, knotweed (Polygonum spp.) or dock (Rumex spp.), lamb's-quarters (Chenopodium album), saskatoon (Amelanchier alnifolia), and pigweed (Amaranthus retroflexus) (Howe et

al. 1974, Garrod et al. 1981). Cedar (Thuja occidentalis), was not mentioned in the analysis by the above authors. However, deer now seek out cedar in Charleswood/Fort Whyte and Murray Park areas (Figure 1). Suburban residents complaints about deer are generally limited to when their gardens and ornamentals become browse. Cedar is sought by deer during winter because it is a nutritionally "complete" food (Ullrey et al. 1970).

Unlike other areas of Manitoba where deer have not always been able to meet nutrient requirements through the above mentioned sources (Menzies 1979), the Winnipeg herd historically has had an adequate supply of supplemental food sources. Although the Winnipeg deer herd gives credence to Leopold's (1933) observation that food is the density dependent factor of wild ungulates, more recent studies by Chitty (1967) and Krebs (1978) indicate that populations may be self regulating through genetic changes which influence behavior. However, Chitty points out that this rapid natural selection process may not operate in unnatural environments.

#### 4.2.1 Controlling the Deer Population

Favorable conditions over the past decade has resulted in locally abundant deer populations which have, at times, created management problems. Attempts to limit the size of the deer herd in order to reduce unfavorable incidents have

brought criticism on the MDNR by some members of the public. However, there has not been opportunity for organized public input into urban deer management decisions.

Citizen reaction, at times prompted by media headlines, such as "Winnipeg Deer Herd Too Large; Slaughter Urged" (Gage 1982), have effectively halted past efforts at controlling the deer population. Management action was often minimized to avoid conflicts with the public. As a result, past deer management efforts for the Winnipeg herd have been called stop gap and crisis management (Koonz 1985).

Management techniques for population control of locally abundant game animals traditionally emphasized hunting as a primary tool (Jewel and Holt 1981), but as Smith (1974) and Ashley (1982) found, this is not always acceptable to the general public, particularly in an urban setting. Opposition to hunting or killing of wild animals is more prevalent among urbanites "who have little contact with the land" (Bailey 1984). As a result, much sentimentalist emotion is generated by the "unrealistic and sometimes anthropomorphic presentations of wildlife in books and films about animals" (Bailey 1984), which is referred to as "Bambi Syndrome". Smith described the dilemma as follows:

"To appreciate the complex problem of managing wildlife one might examine the case of the White-tailed deer, an animal whose management has aroused so much emotion through the years that the result has usually been no management at all" (Smith 1974).

As a result, other methods of reducing natality have been suggested. Koonz (1985) considered birth control, though a steroid implant method tested by Matschke (1980) to prevent pregnancy in white-tailed deer proved to be ineffective due to high cost and limited success of the chemical.

Perhaps the most commonly suggested technique is live removal. Craven (1983) stated that live trapping is rarely justified unless a "delicate public relations program mandates live removal as the ONLY choice". He added that methods used in live animal removal e.g. rocket nets, drop door box traps and tranquilizer guns are expensive and time consuming. Ashley (1982) and O'Bryan and McCullough (1985) estimated their removal costs at US\$100 to US\$431<sup>1</sup> per deer respectively. Seasonal considerations, animal stress and health are also factors to be considered when transplanting deer. A California study by O'Bryan and McCullough (1985) found that mule deer which were live captured and transplanted to a suitable relocation had a very poor survival rate after 1 year. The report stated that some deer died of malnutrition despite an adequate food supply. Other deer were subject to predation, hunters and vehicle collisions, factors which were not present at their home site. However, the results of the Angel Island project have been questioned by some biologists because of the small sample size of monitored animals (J Witham, pers. commun.).

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<sup>1</sup> Both prices quoted are 1982 dollars.



Lack of success by most transplant programs was largely due to a lack of follow-up management by wildlife biologists (H. Goulden, pers. commun.). Monitoring of deer movement patterns and mortality rates after transplant are the only techniques regularly used in relocation projects. Programs to assist the animal's adaptation, e.g. supplementary feeding of familiar foods, has not been a reported practise in the past.

Ishmael and Rongstad (1984) determined deer removal is most successful when several methods are employed. Among the methods suggested were netting and shooting over bait. Shooting baited animals was determined to be most cost effective. They also noted:

"When selecting methods for deer control, biologists must consider public sentiments and safety, cost and effectiveness of the method."

Ashley (1982) provided a successful account of a deer removal program through chemical (tranquilizer) capture of Milwaukee animals. Citing the complicated emotional issues involved in dealing with an urban wildlife situation, he found that public participation lead to voluntary manpower and financial support.

The MDNR implemented a deer removal program in Winnipeg during the winter of 1985-86. Commercial deer feed was used to bait the animals into 3 trap-sites, the Genstar Cement Plant, Assiniboine Forest and west of the Winnipeg International Airport, on the Butler property. After 8 weeks of

baiting, a 20x20 m drop net was installed over the feed trough using a 5x5 cm knotless nylon mesh. The 6 week capture program was aimed at removing approximately 100 does and fawns from the 3 areas with a long term goal of reducing the Winnipeg herd by 1/2 or approximately 250 - 300<sup>2</sup> animals. Officials believe that by reducing the number of breeding females, growth of the deer herd would be slowed. In total 114 deer were removed, 88 of these were does and fawns. The captured animals were relocated 100 km southeast of Winnipeg where they were released into the St. Malo Wildlife Management Area (WMA) and St. Malo Provincial Park. The St. Malo Wildlife Association assisted in capturing, relocating and feeding the transplanted deer. The deer were released into sections of the WMA and St. Malo Park. Costs have been estimated at \$185 per deer (T. Moran, pers. commun.).

The effectiveness of deer relocation has not yet been evaluated. Koonz (1985) reported 471<sup>3</sup> deer in the February, 1985 census. In March 1986, after the relocation program

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<sup>2</sup> This number was derived using general ungulate model version 3.0 (Johnson 1984). The objective was to reduce the deer population to the lowest level at which the herd could still maintain its numbers. By removing approximately 100 does and fawns, the ratio of breeding animals would be reduced. At 250 - 300 animals, the MDNR expects deer numbers to increase at a slower rate than presently occurs (T. Moran pers. commun.).

<sup>3</sup> The estimated deer population for Winnipeg is the censused number plus 10%. Estimated deer populations in 1985 and 1986 were 518 and 506 respectively (Figure 3).

ended, Koonz (1986) reported 461 deer. Though this suggests the deer population has not changed significantly as a result of fawn recruitment from spring 1985, it does not account for the possible change in the deer herd's sex ratio.

The program was initiated with extensive media coverage as a public education measure. The resulting media coverage was shown on 4 local television channels as well as national coverage on both CBC TV and radio. This exposure gave MDNR personnel an opportunity to explain the program to the people of Winnipeg resulting in a generally positive response. If this transplant program proves successful, it will allow MDNR wildlife biologists to achieve a previously determined deer population in a way which meets with public approval.

#### 4.2.2 Supplementary Feeding

A common technique to enhance deer populations is supplementary feeding. Though Leopold (1933) did not advise feeding because of long term detrimental affects to the herd, Karns (1980) concluded that in northern regions supplementary feeding may be necessary to maintain deer herds particularly during high stress periods (i.e. severe winter). This is supported by Baker and Hobbs (1985) who determined that feeding is necessary to maintain mule deer herds in harsh winters. Earlier literature on deer feeding suggested that deer mortality increased with winter feeding (Leopold 1933).

Past deer mortality associated with winter feeding was probably a result of low quality feed. Nutritionally deficient supplements may cause disorders such as acidosis, or death (Ozoga and Verme 1970).

Winter loss to starvation is no longer considered to be just density dependent, i.e. the greater the population the greater percentage of expected die-off. Mortality is also related to the physical (nutritional) condition of deer at the onset of winter combined with severity of winter. In northern regions white-tailed deer "yard" in winter to conserve energy. In many areas these deer yards provide adequate cover but little or no food. Severe winters can reduce nutrient availability to deer or put them in a negative energy plane should the animals seek out low nutritional browse at the expense of stored energy. In order to survive winter, deer exist in a state of "walking hibernation" (McCaffery no date) living off stored energy. If severe winter conditions are increased, e.g. more than 13 weeks of  $-18^{\circ}\text{C}$  or in excess of 46 cm of snow, energy reserves run out and deer starve. If the herd is at the habitat's maximum carrying capacity<sup>4</sup> so that "recruitment equals natural mor-

<sup>4</sup> Carrying capacity has been defined in several ways (McCaffery no date). Karns (1980) used the Dahlberg and Guettinger (1956) definition as the accepted concept for deer carrying capacity:

"The number of deer a unit of range can support for a full year without doing serious damage to the plants that provide deer with food and cover or to the deer themselves".

tality" (McCafferty no date), the decline will be greater than the expected (20-25%), because the herd is already stressed.

High quality forbs can maintain a deer through prolonged winters and nutritionally balanced deer food pellets can improve animal condition in some cases (Karns 1980). Recent mild winters combined with sufficient high quality winter feed, such as sugar beets and alfalfa pellets, appear to be responsible for the increase in Winnipeg's deer population despite loss of cover. Domestic crops and private feeding have increased nutrient availability to the point of redefining habitat composition. Overhead canopy or cover is commonly considered a major component of deer habitat (Banfield 1981). However, Moen (1968) determined that deer can survive northern winters with little cover while on a high plane of nutrition.

Abundant food sources may also be aiding natality. Ashley (1982) has suggested the normal stress reactions to crowding which prevent twin and triplet births may be overcome by adequate nutrition. W. Koonz (pers. commun.) is of the opinion that multiple births have increased in the Winnipeg herd.

Similar increases in deer populations in other cities have lead to legislation preventing or severely limiting private feeding programs. An ordinance passed in Boulder,

Colorado, allows only squirrels and songbirds to be fed by residents (Scott 1985). However, a similar law in Minnesota resulted in many residents raising their deer feeding structures off the ground and calling them birdfeeders (R. Johnson, pers. commun.).

Winter feeding can be an effective management tool. Supplements can be used to control deer movement to some extent (Goulden 1985). By use of intercept feeding, wildlife managers in rural areas can sometimes contain deer and minimize damage to surrounding agricultural crops. This method has also been recommended for controlling deer movement in Assiniboine Forest (Richards 1974).

#### 4.2.3 Deer Feeding in Winnipeg

In order to assist deer to survive Winnipeg winters, many citizens and organizations distribute feed for these animals. Deer in Winnipeg are very dependent on man's activities. In winter, deer concentrate in areas of available feed often risking exposure to the elements and their own safety. This is perhaps best demonstrated on Wilkes Avenue south of Assiniboine Forest (Figure 5 and Table 1). Deer from the forest cross the road en mass between November and March just before sunrise and shortly after sunset. This corresponds with rush hour traffic so that commuters are faced with as many as 30 deer on or near the road in dark or

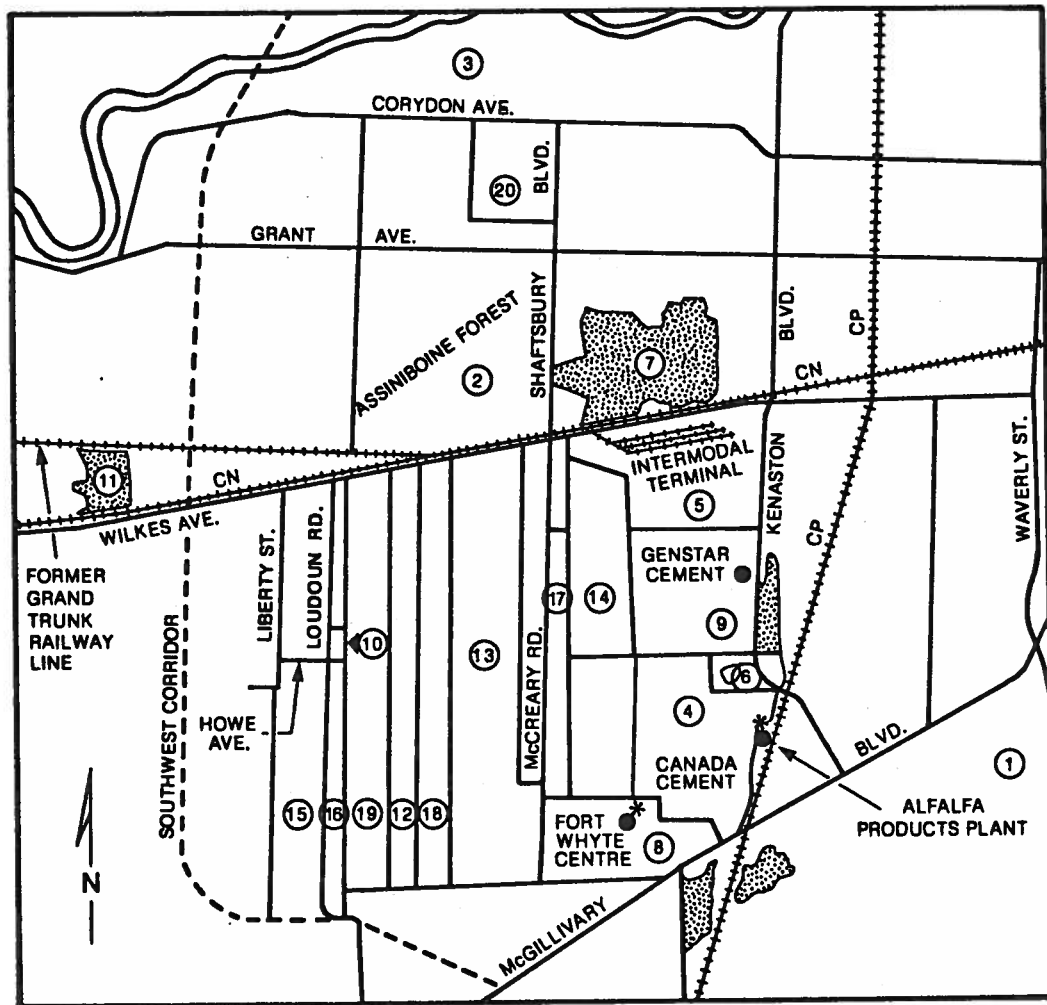


Figure 5: Deer Habitat in Charleswood/Fort Whyte – Landowners

(1-20) Landowners (see Table 1)

Land will be developed by 1995

----- Proposed Road Development

\* Deer Feeding Sites



Table 1: Potentially manageable deer habitat in Charleswood/Fort Whyte.

	LAND OWNER	LOCATION	PROPERTY SIZE (hectares)	ZONING
1.	Alfalfa Products Plant	Fort Whyte	1.20	I
2.	Assiniboine Forest	Grant Ave.	282.60	P
3.	Assiniboine Park	Corydon Ave.	156.00	P
4.	Canada Cement La Farge	2395 McGillivray Blvd.	239.00	I
5.	Canadian National Railways	Kenaston Blvd.	40.30	I
6.	City of Winnipeg	Kenaston Blvd.	4.04	I
7.	Duraps Corporation	Wilkes Ave	80.00	R
8.	Fort Whyte Centre	McCreary Rd.	72.66	I
9.	Genstar Cement	1191 Kenaston Blvd.	99.21	I
10.	G.Gerbrandt	1449 Loudoun Rd.	4.84	A
11.	Meinzer Construction Limited	Fairmont Rd.	6.86	R
12.	R. Hooker	2790 Wilkes Ave.	38.35	A
13.	MHRC, G. Anseeuw	McCreary Rd.	41.30	A
14.	MHRC, J. Overwater	McCreary Rd.	72.95	I
15.	MHRC	Loundoun Rd.	284.50	A
16.	E. Otremba	1727 Loudoun Rd.	5.65	A
17.	J. Overwater	1353 McCreary Road	51.43	I
18.	Qualico Developments Limited	Wilkes Ave.	271.17	A
19.	Qualico Developments Limited	Wilkes Ave.	38.76	A
20.	Tuxedo Golf Course	Shaftsbury Blvd.	47.80	P
Total			1838.62	

Zoning legend: A - Agricultural    P - Park    I - Industrial    R - Residential



dusk conditions. In 1985, feed was placed on the south side of Wilkes Avenue by Assiniboine Forest adding to the problem. Swareflex reflectors have been installed along this stretch of road, but their effectiveness has not been proven (Schafer and Penland 1985).

Feeding in Winnipeg takes place in a number of locations by a variety of individuals and organizations. Residents on streets surrounding Assiniboine Forest have been feeding deer for as long as 15 years (A. Bargery, T. Vardalos, pers. commun.). Two organizations distribute deer feed in the Fort Whyte area, the Alfalfa Products Plant and the Fort Whyte Environmental Education Centre.

Various homeowners south of Murray Park individually fed deer until they joined to create FOOD (Friends Of Our Deer). FOOD now assists with the deer feeding program which is established on Boeing of Canada's property (Figure 6 and Table 2). Funds for deer feeding structures, commercial deer pellets and other supplements has been donated by the volunteer organization and Boeing, who have indicated a serious commitment to maintain this site as a 'deer sanctuary' (G. Lethbridge, pers. commun.). Organized deer feeding also takes place northwest of the Boeing plant. North of the Sunshine Riding Academy on Saskatchewan Avenue, the Assiniboia Wildlife Association put out alfalfa bales during the winter of 1984-85. This organization also fed deer in the St. Charles Rifle Range, with permission of the Department

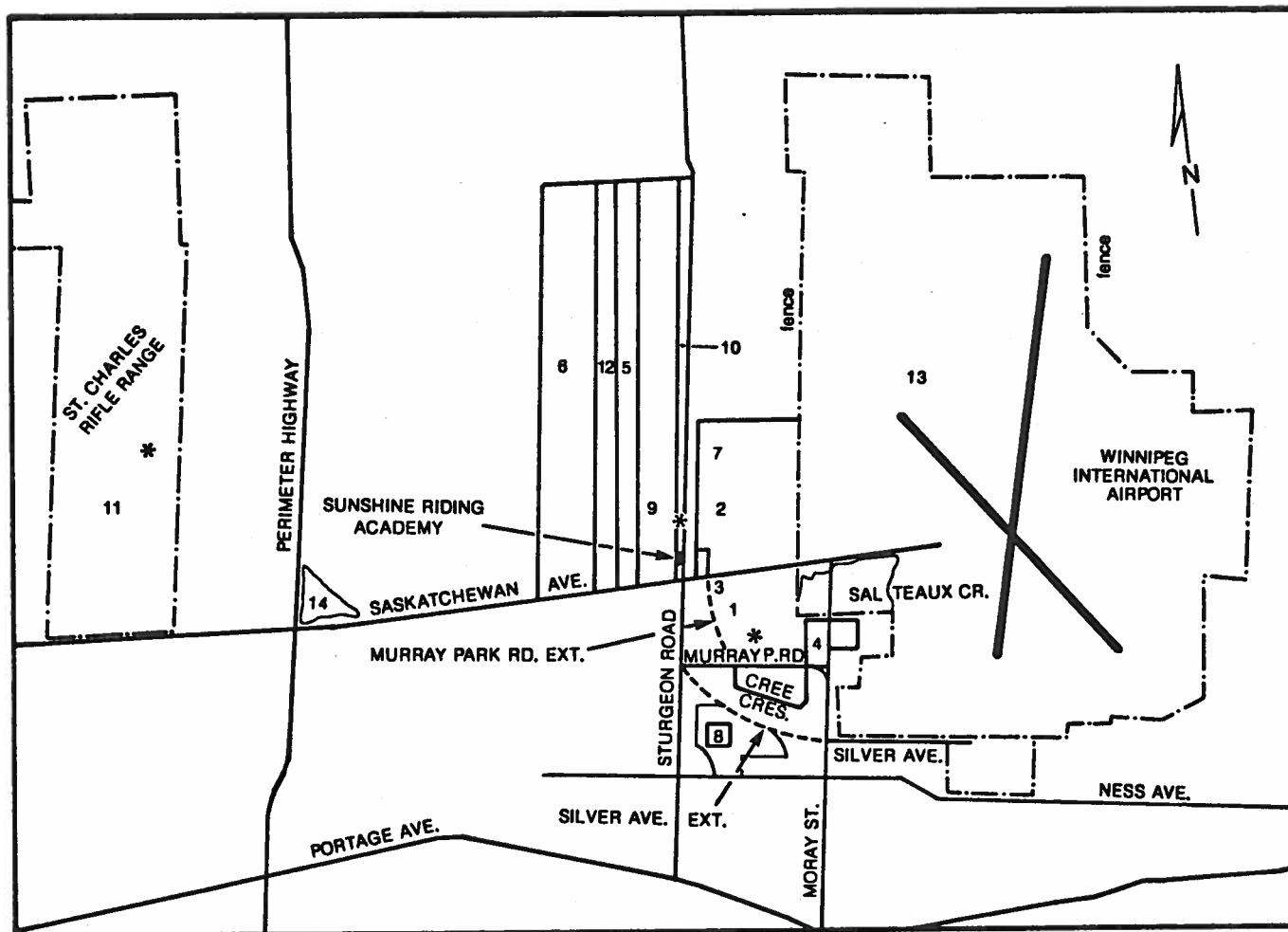


Figure 6: Deer Habitat in Murray Park Area - Land Owners

\* Deer Feeding Sites  
 ----- Proposed Road Development



**Table 2: Potentially manageable deer habitat in the Murray Park area.**

	LAND OWNER	LOCATION	PROPERTY SIZE (hectares)	ZONING
1.	Boeing of Canada	99 Murray Park Rd.	50.68	I
2.	N. Butler	2850 Saskatchewan Ave.	40.30	I
3.	City of Winnipeg	Saskatchewan Ave.	3.61	I
4.	City of Winnipeg	Cree Cres.	2.58	I
5.	Canadian Pacific Railways	Saskatchewan Ave.	63.30	A
6.	Genstar Land Development (BACM)	Saskatchewan Ave.	34.54	A
7.	Lakeview Properties	Sturgeon Rd.	4.83	I
8.	Living Prairie Museum	2795 Ness Ave.	12.00	P
9.	Qualico Developments Limited	Surgeon Rd.	79.13	A
10.	Quality Construction Limited	Sturgeon Rd.	16.44	A
11.	St. Charles Rifle Range (DND)	Saskatchewan Ave.	341.38*	A
12.	Stradbroke Investments	Saskatchewan Ave.	39.83	A
13.	Transport Canada (Airport)	Saskatchewan Ave.	40.00#	I
14.	Trizec Equities	Saskatchewan Ave.	16.08	A
Total			744.70	

**Zoning legend:** A - Agricultural      R - Residential  
                         I - Industrial      P - Park

\* St. Charles Rifle Range lies outside the Perimeter highway. Murray Park habitat inside the Perimeter Highway totals 403.32 ha.

# Winnipeg International Airport has 1660 ha which are not considered managable deer habitat. Regular removal of deer from the Airport grounds for safety reasons indicates that this is not viable deer habitat from a management perspective.

of National Defence (DND), and has recently donated a deer feeding structure to the DND (R. Bean, pers. commun.).

Feeding deer on private property occasionally creates problems for owners. Deer soon become accustomed to receiving hand-outs, knocking down fences and destroying greenery in the process. If this becomes too serious, landowners are faced with nuisance animals.

Deer concentrated into relatively small areas to feed may attract other problems for themselves and landowners. Some residents and employees in the Murray Park area of Winnipeg believe there has been an increase in both poaching and dog predation as a result of the easy access to deer (G. Lethbridge, pers. commun.). Deer in this part of town rely heavily on feed supplements put out by various organizations and they concentrate around the feed sites. Poachers have been chased off the Boeing property at night by employees, and dogs have been seen to come on to the property during the day to chase deer (G. Lethbridge, pers. commun.).

Deer populations in parks can face similar problems. A 1.22m (4 ft) fence was proposed for Assiniboine Forest to allow deer free movement while deterring dogs and poachers. However, this method was considered to be of questionable effectiveness (Richards 1974).

Some residents who enjoy feeding deer are not sure what to feed them. Though balanced deer pellets are available in Winnipeg, local animals have eaten lettuce and table scraps distributed by well-meaning, but uninformed citizens. There are people who have taken the initiative to obtain advice, but it appears many simply decide what to leave out based on what deer will take.

#### 4.2.4 Deer Related Damage

A major concern with having a large ungulate population in an urban centre is deer-vehicle accidents. Approximately 100 deer related vehicle collisions have been reported annually in recent years (Koonz 1985) with damages estimated at \$1000 per vehicle (D. Robertson, pers. commun.). Most of these accidents occur during late fall and early spring when deer movement coincides with rush hour traffic. Swareflex reflectors have been installed in chronic problem areas, but their effectiveness has not been documented.

White-tailed deer can rarely be regarded as a threat to human life or safety. One exceptional situation is when deer are found within the grounds of an airport. A Pennsylvania report stated that, of 23 collisions involving aircraft and deer, 14 resulted in aircraft damage and human injury occurred in 2 cases. Two of 7 damage reports which quoted costs were in excess of US\$50,000 (Bashore and Bellis

1982). At present there have been no reported incidents of deer-aircraft collisions at the Winnipeg International Airport. However, near misses have become more frequent as the number of deer on the airport grounds increase (Dixon 1985). Though the airport grounds are enclosed by a 7 foot (2.2 m) chain-link fence, deer have little trouble entering through open gates, holes in the fence or via creek beds which run under the fence. MDNR recommendations that bush cover be removed, fences repaired and management and security upgraded have not been fully implemented thus necessitating a removal project (Dixon 1985). In August 1984, an attempt to drive the deer out through a hole in the fence was 85% successful, and 5 remaining deer were shot by MDNR personnel. Since 1984, fencing has been upgraded and airport personnel has tightened security. The MDNR now has a policy of dispatching all deer found on airport property.

As a management problem, the Winnipeg Airport presents a rare case for traditional control techniques to be used with minimal public outcry. The inaccessibility of the airport grounds to the average citizen helps assure that the airport reduction program is not well-advertised. As well, the MDNR is confident that it can justify any techniques they use to control airport deer because the threat to human life and property is so high (C. Dixon, pers. commun.).

Destruction of agricultural crops, gardens and shrubs is common in areas where deer are prevalent. Chronic deer depredation occurs to properties surrounding winter habitat (Figures 2 and 3). In the Charleswood area most deer are concentrated around the wooded areas surrounding McCreary Road. The 2 agricultural properties on this street between the Assiniboine Forest and Fort Whyte Centre provide coarse grains (e.g. barley). In 1985, flax was substituted for sugar beets, which had been a traditional source of forage for deer in the Fort Whyte area. Though both farmers on McCreary Road have deer on their property, only Mr. J. Overwater (pers. commun.) to the east indicated sufficient damage to warrant compensation. In 1985 bad weather prevented Mr. Overwater from harvesting his crop on time. By the time it was dry enough deer had trampled the flax, so he indicated that he would not harvest. Lot owners along this strip also suffer depredation problems. Deer eat or urinate on livestock feed, making it unusable for horses (Morris 1985).

Similar situations occur in Murray Park where deer are concentrated in the limited remaining habitat. Though crop damage is less extensive in this area, vehicle collisions and dog predation are problems.

The MDNR presently compensates farmers for agricultural damage, but urban residents are not so fortunate. It is

likely that some are covered by home insurance and many do not suffer enough damage to seriously consider compensation. Those who have been subjected to hundreds or thousands of dollars of damage to property have no recourse for their loss. Complaints to city or provincial officials provide little more than advice for preventing further incidents.

#### 4.2.5 Deer Management Concerns - Documentation

There are many questions yet to be answered about the Winnipeg deer herd. Documentation of deer-vehicle accidents, travel corridors, areas of chronic deer depredation and dispersion patterns by an overcrowded deer population, are important for management planning. Much of the necessary data may exist in MDNR Occurrence Reports and Manitoba Public Insurance Corporation (Autopac) claims. Occurrence Reports are filed for all wildlife complaints. Accident reports filed through Autopac are filed as 'wildlife' accidents, making no reference to wildlife species. As a result, attempts to correlate Occurrence Reports with Autopac claims and police reports proved unsuccessful. (D. Robertson, pers. commun.). The nonspecificity to deer is further complicated by location of claim reports. People involved in automobile accidents tend to file reports at their local claim centres which may not be in Winnipeg, and accidents outside the city may become 'Winnipeg accidents' by virtue of the claim site (M. Grant, pers. commun.).



As a result the Occurrence Reports used by the Southeastern Region office did not provide adequate or extensive enough information to be of use in this practicum. Occurrence Reports have only been used since 1980, and with the present filing system they were not found to be a viable source of information. The Occurrence Report document is an adequate form in itself (Appendix A); however, it has yet to be used for assessment.

#### 4.2.6 Managing Deer Habitat in Winnipeg

Smith (1974) felt that long term wildlife management techniques are best applied through habitat management. Habitat management, "determining the environmental requirements ... and then manipulating the composition and interspersation of types of land" (Leopold 1933), is essential to ensure the existence of a good quality deer herd. Habitat resources are considered to be the limiting factor of ecological carrying capacity. Forest and agricultural land which make up deer habitat in rural areas are only a part of urban deer habitat. Private land such as industrial and residential properties provide many habitat components for Winnipeg deer. Resource managers have no jurisdiction over much of the land which supports deer, so habitat management or manipulation is a limited technique. MDNR officials have employed some management practises on private land, e.g. the deer relocation program. However, no habitat manipulation has occurred in Winnipeg.

Parkland which provides deer habitat is generally multi-use in nature. Featured species habitat management, i.e. managing land specifically for deer (Thomas 1982), is not presently practised on public land in Winnipeg. Featured species may be considered a priority if a deer interpretative program is to be implemented. If species diversity is the goal as in the Assiniboine Forest (Richards 1974), then population control may be necessary to prevent deer from destroying the wooded areas as has happened in American arboretums (Loucks 1975, M. Morgan, pers. commun.).

#### 4.3 URBAN DEER AS AN INTERPRETATIVE RESOURCE

In order to maximize the potential of the Winnipeg deer herd as a resource, public education and interpretative programs may be an asset. Interpretation is a service used as a "means of contact and communication between the ... resource base and the visitor" with the purpose of "gaining public awareness, understanding and appreciation" (Helmsley 1971), or to gain knowledge and understanding (Peart 1979). Sharpe (1976) stated interpretation has 3 objectives:

1. To assist the visitor in developing a keener awareness, appreciation and understanding (of the resource).
2. To accomplish management goals. "The purpose of public relations is to inform the public of your programs

and services. Without this, often the only matters that get into print are controversial ones. This frequently means your image is being shaped by your critics".

3. To promote public understanding of an agency and its programs.

Interpretation of white-tailed deer as a resource in Winnipeg presently takes place through a number of organizations. The City of Winnipeg through the Interpretative Services Section of the Parks and Recreation Department run programs relating to white-tailed deer in the city at Assiniboine Park/Forest and Living Prairie Museum (D. Ross, pers. commun.). Fort Whyte Centre is the only private agency with interpretation programs relating to Winnipeg's deer herd (W. Loly, pers. commun.). Beaudry Provincial Park plans include an interpretative centre, though programs involving deer will likely be minor and specific to the park (K. Porteus, pers. commun.).

Interpretation can be divided into 2 categories, personal and impersonal (Sharpe 1976). The City of Winnipeg and Fort Whyte deer programs use largely personal techniques, e.g. slide shows and guided walks. Themes for interpretative programs are varied according to the audience. School-aged children are presented with management problems, e.g. deer in Winnipeg, and asked to consider methods of managing these

situations. The Fort Whyte Centre is able to make use of both an indoor facility and a deer feeding station on the site, for interpretative programs. The City of Winnipeg has programs designed for school-aged children as well as family-oriented programs. Methods used by city interpreters consist of slides shows, hikes and special programs which relate to a specific topic or issue. Themes are natural history oriented including such topics as biological characteristics e.g. how to tell white-tailed deer from mule deer, deer in the city, deer in winter, and deer rut. City interpreters are able to make use of the Winnipeg Zoo and Assiniboine Forest as outdoor classrooms which provide visitors an opportunity to see deer. As well, props such as deer antlers and skins are used for some programs.

The man-made pond and adjacent viewing mound in this "urban wilderness" park, provide an excellent opportunity for users to see a variety of wildlife not usually seen in an urban setting. The pond and salt licks lure deer into the viewing area which is readily accessible even to handicapped users. A similar example of a deer viewing facility which does incorporate impersonal interpretation exists at Bird's Hill Provincial Park. The structure was developed to increase public awareness in order to gain support for a deer management plan in the park and has been effective in this capacity (K. Porteus, pers. commun.). A self guided trail with interpretative signs and a viewing tower which over-

looks an established feeding site provide opportunity for sighting deer. This establishes a personal experience relating to the information presented, and falls within interpretative principles described by Tilden (1967):

"Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile".

The urban setting and structure of the Assiniboine Forest viewing mound lends itself to other services that Birds Hill cannot provide (K. Porteus, pers. commun.). This site is used as a viewing facility for handicapped users. Unlike the Bird's Hill Park tower which is ascended by stairs, the mound is an inclined walkway suitable for wheelchair use.

The City of Winnipeg and the MDNR are considering the development of a deer removal site in the Assiniboine Forest. This will comprise of a feeding site and a permanent blind for the removal project, which can also be used for photography by the public at other times of the year.

There are drawbacks to providing unattended services in remote sections of residential areas. Past vandalism problems to signs and plaques, for impersonal interpretation at Assiniboine Forest, has resulted in removal of these aids (D. Ross, pers. commun.).

Publications specific to Winnipeg deer or to urban wildlife in general within this city are minimal. Fort Whyte

Centre has included a 3 page article (Goulden 1986) in its bi-monthly newsletter. The City of Winnipeg plans to update its pamphlet about deer, and the province has a public education booklet (Goulden 1981) which provides a mixture of natural history and basic management theory. However, this is not an urban oriented publication, and does not consider the question of deer in a major city.

One of the primary objectives of interpretation is to promote public understanding and support of an organization (Sharpe 1976, Foley 1980). Edwards (1979), describes 5 services which management agencies can provide: information, guiding, entertainment, education and propaganda. The MDNR is responsible for deer management; however, this department is not actively involved in interpretation or education within the city limits. Information from the MDNR has been restricted to occasional press releases and short articles which are relayed through the local media. These are presented in an informative style, i.e. facts without provocation (Tilden 1967), rather than interpreted.

To effectively interpret the Winnipeg white-tailed deer herd in an informative and provocative way, both the natural history of the animal and its relation to man should be considered (D. Ross, pers. commun.). This is consistent with the Canadian Wildlife Service's (CWS) interpretative strategy which places emphasis on "man's influence on the land as well as the ecology" (Barkley 1972).

Tilden (1967) emphasized the importance of on-site interpretation. Though it is possible to present interpretative programs in classroom situations through various media, the most effective interpretation is through original objects and first-hand experience. Winnipeg's deer are concentrated and basically sedentary so that on-site interpretation is possible. Areas such as Fort Whyte Centre, Assiniboine Forest, the Boeing of Canada property and Beaudry Park all have resident deer herds which present potential for interpretation. Nonpersonal interpretation such as self-guided tours, could be used in addition to personal interpretation.

## Chapter V

### RESULTS AND DISCUSSION

#### 5.1 DEER MANAGEMENT IN OTHER CITIES

Urban deer management is a concern in cities throughout North America. At least 7 other cities, Boulder, Calgary, Chicago, Milwaukee, Minneapolis, Ottawa and Washington D.C. have deer populations which present management concerns to their community. Despite these concerns, management action is limited by residents who oppose techniques which may harm deer, similar to Winnipeg's situation.

Some state departments, e.g. Minnesota and Illinois, have found urban deer management frustrating, expensive and time consuming, and therefore passed responsibility onto city authorities. By making urban deer management a local rather than state issue, the Minnesota DNR hopes to increase community involvement. In this way, citizens may be able to gain a better understanding of urban deer issues and management options (R. Johnson, pers. commun.).

This transfer of responsibility appears to be showing signs of success. Through public meetings, citizens are working with city officials to determine how deer-related



problems will be solved. The new role of the Minnesota DNR is to offer advice to urban officials, supplies necessary permits (e.g. transport, capture, hunting, etc.) and loan equipment to towns and cities in need of assistance.

All contacts cited controlling deer populations as a major concern. At present, one area of Minneapolis appears to have the most active urban culling operation in North America. North Oaks removes deer by use of selective hunting or live capture and shooting. However, public opposition and media interest has forced the program to remain low profile and has occasionally ceased operation to ensure anonymity (P. Jordan, pers. commun.). Despite this, the North Oaks operation has been successful in controlling their deer population.

Deer in Cook County, Illinois are reduced by night lighting on an experimental basis, but this has not proved viable as a large scale management technique (J. Witham, pers. commun.)

Some urban areas have attempted live capture and removal, but with limited success. The only urban management program attempting a live transport project with large numbers of free-ranging deer is Cook County. This experimental venture has thus far been unsuccessful in capturing any deer (J. Witham, pers. commun.).

Minnesota is discouraging transplant attempts by prohibiting transportation of live deer during stress periods. Cited as a humanitarian measure, this law allows live transport for less than 3 months of the year. Deer are most fit for transplanting in autumn, when they are generally well nourished, and therefore unlikely to be baited into traps (R. Johnson, pers. commun.).

Deer herds in Ottawa and Calgary are smaller than Winnipeg's (both were estimated at 250 or less), and both these cities have more parkland to provide habitat (J. Allen, G. Shearer, pers. commun.). As a result, deer-related problems are not extensive enough to warrant population control. Both Calgary and Ottawa rely on hunting around the urban area to help reduce the number of deer moving in and out of their cities.

Generally, techniques to minimize deer-vehicle collisions differ minimally in cities throughout North America. Preventative measures against vehicle accidents such as deer crossing signs, fencing, lighting and reflective devices (e.g. Swareflex Wildlife Reflectors) have been installed along roads in many cities. Underpasses have been built to accommodate mule deer in Colorado, but these structures are considered ineffective for white-tailed deer (Arnold 1978).

Controlling depredation by white-tailed deer involves similar management practises in most cities; fencing, repel-

lents and scaring provide some relief, but are not completely effective. Electric fences are used experimentally; the University of Minnesota is testing high volt, low current fences specifically for urban use (P. Jordan, pers. commun.). Professional and sport hunting, as well as laws which prohibit feeding deer are techniques used in American cities which are not practised in Winnipeg.

Encouraging public participation in management practises and decisions is also a recommended policy in certain situations. Some resource managers have considered financial compensation for residents who have property damaged by deer, however, no city presently provides this benefit.

## 5.2 DEER HABITAT MANAGEMENT IN OTHER CITIES

White-tailed deer are opportunists. They thrive in the presence of urban man, and in some cities exceed the population densities of their rural counterparts. The open green space that supports deer in the cities contacted was comprised of parkland, or undeveloped residential or commercial property. Urban parks are generally for multiple-use, therefore manipulation of such land is subject to the scrutiny of all users. Since resource managers generally have limited control over development and policy of these land areas, urban wildlife habitat is rarely considered a manageable resource. In park and undeveloped areas, resource man-

agers are more often concerned with maintaining the deer population at levels the habitat can support, rather than developing habitat to support more deer.

Cities with arboretums similar to Winnipeg's Assiniboine Forest are also concerned with controlling deer numbers to protect what habitat is available (M. Morgan, pers. commun.; Loucks 1975). Arboretums emphasize species diversity; therefore, an overabundance of deer threatens the ecosystem. Habitat management in these cities means preventing deer from destroying their own environment.

Western Resource Development Corporation (1984) recommended reducing habitat quality for deer in urban areas. Removal of cover and food sources wherever possible, and encouraging homeowners to plant non-browse species were also suggested. Craven (1983) cautioned against this; he indicated that negative modification to deer habitat would be detrimental to other wildlife species as well.

### 5.3 DEER HABITAT AND URBAN DEVELOPMENT IN WINNIPEG

#### 5.3.1 Future Land Development in Winnipeg's Deer Wintering Areas

The Plan Winnipeg zoning scheme was created to prevent urban sprawl (Figures 2 and 3), and is in effect until 2001 (C. Knoll, pers. commun.). Though zoning changes can occur through public lobbying or city policy review, city develop-

ment has been consistent with Plan Winnipeg Zoning for the most part. Notable exceptions are small residential strips along McCreary, Liberty and Loudoun Roads (Figure 5). Deer concentration in Metropolitan Winnipeg occurs mainly on parkland, industrial, minimum service industrial and rural land not presently in development stages (Figures 2 and 3). However, development around these areas has been intensive. In the last 10 years residential properties have been developed up to the west edge of Assiniboine Forest between Grant and Wilkes Avenues (Figure 5).

Further west, housing is under construction in a number of locations north of Wilkes Avenue. Several pockets of undeveloped land still exist between the former Grand Trunk Railway (GTR) and Grant Avenue but most of these have survey lines or preliminary construction. The city-owned GTR, which is zoned as a road allowance, will likely have residential housing surrounding it within 10 years according to city land assessor W. Thorsteinson (pers. commun.). This is supported by A. Meinzer (pers. commun.) who expects to develop approximately 20 ha of this land by 1990 (Figure 5 and Table 1). F. Meinzer Construction Limited's holding is the largest unbroken area of woodland between Wilkes Avenue and the GTR. Residential building east of the forest has replaced approximately 80% of the early successional aspen growth between McCreary Road and Kenaston Boulevard. The remaining woodlot is expected to be cleared for development within 5 to 10 years (S. Searle, pers. commun.).

Linden Woods, a partially developed residential site, is situated between Waverley and Brockville Streets just east of agricultural land which has historically provided deer with a source of sugar beets, wheat and potatoes. Deer migrating east across Kenaston Boulevard no longer find agricultural products, however, the ornamental shrubs planted by homeowners in Linden Woods could provide a new source of browse. The 5-6 ha of woodland east of Kenaston Boulevard between Wilkes Avenue and McGillivray Boulevard is city-owned land, zoned for industrial use. However, the lack of demand for industrial property coupled with the unexpected success of Linden Woods has prompted city officials to speculate that this land may be re-zoned as residential (A. Johnson, pers. commun.).

Whyte Ridge, a residential community bordering Fort Whyte, is in the early stages of development. Located adjacent to Alfalfa Products Limited and the Fort Whyte Centre, who both participate in winter deer feeding (Figure 5), Whyte Ridge may become a future management concern should deer begin to browse ornamentals in that development.

Many acreage owners along McCreary Road (Figure 5 and Table 1) have woodlots which provide cover for deer. None of these residents anticipate removing any bush, although some manicure small sections, i.e. removal of understory shrubs. Further west on Wilkes Avenue, south of Assiniboine Forest,

R. Hooker owns 38 ha of property. Approximately 20 ha are forested and the remainder is leased for agricultural purposes (R. Hooker, pers. commun.). R. Hooker expressed an interest in subdividing the property for development, however, he indicated present zoning does not allow for this.

Another type of development may also affect the Charleswood area. A thoroughfare linking Bishop Grandin Boulevard with Waverley Street is expected to begin construction in 1987 (C. Torpey, pers. commun.). This particular project will be constructed on land which is rarely occupied by deer. However, several options for future development of this transportation corridor may have significant impact. A proposed upgrading of Kenaston Boulevard including an underpass at Wilkes Avenue, will increase traffic flow through one of the densest concentrations of deer in Winnipeg. A long term option, i.e. beyond 10 years, is a southwest corridor (Figure 5 and Table 1) which would include development of a thoroughfare around the Assiniboine Forest/Fort Whyte Centre area. Also included is development of the GTR into a road extending west from Wilkes Avenue, at the Assiniboine Forest (City of Winnipeg 1980). These are long term considerations of an unpredictable nature, which are subject to modification from the present proposal.

Murray Industrial Park, in northwest Winnipeg, is an area of high deer concentration which could change in the near future. The Winnipeg International Airport property which

borders the industrial park has recently removed about 20 ha of bush. Present construction and commercial land advertisements on city owned land within Murray Park suggest a portion of the cover southwest of the airport may be removed (Figure 6 and Table 2). The Department of Transport (DOT) and Department of National Defence (DND) both own woodland east of Moray Street, but neither agency has committed their land to immediate development (W. Smook, pers. commun.). The Winnipeg International Airport Master Plan (Transport Canada 1984) indicates some development on DOT property, but no changes were cited for the DND property, which makes up the majority of the remaining forest.

Approximately 3 ha on Saulteaux Crescent bordering the Boeing of Canada property (Figure 6 and Table 2) are for sale by the City of Winnipeg. City owned land on the west side of the Boeing property is being held as a road allowance to connect a proposed extension of Murray Park Road to Saskatchewan Avenue. One of the largest parcels of woodland, the Boeing property southeast of the junction of Saskatchewan Avenue and Sturgeon Road, will not be developed in the foreseeable future. The majority of forest north of Saskatchewan Avenue lies on agricultural land (Figure 6) which is unlikely to see any development in this century because "it's outside the urban fringe and suffers infrastructure<sup>5</sup> problems" (R. Walford, pers. commun.).

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<sup>5</sup> There are no existing amenities such as sewage or elec-



Two areas of deer concentration which are unlikely to undergo any change before 2001 are Beaudry Provincial Park and the St. Charles Rifle Range (Figure 1). Beaudry Park plans incorporate its bottomland forest in the present state and existing lure crops for deer are to be maintained (Parks Branch 1983). The woodlot behind the target area of the St. Charles Rifle Range provides a safety barrier for various military manoeuvres; therefore the DND has made no plans for development (J. Marcotte, pers. commun.).

East of the St. Charles Rifle Range at the junction of Saskatchewan Avenue and the Perimeter Highway (Figure 6 and Table 2), a proposed mobile home site will replace a large tract of cover, pending zoning approval (M. McGonigal, pers. commun.). This will remove one of the largest parcels of cover between the St. Charles Rifle Range and Murray Park.

#### 5.3.2 Maintenance of Deer Habitat in Winnipeg

If deer movement is to be regulated to areas which are advantageous to both the Winnipeg herd and city residents, habitat maintenance is necessary. This involves both preservation of desirable cover and acquiring land with potential for development as habitat.

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tricity and Plan Winnipeg zoning does not provide for the development of these facilities.

#### 5.3.2.1 Charleswood/Fort Whyte

Provincially owned land does exist just south of the Assiniboine Forest. Property held by the Manitoba Housing and Renewal Corporation (MHRC) was purchased before the existence of Plan Winnipeg for future residential development. Since that time the land has been zoned for industrial or agricultural use (Figures 2 and 5) and the MHRC is planning to sell some of their land (number 14, Figure 5). This land had been under a renewable 3 year lease to J. Overwater, who is selling property adjacent to the MHRC land (number 17, Figure 5). The MHRC lease price was \$59.44 per ha (\$24.00 per ac) compared to a market sale price of approximately \$24,470.00 per ha (\$10,000.00 per ac.)<sup>6</sup> However, the MHRC property does not front onto any traffic corridor; therefore its market potential may be limited.

Organizations wishing to acquire MHRC land for wildlife habitat and/or parkland would not likely receive financial support from the city of Winnipeg. The City's priorities for land acquisition are aimed toward the development of regional parks and riverbank property. Plan Winnipeg (City of Winnipeg 1981) also takes natural or historical aspects of a site into consideration. The property south of Assiniboine Forest does not qualify under any of these categories except possibly as a potential regional park. The Tuxedo/Charles-

<sup>6</sup> Land prices are based on market prices of J. Overwater's property immediately west of the MHRC property.

wood area is low priority in this respect since Assiniboine Forest and Assiniboine Park comprise approximately 400 ha of parkland, the largest in Winnipeg.

If assistance is needed, private organizations such as Wildlife Habitat Canada may be interested since this land already serves as a staging area for migratory waterfowl. However, the east side of McCreary Road alone would cost \$1,806,880.00, based on previously stated figures. The purchase of prime urban real estate for wildlife may be difficult to justify when land of equal quality can be purchased in rural areas for a fraction of the price.

Leasing may prove successful for maintaining deer habitat on private properties. Land owners such as Genstar or Canada Cement may be less inclined toward future development if their land is under lease. Payment for use of property as habitat might include the right to improve its potential through manipulation, e.g. introduction of crops or browse.

Purchase or lease of land for deer habitat may be considered too expensive. However, political process has initiated land donations for worthy projects in the past. Publicly owned land such as the MHRC parcels may be accessible through this method. Assiniboine Forest provides an example of parkland which was partially donated by the City of Winnipeg and citizens (Richards 1974).

City-owned land in Charleswood also has potential for deer habitat. Presently the GTR serves as a park and recreation area, though little of it is developed. The rail line extends through Beaudry Provincial Park, and despite being very open beyond the Perimeter Highway (it is presently under cultivation ), the GTR shows potential as a multi-use recreational facility. Maintenance of the GTR as a green-belt would provide a natural corridor for both wildlife and recreational activities, e.g. cycling, cross-country skiing. Though Charleswood is not recognized as an area of high priority for land purchase, this property might be preserved under another option. The City of Winnipeg requires that all residential development set aside 10% of the land area as open green space.

#### 5.3.2.2 Murray Park Area

The majority of deer habitat available to the Murray Park herd is privately owned land (Figure 6 and Table 2). The most significant area is the Boeing of Canada property which also serves as recreational land for the company's employees (e.g. ski trails, baseball diamond). Boeing has indicated that there are no plans to develop their property in the foreseeable future (G. Lethbridge, pers. commun.). Many of the remaining Murray Park deer occupy forested areas of the Butler property, north of Saskatchewan Avenue. These deer move across Sturgeon Road on a regular basis in winter when the Assiniboia Wildlife Association erects feeding sites.

Deciduous woodland on both sides of Sturgeon Road is privately owned and only the Lakeview Development property has been cited for development in the next 10 years. Land prices within Murray Park are more expensive than the Assiniboine Forest area. Undeveloped commercial properties are generally serviced or serviceable. Commercial property of this type is presently selling at approximately \$111,465.00 per ha (\$45,000.00 per ac). Agricultural property northwest of Murray Park is considerably less expensive. Farmland is selling at \$24,770.00 - 49,540.00 per ha (\$10,000 - \$20,000 per ac) west of Sturgeon Road, depending upon frontage to Saskatchewan Avenue.

#### 5.3.3 Deer Habitat Loss in Winnipeg

In the past 60 years, deer habitat in Winnipeg has been decreasing at a rapid rate (Shoesmith and Koonz 1977). There is presently 3490 ha of manageable deer habitat in Winnipeg (Table 3). Of this total, 2242 ha lies within the Perimeter Highway. Urban development inside the Perimeter will reduce wintering habitat by 103 ha or 4.5% within 5 - 10 years (Table 4), and could potentially reduce this by a total of 737 ha or 33% by 2001 (Table 5).

Residential development will account for 87 ha of the habitat loss. Most of this will occur around Assiniboine Forest, a park which supports 30% of the urban deer herd. The

remaining 16 ha to be developed are commercial properties in the Fort Whyte and Murray Park regions. Another 634 ha of commercially zoned land could be developed under Plan Winnipeg guidelines by 2001, but this does appear likely to occur.

Many private landowners who had no specific plans indicated that they would like to develop in the future. The uncertainty of their decisions makes long range management planning difficult. With 1232 ha<sup>7</sup> or more than 50% of deer habitat within the Perimeter Highway held privately habitat management is largely beyond the control of resource managers.

Enough habitat has already disappeared so that Winnipeg deer have essentially become segmented populations. At present, it is still possible for deer to migrate in and out of the city; however, as residential traffic increases, this may result in more deer-vehicle collisions. Most movement occurs along "corridors" of vegetation such as river systems and the bluffs and greenbelts in south Charleswood. The exchange of deer which is believed to occur with animals outside the city will continue to some extent despite the planned development.

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<sup>7</sup> This includes undeveloped City of Winnipeg holdings other than parks.

Table 3: Potential loss of manageable deer habitat in Winnipeg by 2001.

	LOCATION	HABITAT AREA 1985 (ha)	HABITAT AREA 2001 (ha)	NET LOSS (ha)	% LOSS
1.	Assiniboine Forest	282.60	282.60	0	0
2.	Assiniboine Park	156.00	156.00	0	0
3.	Beaudry Provincial Park	907.00#	907.00	0	0
4.	Charleswood/Fort Whyte	880.81 *	684.57	196.24	5.60
5.	Fort Whyte Centre	72.66	72.66	0	0
6.	Living Prairie Museum	12.00	12.00	0	0
7.	MHRC	398.75	0	398.75	11.45
8.	Murray Industrial Park	351.32 *	249.32	102.00	2.90
9.	St. Charles Rifle Range	341.38#	341.38	0	0
10.	Tuxedo Golf Course	47.80	47.80	0	0
11.	Transport Canada (Airport)	40.00	40.00	40.00	1.14
	Total	3490.32	2753.33	736.99	21.09

Habitat reduction in the year 2001 is based on expected development to 1995 and full development of industrial areas, minus Fort Whyte Centre. This is a worst case scenario, based on present zoning. If all industrial land is developed, deer habitat will be reduced by 21.1% in the study area. This would result in a 33% loss of the 2242 ha manageable habitat within the Perimeter Highway, where most of the deer herd is found.

\* Private Landowners

# Land outside the Perimeter Highway.

Table 4: Expected deer habitat loss in Plan Winnipeg zoning areas by 1995.

	ZONE	HABITAT AREA 1985 (ha)	HABITAT AREA 1995 (ha)	NET LOSS (ha)	% LOSS
1.	Residential	86.86	0	86.86	2.5
2.	Agriculture	1275.27*	1275.27	0	0
3.	Industrial	722.79	707.73	15.06	0.4
4.	Park	1405.40#	1405.40	0	0
Total		3490.32	3388.40	101.92	2.90

\* 933.89 without the St. Charles Rifle Range.

# 498.40 without Beaudry Provincial Park.

Table 5: Potential deer habitat loss in Plan Winnipeg zoning areas by 2001.

	ZONE	HABITAT AREA 1985 (ha)	HABITAT AREA 2001 (ha)	NET LOSS (ha)	% LOSS
1.	Residential	86.86	0	86.86	2.5
2.	Agriculture	1275.27*	1275.27	0	0
3.	Industrial	722.79	72.66	650.13	18.6
4.	Park	1405.40#	1405.40	0	0
Total		3490.32	2753.33	736.99	21.10

\* 933.89 without the St. Charles Rifle Range.

# 498.40 without Beaudry Provincial Park.

Total land area inside the Perimeter Highway is 2241.94 ha. Resulting habitat losses in this area are 4.5% and 32.9% in 1995 and 2001, respectively.



#### 5.4 INTERPRETATION AND PUBLIC EDUCATION

Education and interpretation programs about deer exist in and around Winnipeg. Bird's Hill Park and Beaudry Park are not urban, but interpretative experiences in these locations would likely be similar to Winnipeg due to their close proximity. Like the Winnipeg herd, deer populations in these parks are virtually unpredated and rely heavily upon man's activities for sustenance. As a result, potential exists for redundancy in education and interpretation programs between city and provincial agencies. However, by coordinating interpretive programs available through Beaudry Park, the City of Winnipeg and Fort Whyte Centre, public support and input for an urban deer management plan could be gained. Types of programs might include:

1. Natural History of the Winnipeg Deer Herd:
  - a) General information about deer, e.g. biology, habits etc.,
  - b) History of deer movement into Manitoba,
  - c) General management concepts.
2. Urban White-tailed Deer Management:
  - a) History of management issues; define and describe,
  - b) Preventive management techniques against deer depredation,
  - c) Pro-active management; Certain practises that are likely to arouse interest among the public, e.g.

deer removal, may be dealt with individually. Questions concerning such activities could be answered through a series of newspaper articles or television documentary (D. Ross, pers. commun.).

d) Management issues:

- i) Feeding versus not feeding,
- ii) Population problems and control,
- iii) Habitat loss,
- iv) "Bambi" syndrome.

Urban deer interpretation/education programs could be aimed at enlightening the public about policies and approaches to urban wildlife management. Development of new programs, e.g. a blind to watch the fall rut, could be done in conjunction with the City of Winnipeg or Fort Whyte Centre. Programs that explain deer management projects such as a television documentary on the entire deer relocation effort, would help the public understand the complexities of urban wildlife management. This may also generate more interest in the deer herd by the public so that support for various projects, e.g. land acquisition, may increase.

## 5.5 FACTORS TO DETERMINE AN OPTIMAL DEER POPULATION

"The most basic wildlife management problem, in our opinion, is to determine the optimum population levels of wildlife species (Langford and Cocheba 1978).

Winnipeg's deer herd is viewed by many as a valuable resource. Residents have voiced this opinion through both words and action. Citizen complaints to various MDNR and city departments are a regular occurrence when any action is taken that is perceived as a threat to city deer. There are currently more than 5 organizations as well as many individuals who distribute feed for Winnipeg deer.

Despite this support for maintaining an urban deer herd, there is also negative reaction. Many residents who suffer deer depredation would like to see the deer herd reduced in numbers in order to minimize property damage. In areas where deer-human activities conflict, sociological limitations rather than ecological carrying capacity<sup>8</sup> are more appropriate for determining an optimal deer population (Brown and Decker 1979, Mattfeld et al. 1984).

Krueger and Mitchell (1977) describe resource management as a "complex decision-making process ideally involving inventory, assessment, goal formation, policies, programs, legislation, administration, and managerial strategies." They incorporated the decision making process into a frame-

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<sup>8</sup> See page 28.

work which included biophysical, economic, social, political and legal perspectives. These perspectives can also be described as the factors needed to determine an optimal deer population or a "sociological" carrying capacity<sup>9</sup> for Winnipeg:

1. Biophysical factors of managing the Winnipeg deer herd are largely concerned with habitat limitations. Much of the wooded cover which provides shelter, especially important for winter thermal protection, has disappeared during the past 60 years. Although deer require a balance of wooded cover and a sufficient quality and quantity of nutritional sources, the extent to which the nutritional component can offset insufficient cover during a severe winter is unknown.

Diminishing cover is also concentrating the deer herd, which may increase their susceptibility to disease, dog predation and poaching. Deer numbers have tripled since 1975 and there is no indication of when or how the population will stabilize. As biophysical limitations increase, the Winnipeg deer herd may become more susceptible to a population decline.

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<sup>9</sup> Density for a wildlife population based on the human perception of carrying capacity (Brown and Decker 1979, Mattfeld et al. 1984).

2. Economic factors include costs to deer management agencies and the economic value of the deer herd to society. Agency budgets are the key factor which determine the degree of deer management that will be implemented. The fate of existing programs such as deer relocation and the annual census, and future ventures such as habitat acquisition or fencing of problem areas, are subject to the financial limitations of management agencies. This support is often based on the perceived value of the resource.

Determining the economic value of the Winnipeg deer herd requires assessment of the costs and benefits. Costs can be classified as maintenance costs which are borne by society as a whole, or negative costs, uncompensated expenses incurred by individuals. If negative costs such as deer depredation, can be controlled or absorbed by society through compensation, these would be considered maintenance costs.

a) Present costs for Winnipeg's urban deer herd include:

- i) Deer management staff costs; wages for deer managers, conservation officers, interpretative staff and city maintenance crews involved with day-to-day management of Winnipeg deer and deer-related incidents,

- ii) Deer-vehicle collisions; Automobile repair costs and deductible,
  - iii) Deer relocation program; including extra staff time, trapping and removal equipment, feed (bait) and public education,
  - iv) Deer depredation; Costs of shrubs, trees and property,
  - v) Miscellaneous management expenses, e.g. fencing (private), Swareflex reflector maintenance.
- b) Future costs for the Winnipeg deer herd:
- i) Habitat preservation or procurement,
  - ii) Fencing of public areas,
  - iii) Compensation for deer depredation,
  - iv) Deer feeding.
- c) Benefits which the Winnipeg deer herd provide include:
- i) Photography opportunities,
  - ii) Viewing opportunities,
  - iii) Feeding opportunities,
  - iv) Scientific research opportunities,
  - v) Nature study or interpretation,
  - vi) Museum effect; i.e. the satisfaction of knowing deer are there even if they are never seen,

vii) Source of deer for translocation to depleted areas,

viii) Environmental monitor; for the urban environment and possibly for deer status throughout Manitoba (Shoesmith and Koonz 1977).

3. Social factors are often related to economic costs and benefits, and can therefore be described as socio-economic. However, some social values such as aesthetics, cannot be directly quantified in monetary terms. Measuring the dollar benefit of intangible factors may require valuation through methods such as those described in Langford and Cocheba (1978).

Social perspectives of urban deer management are not only varied, but often opposing. Though lobby groups and individuals may share some common goal, e.g. maximum benefit to the maximum number of people from this resource, they are motivated for different reasons. Desired benefits and acceptable costs are not necessarily homogeneous among various groups.

For example, a Winnipeg organization such as FOOD appears ready to supply food to increase deer numbers, as they believe that deer population growth will eventually stabilize. While some residents who feed deer may share this view, many who have suffered

economic loss through depredation feel the deer population should be regulated. Controlling the deer population is also a concern for city farmers, some of whom have experienced sufficient depredation to alter cropping patterns in recent years in an attempt to minimize losses.

Many residents who feel that some deer should be relocated are concerned that these animals not be harmed. Hunting fraternities which support deer removal see it as a method of restocking areas of the province where white-tailed deer populations are depleted. Some citizens are of the opinion that "excess" deer (i.e. those to be relocated) could be culled to provide a food source for underprivileged citizens.

In order to develop an urban deer management plan for the future, specific information is needed regarding:

- a) Who is interested in deer management;
- b) What benefits are desired; and
- c) What are people willing to pay for urban deer management.

4. Political factors may be a significant issue of deer management:

"Wildlife in America is owned by the public and controlled by state and federal governments. Thus it's management unfortunately



is subject to both public pressure and political whims rather than ecological principles" (Smith 1974).

Though the above statement was made in reference to the United States it aptly describes the Winnipeg situation. Public pressure has influenced major decisions regarding deer management in Winnipeg and other parts of Manitoba (Speirs 1985). Various organizations including citizen groups and biologists have their own management goals for the urban deer resource.

Through their lobbying power these people can influence management decisions at the political level. Politicians relying on the voting public to keep them in office have their decisions influenced by popular opinion. This is particularly true if action is perceived to be contrary to conservation and preservation attitudes held by much of Canadian society (Filion et al. 1983). Opposing views on issues such as deer culling have been so strong in the past that management action has been avoided (Smith 1974). Other issues such as damage compensation, deer relocation and feeding may also be affected through a public lobby.

Identifying specific needs of interest groups bears out the multiple satisfactions to be gained

through varied use of this deer resource. Documenting these needs may be useful should a vocal minority attempt to use political means to further their objectives. If opposing resource activities are recognized, resource managers can defend their management actions through documented positions of other clientele (Mattfeld et al. 1984).

5. Legal factors reveal a number of considerations for urban deer management. Plan Winnipeg zoning policies and zoning by-laws dictate the general development guidelines for Winnipeg. Within these parameters, individual land use practises impact on how much deer habitat remains in Winnipeg. Maintenance of deer habitat in lieu of economic gain through land development is rarely an incentive to land owners.

The MDNR has legal jurisdiction over deer in Manitoba, but not over any habitat within Metropolitan Winnipeg boundaries. Despite these limitations, resource managers are responsible for managing deer on these lands. Large-scale management programs such as deer relocation depend on the access to privately owned habitat, since this is where most deer are found. Some management action has been taken on private lands but this has been subject to owners' approval.

Legal liability for urban wildlife may be a significant issue in the future. The Wildlife Act (S.M. 1980, c. 73 s. 85) states:

"no right of action lies and no right of compensation exists against the Crown for death, personal injury or property damage caused by wildlife."

The legal system has not yet tested this in an urban situation. Serious injury or death through a deer-vehicle accident may initiate legal procedure against the Province of Manitoba or the MDNR, particularly if lack of active deer management on the part of the Department is confirmed. If such action demonstrates that resource managers were negligent in their management duties, this would reflect poorly on the responsible agency even if liability could not be substantiated.

In summary, urban deer management in Winnipeg has evolved to the assessment and goal formation level. Much of the biophysical data have been compiled; however, the other perspectives have not yet been fully considered for assessment completion and goal formulation.

## 5.6 WINNIPEG DEER IN THE FUTURE

Future urban development will have a major influence on the survival of the Winnipeg deer herd into the next century. Though it is unlikely that deer will disappear from the urban landscape in the next 20 years, proper management is important to ensure that Winnipeg residents derive maximum benefit and minimum costs from this resource.

To maintain a deer herd approximately the size that exists today, habitat would need to be maintained to support these animals. Murray Park will likely be fully developed within 25 years, so that maintaining even a remnant herd may not be possible (Figure 6). Any undeveloped land within the Perimeter Highway will likely be northwest of Sturgeon Road and Saskatchewan Avenue with the possible exception of the Boeing property. If Boeing and/or other organizations are willing to raise funds needed to manage a semi-enclosed herd, then it may be possible to support deer within the industrial park.

Charleswood will still be able to support deer, particularly if MHRC land is acquired through lease or donation, or if the land is simply not sold (Figure 5). If a large deer population is to be maintained, major arteries may experience a significant increase in deer-vehicle accidents.

The Assiniboine Forest deer population will be a management concern if Wilkes Avenue is upgraded. Wilkes Avenue, south of Assiniboine Forest has traditionally been a problem area for deer-vehicle accidents. Road improvements with no mitigating measures would result in an increase of these incidents.

The Fort Whyte deer herd will be under similar pressure when Kenaston Boulevard is upgraded. An increase in deer-vehicle collisions may result if movement across Kenaston Boulevard is not curtailed.

Further urban development may require limiting deer movement, e.g. through fencing, intercept feeding and reducing deer populations in problem areas. One method may be to enclose deer into an area such as Assiniboine Forest. Confinement of the Assiniboine Forest deer would require some of the same responsibilities and treatment for zoo animals. Richards (1974) was of the opinion that fencing deer into Assiniboine Forest would be detrimental, since overbrowsing would "alter the ecology" of the park. Although this has been a problem in American arboretums, local resource managers feel that full enclosure of Assiniboine Forest, and possibly other areas, may be an issue of the future (D. Ross, M. Shoesmith, pers. commun.).

Deer depredation and deer-vehicle accidents will continue to be management issues. One activity which contributes to these problems is deer feeding by residents. Though deer

feeding is a recognized benefit of having an urban deer herd, future management may require regulatory measures.

The effectiveness of deer population control through the relocation program has not yet been established. If the relocation program does not result in a population decline, a more intensive effort may be necessary to reduce the Winnipeg deer herd. There is also speculation that transplanted animals may return to the city. An unbroken river corridor links St. Malo to Winnipeg via the Rat and Red Rivers. The recapture of an ear-tagged buck in Assiniboine Forest during the 1986-87 campaign 9 months after relocation indicates that this may be a legitimate concern (D. Robertson, pers. commun.). An abundance of natural corridors makes Winnipeg accessible to animals in any direction, and increasing the distance of the relocation becomes prohibitive in cost and effort. Should the relocation program prove to have limited potential, less popular methods, such as selective hunting, may serve as supplementary techniques for controlling the deer population.

In past years, urban deer management has been crisis or incident oriented. Resource managers are faced with a rapidly growing deer herd which, with well planned, intensive management, could provide many benefits to the people of Winnipeg. Creating an urban deer management plan requires that both citizens and resource managers confront controver-

sial issues, particularly regulation of the Winnipeg herd. Policies regarding methods of population control (which includes possible alternatives to relocation), and development of a sociological carrying capacity are central to an effective long range deer management plan.



## Chapter VI

### CONCLUSIONS

1. Urban land development has not yet had significant negative impact on the Winnipeg deer herd. However, increased interaction between Winnipeg citizens and the deer herd has resulted in the need for management action.
2. Many residential and commercial properties which provide habitat components are not viable habitat from a management standpoint. Future deer strategies will likely be most effective using the manageable land base for determining sociological carrying capacity.
3. The study area has 3490 ha of land which serves as potentially manageable habitat for deer, 1232 ha privately owned, 2258 ha government owned. Approximately 65% (2242 ha) of manageable habitat is inside the Perimeter Highway.
4. There are 737 ha of privately owned deer habitat which could potentially be developed within Plan Winnipeg guidelines by 2001. However, only 103 ha are expected to be developed and this will be completed within 10 years. Of this total, 87 ha are zoned residential and 16 ha are zoned industrial.



5. Properties belonging to the MHRC presently provide about 400 ha of wildlife habitat. This is provincially owned land which could possibly be set aside as wildlife habitat for little or no cost to deer management agencies.
6. The 87 ha of residential zoned land to be developed by 1995 is in the vicinity of Assiniboine Forest, a park which supports approximately 30% of the deer herd within the Perimeter Highway. Some agricultural properties along McCreary, Loudoun and Liberty Roads have been converted to residential lots in the past (contrary to Plan Winnipeg) and this may continue.
7. Traditional methods of determining an optimal population may not be viable for this deer herd, where biophysical, economic, social, political and legal perspectives are influencing factors. Two-way communication between Winnipeg residents and resource managers may be necessary for creating a sociological carrying capacity for the Winnipeg deer herd.
8. Open green space in other North American cities is not managed specifically for deer. Parkland is multi-use in nature and private land is generally developed with little consideration of the wildlife resource. Arboreta which contain deer are primarily concerned with species diversity, such that deer management amounts to damage control.

9. Deer management in other cities appears to be largely stop gap or crisis management. Management in these cities is aimed at minimizing deer related problems rather than maximizing benefits. Techniques for urban deer management were found to be similar throughout North America. Some techniques are used elsewhere that are not employed here including:
- a) Jurisdictional changes,
  - b) Laws to prevent deer feeding,
  - c) Professional and sport hunting.

Chapter VII  
RECOMMENDATIONS

1. Develop an urban deer management plan for the City of Winnipeg.
2. Assign an urban wildlife specialist to be responsible for:
  - a) Monitoring wildlife incidents.
  - b) Developing policies toward damage prevention and/or compensation.
  - c) Educating the public regarding urban wildlife management and department policies.
  - d) Working with government officials to preserve wildlife habitat.
  - e) Acting as a liaison between city and provincial officials involved with wildlife parks and public education, on urban wildlife issues.
  - f) Monitoring the deer population and implementing the removal program.
  - g) Providing information and presenting plans and proposals to the public for development of a long term urban wildlife management plan.
3. Encourage public input into management planning. Two-way communication could create a forum for devel-

- oping a sociological carrying capacity for the Winnipeg deer herd. This could be accomplished by formulating management goals through public participation.
4. Promote preservation of urban deer habitat on provincially or city owned land which may be maintained as habitat without purchase.
  5. Consider providing incentives to landowners who are willing to maintain deer habitat. Through tax reductions, grants or leases, private property which provides winter deer habitat may be maintained.
  6. Publish an information booklet on the Winnipeg deer herd, including urban deer ecology, history and management.
  7. Continue the deer relocation program as a method of reducing the city deer population to approximately 250-300 animals by 1988. Continuation of this program should be subject reducing the breeding animals to minimize breeding potential. If the relocation program fails to adequately reduce deer numbers, e.g. due to increased fawning success or deer returning to Winnipeg, supplementary methods, such as selective culling, could be considered.
  8. It may be possible to monitor deer-vehicle accidents more effectively if a mutually beneficial program were to be negotiated with Autopac. In order to be effective for evaluating wildlife related problems,

incidents need to be recorded by animal species, town and/or type of accident.

9. Survey the public about deer feeding. Through use of questionnaires, information regarding deer feeding practises (e.g. who feeds deer, what is fed) could be documented.
10. Consider changes to the Wildlife Act (W140 - M.R. 212/82) or regulations authorized to provide damage compensation for residents and commercial operations resulting from deer depredation. Information from damage claims may also provide data about the extent of deer depredation, which could aid future management planning.
11. List the telephone number of the Southeastern Region Office department under an appropriate title, such as "Wildlife Problems", in the 'Frequently Called Numbers' section of the Manitoba government listing in the Winnipeg telephone directory.
12. Urban deer management could be improved through the following research studies:
  - a) Movement patterns of deer into Winnipeg from Beaudry Provincial Park and St. Charles Rifle Range.
  - b) Winnipeg resident attitude studies toward:
    - i) The deer resource in Winnipeg (i.e. perceived benefits, acceptable and unacceptable costs).

- ii) Controlling the deer population through;
  - live removal,
  - selective culling,
  - other.
- c) Deer feeding by government agencies.
- d) Deer dispersion monitoring at various population levels. This could include "hot-line" for deer sightings throughout Winnipeg.
- e) Survey of supplementary deer feeding in Winnipeg.

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## Appendix B

### PERSONAL COMMUNICATION-AGENCIES

1. J. Allen, Alberta Department of Fish and Wildlife, Red Deer, (403) 340-5142.
2. W. Banting, Department of Natural Resources, Winnipeg, (204) 945-7270.
3. R. Bean, Assiniboia Wildlife Association, Winnipeg, (204) 895-0001.
4. C. Dixon, Department of Natural Resources, Winnipeg, (204) 945-7762.
5. G. Glover, City of Winnipeg Parks and Recreation, Winnipeg, (204) 888-3634.
6. H. Goulden, Department of Natural Resources, Brandon, (204) 728-4788.
7. M. Grant, Manitoba Public Insurance Corporation (Autopac), Winnipeg, (204) 945-6568.
8. A. Johnson, City of Winnipeg Planning Division, Winnipeg, (204) 986-5017.
9. D. Johnson, Western Resource Development Corporation, Boulder, Colorado, (303) 449-9009.
10. R. Johnson, Minnesota Department of Natural Resources, Minneapolis, Minnesota, (612) 464-5200.



11. Dr. P. Jordan, Department of Zoology, University of Minnesota, Minneapolis, Minnesota, (612) 373-3028.
12. W. Loly, Fort Whyte Environmental Education Centre, Winnipeg, (204) 895-7001.
13. B. Koonz, Department of Natural Resources, Winnipeg, (204) 945-6811.
14. C. Knoll, City of Winnipeg Planning Division, Winnipeg, (204) 986-5017.
15. T. Moran, Department of Natural Resources, Winnipeg, (204) 945-7249.
16. M. Morgan, Smithsonian Institute, Washington, D.C., (202) 673-4866.
17. K. Porteus, Department of Natural Resources, Winnipeg, (204) 945-4373.
18. W. Redlick, Department of Natural Resources, Winnipeg, (204) 945-7270.
19. D. Robertson, Department of Natural Resources, Winnipeg, (204) 945-7254.
20. D. Ross, City of Winnipeg, Parks and Recreation Department, Winnipeg, (204) 986-2036.
21. S. Searle, Duraps Corporation, Winnipeg, (204) 957-1660.
22. G. Shearer, Ontario Ministry of Natural Resources, Ottawa, (613) 836-1237.
23. D. Smith, City of Winnipeg Animal Control, Winnipeg, (204) 986-2155.

24. T. Smith, Department of Natural Resources, Wisconsin,  
(414) 562-9604.
25. C. Torpey, City of Winnipeg, Operations Department  
District 6, (204) 477-5140.
26. W. Thorsteinson, City of Winnipeg Real Estate Depart-  
ment, Winnipeg, (204) 986-2353.
27. J. Witham, Illinois Natural History Survey, Spring-  
field, Illinois, (312) 830-2208.



## Appendix C

### PERSONAL COMMUNICATION-PRIVATE AND CORPORATE LAND OWNERS IN WINNIPEG

Note: names accompanied with an asterisk (\*) are not cited in the Practicum text. McCreary Road residents were referred to as a group, therefore most are not listed individually either in the text or on the map.

1. G. Anseeuw\*, Oak Bluff, Manitoba
2. A. Bargery, 396 Chalfont Rd., Winnipeg
3. N. Butler, 2850 Saskatchewan Ave.
4. F. Cates, Manitoba Housing and Renewal Corporation
5. T.M. Chuback\*, 1400 McCreary Rd.
6. H. Edmonds, Canada Cement La Farge
7. G. Gerbrandt\*, 1449 Loudoun Rd.
8. P. Golteri, Genstar Land Development
9. G. Hammerling\*, 1390 McCreary Rd.
10. J. Handley\*, 1662 McCreary Rd.
11. R. Hooker, 2790 Wilkes Ave. (Sonning Developments)
12. B. Hughs\*, 851 Shaftsbury (land owner B. Richardson)
13. W. Klassen\*, 1420 McCreary Rd.
14. Gloria Lethbridge, Boeing of Canada Limited
15. Marv McGonigal, Trizec Equities Limited

16. A. Meinzer, F. Meinzer Construction Limited, 5606  
Roblin Boulevard
17. E. Otremba\*, 1727 Loudoun Rd.
18. John Overwater, 1353 McCreary Rd.
19. W. Smook, Transport Canada, Winnipeg International  
Airport
20. W. Robinson\*, 1356 McCreary Rd.
21. T. Vardalos, 1240 McCreary Rd., Winnipeg
22. R. Walford, Qualico Developments Limited
23. L. Wiebe\*, 1255 McCreary Rd.