

# MANDATORY USE OF NON-TOXIC SHOTSHELL: CULTURAL AND ECONOMIC CONCERNS FOR MUSHKEGOWUK CREE

Leonard J.S. Tsuji  
Department of Biology  
York University  
4700 Keele Street  
North York, Ontario  
Canada, M3J 1P3

## Abstract / Résumé

A Canadian ban on the use of lead shot for all migratory bird harvesting takes effect in 1999. I argue that the Cree of the Mushkegowuk area of Ontario, and other subsistence harvesters, should be given a longer period of grace. Whole cultures are being affected because gamebirds represent subsistence harvesting for First Nations people, rather than a recreational activity. Other countries considering similar legislation may learn from the Canadian experience with Aboriginal peoples and this type of significant change.

Une loi canadienne sur l'interdiction de l'usage du plomb lors de la chasses aux oiseaux migrateurs entrera en vigueur en 1999. Il est de mon avis qu'un délai plus long devrait être accordé aux Cris du territoire de Mushhegowuk (Ontario) ainsi qu'aux peuples similaires. En effet, cette loi aura un impact direct sur les communautés autochtones entières, la chasse aux oiseaux migrateurs constituant pour ces peuples une activité de subsistance plutôt qu'une activité récréative. L'expérience canadienne avec les peuples des Premières nations de même qu'un tel chargement significatif d'exemple aux autres pays envisageant de recourir à une législation semblable.

## Introduction

Lead is neither essential to live nor beneficial to living organisms (Eisler, 1988). Lead is a toxic metal that adversely affects organisms exposed to it (Royal Society of Canada, 1986; US Centers for Disease Control, 1991; Fleming, 1994). Thus, a concerted effort over the last two decades has been made to decrease the amount of anthropogenic lead in North America and other parts of the world, for environmental and human health reasons. In North America, leaded gasoline has virtually been eliminated, lead content in paint has been drastically reduced, and lead-free solder is now used in the canning industry (Royal Society of Canada, 1986; US Centers for Disease Control, 1991; Fleming, 1994). However, other significant sources of anthropogenic lead must be considered, such as, lead shotshell used for hunting (Jorgensen and Willems, 1987; Ma, 1989). In the United States prior to the banning of lead shot for waterfowl hunting in 1991, approximately 6,000 tonnes of lead pellets were deposited annually into the environment (Humberg and Babcock, 1982). In Canada, an estimated 2,000 metric tonnes of lead shot is discharged into the environment each year (Scheuhammer and Norris, 1995). For the Mushkegowuk Territory, it has been calculated that 34 metric tonnes of lead pellets are deposited annually (Tsuji *et al.*, 1996a).

It is a well documented fact that lead poisoning in birds is the result of ingestion of lead pellets mistakenly taken as grit (small stones) or ingestion of lead pellets embedded in tissue. Since birds do not possess teeth, they must swallow and store grit in the gizzard, the muscular part of the bird's stomach, in order to grind their food. The grinding action of the gizzard plus the action of gastric acids cause the breakdown of the metallic lead pellets. When soluble lead salts are formed, these lead salts are absorbed by the intestine and enter the body of the bird (Fisher and Hall, 1986; Friend, 1987). When hazardous levels of lead enter into the body, lead poisoning is the result. It should be stressed that the ingestion of only one lead pellet can result in significant mortality in waterfowl (Longcore *et al.*, 1974).

Recently, in the Netherlands, Norway, and the United States, the use of lead shotshell for waterfowl hunting has been prohibited nation-wide due to the deleterious effects of lead on birds (US Fish and Wildlife Service, 1988; Pain, 1992; Annema *et al.*, 1993). In Canada, the use of lead shot for hunting migratory birds was to be banned nation-wide beginning in the fall of 1997 (Canadian Wildlife Service and the Ontario Federation of Anglers and Hunters, 1996); however, last minute changes by Environment Canada has moved the start-up date to September 1, 1999 (Environment Canada, August 19, 1997, News Release). In this paper, I argue that First Nations of the Mushkegowuk region and other subsistence harvesting groups in

Canada should not be restricted by the new non-toxic shotshell regulations, until hunters have participated in both hunter education programs as well as steel shot shooting clinics. This extended period of adjustment is required because of cultural and economic factors as will be discussed.

## The Mushkegowuk Area

The Mushkegowuk area is located in the western James Bay and southern Hudson Bay regions of northern Ontario, Canada. This area is populated by approximately 10,000 West Main (Omushkego, Swampy) Cree who inhabit seven First Nation communities (New Post, Moose Factory, Fort Albany, Kashechewan, Attawapiskat, Fort Severn, and Peawanuck) and one town, Moosonee.

Historically, traditional Cree land-use practices (e.g., harvesting of wildgame, wood and berry collection) have been well documented in the region (Honigmann, 1948; Hanson and Currie, 1957; Cummins, 1992). However, until recently, it was generally believed that the "Cree hunting and trapping economy had disintegrated in the face of Euro-Canadian competition and the lure of wage labour and village life" (George *et al.*, 1995:69). Several recent studies have collected data that clearly shows that traditional land-use practices are still an important part of Cree life for both cultural and economic reasons (Prevett *et al.*, 1983; Thompson and Hutchinson, 1989; Berkes *et al.*, 1994; Fast and Berkes, 1994; Berkes *et al.*, 1995). At present, the economy of the Mushkegowuk region is mixed, being "a combination of traditional land-based harvesting pursuits, government transfer payments and wage work" (George *et al.*, 1995:71). The value of land-based resources (wildmeat, furs, fuelwood, and berries) in 1990 was estimated at \$8,400 per household annually or a third of the total income of the household (Berkes *et al.*, 1994). More important, Fast and Berkes point out that traditional land-use (especially the waterfowl harvest)

is not merely a material or economic aspect of life; it is the basis of aboriginal culture and social health, which cannot readily be quantified in monetary terms (Fast and Berkes, 1994:l).

## Waterfowl Subsistence Harvesting Practices

Subsistence harvesting in Canada and Alaska was recognized by the signing of the *Migratory Bird Treaty Act* in 1916 between the US and Canada (England acted on behalf of Canada). Although the treaty restricted the harvesting of migratory birds during the breeding season (March 10 to September 1), exceptions were made for subsistence harvesting Natives of both countries. Natives were allowed to harvest certain birds (e.g.,

scoters, *Melanitta spp.*, and certain seabirds) and their eggs anytime for food and feathers; however, the species specified were not the ones commonly harvested (US Fish and Wildlife Service, 1988). Although Natives who harvested other gamebirds not specified in the treaty were in violation of the strict interpretation of the law, the importance of the migratory bird harvest for food and cultural purposes has been recognized and

the Service [US Fish and Wildlife], by long standing policy and practice, has not enforced the closed season provisions of the Migratory Bird Treaty Act against subsistence hunting. The CWS [Canadian Wildlife Service] has taken a similar approach with Indians and the Inuit (US Fish and Wildlife Service, 1988:26).

Recently, Canada and the US have renegotiated the *Migratory Bird Treaty Act* to legalize spring and late summer harvests by Native people in northern Canada and the US with the changes being ratified by the Canadian government but to date, ratification is still required by the US Senate (Ankney, 1996). Ankney (1996:221) points out that:

changes were made because it was agreed that prohibition of such harvest, under the original Treaty, was unnecessary and unworkable (and illegal, under Canada's Constitution Act of 1982), and that simple regulation will be sufficient to ensure conservation.

### **Waterfowl Harvesting in the Mushkegowuk Region**

Of all the harvesting activities recorded in the Mushkegowuk region, it has been found in several studies that the largest participation rates were associated with waterfowl harvesting (Berkes *et al.*, 1994). Participation rates have been shown to be equal to or greater than 80% of the potential Cree harvesters (Prevett *et al.*, 1983; Thompson and Hutchinson, 1989; Berkes *et al.*, 1994). Indeed, it has been estimated for 1990 that Omushkego Cree spent 14,000 person days in the spring and 10,000 person days in the fall harvesting waterfowl (Berkes *et al.*, 1995). The harvesting of waterfowl, especially the Canada goose (*Branta canadensis*) in the spring, has been described as a religious and cultural experience (Hanson, 1957; Thompson and Hutchinson, 1989; Cummins, 1992). The harvest of the Canada goose in the spring was traditionally a celebration of life that represented the survival of the family through the harsh winter months (Hanson, 1957; Thompson and Hutchinson, 1989; Cummins, 1992).

In 1990, it was calculated that the waterfowl harvest in the Mushkegowuk region included 56,536 Canada geese, 55,076 snow geese (*Chen*

*caerulescens*), and 21,766 ducks (Berkes *et al.*, 1994). The estimated harvests of upland gamebirds were as follows: 13,085 sharp-tailed grouse (*Tympanuchus phasianellus*); 11,420 red grouse (*Lagopus lagopus*); 7,251 spruce grouse (*Dendragapus canadensis*); and 4,813 ruffed grouse (*Bonasa umbellus*) (Berkes *et al.*, 1994). The harvest of shorebirds has been estimated at 3,486 birds annually (Thompson and Hutchinson, 1989). The main point is that a large number of gamebirds are harvested annually with lead shotshell by Omushkego Cree. As Berkes and associates have suggested, the traditional economy (especially gamebird harvesting) is the "cornerstone of the regional mixed economy" (Berkes *et al.*, 1994:350). Thus, policy changes to gamebird harvesting practices would dramatically affect both the economy and culture of First Nations of the region.

## American Policy

Regulations requiring the mandatory use of steel (soft iron) shot for waterfowl hunting were based upon scientific data collected in a large number of studies (US Fish and Wildlife Service, 1986). Regulations were gradually introduced beginning in 1976 in some areas of the Atlantic Flyway, in some areas of the Mississippi Flyway in 1977, and in some areas of the Central and Pacific Flyways in 1978 (Humberg and Babcock, 1982; Anderson and Havera, 1989). By the 1991 hunting season, non-toxic shot regulation had been gradually phased-in nation-wide (US Fish and Wildlife Service, 1986). This methodology was deemed "a more reasonable approach to the problem than a total ban in a single year" (US Fish and Wildlife Service, 1986:318), because a ready supply of new steel shot was ensured while allowing for public education and consultation (Humberg and Babcock, 1982; US Fish and Wildlife Service, 1986; Anderson and Havera, 1989).

Even though much effort was expended on the education and consultation process, information and education came after a federal mandate (Bishop and Wagner, 1992). Thus, "there were 10 unsuccessful challenges (6 lawsuits and 4 appeals) to non-toxic shot regulations" (Anderson, 1992:56). Evidently, the non-toxic shot issue was such a volatile issue and timing of education and consultation programs an important factor that even with education and consultation, problems arose.

## The Public Education and Consultation Process

Beginning in 1982, the US Cooperative Lead Poisoning Control Information Program was the major source of information on non-toxic shotshell (Bishop and Wagner, 1992). Other groups, such as the Hunter Education Association (a network of federal, state, provincial and private industry

people) distributed workbooks and educated people on how to use non-toxic shotshell (Sparrowe, 1992). Although education should be the essential first step in switching from lead to steel shot, "stronger training programs that include hands-on shooting with steel shot" are essential to other countries contemplating non-toxic shot policy (Sparrowe, 1992:41).

Extensive public consultation similar to that in the US should be another part of the process in switching to non-toxic shot. In the US, public "involvement has been widespread and intense throughout the course of development" of the final non-toxic shotshell legislation with responses "in excess of 625 respondents" from private citizens, local, state and national conservation organizations, wildlife professionals, hunting clubs, and members of government (Federal Register, 1986:29674). The draft of the final non-toxic regulations was released for public reviews in 1987, with comments being accepted for a total of 132 days (US Fish and Wildlife Service, 1988). Final regulations were released by the US Fish and Wildlife Service in 1988, requiring the use of non-toxic shotshell nation-wide in 1991 (US Fish and Wildlife Service, 1988).

### **Steel Shot: A Non-toxic Alternative**

The US Department of the Interior recommends steel shot as the best substitute for lead shot (US Fish and Wildlife Service, 1986). Lead is much more dense than steel. The result of this lack of density is that a steel pellet is 30% lighter than the same size lead pellet (Brister, 1992; Kruper, 1992). Lead is also much softer than steel. Differences in the physical characteristics of the two metals result in differences in the ballistic characteristics of the shot.

Hunters have claimed that steel shot is ballistically inferior to lead shot and that the use of steel shot increases crippling of waterfowl and offsets the benefit of decreased mortality due to a decrease in lead poisoning. Although crippling rates did increase in the US when steel shot was first introduced, once hunters became familiar with the ballistic characteristics of steel shot, crippling rates for waterfowl have fallen approaching earlier levels when lead shot was used (Morehouse, 1992). Moreover, in a comprehensive study summarizing all available information on the performance of lead and steel shot in the field, it was found that there was "no clear advantage to either lead or steel" (Morehouse, 1992:33).

Several safety factors should be considered when using steel shot: 1. Steel shot should be kept dry and checked occasionally by cutting a shell open to examine whether rusting together of steel pellets has occurred. 2. Moisture may also cause ignition problems resulting in misfire, thus, if a hunter experiences a light recoil, the barrel should be checked for obstruc-

tion. 3. Hunters should be aware that steel pellets ricochet off objects (Brister, 1992; Kruper, 1992).

I do not address bismuth shot as a viable non-toxic alternative although tentative approval has been given for its use in Canada. I do not consider bismuth shot because of its price and the uncertainty of its' effect with respect to the environment and human health (Tsuji and Nieboer, 1997).

In closing this section, it must be emphasized that:

It is essential to have an effective information, awareness and education programme prior to, and during, the implementation of a lead shot replacement programme. This should include definition of the problem, an explanation of the options considered for the solution, and hands-on demonstrations for hunters to see for themselves the efficacy of non-toxic shot (Pain, 1992:96).

## Canadian Policy

In 1992, Wendt and Kennedy (1992:62) of the CWS stated that lead "poisoning has, in fact, rarely been investigated or reported in Canadian wildlife." Indeed, Canadian researchers have done relatively little (Schwab and Daury, 1989; DeStefano *et al.*, 1991), until recently (Kennedy and Nadeau, 1993; Scheuhammer and Norris, 1995). Scheuhammer and Norris (1995:77) of the CWS state:

Neither CWS nor the provinces/territories have the resources to effectively assess all areas for which nontoxic shot zoning... may be appropriate, nor do they have the capability to effectively enforce bans on the use of lead shot... in numerous local 'hot spot' areas.

Granted, there are fiscal and logistic constraints, however, these factors do not preclude the fact that scientific data are required by policy makers in order to make rational decisions. This is especially true when dealing with controversial legislation impacting Native Canadians. If scientific data are not available, decisions are made in a vacuum and are open to criticism.

In April 1995, the Scheuhammer and Norris report dealing with lead shotshell issues in Canada was made available. In the report, future plans for non-toxic shot zones in Canada were presented. Several provinces (British Columbia, Quebec, New Brunswick, Nova Scotia and P.E.I.) and the Yukon Territory were said to be ready to bring in legislation for province-wide and territory-wide non-toxic zones beginning in 1997. Other provinces (Alberta, Saskatchewan and Newfoundland) and the North West Territories had no plans to establish non-toxic zones. Manitoba was to have expanded the one current zone, while Ontario was to have expanded the

current Wye Marsh non-toxic zone and establish one at Pesqu'ile (Scheuhammer and Norris, 1995). In March 1996, Scheuhammer (1996) of the CWS distributed a one page lead shot fact sheet to First Nations of the Mushkegowuk region. On the fact sheet, it stated that:

In July 1995, Environment Minister Sheila Copps announced her intent to move to non-toxic shot for hunting migratory birds in Canada. This means that by fall of 1997 all migratory birds should be hunted with shotgun pellets which are not made of lead.

What happened in the three intervening months that would warrant a nation-wide ban on lead shot when some provinces and one territory had no plans earlier in April 1995 for establishing non-toxic zones? Further, "there are geographic differences in the seriousness of lead poisoning in wild waterfowl" (Sanderson, 1992:16) with diet being "the single most important factor influencing lead toxicity" (Pain in Wendt and Kennedy, 1992:64). Therefore, in a country as geographically diverse as Canada, if there are no scientific data supporting a lead poisoning problem in waterfowl of geographically distinct areas, then there is no rational basis for a nation-wide ban unless human health concerns are considered. This issue will be briefly discussed later.

### **A Delay in the Mandatory Use of Non-toxic Shotshell for the Harvesting of Migratory Game Birds**

As stated previously, it was announced in 1995 that there would be a nation-wide ban in Canada on the use of lead shot for all migratory bird harvesting activities. This ban was set to begin on September 1, 1997. On August 19, 1997, just prior to the September 1, 1997 start date of the nation-wide ban on the use of lead shot, Environment Canada announced through a News Release that the *Migratory Birds Regulations* have been amended as follows: 1. Hunters are now required "to use only non-toxic shot for hunting waterfowl and most other migratory game birds in areas within 200 metres of any water course or water body, (effective September 1, 1997)." 2. Hunters will be required "to use only non-toxic shot" to hunt migratory game birds "across the country, starting in 1999." 3. "Three species of upland game birds—woodcock, band-tailed pigeons and mourning doves—will be exempted from the ban, except in National Wildlife Areas." These changes to the original ban were implemented because, during "consultations on the proposed additional ban", it was found that some "favoured the ban; others urged a delay to give hunters more time to adapt to alternative shot... others proposed extending the 'hot spots' approach to all wetlands as an alternative." I find it peculiar that Environment

Canada implements the consultation process *after* Sheila Copps announces that a nation-wide ban will come into effect on September 1, 1997. The consultation process is usually performed *before* a decision has been made and announced. Further, Environment Canada states that they have addressed "the concerns raised by those who are most directly affected by this legislation." To my knowledge, I do not know of any extensive consultation with Native Canadians, the people most directly and extensively affected by the ban.

The new regulations are also very ambiguous. Although restrictions on hunting "within 200 metres of any water course or water body" is mentioned, what about spring hunting by Native Canadians when there is mostly snow and ice and some water? What constitutes a water course or water body in the spring? Tides must also be considered. Obviously, Native Canadians were not consulted sufficiently on this issue.

Environment Canada even suggests that their "approach represents a workable course of action that offers immediate protection to the most vulnerable migratory game bird species and wetland habitat" (August 19, 1997, News Release). I disagree. If hunters are restricted in how close they are to "any water course or water body", then hunters will be firing at migratory birds from greater distances if they are using lead shot. Shooting of game birds from greater distances will surely increase the number of game birds crippled. How does this restriction protect the birds? Also, just because hunters are physically 200 metres away from prime wetland habitat, lead pellets will definitely be shot into the 200 metre "restricted area", especially when considering that many hunters will be using more powerful magnum loads to compensate for the increased distance to the game bird. It is obvious that these new regulations have not been thought out thoroughly. It will be interesting to see in the future, any new amendments to the *Migratory Birds Regulations*.

### **Public Education and Consultation**

In Canada, the CWS included an information pamphlet about lead poisoning in waterfowl and non-toxic zones in Canada with the 1990 Migratory Game Hunting permit as part of a hunter education and awareness program (Pain, 1992). However, a portion of the Canadian hunting population was not informed because they do not require licences to hunt, that is, Native Canadians. Thus, First Nation residents of the Mushkegowuk region were not made aware of the lead shotshell issue by the CWS until March 1996 when the lead shot fact sheet was distributed to the communities. Thus, a minimum time period of six years had elapsed from the time

non-Status hunters were first informed of the lead poisoning problem by the CWS to the time when Status hunters were informed.

The CWS consultation process has also been selective. To my knowledge there has been no public consultation process similar to the one in the US where draft non-toxic policy was reviewed (Federal Register) by the public (private individuals, conservation and wildlife organizations, and other levels of government), with comments being sent in for review. It appears that only certain groups were involved in the consultation process, such as the Ontario Federation of Anglers and Hunters (OFAH). This organization in 1987 was "opposed to blanket regulations requiring the use of steel shot for waterfowl hunting in Ontario" (Ontario Federation of Anglers and Hunters, 1987:2). However, the Ontario Federation of Anglers and Hunters came to support non-toxic, nation-wide policy as is evident in the joint CWS and OFAH publication "Non-toxic shot. New regulations in 1996 and 1997" distributed to licensed hunters (Canadian Wildlife Service and the Ontario Federation of Anglers and Hunters, 1996). It appears that the consultation process can work if given a chance.

### **A Period of Adjustment**

It should be stressed that I am not arguing against a nation-wide ban on the use of lead shotshell in Canada, because it has been shown in the Mushkegowuk region that: lead pellet ingestion does occur in both birds and First Nation Cree (Tsuji and Nieboer, 1997; Tsuji *et al.*, 1998); liver lead levels are elevated in birds (Tsuji *et al.*, MS); dentine lead levels are elevated in both children and adults (Tsuji *et al.*, 1997; Tsuji *et al.*, MS); and lead pellets and fragments do contaminate wildmeats to levels above that set for human consumption (Tsuji *et al.*, 1996b). What I am arguing is that First Nation people of the Mushkegowuk region (and other subsistence hunting Canadians in general) should be given a grace period of at least six years before the use of non-toxic shot is mandatory. This six year figure is representative of the time period between the date when licensed hunters were first informed of the lead shot problem (1990) and the date First Nation people of the Mushkegowuk region received the CWS fact sheet (1996). It should be stressed that I believe that Native people should switch over to steel shot use, as quick as possible for the wildgame harvesting, to avoid the human health risks associated with the continued use of lead shot.

Consultation with First Nations of the Mushkegowuk area by the CWS on other migratory gamebird harvesting issues has also been limited. The relationship between the CWS and Mushkegowuk Council (the regional First Nation political organization) has been strained because in April 1995, a CWS representative physically barred the Mushkegowuk Council chair-

person from attending a meeting between Canadian and US officials concerning amendments to the *1916 Migratory Bird Treaty Act* (Anonymous, 1995; Phelan, 1995). The chairperson after getting past the CWS representative

was only able to point out that First Nations have not been adequately consulted about these negotiations, and that the CWS staff cannot speak on behalf of Canadian First Nations (Archibald, 1995:2).

The importance of the consultation process is evident, especially when dealing with First Nation cultural issues. One cannot quantify the cultural value of the waterfowl harvest to the Omushkego Cree.

Economics is another important consideration. Store bought products are too expensive for everyday consumption being approximately three times more expensive in the most southerly coastal community (Fort Albany) of the Mushkegowuk region compared to more southern Ontario cities (Table 1). Moreover, country foods are not only nutritious but relatively inexpensive (Usher, 1976). Furthermore, steel shot is a "hard sell" due to its' high purchase price compared to lead (steel shot is at least twice as expensive [Table 2]) and the perceived decrease in performance of steel shot compared to lead. One possible solution is to have Mushkegowuk Council purchase steel shot directly from an ammunition manufacturer and then sell the steel shot at cost to First Nation members. In this way the new ammunition would be made available and affordable to people of the region, that is, there is no mark-up of price. A good price would likely be secured from the ammunition manufacturer because Mushkegowuk Council could guarantee large annual orders of steel shot. Time would be needed to implement this plan or a similar plan.

Another important reason why a phase-in period is needed relates to the time required by hunters to adjust to the different ballistic characteristics of steel shot. Hands-on steel shot shooting clinics are needed to improve a hunters' skill. Steel shot is less "forgiving" than lead requiring greater hunter skill. By allowing an adjustment period, crippling rates of migratory birds would decrease (compared to if there was no adjustment period) due to familiarity with the ballistics of the non-toxic shotshell. Furthermore, First Nation harvests would not decrease dramatically which is of importance to the Omushkego Cree for economic and cultural reasons.

**Table 1: A comparison of prices for goods from three Toronto, Ontario, Canada, stores and the Northern store located in Fort Albany, Ontario. Toronto stores represent city prices while the Fort Albany store represents prices from a remote, fly-in community in the Mushkegowuk region of northern Ontario.**

Item	Store				
	1	2	3	$\bar{X}$	Northern
Lean ground beef per kg	\$3.89	\$4.17	\$4.39	\$4.15	\$8.89
2% milk 4L	\$2.89	\$3.19	\$3.19	\$3.09	\$10.78
Pop 24 cans	\$5.97	\$5.99	\$5.99	\$5.98	\$18.99
Potatoes 10 lbs	\$1.99	\$0.99	\$0.99	\$1.32	\$8.56
#4, 2 3/4" 12 gauge, magnum Box of 20 lead shells	---	---	---	\$5.99	\$28.99

**Table 2: A comparison of prices per shotshell (#2-6, 2 3/4", 12 gauge, lite magnum or magnum) for bismuth/tin, steel and lead. All prices are quoted in Canadian currency. Toronto purchases represent "southern" city prices while Fort Albany purchases represents prices from a remote, fly-in community in the Mushkegowuk region of northern Ontario.**

Location of purchase	Price per shotshell		
	Bismuth/tin	Steel	Lead
Toronto, Ontario	\$2.45	\$0.68	\$0.30
Fort Albany, Ontario	\$11.76 <sup>1</sup>	\$3.26 <sup>1</sup>	\$1.45

<sup>1</sup>These shotshell are not available in the Mushkegowuk region. Values were derived using the conversion factor of 4.8 x (Toronto price per shotshell).

## Discussion

It is clear that a policy adjustment is warranted with respect to the mandatory use of non-toxic shotshell in Canada for First Nation Cree harvesters of the Mushkegowuk Territory. Moreover, all subsistence harvesting groups in Canada should be given an extended period of adjustment (if required), because the socio-economic and cultural arguments outlined in this paper for Mushkegowuk Territory Cree are also applicable to many Native groups living in other regions of Canada. If Aboriginal groups form a coalition and lobby the federal government and the Canadian Wildlife Service, policy adjustments including future and more comprehensive consultation, community education including shooting clinics, and enforcement delays may be possible.

In addition, even though federal legislation will prohibit the use of lead shotshell in the fall of 1999, there will be a lag period of at least a year before most hunters will be using non-toxic shotshell. I make this assertion based on these assumptions: 1. Hunters will use their remaining lead shot before they switch to non-toxic shot. 2. A wide range of non-toxic shot is still not available in many regions of Canada even the large cities. 3. Lead shotshell will still be available throughout Canada for upland game hunting and will undoubtedly be used for migratory bird hunting. 4. Since Canada is such a large country, as was stressed by Scheuhammer and Norris (1995), the Canadian Wildlife Service and the provinces/territories do not have the resources to effectively enforce a ban on the use of lead shot. This is especially true in this era of fiscal restraint and downsizing of departments in Canada. Obviously, the mandatory use of non-toxic shot cannot be forced upon the general public and especially Native subsistence harvesting groups. Proper consultation, education and a basic plan to win public support are required.

Although I have limited this paper to Native Canadians, many arguments expressed are applicable to other Native groups and countries (e.g., Russia). These countries if contemplating the move towards mandatory use of non-toxic shot could learn from the American and Canadian experience.

### Note

1. I would like to thank all my collaborators on the lead shot project: E. Nieboer, J. Karagatzides, B. Katapatuk, D. Kozlovic, and J. Young. I also thank an anonymous reviewer for his comments on the manuscript.

## References

- Anderson, W.L.  
1992 Legislation and Lawsuits in the United States and Their Effects on Nontoxic Shot Regulations. *International Waterfowl and Wetlands Research Bureau Publication* 16:56-60.
- Anderson, W.L. and S.P. Havera  
1989 Lead Poisoning in Illinois Waterfowl (1977-1988) and the Implementation of Nontoxic Shot Regulations. *Illinois Natural History Survey, Biological Notes* 133:1-37.
- Ankney, C.D.  
1996 An Embarrassment of Riches: Too Many Geese. *Journal of Wildlife Management* 60:217-223.
- Annema, J.A., H. Booij and J.P.M. Ros  
1993 Emissions and Emission Factors of Heavy Metals in the Netherlands, in R.J. Allan and J.O. Nriagu (Editors): *International Conference: Heavy Metals in the Environment, Volume 2*. Toronto, Ontario.
- Anonymous  
1995 Mushkegowuk Bans Canadian Wildlife Service from the James Bay Area. *Omushkego Arrow* July:7.
- Archibald, D.R.  
1995 Mushkegowuk Chairperson Denied Access to Migratory Birds Negotiations. *Omushkego Arrow* May/June:1-2.
- Berkes, F., P.J. George, A. Hughes, J. Turner and B.D. Cummins  
1994 Wildlife Harvesting and Sustainable Regional Native Economy in the Hudson and James Bay Lowland, Ontario. *Arctic* 47:350-360.
- Berkes, F., A. Hughes, P.J. George, R.J. Preston, B.D. Cummins and J. Turner  
1995 The Persistence of Aboriginal Land Use: Fish and Wildlife Harvest Areas in the Hudson and James Bay Lowland, Ontario. *Arctic* 48:81-93.
- Bishop, R.A. and W.C. Wagner  
1992 The US Cooperative Lead Poisoning Control Information Program. *International Waterfowl and Wetlands Research Bureau Publication* 16:42-45.
- Brister, B.  
1992 Steel Shot: Ballistics and Gun Barrel Effects. *International Waterfowl and Wetlands Research Bureau Publication* 16:26-28.

Canadian Wildlife Service and the Ontario Federation of  
Anglers and Hunters

1996 *Non-toxic Shot. New Regulations in 1996 and 1997.* Ottawa,  
Ontario: Environment Canada.

Cummins, B.D.

1992 *Attawapiskat Cree Land Tenure and Use 1901-1989. Ph.D.  
dissertation.* Hamilton, Ontario: McMaster University.

DeStefano, S., C.J. Brand, D.H. Rusch, D.L. Finley, M.M. Gillespie

1991 Lead Exposure in Canada Geese of the Eastern Prairie Popu-  
lation. *Wildlife Society Bulletin* 19:23-32.

Eisler, R.

1988 *Lead Hazards to Fish, Wildlife, and Invertebrates: A Synoptic  
Review. Biological Report 85.* Laurel, Maryland: USFWS.

Fast, H. and F. Berkes

1994 *Native Land Use, Traditional Knowledge and the Subsistence  
Economy in the Hudson Bay Bioregion.* Municipality of Saniki-  
luaq, Canada: Canadian Arctic Resources Committee.

Federal Register

1986 50 CFR Part 20. Migratory Bird Hunting: Strategy for Eliminating  
Lead Toxicity as a Major Factor in Waterfowl. *Federal Register*  
51(161):29673-29674.

Fisher F.M. and S.L. Hall

1986 Heavy Metal Concentrations of Duck Tissues in Relation to  
Ingestion of Spent Shot, J.S. Feierabend and A.B. Russell  
(Editors): *Lead Poisoning in Wild Waterfowl—A Workshop.*  
Washington, D.C.: Cooperative Lead Poisoning Control Infor-  
mation Program.

Fleming, S.W.

1994 *Scientific Criteria Document for Multimedia Environmental  
Standards Development—Lead.* Ottawa, Ontario: Queen's  
Printer for Ontario.

Friend, M.

1987 Lead Poisoning. *Field Guide to Wildlife Diseases, US Fish and  
Wildlife Service, Resource Publication 167.*

George, P., F. Berkes and R.J. Preston

1995 Aboriginal Harvesting in the Moose River Basin: A Historical and  
Contemporary Analysis. *Canadian Review of Sociology and  
Anthropology* 32:69-90.

Hanson H.C. and C. Currie

- 1957 The Kill of Wild Geese by the Natives of the Hudson-James Bay Region. *Arctic* 10:211-229.

Honigmann, J.J.

- 1948 *Foodways in a Muskeg Community*. Ottawa, Ontario: Department of Northern Affairs and National Resources.

Humberg D.D. and K.M. Babcock

- 1982 Lead Poisoning and Lead/Steel Shot. *Missouri Department of Conservation. Terrestrial Series* 10:1-23.

Jorgensen, S.S. and M. Willems

- 1987 The Fate of Lead in Soils: The Transformation of Lead Pellets in Shooting-range Soils. *Ambio* 16:11-15.

Kennedy, J.A. and S. Nadeau

- 1993 Lead Shot Contamination of Waterfowl and Their Habitats in Canada. *Canadian Wildlife Service Technical Report Series* 164:1-109.

Kruper, W.

- 1992 Steel Shot: Ballistics and Gun Barrel Effects. *International Waterfowl and Wetlands Research Bureau Publication* 16:29-31.

Longcore, J.R., L.N. Locke, G.E. Bagley and R. Andrews

- 1974 *Significance of Lead Residues in Mallard Tissues. Special Scientific Report. Wildlife* 182.

Ma, W.C.

- 1989 Effect of Soil Pollution with Metallic Lead Pellets on Lead Bioaccumulation and Organ/body Weight Alterations in Small Mammals. *Archives of Environmental Contamination and Toxicology* 18:617-622.

Morehouse, K.A.

- 1992 Crippling Loss and Shot-type: the United States Experience. *International Waterfowl and Wetlands Research Bureau Publication* 16:32-37.

Ontario Federation of Anglers and Hunters

- 1987 *Position Paper on the Use of Steel Shot for Waterfowl Hunting in Ontario*. Peterborough, Ontario: OFAH.

Pain, D.J.

- 1992 Lead Poisoning in Waterfowl: Summary of National Reports. *International Waterfowl and Wetlands Research Bureau Publication* 16:86-99.

Phelan, B.

- 1995 Canada and US Recognize Year-round Aboriginal Rights to Migratory Birds. *Wawatay* June:9.

Prevett, J.P., H.G. Lumsden and F.C. Johnson

- 1983 Waterfowl Kill by Cree Hunters of the Hudson Bay Lowland, Ontario. *Arctic* 36.

Royal Society of Canada

- 1986 *Lead in the Canadian Environment: Science and Regulation. Final Report.* Ottawa, Ontario: The Commission of Lead in the Environment.

Sanderson, G.C.

- 1992 Lead Poisoning Mortality. *International Waterfowl and Wetlands Research Bureau Publication* 16:14-18.

Scheuhammer, A.M.

- 1996 *Migratory Birds are Important.* Hull, Quebec: Environment Canada.

Scheuhammer, A.M. and S.L. Norris

- 1995 *A Draft Review of the Environmental Impacts of Lead Shotshell Ammunition and Lead Fishing Sinker Products In Canada.* Hull, Quebec: Canadian Wildlife Service.

Schwab, F.E. and R.W. Daury

- 1989 Incidence of Ingested Lead Shot in Nova Scotia Waterfowl. *Wildlife Society Bulletin* 17:237-240.

Sparrowe, R.D.

- 1992 Side Issues: Environmental, Economic, and Social. *International Waterfowl and Wetlands Research Bureau Publication* 16:38-41.

Thompson, J.E. and W.A. Hutchinson

- 1989 *Resource Use by Native and Non-Native Hunters of the Ontario Hudson Bay Lowland.* Moosonee, Ontario: Ontario Ministry of Natural Resources Report.

Tsuji, L.J.S., J. Young and J.D. Karagatzides

- 1998 Lead Shot Ingestion in Several Species of Birds in the Western James Bay Region of Northern Ontario. *Canadian Field-Naturalist* 112:86-89.

Tsuji, L.J.S. and E. Nieboer

- 1997 Lead Pellet Ingestion in First Nation Cree of the Western James Bay Region of Northern Ontario, Canada: Implications for a Nontoxic Shot Alternative. *Ecosystem Health* 3:54-61.

- Tsuji, L.J.S., E. Nieboer, J.D. Karagatzides and D.R. Kozlovic  
1997 Elevated Dentine Lead Levels in Adult Teeth of First Nation People from an Isolated Region of Northern Ontario, Canada. *Bulletin of Environmental Contamination and Toxicology* 59:854-860.
- Tsuji, L.J.S., E. Nieboer and J.D. Karagatzides  
1996a Spent Lead Shot and the Environment: The Effect on Wetlands and Wildlife in the Mushkegowik Region. *Fort Albany First Nation. Special Environmental Health Report #1.*
- Tsuji, L.J.S., E. Nieboer, J.D. Karagatzides and R.M. Hanning  
1996b Spent Lead Shot and the Environment: Human Health Concerns in the Mushkegowuk Region. *Fort Albany First Nation. Special Environmental Health Report #2.*
- US Centers for Disease Control  
1991 *Preventing Lead Poisoning in Young Children.* Atlanta, Georgia: US Centers for Disease Control, Department of Health and Human Services, Public Health Service.
- US Fish and Wildlife Service  
1988 *Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Sport Hunting of Migratory Birds.* Washington, D.C.: US Fish and Wildlife Service, Department of the Interior.
- 1986 *Final Supplemental Environmental Impact Statement: Use for Lead Shot Hunting Migratory Birds in the United States.* Washington, D.C.: US Fish and Wildlife Service, Department of the Interior, Office of Migratory Bird Management.
- Usher, P.J.  
1976 Evaluating Country Food in the Northern Native Economy. *Arctic* 29:105-120.
- Wendt J.S. and J.A. Kennedy  
1992 Policy Considerations Regarding the Use of Lead Pellets for Waterfowl Hunting in Canada. *International Waterfowl and Wetlands Research Bureau Publication* 16:61-67.