DEVELOPING A PROGRESSIVE NON-LETHAL HUMAN/DEER CONFLICT RESOLUTION STRATEGY FOR BRITISH COLUMBIA

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Introduction:

The purpose of this paper is four fold:

- Purpose #1 is to examine the rationale for lethal deer management put forward by British Columbia's provincial and municipal governments and to ascertain the accuracy of the reasons given to support lethal action against the deer.

- Purpose #2 is to explore methods of killing the deer and the humaneness of those methods.

- Purpose #3 is to demonstrate that human/deer conflicts can be effectively managed through non-lethal means by providing examples from other communities in Canada who have successfully implemented alternative resolutions.

- And Purpose #4 is to put forward an alternative strategy that prevents human/deer conflicts from occuring where possible and that compiles a series of non-lethal strategies where conflicts occur.

In addition, this paper will examine material generated by the Capital Regional District (CRD) to determine the accuracy of the assertions made in those reports.

Deer species targeted for lethal control:

Three deer taxa are being targeted, Mule Deer, Black-tailed Deer and White-tailed Deer. As described by the BC Ministry of the Environment (MoE), "Mule and Black-tailed deer are both members of the same species, *Odocoileus hemionus*, yet they are very different from one another. In British Columbia, these two subspecies or races are the most widespread members of the deer family (Cervidae) and probably the most familiar…Black-tailed Deer have been around in North America for over two million years. Mule Deer may have appeared later as a hybrid of Black-tailed and White-tailed deer. Since then at least seven races or subspecies of Mule and Black-tailed deer have developed.**"** (Mule and Black-tailed Deer in British Columbia, Ecology, Conservation and Management, British Columbia Ministry of Environment, Lands and Parks, Pg 2),

Brief Descriptions:

1. Mule Deer:

"Mule Deer are relatively large animals – 90 to 95 cm high at the shoulder. Adult males, or bucks, weigh 68 to 113 kg, but bucks in peak physical condition may weigh up to 180 kg. Females, or does, weigh 50 to 75 kg. Mule Deer have a reddish brown coat that changes from tawny brown in summer to dark or grizzled brown in winter. They have a dark brown forehead, a whitish face with a black muzzle, and a white throat patch. Their ears are large – about two-thirds the length of the head – with

black borders and white hair on the inside, and they have a large white rump patch with a narrow blacktipped tail. Each year male Mule Deer grow and shed a set of antlers. Their antlers have two main beams, each of which forks again into two beams (dichotomous branching)." (Mule and Black-tailed Deer in British Columbia, Ecology, Conservation and Management, British Columbia Ministry of Environment, Lands and Parks, pgs 2 & 3)

2. Black-tailed Deer

"Blacktails are smaller than Mule Deer and slightly darker in color, with a small rump patch and a tail that is dark brown or black for most of its length, rather than just at the tip. Adult males in good condition weigh about 48 to 90 kg, females 40 to 65 kg. Sitka blacktails tend to be smaller and darker than Columbia blacktails." (Mule and Black-tailed Deer in British Columbia, Ecology, Conservation and Management, British Columbia Ministry of Environment, Lands and Parks, pgs 2 & 3)

3. White-tailed Deer:

"The graceful and adaptable White-tailed Deer is a strictly American species, with no close relatives on other continents. Today's Black-tailed (Mule) Deer and White-tailed Deer **(Odocoileus virginianus)** have evolved from primitive deer of the genus **Odocoileus**. The White-tailed Deer is the oldest species of this family. It first appeared in the southern part of North America some four million years ago. The whitetail is the most widely distributed and abundant ungulate (hoofed mammal) in the western hemisphere. Its range extends across southern Canada from British Columbia to Nova Scotia, and southward through the entire US, Mexico, and Central America into the northern third of South America. All 38 subspecies have adapted to a wide range of environments, from the frigid winters of the Peace River area to the tropical climates of Central and South America. Whitetails have also demonstrated a remarkable ability to live near people…White-tailed Deer stand about 90 cm tall at the shoulder. Adult males (bucks) typically weigh 68 to 102 kg and adult females (does) 45 to 73 kg. But weights vary considerably depending on age, the season, and the condition of the range. Their coat is mostly reddish brown in summer but changes to grey or greyish-brown in winter, with a contrasting white pelage on the belly, inside of the legs, underside of the tail, around the eyes, and on the chin and throat. The most striking feature of this deer, and the source of its name, is its triangular foot-long tail. On top, the tail is brown with a prominent white fringe, but the underside is snowy white. When a whitetail runs, its tail sticks up and bobs from side to side with each bound." (White-tailed Deer in British Columbia, Ecology, Conservation and Management, British Columbia Ministry of Environment, Lands and Parks, pgs 2 & 3)

Purpose 1 – Ministry's rationale for lethal deer management and assessment of the accuracy of the assertions made against the deer:

Assertions made by the Ministry of the Environment:

In March 2010, the Ministry of the Environment released two reports, one titled, "British Columbia Urban Ungulate Conflict Analysis" and the other, "British Columbia Urban Ungulate Conflict Analysis Summary Report for Municipalities". Municipal governments have relied on these documents to establish their municipal deer management programmes.

The Ministry assertions are as follows:

1) that the deer are "overabundant"; and

2) that the consequences of "overabundance" include:
   a) gardens, landscape plantings and community forests "damaged";
   b) more ungulate/vehicle collisions;
   c) potential for disease transmission; and
   d) communities experiencing "aggressive ungulate behaviour".

Examining the Ministry's case for overabundance:

Wildlife managers for the BC Ministry of the Environment have deemed deer populations in various areas to be "overabundant" and therefore problematic. Yet no scientific data are provided as justification for the label. No estimates of deer population sizes are given in those areas where "overabundance" is alleged.

The authors state that "When population numbers approach or exceed BCC (Biological Carrying Capacity), habitat quality decreases with loss of native plant species, the herd physical condition declines, and the likelihood of winter mortality due to poor nutrition or disease increases." (British Columbia Urban Ungulate Conflict Analysis Summary Report for Municipalities, Ministry of Environment, Gayle Hesse B.Sc. British Columbia Conservation Foundation 200 1383 McGill Road Kamloops BC V2K 2E4, pg 1)

Based on this definition, all evidence in the reports suggest that deer populations on Vancouver Island and mainland BC are healthy and in good physical condition, and therefore BCC has not been approached or reached. The Ministry's *British Columbia Ungulate Species Regional Population Estimates and Status – Preseason 2011* shows that the population of Black-tailed deer are largely stable at 99,000 to 150,000 and Mule deer at 115,000 to 205,000. Both show population increases in some areas and decreases in others. White-tailed deer number between 87,000 and 140,000 and are

either stable or increasing in some regions.

Despite claiming overabundance throughout both reports, the authors provide no evidence that deer numbers have reached what they define as the biological carrying capacity in either urban or rural areas, including those municipalities currently conducting culls. Are Black-tailed deer "overabundant" at 99,000 or 150,000? Are Mule deer "overabundant" at 115,000 or 215,000? And are White-tailed deer "overabundant" at 87,000 or 140,000?

In fact, the differential between the high and low counts for all three species, 51,000 for Black-tailed deer, 90,000 Mule deer and 53,000 for White-tailed deer, is so extreme as to suggest that the MoE does not really know the size of the populations.

Ministry staff justify the deer population reduction recommendation by relying on the frustration and intolerance expressed by some BC residents, claiming that communities have reached their Cultural Carrying Capacity (CCC). Cultural Carrying Capacity deals with the sensitivity of local human populations to the presence of animals of any given species. The greater sensitivity to the presence of animals, the greater likelihood of a cull, even if the species in question is only locally abundant but not abundant on the broader landscape, as the term abundant is defined. CCC is a management term, not a biological term.

For example, sea otters are classified as "endangered" in the IUCN (International Union for the Conservation of Nature) Red Book, and yet are still deemed to be too abundant by some stakeholders who see them as competitors for shellfish. Mediterranean monk seals are also endangered, yet are culled by fishers with similar intolerance. CCC varies as a function of tolerance levels that reflect various socio-economic values and attitudes. Species such as wolves can be simultaneously above and below the CCC, depending on numerous factors. The CCC is greatly influenced by education and government policy.

In both reports, biased statements unquestionably assume overabundance and assume that lethal management is necessary to rectify any problems derived from "overabundance". On page ii in both reports, the authors state, "When complaints caused by overabundant ungulates are increasing in numbers and severity, then conflict reduction options such as fencing, repellents, and aversive conditioning will not significantly reduce the numbers of complaints. Population reduction is needed to reduce the damage caused by overabundant ungulates. Once the population numbers are lowered, then damage is easier to manage with conflict reduction techniques. The method of population reduction and how often it needs to be carried out is dependent on the site specific circumstances in each

community."

As the reports ultimately acknowledge, the impetus for the cull are the complaints about collisions between deer and vehicles and deer eating gardens and crops. As the report states, "Excessive numbers of wildlife vehicle collisions, homeowner and gardener complaints, or reports of wildlife aggression indicate that [Cultural Carrying Capacity] has been exceeded." and a population reduction strategy must be considered.

Instead of engaging in an effective, educational programme to teach people how to co-habit peacefully with deer and other wildlife and minimize conflict situations, Ministry staff demonize the deer in order to justify permitting lethal culls in various municipalities on the mainland and on Vancouver Island.

Ministry's assertions of the consequence of overabundance:

The second assertion made by the Ministry is that the following consequences occur:

a) dens, landscape plantings and community forests are "damaged";
b) ungulate/vehicle collisions increase;
c) potential for disease transmission increases; and
d) communities experience aggressive ungulate behaviour

What is the Ministry's evidence to back the accusations in the report against the deer?

Damage to gardens, landscape plantings and community forests:

The Ministry also claims that deer browse can have "severe consequences on the variety, composition and abundance of native plant communities, community forests and forest bird species" without providing a shred of proof for such statements and without acknowledging that deer have been an integral part of the environment for thousands of years. Nowhere is it indicated that any species of native fauna has been exterminated, or even extirpated from a significant part of its natural range, as a result of deer activity.

Nowhere is there any indication of the effects of non-native plant species on deer populations, or on populations of native fauna. In fact, invasive species such as English Ivy and Scotch Broom are available at garden centres in the Capital Regional District, despite them being listed in the MoE's own *"Invasive Alien Species Framework for BC: Identifying and Addressing Threats to Biodiveristy"* (http://www.env.gov.bc.ca/wld/aliensp/#seventh_)

Deer eat all sorts of plants in backyards gardens, community plantings and edge forest environments. The resulting concerns are largely aesthetic, many of which can be addressed by alternative plantings as listed on the BC Ministry of Environment web site: (http://www.env.gov.bc.ca/cos/info/wildlife_human_interaction/docs/garden.html)

What the Ministry fails to examine is the impact of human development on the community forests and natural areas, including the impacts of human use and the introduction of non-native garden plant species to natural areas, such as the extensive coverage of some of the community forest floors by non-native ivy. The Ministry also fails to assess the impacts of plant and animal agriculture and the use of fertilizers, herbicides and pesticides and subsequent runoff from adjoining or upstream areas of use such as farms and gardens.

Ungulate/vehicular collisions increase:

In the October 26, 2011 report to the Planning, Transportation and Protective Services Committee, the CRD makes the following statement:

"ICBC data shows motor vehicle collisions with deer reported to ICBC within CRD municipalities have increased by an average of 13% annually since 2000, growing from 35 collisions in 2000 to over 100 collisions in 2010. Collisions are not evenly distributed across municipalities. Between 2000 and 2010, Saanich (Pat Bay Hwy), Langford, Central Saanich and Sooke had notably more collisions compared to the rest of the local governments in the CRD. Deer collisions increase in the summer months when individuals migrate out of wilderness environments in search of additional food sources in anticipation of scarce resources in winter (for full details see Appendix B).

"Between 1997 and 2007 animal-related insurance claims in BC have increased from $15.8 million to $30.8 million. Costs for animal related motor vehicle insurance claims are available at the provincial level; specific data by region and by animal has not been produced at the time of this report. According to the Ministry of Transportation and Infrastructure (MoTI), total annual road-related deer fatalities from motor vehicles on provincial highways have increased by an average of 3.3% annually in the CRD between 2001 and 2010, growing from 214 deer fatalities in 2001 to 324 in 2009 before falling to 236 in 2010. Due to the discrepancy between the ICBC claim data and the MoTI road-related fatality data, an inference can be made that not all deer collision damages are pursued through insurance claims.

The costs to clean up wildlife road kill are borne by the ministry. Human fatalities from deer collisions are rare and none have been recorded in the region."

Lets examine the efficacy of these and other statements made by the CRD, MoE and Ministry of Transport.

MoE: According to the British Columbia Ungulate Species Regional Population Estimates and Status, the Black-Tailed Deer populations is largely stable or in some cases in decline. On Vancouver Island the population is estimated at 45,000 to 65,000 and the MoE describes the population as stable and increasing but no comparative numbers are provided from 2000 to 2010, the years used by the ICBC to compare the number of deer car collisions. The 2011 Black-tailed deer population estimates, in fact, signify a decline in the size of the population in 1979 estimated to range form 150,000 to 300,000, or 49% of the provincial herd. (Interactions Between Black-Tailed Deer And Intensive Forestry Management, Problem Analysis, Integrated Wildlife Intensive Forestry Research, A cooperative project between the Ministries of Environment and Forests, pg 28)

ICBC: According to the ICBC's Quick Statistics for the Media document, the total number of incidents involving animals ranged from 9,300 to 10,600, with the largest number of incidents in 2006 and the smallest in 2009. The number of injured victims remained the same, at 400, from 2006 to 2010 as did the number of fatalities, at 5. It should be noted that no fatalities have been documented as occurring in the CRD.

At the same time, the number of active drivers licenses increased by 6% between 2006 and 2010 as has the vehicle population. So the ICBC statistics do not show a rise in the number of accidents, in the personal injuries or the number of fatalities as they relate to the increase in the number of active driver's licenses and vehicles on the road.

Quick Statistics for the Media also shows that more accidents occur with high risk driving, more people are injured and there are substantially more fatalities than with deer collisions. While it is important to try to reduce deer car collisions, it is also important to put those statistics into some kind of perspective.

It is clear that high risk driving is a priority for the ICBC, as it should be. In the Service Plan for 2011 to 2013, the ICBC writes, "High-risk drivers are a serious concern as they cause a

disproportionate number of crashes and these crashes are very costly, which in turn affect all of our customers' insurance premiums. There were more than 100 traffic fatalities and 3,000 injuries caused by impaired driving in 2008, and approximately 180 fatalities and 10,300 injuries caused by other high-risk driving behaviours such as excessive speed, failing to yield, and ignoring traffic control. We will be taking steps to increase personal accountability for high-risk driving through underwriting enhancements, which include higher premiums for higher risk drivers to help keep rates low and stable for safer drivers."

As a matter of comparison, high risk driving behaviours, drinking and others, caused 280 deaths and 13,300 injuries as compared to 5 fatalities involving animals (likely not all caused by deer) and 400 injuries.

MoT: The Ministry of Transport's (MoT) Wildlife Accident Reporting and Mitigation reporting programme (WARS) produced a special annual report with vehiclular/wildlife collision data from 1988 to 2007. In Table 5.1, titled Wildlife Accidents (Total and selected major species), the number of deer/car collisions peaked in 2005 at 5,156 and declined in 2006 and 2007 to 4,473 or a 15% decline. The decline occurred at the same time as the number of active drivers increased in 2005, 2006 and 2007.

In District 2, Vancouver Island, the number of deer/car collisions peaked in 2005 and declined by 16% in 2007. In District 3, Rocky Mountain, 2006 was the only year that the number of deer car collisions was over 1,000 at 1,019 accidents. In West Kootenay, District 4, for only two years of a 25-year period, deer/car collisions were above 1000, 1014 in 1993 and 1227 in 1994.

WARS spends considerable time estimating the cost of wildlife related motor vehicle accidents, including claims and collision severity but provides no comparative statistics with costs associated with other types of collisions.

The WARS report cites ICBC statistics. In Section 3, page 2, Table 3.2 titled, Animal-related Motor Vehicle Accident Claims (1997 to 2002), the authors show claims costs at $30.8 million in 2007. What they fail to point out however is the decline in the costs of claims from $34.3 million in 2006 to $23 million in 2010 (WARS Executive Summary, pg. i) or a 32% decrease.

In addition, WARS provides no information about how many wild animals would have to be culled in order to reduce the number of

collisions involving wild animals to a "satisfactory level, given that a total absence of collisions involving wild animals could only occur because of a total absence of wildlife.

In the same report, WARS has produced maps which show the total number of deer accidents. Map 5.32 shows the total number of deer accidents between the years 1988 and 1997 and Map 5.33, the total number between 1998 and 2007. A comparison of these two maps shows that on significant portions of the road the number of accidents has not changed over a 20-year period. Where change has occurred, we have been able to identify 19 areas of road where deer accidents have increased and 11 where they have decreased.

The assertion that WARS puts forward that deer/car collisions results in a loss of provincial hunting and trapping license revenue is simply not supported by any evidentiary information. The authors assume that animals killed in collisions would otherwise have been hunted or trapped without a shred of information to back such an assumption.

Finally WARS asserts that the MoE would lose revenue from the 863,000 non-hunting residents who would be impacted by wildlife killed by vehicles. What WARS fails to understand is that many of the residents who simply want to view wildlife are likely to take a very different view of culling than hunters and there are significantly more non-hunting than hunting residents.

In fact, the number of resident hunters and animals killed is in decline, calling into question the WARS assertion that deer car collisions result in loss of provincial hunting revenues. The August 2005 BC Stats document, titled, British Columbia's Hunting, Trapping & Wildlife Viewing Sector (http://www.bcstats.gov.bc.ca/data/bus_stat/busind/fish/wildlife.pdf) examines the value of hunting in British Columbia. The document states that over 23,000 deer were legally killed by hunters in 2002. No yearly comparative data were available. The report states that the resident harvest of all big game species fell by 40% between 1992 and 2002. The decline in the number of hunters and animals harvested was attributed to lower participation, changes in wildlife management practices and changes in populations of species hunted. The fact that this document does not include the impact of wildlife fatalities on hunting revenues indicates the lack of statistical importance of such fatalities to the value of hunting in BC.

TC: As the authors of the 2003 final report to Transport Canada (TC) Road Safety Directorate, titled Collisions involving motor vehicles and large animals in Canada (pg 25) point out, "The total claims for animal-vehicle collisions represent 1.5% of all collision claims for property damage in British Columbia. For all claims (fatality and injury), the percentage drops to 0.12% (Koganow, 1997)". This statistic shows that collisions involving wildlife comprise a tiny portion of all accidents in British Columbia. (http://www.wildlifeaccidents.ca/docs/d6acdb93dfabc8c6.pdf)

Potential for disease transmission:

The report suggests that the potential for disease transmission increases with an overabundant species and lists an extensive number of diseases the deer could potentially carry. While the report also shows that anthrax does not exist in BC, that TB has not been found in free ranging wildlife populations in BC and the greater likelihood is transmission from farm animals to wildlife; and that Chronic Wasting Disease has not been found in BC, it does little to alleviate the fears of those who believe that deer are diseased and present a significant risk to human health.

The same problem exists with Lyme disease and e-coli. A public health surveillance programme for Lyme disease demonstrates a consistently low rate of both infected ticks (less than 1%) and infections in the human population (less than 0.5% per 100,000). And, although e-coli is naturally occurring in the intestines of humans and all other species of mammals, transfer from deer to humans is considered a very low risk.

The disease issue exposes two flaws in the Ministry's assertions. The first is that the deer populations in BC do not carry many of the diseases listed in the Ministry reports and where they do, they present a very low public health risk to the human population. The second comes with the Ministry's argument that disease is a measure of overabundance, so the absence of disease would lead to the logical conclusion that the deer population in BC is not overabundant.

Purpose 2: - Examining Net and Bolt Killing and Bow Hunting:

Net and bolt killing: Municipalities throughout BC have adopted the Helena Montana approach to lethal deer management, a method called Net and Bolt killing which is described in Appendix A, Urban Deer Management Case Study: Helena, Montana, British Columbia Urban Ungulate Conflict Analysis. On page 164, the report describes the process as follows: "The traps were checked about one hour prior to sunrise. If an animal was found in the trap, the frame and net were collapsed down onto the animal to restrict its movements, and then the animal was dispatched on

site using a bolt gun. Bolt guns are used in the food processing industry, and the mechanism fires a steel bolt directly into the brain of the animal, causing instant brain death. The time the officers reached the trap until the animal was dispatched was timed at 18 seconds."

Under lessons learned, the report states, "Dispatching prior to sunrise was done as a means of carrying out the project as discreetly as possible but if locations were carefully chosen, it could still be kept out of view although conducted during daylight hours." (IBID pgs 165, 166)

This statement suggests that the net and bolt killing is controversial and gruesome to watch and must therefore be hidden from public view. This presents a serious public relations problem for municipalities implementing such a programme and suggests that the sanitized version of immobilizing and "dispatching" the deer in 18 seconds is highly suspect.

The bolt gun was designed to be used by the farming industry to stun animals prior to slaughter. However, it is clear to anyone who has observed the slaughtering process, as the authors of this report have, that the animals who are to die are stressed by the transport, corralling and the pre-slaughter process. The captive bolt gun was never designed to kill deer who are wild and fearful of humans.

In order to assess the humaneness of net and bolt killing of wild deer, a literature search was conducted to determine whether the claim that "the mechanism fires a steel bolt directly into the brain of the animals, causing instant brain death." (BC Urban Ungulate Conflict Analysis, pg 164) was correct or open to challenge.

Review of the literature suggests while it is the intent of the mechanism to cause instant brain death, in fact there are too many variables to ensure instant death. Some of the reports consider the penetrating captive bolt gun as a stun gun, not a killing device. Many reports recommended or strongly recommended exsanguination immediately after applying the bolt gun to the skull of the animals. Most of the reports discuss farmed not wild animals.

Here are samples of the government and veterinary reports:

- The European Food Safety Authority's Scientific Report on "The welfare aspects of the main systems of stunning and killing applied to commercially farmed deer, goats rabbits, ostriches, ducks, geese and quail" examines both advantages and disadvantages of penetrative captive bolt killing. The assumption is that the deer are confined to a stunning box. The report states that when the animal is properly restrained the method is effective. The disadvantages include the stress

of handling and restraint, with possible resulting severe welfare problems. (Pgs 18 & 19 – our emphasis)

- The European Commission's Report on the slaughter and killing of animals by the Animal Welfare Section of the Scientific Veterinary Committee concluded that where the penetrating captive bolt was used, "The animals should be rendered unconscious in a single shot to the head and the bolt should damage the brain. Bleeding should occur as soon as possible after the shooting." (Pg 10)

- Australia's Primary Industry Standing Committee's Model Code of Practice for the Welfare of Animals [at] Livestock Slaughtering Establishments examines the slaughter of deer. In Section 2.7.1, the Code states, "Farmed deer cannot be considered completely domesticated, and are intrinsically nervous and excitable animals.". Section 2.7.4 and d27.5 states, "Stunning should be by a penetration captive-bolt pistol, or by shooting. Bleeding should be carried out immediately after stunning." (Pg 11)

- Tasmania's Animal Welfare Guidelines for deer considers both the captive bolt stunner and the penetrating captive bolt as stunning and not killing devices. The Guidelines read, "The captive-bolt stunner is safer since a blank cartridge is used. The operator does not have to be a marksman as the instrument's muzzle is firmly pressed against the animal's skull before firing. It must however, be assumed that the animal has only been stunned and a follow-up method of ensuring death, such as bleeding out, is required" (Section 9. Humane Destruction)

- The U.S. Department of Agriculture's Operations Guidelines for Euthanasia (January 2004) state, "While penetrating captive bolt and gunshot, when properly applied, are usually fatal, it is strongly recommended that adjunct measures (e.g., exsanguination via carotid or brachial arteries or thoracotomy) be used to ensure rapid death and prevent the possibility of an animal that may be only stunned regaining consciousness." (Pg 25)

- The Australian Deer Industry Code of Practice for the Welfare of Deer states with regard to "humane destruction" that "Effective and humane methods of euthanasia for deer that administer a quick and painless death include shooting with a firearm, electric stunning or stunning with a captive bolt pistol followed by bleeding." (Pg 281)

- With regard to euthanasia, the Canadian Council on Animal Care's Guidelines on: the care and use of wildlife states, "one of the most important criteria of acceptance of a euthanasia method as humane is

that it have an initial depressive action on the central nervous system to ensure immediate insensitivity to pain; this must be followed by cardiac arrests or respiratory arrest." (Pg 42)

- The American Veterinary Medical Association Guidelines on Euthanasia states, "A penetrating captive bolt is used for euthanasia of ruminants, horses, swine, Laboratory rabbits, and dogs…Adequate restraint is important to ensure proper placement of the captive bolt. A cerebral hemisphere and the brainstem must be sufficiently disrupted by the projectile to induce sudden loss of consciousness and subsequent death." The disadvantages cited by this report include that it is aesthetically displeasing and that death may not occur if equipment is not maintained and used properly." (Pg 13)

The literature review demonstrates that humane deaths cannot be assured for the penetrating bolt gun method now being used to kill wild deer in municipalities in British Columbia. The reports call into question the assertion that the steel bolt fired into the brain of the animal causes instant brain death and without immediate exsanguination, an immediate and humane death cannot be guaranteed.

The BC SPCA observed the killing of five deer, which included wrestling the deer to the ground, immobilizing the head, applying the captive bolt gun and exsanguinating the animals. However even with exsanguination, there are serious animal welfare concerns. As Laura Simon, Field Director of the Urban Wildlife Program for the Humane Society of the United States points out to the Mayor of the City of Pepper Pike, Ohio about a net and bolt deer cull, "Captive bolt guns are designed for use on restrained domestic animals in highly structured and controlled environments. Even there, the 'humaneness' of these devices has been called into question. These guns were not designed for use on wild animals under any circumstance, and certainly not as a management tool for white-tailed deer."

In a 2006 statement, Terry Clark, President of the New Jersey SPCA writes, "The NJSPCA believes that the killing of deer by netting and bolting inflicts substantial pain, stress and suffering both during the netting and bolting phases of the operation. The NJSPCA has reviewed various expert opinions, all of which concluded that netting and bolting of deer constitutes unnecessary cruelty. Even Dr. Temple Grandin, one of the nation's foremost experts in designing systems to reduce the stress and suffering of animals before and during slaughter, describes the process as 'cruel'. According to Dr. Grandin, because deer are 'flighty' animals, the netting process alone causes undue stress and panic." (NJ SPCA Opposes "Netting & Bolting" of Deer: Urges NJ Fish & Game Council to End Practice & Convene Expert Panel, State by Terry Clark, President NJ SPCA, March 7, 2006)

In an article about the Village of Cayuga Heights, Jack J. Schrier, member of the New Jersey Fish and Game Council from 2000-05 consistently voted against the use of the net and bolt method of killing deer. He is quoted as saying, "Too often the bolt misses the target, followed by second and third attempts before getting the bolt into the deer. Even then, the head is missed entirely. Certain it is not. Swift it is not. Humane it surely is not." (Deer Control Method Sparks Debate, Anne Marie Cummings, Tompkins Weekly,

Allen T. Rutberg, Ph.D., Research Assistant Professor, Centre for Animals and Public Policy, Cummings School of Veterinary Medicine at Tufts University writes, "My personal opinion, which does not in any way imply endorsement from the Tufts-Cummings Veterinary School or the Tufts Center for Animals, is that netting & bolting free range deer is at best difficult to carry out humanely and at worst is brutally cruel. Because the practice localizes responsibility for killing with specific property owners, it also stirs up personal animosity among members of the community. Again in my opinion, the potential for animal suffering and the elevated animosity generated by the practice outweighs any benefits that might be achieved by deer population reduction."

Bob Kubiak is a Princeton resident and hunter. In his testimony about net and bolt killing of deer, he writes, "I testified to Mayor Marchand and the township committee that as a former farm hand and later a slaughterhouse worker for many years, I had personally used the device to kill many hundreds of animals. It was my personal observation that, even in the best of circumstances, in a very controlled environment wherein the animal to be killed was first herded into a "squeeze gate", the bolt gun had to be held firmly against the animal with significant pressure which made the animals extremely anxious as they furiously jerked their head from side to side trying to avoid the inevitable. During the procedure, I have personally shot an animal through eyes, foreheads and noses as they struggled against the restraints. In Princeton, I personally brought to the table my objections based solely on my conviction that "bolting" in actual practice is grossly inhumane. As a long-time butcher I can assure all who hear that this method is not only inhumane but barbaric. Secondly, netting in itself is also very inhumane. Wildly thrashing deer with sharp hooves often cause injury to themselves and each other as they try to get free. The White Buffalo agents who attempt to subdue the animal often break their legs as the deer violently struggle underneath the net. I can personally attest to the violent and traumatic experience deer are subjected to during the procedure."(November 22 – no year attached) http://www.netandboltcruelty.net/network.htm)

And finally, an eyewitness describes the deer kill in Invermere. The person saw deer in the traps early in the morning, likely for many hours. The deer were lying down when the contractors arrived at 6a.m. They went

"ballistic" when the traps were collapsed on top of them. After that it took mere seconds to kill them. He said it was not for the squeamish. This points to the fact that if the footage of an execution were ever to be shown to the general public there would be public outrage.

Effects of confinement: In a 2009 study titled, "Biochemical Variables in Free-ranging White-tailed Deer (*Odocoileus virginianus*) after Chemical Immobilization in Clover Traps or Via Ground-darting" As the paper states, "The white-tailed deer immobilized by hand-injection in Clover traps experienced more severe physiologic perturbations than deer remotely injected by dart after ground-stalking. These perturbations might be sufficient to cause myocardial damage." This study indicates that trapped deer experience greater "stress" as a result of confinement which causes "more sever physiologic perturbations". The study calls into question claims that using clover traps to trap and kill deer are "humane". There is no indication in the information provided by the MoE, that confinement stress effects have been examined. We can only surmise the reason – that the deer are to be destroyed and not released and therefore myocardial damage is not significant. However, such damage is significant from a humane perspective because of its indication of high levels of stress related to confinement.

Bow hunting: When the Upper Thames Conservation Authority (London Ontario) staff considered bow hunting as a method of killing the deer in Sifton Bog, they provided the following assessment:

> ***"ii) Benefits:*** *Although not as effective at reducing deer herd as sharpshooting, an archery deer hunt can contribute substantially to population reduction or maintenance goals. This method is often used to remove deer in suburban areas when firearm discharge is not permitted since it is relatively safe because of the limited shooting range for archery equipment. Bow hunting is a relatively discreet and silent activity.*
>
> ***"(ii) Disadvantages:*** *There is strong opposition to the shooting of deer by local animal welfare advocates and the influence of animal welfare and animal rights groups on local political decisions through litigation or disruptive activities. On its own, this method is not as effective at reducing the deer herd as sharpshooting. Constraints on season length and hunting hours as well as restrictions on types and numbers of deer to hunt reduces the effectiveness of bowhunting. It is difficult to consistently attract large numbers of bowhunters when there are other more suitable areas to hunt. As well, it is difficult to secure cost-effective liability insurance coverage for bow hunting activities. Highly skilled marksmen are needed to ensure public safety in a heavily*

populated urban area. There is a chance that some animals will be wounded. These animals will either die slowly, become permanently disabled or fully recover. Deer that are mortally wounded with an arrow can travel 100 yards or more before succumbing and in developed suburban areas this could result in fatally struck deer dying on adjacent properties." (Approaches and Options to Deer Management, 2.Lethal Methods To Manage Deer Populations, Management Strategies; White-tailed Deer, Upper Thames River Conservation Authority http://www.thamesriver.on.ca/Wetlands_and_Natural_Areas/white-tailed_deer_mgmt_pg4.htm#2.%20LETHAL%20METHODS)

Wounding Rates in Bow Hunting: There is considerable debate about the wounding rate of animals who are bow hunted. We conducted an extensive literature search and found that most were not peer reviewed research papers but articles that discussed and debated bow hunting issues.

However, we found a study conducted by wildlife researchers and managers in the State of Oklahoma between 1995 and 1997. This study was done to determine the deer wounding rates in bow hunting and to determine how many of the wounded deer die. This information is used to determine how many deer tags to issue during hunting season.

Th Abstract describes the study as follows: *"We captured and affixed radio collars to 80 male white-tailed deer (Odocoileus virginianus) during 1995-1997 to ascertain the wounding rate and proportion of deer that die from hunter-inflicted wounds. Our study population was hunted only with traditional archery equipment (recurve and longbows). Of the 22 deer shot by archers, 11 were recovered by the hunter, resulting in a 50% wounding rate (deer shot but not recovered). Only 3 (14%) of the 22 deer shot by hunters died and were not recovered. Based upon demographic and harvest statistics, these estimates indicate that approximately 4% of adult males in the population die from archery related wounds annually and are never recovered."* (Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies 52:244-248)

The report goes on to say, "Funding and support were provided by the U.S. Army and the Oklahoma Cooperative Fish and Wildlife Research Unit (Okla. Dep. Wildl. Conserv., Okla. State Univ., Wildl. Manage. Inst., U.S. Geol. Surv. Biol. Resour. Div., cooperating). B. J. Farrar, D. E. Townsend II, and S. Grubbs provided assistance in the field."

This particular study is important because it was conducted by wildlife managers and researchers with radio-collared deer in a controlled setting. The wounded animals were tracked and in some cases necropsied to determine the extent of wounding

The study showed that approximately 27% of the deer were shot. Of the twenty-two deer shot, 11, or 50%, were wounded and not recovered. Because of the radio collars the wounded animals were tracked. Of the 3 deer who died from their wounds, 2 died within 24 hours and 1 remained alive for 5 to 7 days before succumbing to injuries. Eight deer sustained flesh wound injuries and survived.

As the study indicates "The 50% wounding rate from our data is similar to data reported from other studies. Downing (1971) and Boydston and Gore (1987) reported wounding rates of 50% with archery equipment for white-tailed deer in Georgia and Texas. Similar wounding rates have been reported in Georgia (44%; Croft 1963), Indiana (58%; Stormer et al. 1979), New Jersey (55%; Lohfield 1980), Wisconsin (31-37%; Herron 1984), South Dakota (48% McPhillips et al. 1985), and Michigan (43%; Langenau 1986)."

Purpose 3: Managing human/deer conflicts through non-lethal means - approaches in other communities:

Sifton Bog – London Ontario:

Upper Thames Conservation Authority

In January 2011, Natural Resources Solution Inc tabled its report to London City Council regarding the management of deer in Sifton Bog and throughout the City of London. The following is a brief overview of the Sifton Bog/White-tailed Deer issue and is striking in its similarity to the issues raised by the Ministry of Environment, the CRD and other municipalities:

"Within the vicinity of the Sifton Bog ESA , there are several issues and challenges regarding the white-tailed deer population. These relate to concerns over deer-vehicle interactions, the potential spread of diseases, damage to the bog ecosystem and surrounding private property, and supplemental feeding of deer. These issues are presented below.

Deer-vehicle collisions are a threat to human safety and are one of the predominant causes of deer mortality within suburban environments where a lack of natural predators or hunting bans exist. Vehicle collisions with deer can result in serious vehicle damage, personal injury and human mortality. High deer-vehicle interaction rates have been observed in the vicinity of the Sifton Bog ESA.

There is concern that deer populations within residential or suburban areas may pose a threat to human health by increasing the exposure to disease

such as Lyme disease, encephalitis and parasites. As described in City of London City-Wide White-tailed Deer Management Strategy (NRSI 2011), Lyme disease is not currently a concern in Middlesex-London. There are also concerns that a large deer population would pose a threat to the herd health by increasing the potential spread of disease or parasites within the herd (such as Chronic Wasting disease (CWD)).

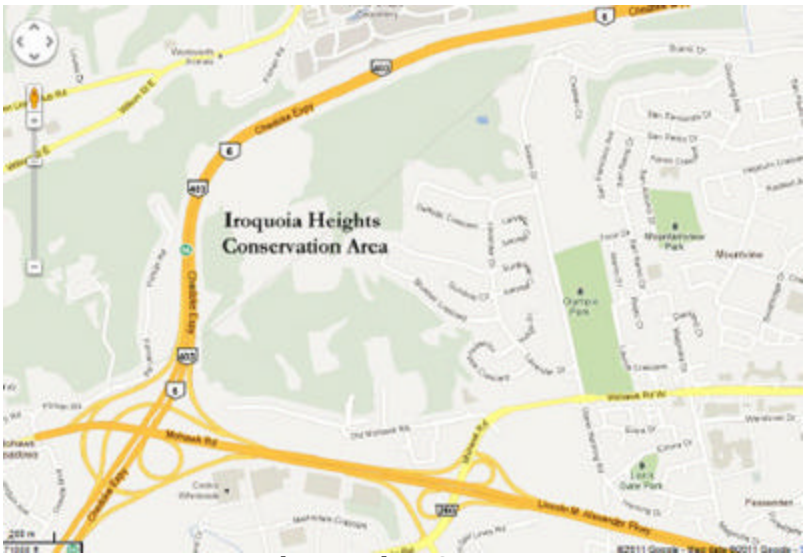
Anecdotally, concerns have been raised in the past regarding the impact deer may be having on the bog mat and surrounding vegetation. Studies on the vegetation within the Sifton Bog ESA have been conducted to qualify and quantify these impacts.

Deer frequently prefer landscape plantings and agricultural crops to other wild foods in their range. Throughout past years some residents living in close proximity to the Sifton Bog ESA have been providing supplemental food for the deer. Recently the UTRCA has enforced a ban on feeding all wildlife within the Sifton Bog ESA, among other natural areas within London. Signage and educational information about the detrimental effects of feeding wildlife have been utilized in an attempt to educate residents and alter human behavior." (pg 5)

The report recommended a multi-pronged approach to resolving deer/human conflicts. The City implemented an active campaign to educate residents about the problems of supplemental feeding of the deer and enforce the non-feeding programme and as a result deer numbers on the Sifton Bog lands fell from the highest numbers of 54 to 6 in the most recent count.

Finally, in examining the issue of Threshold for Implementing Population Control the authors recommend this, "Are there thresholds in the white-tailed deer population in the City of London that would trigger the use of population control measures? This is as much or more a social question as opposed to an ecological one, as much management of residents as it is deer. It can be expected that some residents would never support deer removal, while others may accept it especially if human safety was in the forefront. In the end, education of residents in terms of expected deer population fluctuations, implications of artificial feeding, landscaping choices, etc are the best tools for the City to use for managing the white-tailed deer issue."

Iroquoia Heights Conservation Area (IHCA) – Hamilton Conservation Authority(HCA):



The Hamilton Spectator

The concern with the deer population was described by the HCA in the following manner, "Over the years, HCA has had a growing concern about the effect high populations of white-tailed deer were having on the ecosystem in the Ancaster-Dundas area, specifically at Iroquoia Heights and the Dundas Valley. Trilliums and other forest-floor plants have been disappearing making room for invasive garlic mustard (which deer don't find tasty!); signs of deer grazing are becoming more and more prevalent; incidents of deer strikes with vehicles have been increasing; and many nearby residents have had their yards and gardens devoured right under their noses. Milder winters, lack of natural migration corridors, the abundance of food and the absence of natural predators are some of the factors contributing to the rising populations."

In May 2010, the Hamilton Conservation Authority established a Deer Management Advisory Committee (DMAC) whose purpose was "to provide recommendations to HCA Board of Directors for the short- and long-term management of the white-tailed deer population and their habitat at Iroquoia Heights Conservation Area."

The Committee completed its work in August/ September of 2011 and the recommendations were accepted by a unanimous vote of the Board. Included in the recommendations by the DMAC was that "no hunting be permitted in IHCA because of public safety issues related to the close proximity of residential areas."

The DMAC produced an extensive list of recommendations which can be found at

(http://www.conservationhamilton.ca/images/iu_files/PDFs/IHCA%20DMAC%20final%20report%20Sep%2021%2011.pdf)

City of Ottawa :

City of Ottawa

The following was a Media Advisory published on July 31, 2008 by the City of Ottawa about the Speeding Costs You Deerly programme:

NR: Ottawa bucks rising trend in deer-vehicle collisions for second year in a row

Ottawa - *The number of deer-vehicle collisions on Ottawa roadways dropped for a second year in a row last fall and posted the lowest rate in nearly a decade, according to the Integrated Road Safety Program (IRSP). With an average of 344 deer-vehicle collisions occurring on Ottawa roadways between 2003 and 2005 (during the months of October and November – the peak period for the movement of deer), the IRSP initiated the Speeding Costs You Deerly campaign in 2006, and the number of collisions dropped to 298 – a 13 per cent reduction. The campaign ran again last fall and collisions were further reduced by 21 per cent, with 236 collisions reported.*

"I am pleased with the success of the Speeding Costs You Deerly campaign and proud of the ongoing efforts to make Ottawa roadways safer for all residents," said Mayor Larry O'Brien. "One of my top priorities is public safety and the Integrated Road Safety Program plays an important role in sustaining and improving safety for our citizens."

"What makes this achievement great is the fact that these reductions occurred in the midst of a recent deer population explosion," said Councillor Maria McRae, Chair of the City's Transportation Committee. "Ottawa is the highest-ranked area for deer-vehicle collisions in Ontario. When you apply the Ontario Ministry of Transportation's social cost calculations, the drop in these collisions resulted in an estimated $920,000 savings in personal and property damage costs for Ottawa residents."

The Speeding Costs You Deerly campaign focuses on reducing deer-vehicle collisions by encouraging motorists to be more aware and reduce speeds to increase reaction time. Following the first edition of the campaign, a Decima survey showed that 62 per cent of Ottawa residents recalled the campaign, and the key messaging resonated with 71 per cent of those respondents.

In 2007, the Ontario Ministry of Transportation presented the campaign with the province's Road Safety Achievement Award for 2006. The Integrated Road Safety Program is a partnership between Ottawa Police, Ottawa's Public Health and Public Works departments, and community partners. The "Speeding Costs You Deerly" campaign was assisted by the Ontario Federation of Anglers and Hunters, Ontario Ministry of Transportation, Canadian Automobile Association North & East Ontario and Ontario Provincial Police.

In 2009, the City reviewed the success of its Speeding Costs You Deerly programme in Ottawa Roads Safety Results report. The reports states, "Since the campaign first ran in 2006, the number of deer-vehicle collisions has decreased by 38 per cent over four years. Between 2003 and 2005, the average number of deer-vehicle collisions during the months of October and November - the peak period for the movement of deer - was 344. The number dropped to 298 in the fall of 2006, 236 in the fall of 2007, 214 in the fall of 2008 and further dropped to 213 last fall. These collision reductions result in an estimated social cost savings of $1.1 million. In 2009, the campaign received an environmental award from the Ottawa-Carleton Wildlife Centre - only the second award given by the Ottawa-Carleton Wildlife Centre in its 22 year history. This is the second major award won for the campaign."

Purpose 4: Alternatives to prevent and non-lethally resolve human/deer conflicts:

Numerous non-lethal alternatives are available to help resolve human/deer conflicts. The problem faced by those who advocate for non-lethal approaches is a constant barrage from wildlife managers across Canada who advocate for lethal solutions without recognizing that societal values are changing away from lethal options.

Wildlife agencies must recognize change in societal values toward lethal management:

Wildlife Society Bulletin #34(2) has an article that discusses how changing values challenges the relevancy of wildlife management agencies and that these agencies reflect the changing values by offering alternatives to lethal programmes. The authors write, *"Declining numbers of traditional*

stakeholders, coupled with an increasingly diverse, interconnected, and suburbanized society has created a need to better understand how state wildlife management agencies, policy-making bodies, and allied organizations are adapting to a changing social context (Peyton 2000). The impacts of some societal changes on the biological components of wildlife management are readily apparent. For example, urban sprawl and human population growth have clear and measurable consequences for wildlife (e.g., reduces or modifies habitat). [Numerous] indications of a shift in public perception regarding wildlife management are evident: increasing numbers of wildlife-related ballot initiatives and popular referenda (Williamson 1998); growth of wildlife organizations with nonconsumptive orientations (e.g., environmental, humane; Manfredo et al. 2003); and efforts to change the composition of wildlife boards and commissions (e.g., via legislation; Nie 2004). These trends suggest the potential for tensions to exacerbate between society and the traditional state wildlife management system." (Ensuring the Future of State Wildlife Management: Understanding Challenges for Institutional Change, Jacobson, Cynthia and Decker, Daniel, Wildlife Society Bulletin #34(2), pgs 531-536, 2006 – pg 531)

Alternatives:

No feeding deer by-law: As was demonstrated at Sifton Bog, the number of deer in the conservation area dropped from 35 to 6 animals once the City implemented a concerted campaign to stop supplementary feeding of deer (pg 14 of this report). All 13 municipalities and the 3 electoral areas should adopt a consistent by-law that prohibits the feeding of deer.

The Iroquoia Heights Conservation Area White-tailed Deer Final Report of the Deer Management Advisory Committee, September 2011 recommended a prohibition on the feeding of white-tailed deer. In the comment section, the report states, "It has been clearly demonstrated that many of the deer conflict issues that HCA (Hamilton Conservation Authority) are rooted in the feeding of deer by adjacent landowners and park visitors." (pg 21)

Fencing: Fencing is also an important tool to prevent deer from eating gardens, crops and trees. In urban backyards, fencing is the most effective way to exclude the deer. Fencing is also a necessity for agricultural folks, even though there will be up front costs and subsequent maintenance. It is entirely unrealistic for farmers to expect to run their agricultural operations free from the presence of wildlife.

With regard to agriculture, fencing is as important as irrigation and other activities necessary to run a successful operation. As the Ontario Soil and Crop Improvement Association states, "Fencing costs are generally not economically viable. But exclusion of deer is still the ultimate objective."

The authors of the report go on to say, "John Hendry, an orchard and Christmas tree grower near Perth in Lanark County has taken things a step further in the exclusion game. In 1999, with financial support from the Lanark Stewardship Council, he enclosed three hectares of orchard with invisible fencing. A couple of dogs outfitted with special electronic collars patrol the inside area...With the invisible fencing, the dogs stay within the orchard and any deer crossing the fence become fair game for the dogs. To assess the effectiveness, fifty trees within and an equal number outside the fencing were monitored with remarkable results. The bud gain within the protected area was decidedly more; that outside showed substantial loss." (Wildlife Wise, Ontario Soil and Crop Improvement Association, pg 4)

Deer Fence Canada (http://www.deerfencecanada.ca/) is a company that provides inexpensive fencing options for small areas like backyard gardens to larger farms and tree operations. In fact Deer Fence Canada provided fencing for a project with the CFIA in Saanich BC.

Reducing deer/car collisions: The BC Ministry of Transport maintains detailed statistics through the Wildlife Accident Monitoring and Mitigation Report (WARS). WARS has already identified areas where deer/car collisions have increased and areas where the collisions have declined. Now an integrated road safety programme is needed to focus on wildlife/vehicular collision prevention throughout BC by examining reasons for increased and decreased collisions and using such programmes as Ottawa's Speeding Costs You Deerly.

Hazing: Hazing with dogs has proven to be very safe and effective in Banff and Waterton. Although hazing sounds like it is hard on the animals and likely to cause accidents and property damage, in reality, the deer are gently pressured by specially trained dogs and gingerly pick their way through the streets and out of town in the early dawn hours. The folks responsible for hazing have had no accidents, no injuries and no damage to property despite conducing hundreds of hazing events involving hundreds of deer and elk in the busy tourist towns of Banff and Waterton.

Hazing or " displacing" the deer from the town site during fawning deals directly with issues of habituation, and has many other lasting benefits such as increasing wariness of deer towards people and dogs, encouraging migratory behaviour and utilize natural ranges away from town and increasing the number of fawns born into wilder environments.

Ensuring eco-passages and connective natural areas: Safe wildlife passages are not typically included or required in the urban planning design. However, developments encroach on natural areas and cause habitat fragmentation. This of course affects the natural migration of wildlife and the maintenance of healthy ecosystems.

Considerable research has gone into the development of natural passages where new development is occurring and of engineered eco-passages in developed areas. The population within the CRD for example, increased by 6% between 2001 and 2006 (Demographics, Populations 2006 Census Results, Capital Region.) resulting in new development and resulting impacts on wildlife.

The CRD should consider amending the region's planning requirements to ensure that impacts on wildlife are addressed.

Initiating a private landowner stewardship program: The CRD should hold public workshops and outreach programmes to discuss the importance of a ban on feeding deer and to educate landowners how to manage their properties to minimize human/wildlife conflicts.

Deer resistant gardens: The Ministry of the Environment has a superb "Gardener's Guide to Preventing Deer and Elk Damage", listing deer resistant plants, suggesting fruit trees that are out of reach of browsing ungulates, recommending deer repellants, alarm and scare mechanisms and suggesting fencing and barrier applications (www.env.gov.bc.ca/cos/info/wildlife_human_interaction/docs/garden.html)

Contraceptives: Products like SpayVac™ are available for managing deer in the United States. As the web site states, "SpayVac™ is a contraceptive vaccine that has proven highly effective in deer and can be used to control populations." (http://terramar.bc.ca/)

The site goes on to say, "Independent trials have shown that a single dose of SpayVac™ can contracept deer for at least 3 years. No treated deer became pregnant over 3 years in trials on Fallow Deer by TerraMar Environmental Research Ltd., or on White-tailed Deer by the USDA's National Wildlife Research Center conducted at Penn State University. The long-lasting, single-dose efficacy contrasts sharply with the results of other PZP vaccines, which require frequent boosting. When other vaccines are used, previously treated animals have to be relocated before each breeding season and given a booster dose, usually with a dart. Repeated boosting exposes the animals to increased stress and greatly increases the cost and technical difficulty of implementing IC to control deer populations. SpayVac™ removes these impediments." (IBID)

Although the Ministry's own information does not support the assumption that deer populations on Vancouver Island and the mainland are overabundant, some residents felt that consideration of some form of contraceptive approach would be significantly better than killing the animals.

However, SpayVac™ is not available for commercial use in Canada and therefore its use is extremely limited.

Appendix#1

British Columbia Urban Ungulate Conflict Analysis
Ministry of Environment British Columbia

Consequence of Overabundance: Disease

Anthrax (cervids and bovids to humans):

Anthrax is a disease mainly of cattle, sheep and horses and is caused by bacteria found in the soil. The anthrax bacterium can be transmitted from bison and cervids to humans. Anthrax has been found in Wood Bison in the Northwest Territories and Alberta, but not in BC.

Bovine tuberculosis (Bovine TB) (livestock to wildlife to livestock):

Bovine TB is a contagious and communicable disease caused by a bacterium (Mycobacterium bovis). It affects cattle, bison, deer, elk, and goats. Bovine TB is caused by a different bacterium than human TB (Mycobacterium tuberculosis), and although highly unlikely, it can affect humans. In BC to date (2009), there have only been 3 cattle that have tested positive for bovine TB, and it is not found in free ranging wildlife populations in BC. References: Manitoba Conservation Wildlife Disease - Bovine Tuberculosis in Elk webpage.

Chronic Wasting Disease:

BC CWD (Chronic Wasting Disease) Program Update The following is a BC CWD Program Update for Spring 2009. SURVEILLANCE The results are in...

In 2008/09 there were 273 heads submitted to the program. The majority of these were hunter killed animals from the Peace and the East Kootenay Regions. These heads (38 Elk, 24 Moose, 42 Mule Deer, and 160 White- tailed Deer, 3 Caribou) were sampled in March and April and sent to the CCWHC for analysis. Still no positives in B.C.

Since 2002, over 1000 samples have been collected from B.C. cervids and none have tested positive for CWD. With this level of surveillance, B.C. can state, with 95% confidence, that if the disease is present, the prevalence is below 1.2% (based on 2007 surveillance numbers). However, CWD detection through laboratory testing is not the only method to ensure freedom from disease. The fact that most of B.C.'s neighbouring jurisdictions have not detected CWD in their cervid populations further supports the assumption that B.C. is currently CWD-free. Only Alberta has detected CWD in wild cervids, and so far all cases have occurred in the south-east area of the province along the Saskatchewan border. Appendix 1 outlines current CWD status, and CWD related regulations in the provinces and states bordering B.C. Based on the disease status of neighbouring jurisdictions and because no positive CWD cervids have been

detected to date in the province, B.C. can be confident that it is free from CWD at this time. (British Columbia Chronic Wasting Disease Risk Assessment, Prepared for: Helen Schwantje Ministry of Environment, Victoria, B.C. by: Jane Parmley (Centre for Coastal Health) Chelsea Himsworth (Western College of Veterinary Medicine) Lea Nogueira-Borden (Centre for Coastal Health) May, 2008, pgs i & ii)

E. coli:

E. coli is a bacterium that naturally occurs in the intestine of all mammals. It does not usually cause disease symptoms in ungulates. It can be transferred from deer to humans and is found in BC but there is low risk because it would occur only when there are extremely high concentrations of deer feces such as at feeding stations.

Lyme Disease:

*Conclusions: There is no evidence to support an epidemic of Lyme disease in BC. The primary vector, I. pacificus, is found in populous areas in consistently low numbers, and rates of infection in the tick population remain less than 1%. Human case rates in BC are less than 0.5 per 100 000. (pg 229,*Lyme disease in British Columbia: Are we really missing an epidemic? Results from surveillance and research on Lyme disease suggest there is a real but low risk of contracting this tick-borne illness in BC. B. Henry, MD, MPH, FRCPC, M. Morshed, PhD, SCCM. This article has been peer reviewed.)

References

Ministry of Environment Documents:

Bannerman, Susan. Clarifying Habitat Use, Coastal Black-Tailed Deer Study. BC Ministry of Environment, Lands and Parks, 1996.

Bannerman, Susan. Habitat and Predator Concerns, Coastal Black-Tailed Deer Study. BC Ministry of Environment, Lands nd Parks, 1996.

Hesse, Gayle B.Sc., British Columbia Foundation, for Badry, Michael, Wildlife Conflicts Coordinator, Conservation Officer Service, British Columbia Ministry of Environment, and Teske, Ireme, Wildlife Biologist, Kootney Regional Officfe, British Columbia Ministry of Environment. British Columbia Urban Ungulate, Summary Report for Municipalities. BC Ministry of Environment, March 2010.

Hesse, Gayle B.SC. British Columbia Foundation, for Badry, Michael, Wildlife Coordinator, Conservation Officer Service, British Columbia Ministry of Environment. British Columbia Urban Ungulate Conflict Analysis. BC Ministry of Environment, March 2010.

McNay, R.s. and Davies, R. Interaction Between Black-Tailed Deer and Intensive Forest Management, Problem Analysis.Integrated Wildlife Intensive Forestry Research. A cooperative project between the Ministries of Environment and Forests, November 1985.

Ministry of Environment. BC Urban Ungulate Species: 2008 Pre-Season Population Estimates by Region and Sub Region.

Ministry of Environment.British Columbia Ungulate Species Regional Population Estimates and Status – Preseason 2011.

Ministry of Environment.A gardener's Guide to Preventing Deer and Elk Damage. Conservation Officer Service, http://www.env.gov.bc.ca/cos/info/wildlife_human_interaction/docs/garden.html.

Ministry of Environment, Summary of Major Hunting and Trapping Regulation Changes for 2010-11 and 2011-12.

Ministry of Environment. White-tailed Deer: Provincially Coordinated Hunting Regulations, 2010-11 and 2011-12.

Rankin, C. & Associates. Invasive Alien Species Framework for BC: Identifying and Addressing Threats to Biodiversity A working document to address issues associated with biodiversity in British Columbia. Prepared for: Biodiversity Branch Ministry of Water, Land & Air Protection, by Rankin and Associates with Madrone Environmental

Services Ltd., The Nature Conservancy of Canada, Jacqueline Booth & Assoc., SydCannings and Osiris Wildlife Consulting, May, 2004.

Teske, Irene. Ministry Permit Process: Lethal removal of urban deer (DRAFT). Koontey/Boundary Region, Ministry of Environment, May 12, 2011.

Ministry of Labour and Citizen's Services:

Ministry of Labour and Citizen's Services. British Columbia's Hunting, Trapping and Wildlife Viewing Sector. BC Stats, August 12, 2005.

Ministry of Transportation and Infrastructure:

Sielecki, Leonard E. Wildlife accident monitoring and mitigation in British Columbia: WARS 1988-2007: Special Annual Report. Engineering Branch, Environmental Management Section, Ministry of Transportation and Infrastructure, June 2010.

ICBC:

ICBC. Quick Statistics for the Media. September 2011.

ICBC. Traffic Collisions Statistics, Police-attended Injury and Fatal Collisions. 2007

ICBC. ICBC Deer Collision Count Within the Municipalities in the CRD From 2000-2010.

BC Jurisdictions Conducting Deer Culls:

Capital Regional District:

CRD. Population: 2006 Census Results Capital Region. Planning and Protective Services.

CRD. Regional Goose Management Strategy, Terms of Reference.

CRD. Regional Deer Management.Report to the Planning Transportation and Protective Services Committee, January 26, 2011.

CRD. Regional Deer Management.Report to the Planning Transportation and Protective Services Committee, October 26, 2011.

CRD. Regional Deer Management. Report to the Planning Transportation and Protective Services Committee and minutes, February 22, 2012.

City of Cranbrook:

City of Cranbrook, Deer Management Committee Terms of Reference, 2010.

City of Cranbrook. Council Meeting Minutes for the dates February 21, 2011, March 21, 2011, April 4, 2011, April 18, 2011, September 12, 2011.

City of Cranbrook. 2011 Urban Deer Cull Summary Report, Report Recommendation, February 2012.

Zettel, Chris and Teske, Irene. Urban Deer Management Annual Report 2011, Urban Deer Cull Pilot Project and Municipal Urban Deer Public Education, City of Cranbrook and Province of British Columbia, February 2012.

District of Invermere:

District of Invermere.Invermere Deer Count Review

District of Invermere. Final Report and Recommendation, Urban Deer Management Committee, July 2011.

District of Invermere.Urban Deer Advisory Committee Terms of Reference.

District of Invermere.Urban Deer Resident Survey.

District of Invermere.Comments on the Deer Population Management in Invermere, 2011.

White, Liz, MacKay, Barry Kent. Invermere Deer Cull. Presented by Liz White to the District of Invermere Council, April 10, 2012.

City of Kimberley:

City of Kimberley. Helena Montana Deer Cull Program, Report to Kimberley City Council

Studies and Reports from Other Jurisdictions:

Beringer, Jeff et al. Efficacy of translocation to control urban deer im Missouri: costs, efficiency, and outcome. Wildlife Society Bulletin, 2002.

Gillingham, Michael P. Ecology of black0tailed deer in north coastal environments. (no date noted)

Giovanna, Massei, et al. Can translocation be used to mitigate human-wildlife conflicts?

Wildlife Research, CSIRO, 2010.

Diseases:

Gross, Lisa. A New View on Lyme Disease: Rodents Hold the Key to Annual Risk. PLoSBiol 4(6): e182.doi:10.1371/journal.pbio.0040182, May 9, 2006.

Johnson, Rachel. Killing Deer Not the Answer to Reducing Lyme Disease, Says HSPH Scientist. Harvard School of Public Health, November 2011.

Ministry of Health. FOR THE RECORD, Lyme Disease in BC. Ministry of Health, BC Centre for Disease Control, February 29, 2008.

Ministry of Health. Anthrax. BC Centre for Disease Control.

Schwantje, H. Chronic Wasting Disease Fact Sheet.January 2006, Chronic Wasting Disease Update, Ministry of Environment.

University of Northern British Columbia, Tuburculosis (Tb) http://www.unbc.ca/nlui/wildlife_diseases_bc/tuberculosis.htm

Net and Bolt Culling:

Animals, Livestock at Slaughtering Establishments. SCARM Report 79, Commonwealth of Australia.

AVMA. AVMA Guidelines on Euthanasia. June 2007.

Canadian Council on Animal Care. Guidelines on: the care and use of wildlife.

Department of Primary Industries and Water. Animal Welfare Guidelines – Deer. Animal Health and Welfare Branch, Tasmania, October 2008

European Food Safety Authority – AHAW Panel. Scientific Report: The welfare aspect of the main systems of stunning and killing applied to commercially farmed deer, goats, rabbits, ostriches, ducks, geese and quail". Adopted by the AHAW panel on 13th Februray 2006.

Mulley, R. C., et al. Rate of blood loss and timing of exsanguination on prevelance of ecchymosis in fallow deer (Dama dama). Scholl of Natural Sciences, University of Western Sydney, Locked Bag 1797, Penrith South DC, NSW 1797 Australia, Meat Sci. 2010 May; 85(1): 21-5. Epub 2009 Nov 26.

National Animal Welfare Advisory Committee, Commercial Slaughter: Animal Welfare (Commercial Slaughter) Code of Welfare 2010. Ministry of Agriculture and Forestry, New Zealand, May 28, 2010.

Oikonomou, Anastasia et al. Head trauma by captive bolt gun.BMJ Case Reports 2011.

Primary Industries Standing Committee. Model Code of Practice for the Welfare of

Scientific Veterinary Committee, Animal Welfare Section, European Commission. Report on the slaughtering and killing of animals. Directorate-General for Agriculture

The Australian Deer Industry Code of Practice for the Welfare of Deer

Veterinary Services Unit of the Animal and Plant Health Inspection Service, Operational Guidelines, Euthanasia.National Animal Health Emergency Management System Guidelines, US Department of Agriculture, Januaryt 2004.

VETMED. Anatomical Landmarks.
www.vdpam.iassstate.edu/HumaneEuthanasia/anat.htm

Other research documents:

Boesch, J.M. et al. Biochemical Variables in Free-ranging White-tailed Deer (*Odocileus virginianus*) after Chemical Immobilaisation in Clover Traps or Via Ground-darting. Journal of Soo and Wildlife Medicine, 42(1): 18-28, 2011

Ditchkoff, S. et at. Wounding Rates of White-tailed Deer with Traditional Archery Equipment. Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies, 1998.

Hernderson, D.W. et al. Response of urban deer to a 50% reduction in local herd density. Wildlife Society Bulletin, 2000.

McShea, William J. et al. The Science of Overabundance: Deer Ecology and Population Management. Smithsonian Institute Publication, 1997.