

The Nature and Significance of Polar Bear Conservation Hunting in the Canadian Arctic

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ABSTRACT. The history and current status of polar bear (*Ursus maritimus*) conservation hunting in the Canadian Arctic, where trophy hunts by non-local hunters have steadily increased in number over the past three decades, have been influenced by local and international factors. Although polar bear hides taken in the subsistence hunt have commercial value, revenues from non-resident trophy hunting provide a much greater economic return to the Inuit. Research suggests that these greater cash returns and the increased local interest by Native hunters in outfitting and guiding do not threaten community cultural values, which continue to emphasize subsistence and the conservation of local wildlife resources. These outcomes suggest that community-based polar bear trophy hunts provide an example of a successful conservation-hunting program that contributes to wildlife management and sustainable economic and community development in the Canadian Arctic.

Key words: conservation hunting, community-based management, conservation, polar bears, trophy hunting

RÉSUMÉ. L'histoire et l'état actuel de la chasse de conservation de l'ours polaire (*Ursus maritimus*) dans l'Arctique canadien, là où la chasse aux trophées par les chasseurs n'étant pas de la région a augmenté régulièrement au cours des trente dernières années, ont été influencés par des facteurs locaux et internationaux. Bien que les peaux d'ours polaires provenant de la chasse de subsistance aient une valeur commerciale, les revenus puisés de la chasse aux trophées par des personnes étrangères à la région procurent un rendement économique beaucoup plus grand aux Inuits. Des recherches suggèrent que ces rendements monétaires plus élevés et l'intérêt accru à l'échelle locale que portent les chasseurs autochtones aux activités de pourvoirie et de guide ne menacent pas les valeurs culturelles de la collectivité, qui continue à mettre l'accent sur la subsistance et sur la conservation des ressources fauniques locales. Ces résultats suggèrent que les chasses aux trophées d'ours polaires dans la région représentent un exemple de programme de chasse de conservation réussi qui favorise la gestion de la faune de même qu'un développement économique et communautaire durable dans l'Arctique canadien.

Mots clés : chasse de conservation, gestion communautaire, conservation, ours polaires, chasse aux trophées

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INTRODUCTION

Less than 40 years ago, the polar bear (*Ursus maritimus*) was considered an animal in danger of extinction. At that time, between 1400 and 1500 bears were being hunted annually from a global population considered by some authorities to number as few as 5000 (Prestrud and Stirling, 1994; Freeman, 2001). This conservation concern caused the five range states (Canada, Denmark/Greenland, Norway, the then-Soviet Union, and the United States) to begin discussing international measures to conserve this shared resource. In 1973, the International Agreement for the Protection of Polar Bears and their Habitat was signed in Oslo by four of the five range states. Over the next four years, all five polar bear range states ratified the treaty, and in 1981 the signatories agreed to extend the treaty indefinitely (Fikkan et al., 1993).

At the time of these international discussions, the question of trophy hunting of bears was a concern for all the

range states, as there had long been an international demand for this highly considered trophy animal. The Soviet Union had first placed restrictions on trophy hunting in 1938, and followed with further restrictions throughout the 1940s and in 1956. The United States stopped all sport hunting of polar bears in 1972 (with passage of the Marine Mammal Protection Act), and in 1973 Norway placed a five-year closure on all hunting of polar bears, a prohibition that remains in effect today. However, in 1970, Canada initiated a program of Native-guided sport hunts, and successfully argued for inclusion of a provision (Article III) in the international polar bear treaty allowing Native-guided hunts by non-Natives to expand in the Canadian North.

This position taken by Canada is noteworthy for several reasons. First, the largest number of polar bears and the largest annual take of bears occur in Canada (Lunn et al., 2002). Second, once Alaska (at that time the prime destination for sport hunters) banned sport hunts, opening an

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adjacent region to the international sport-hunting community might be expected to engender considerable opposition from animal conservation and protection lobbies and politicians at home and abroad sympathetic to such concerns. Third, Canada, in addition to opening a sport hunt, opposed a decrease in its annual take of polar bears, thus appearing to increase hunting pressure just when Norway, the Soviet Union, and the United States were advocating a global reduction in polar bear hunting. That Canada succeeded in enshrining the right of indigenous peoples to benefit financially from their wildlife resources at that time of environmental protectionism (in the 1970s) is perhaps surprising. Its success was a rare example of science-based management overcoming emotion-based political campaigns, which at that time were proclaiming that total protection against consumptive use was the only way to conserve depleted wildlife resources (Freeman, 1997; Hulme and Murphree, 2001; Turner, 2004).

In this paper we discuss trophy hunting of polar bears in Canada, an activity that has progressively expanded since its introduction in the 1970s. Our analysis focuses on the most recent years of the hunt (2000–04) for which data from selected Nunavut communities are available. Recently, the term “conservation hunting” has been introduced to reflect the benefits to wildlife management and conservation and to the associated local wildlife–wildlife user relationship resulting from regulated recreational hunting programs (Wall, 2003, 2005). Conservation hunting refers to a form of sustainable recreational hunting that provides conservation benefits to the targeted wildlife population and social and economic benefits to local rural communities. As a leading conservation organization has concluded:

WWF believes that well managed hunting by local people in these northern regions constitutes a very important conservation tool, whereby future generations will continue to value highly these natural areas for the wildlife populations they support. (Ewins, 2005:15)

CONSERVATION HUNTING

Trophy hunting provides an excellent basis for developing conservation hunting programs. A conservation hunting program contributes to the short- and long-term viability of a wildlife population by generating incentives and a management system to support, and if required, restore, associated habitats and ecosystems. Conservation hunting also provides continuous and inexpensive population monitoring, encourages compliance with the regulatory regime, and seeks to ensure that other land-use activities are compatible with the maintenance of viable wildlife populations (Wall, 2005).

To succeed, conservation hunting programs require the meaningful involvement and cooperation of local communities. Insofar as conservation hunting provides important

economic and social benefits and incentives to these communities, their institutions and businesses, it legitimates and strengthens the conservation hunting regulatory framework, so that conservation outcomes are more likely to be achieved (Wall, 2005). Living with large carnivores such as polar bears involves risks for people, and consequently for the wild species in question. Increasing the consumptive-use value of a potentially dangerous species helps offset the opportunity costs and appears to be reflected in the small number of nuisance kills that occur each year (kills that are deducted from community quotas), despite the reported increasing occurrence of bears in or near human settlements in some parts of the Canadian North (George, 2005a; Pokiak, F., 2005).

As conservation hunting programs yield taxable income and license fees, the economic value of wildlife becomes more visible and is less seriously underrated. The economic benefits thus realized become important when assessing the full economic costs of industrial development projects that may threaten ecosystem integrity, as cost-benefit assessments of these projects often seriously undervalue subsistence production, which is the usual proxy value for wildlife (Freese, 2000).

Conservation hunting, as a consumptive use of wildlife, may benefit Arctic biodiversity conservation in additional ways: these include maintaining the human cultural links to the natural environment and providing local products and services that are less costly to the environment than importing substitutes (Freese, 2000). People need sustainable jobs and income, and obtaining these from local wildlife resources is likely less costly, both environmentally and socially, than meeting these needs through various industrial developments or depending on government subsidies and transfers. The environmental costs of mining, oil, gas, and hydroelectric developments and associated road and pipeline corridors not only affect wildlife and local people's access to food sources, but may cause erosion of highly valued cultural traditions and social institutions. These traditions and institutions are increasingly recognized as important for achieving conservation objectives in many other parts of the world (Van der Linde and Daneskin, 1998; Berkes, 1999; Posey, 1999), as well as in the Arctic:

If Arctic communities become depopulated because their inhabitants lack access to wild species resources or become culturally isolated from their natural environment [by] westernization and urbanization—processes that include the substitution of imported food for food from wild species—less attention is likely to be given to maintaining healthy wild species populations and the ecosystems on which they depend. (Freese, 2000:108)

BIOLOGICAL MANAGEMENT

Baseline Information

Polar bears range throughout the Arctic Ocean basin and into the Subarctic region south of Hudson Bay. Historical information exists from observations of explorers, whalers, missionaries, and resident government officials, but scientific studies extend back scarcely more than 50 years. Traders' records fail to report the large number of untraded polar bear hides, and earlier government records of hunters' subsistence takes are acknowledged to be incomplete. Polar bear hides were not an important regular trade item before the 1940s, although hides had been opportunistically traded to whalers and other visitors since the time of contact in the 19th century. Sport hunting for polar bears was rare in Canada until the mid-1980s (Wenzel and Bourguoin, 2002).

However, Inuit possess a large store of environmental knowledge pertinent to polar bears and their habitat that extends back several generations. This indigenous knowledge is now recognized as useful for indicating trends in wildlife numbers, population composition, and hunting success rates (Freeman, 1975; Ferguson and Messier, 1997; Berkes, 1999; IUCN, 2001; Lunn et al., 2002). However, given that indigenous knowledge is localized (like much scientific knowledge on wildlife population numbers), it must be applied with caution.

The current global population of polar bears is estimated to be 22 000 (Lunn et al., 2002). Information on polar bear use in other jurisdictions is available elsewhere (Prestrud and Stirling, 1994; Derocher et al., 1998; Freese, 2000; Freeman, 2001; Lunn et al., 2002). An effective polar bear management program requires information on population size, recruitment rates, and sex- and age-specific survivorship. Inuit subsistence hunters and conservation-hunting guides have provided information and biological samples for research and monitoring for about 90% of bears taken since 1970 (Derocher and Stirling, 1995; Brower et al., 2002), and close to 100% of the total number of bears killed by humans in Canada since the mid-1990s (Lunn et al., 2002).

Management Objectives

Canadian polar bear management policies are directed toward maintaining healthy populations and aiding the recovery of depleted populations. To accomplish these objectives, policies seek to protect female bears and cubs, yearlings, and denning bears from being hunted and to reduce the number of female bears taken by hunters. Both government agencies and local communities are strongly committed to continuing polar bear research and conducting population inventories in order to inform management decisions. One cornerstone of current Canadian management is to base quotas on two-thirds (or more) of the take being male bears, thus conserving females while maximiz-

TABLE 1. Polar bear trophy hunts in the Canadian Arctic, showing year trophy hunts commenced and composition of the hunt in three regions.

Region	Year	Number	Male %	Female %	Unknown %
Baffin Bay	1973	101	76	19	5
N. Baffin Island	1971	363	84	13	3
Central Arctic	1991	42	86	12	2

ing the number of bears that may be killed. If males constitute more than two-thirds of the take in a given year, consideration is given to increasing the quota in the following year. Inuit hunters are able to determine the sex of the animals being pursued in a large proportion of cases from their expert knowledge of bear morphology and movements and by examining the animals' tracks. Trophy hunters prefer to hunt male bears, and around 80% (see Table 1) of the animals taken in Canadian conservation hunts are male (see also Brower et al., 2002).

Research

It is acknowledged that the international polar bear treaty has resulted in a significant increase in relevant and sustained research on polar bears (Prestrud and Stirling, 1994), enabling management decisions to be science-based to a far greater degree than occurs under some other international resource-management and conservation regimes (Freeman, 1996; Mrosovsky, 1997; Freese, 2000).

The polar bear treaty partners meet every three to five years to discuss the results of national research programs and to consider what data are needed to improve management decision making. Although national governments are responsible for ensuring that management programs conform to the provisions of the international polar bear treaty, it is for the most part the polar bear specialists, specifically research biologists and program managers, who assess conservation status and information and management needs at these international meetings (see Derocher et al. [1998] and Lunn et al. [2002] for reports of the 12th and 13th polar bear specialists' meetings, respectively).

Involvement of Local People

A cooperative approach is in place in Canadian polar bear management, involving the sharing of scientists' and resource users' knowledge and understandings to achieve sustainable management outcomes over a major portion of the species range in Canada. Biologists from governments and universities work closely with their international partners and indigenous hunters in carrying out programs of polar bear research. As mentioned above, this cooperation extends to hunters' routinely collecting required biological samples and data from the polar bears they kill, or from trophy animals taken by visiting hunters. Local hunters inform managers of their concerns about observed changes in the condition of individual bears or bear populations

within their hunting territory. This cooperation and sharing continue, even though incorporating this information into management decisions has led to some reductions in local polar bear quotas (Lloyd, 1986; Derocher et al., 1998; Freeman, 2001). Co-management boards, introduced across the Canadian Arctic following the signing of land-claim agreements, appear to provide an equitable and workable institution that encourages sustainable practices for wild species use (Usher, 1997; Berkes, 1999; Pokiak, F., 2005; however, see Nadasdy, 2003).

REGULATORY JURISDICTION

International

The objectives of the international polar bear treaty are met through periodic reviews of reports on population status received from the management authorities of the range states. Although the international polar bear agreement has no legal enforcement powers, these reviews, undertaken by the International Union for Conservation of Nature (IUCN) Species Survival Commission's Polar Bear Specialist Group, provide international oversight of national management agencies' research programs and compliance with treaty conservation objectives (Prestrud and Stirling, 1994; Freeman, 2001). Like most other renewable resource management regimes, the international polar bear treaty has its operational shortcomings, but despite these, many consider it one of the most successful international agreements for managing natural resources and a model to be followed by others who consider establishing such bodies (Fikkan et al., 1993; Freese, 2000).

The international concern that most directly affects the Canadian polar bear conservation hunt is the U.S. Marine Mammal Protection Act (MMPA), which sets requirements for all polar bear trophies imported into the United States. Basing its policy on information provided by Canadian authorities, the United States permits trophy imports from five of the twelve polar bear populations in Nunavut, and from the three populations hunted by outfitters resident in Inuit communities of the Northwest Territories. Examples of requirements set by the MMPA are (1) that a functioning, monitored, and enforced trophy-hunting program exists that is consistent with the international polar bear agreement; (2) that the program is based on scientifically sound quotas, ensuring the hunted population is maintained at a sustainable level; and (3) that for those populations shared between jurisdictions (e.g., Canada and Greenland), an enforceable, science-based management plan is in place (Gissing, 2005). As a result of some polar bear populations' failing to satisfy these MMPA conditions over the past few years, Inuit communities that previously served mainly or exclusively American hunters now have a more international client base. Clyde River, for example, now hosts hunters from Argentina, Finland, Germany, Israel, Mexico, Norway, and Spain.

National

Within Canada, polar bears are the management responsibility of four provinces and three territories. In Nunavut and the Northwest Territories, wildlife co-management bodies include strong representation from the local user communities. The federal, provincial, and territorial governments conduct research relevant to polar bear management, and two intergovernmental polar bear committees were established, one in 1969 and one in 1970, to facilitate information sharing, research coordination, and production of annual status reports. At present, only the Northwest Territories and Nunavut permit trophy hunting, and each requires that outfitters and guides be licensed to provide appropriate services.

Community

Each community has the responsibility to allocate its polar bear quota among subsistence hunters and outfitters. To legally take a polar bear, the hunter must possess a permit or "tag": taking a bear when not in possession of a tag is unlawful. Unlawful hunting or breaking community hunting bylaws appears to be rare (Stirling, 1990; Freese, 2000; Brower et al., 2002; Wenzel and Dowsley, 2005). In most Inuit communities, the number of hunters wishing to hunt bears exceeds the number of available tags, so a lottery system operated by the local hunters and trappers' organization determines who receives a tag. In most communities, if a local hunter receiving a tag does not take a bear within a certain time, he must return the tag, whereupon it is given to the next hunter in the community waiting to receive a tag.

The manner in which polar bear outfitters or guides receive tags for their trophy-hunting clients varies from community to community. Two Nunavut communities—Clyde River, on Baffin Island, and Resolute, on Cornwallis Island in the Canadian High Arctic—illustrate two different means of licensing trophy hunters.

Clyde River, a community with a population of about 900 residents, between 1986 and 2004 received a quota of 21 polar bears (14 males, 7 females). In the past few years, considerable discussion occurred in the community before the number of tags allocated to trophy hunters was decided, for Clyde River residents place high value on maintaining subsistence pursuits (see below). In the period 1990–96, the Clyde River Hunters and Trappers' Organization (HTO) allocated 5 of the 21 tags to trophy hunters each year; in subsequent years, it increased the number to 7, and in 2000–01, further increased it to 10. These 10 tags are allocated to three community-based outfitters, who purchase the tags from the HTO.

Resolute, a small community of about 165 residents, receives a quota of 35 bears (24 males, 11 females). Given the small size of the community and the relatively large number of tags available, every hunter in the community is assured at least one tag. The HTO decides the number of

TABLE 2. Increasing allocation of animals from the annual polar bear quota to trophy hunts.

Decade	Average Annual Quota	Trophy Hunt		Trophy Hunt as % of Quota
		Average	Range	
1970–79	443	4	0–7	< 1
1980–89	442	31	3–56	7
1990–2000	462	67	32–92	15

tags to be allocated to trophy hunters and allows the single Resolute outfitter to purchase tags from individual hunters in the community, rather than purchasing them from the HTO as in Clyde River.

ECONOMIC CONSIDERATIONS

Marketing

Polar bear trophy hunts in the Canadian Arctic are marketed internationally by wholesalers in southern Canada and the United States, who connect local outfitters in Inuit communities with their prospective clients worldwide. Initially, the community hunters and trappers' organizations acted as the local outfitters, hiring guides and dog teams from local hunters who were licensed by the government to serve as sport-hunting guides (Notzke, 1999). During the last two decades, however, licensed guides in some communities have begun to operate their own outfitting businesses, in some cases also continuing to serve as guides, and in others hiring additional licensed guides to work in their businesses. Despite the growing availability of skilled guides, the demand for trophies exceeds the number of tags that local authorities make available to trophy hunters. Although the number of tags allocated to trophy hunters has increased significantly over the past 30 years (Table 2), further increases may be limited unless the quota itself increases or communities become less reluctant to compromise their subsistence values by constraining the individual hunter's right to hunt bears (Notzke, 1999; Freeman, 2001; Wenzel, 2005). However, at the present time, the Nunavut government is proposing to increase the Nunavut polar bear quota for the 2005–06 season (George, 2005a; Minogue, 2005).

Community Benefits

Polar bears are economically important in Inuit communities, whether taken for subsistence or in sport hunts. The trade value of a hide, based on its nose-to-tail length when scraped and dried, increased from ca. \$100–\$150 (Canadian) per metre in the early 1970s to about \$250–\$330 per metre in the 1980s, and it has since stabilized at about half that peak price. Today, an Inuit hunter may receive \$500 to \$700 (on average) for the hide of a polar bear. Although the government of the Northwest Territo-

ries began to promote sport hunting in the early 1970s, Inuit hunters initially showed little interest in the extra money that guiding a sport hunter might provide. In 1982–83, however, Inuit suffered an economic crisis when the price paid for sealskins (in many communities, the principal source of earned income) seriously declined throughout the North as a result of anti-sealing campaigns that effectively destroyed the international sealskin market (Wenzel, 1991; Freese, 2000). To compound this particular problem, animal protectionists also began targeting ivory, another important trade item for Inuit hunters in a number of Canadian Arctic communities (Wenzel, 2005).

As a result of the economic hardship resulting from these animal protection campaigns, the government of the Northwest Territories sought to diversify community economies. One means of diversification was to provide sport-hunting training programs for Inuit hunters and to help community residents or organizations establish business relationships with big-game wholesalers located outside the Arctic. The number of licensed guides ranges from one or two in some Nunavut communities to more than 20 in some Inuit communities in the Northwest Territories, where sport hunting includes a larger range of trophy animal species (Notzke, 1999).

Polar bear trophy hunting is the most expensive of the sport hunts marketed in the Canadian Arctic. Financial returns to outfitters, guides, and their helpers provide varying amounts of income, depending on the services provided. Canadian Eastern Arctic outfitters received, on average, about \$19 300 for each visiting trophy hunter, which is about 60% of the total paid to the southern wholesaler who arranges air travel and some of the required accommodations.

In spring 2000, the outfitter in the High Arctic community of Resolute received \$306 700 from the southern wholesaler for taking 20 clients on polar bear hunts. From the money received from the wholesaler, the Resolute outfitter paid \$186 700 to local guides and assistants, \$33 350 to 20 individual local hunters willing to sell him their tags, and \$12 670 to purchase supplies. Thus the outfitter received about \$73 000 net for expediting these community-based conservation hunts. The majority of guides and assistants obtain a good proportion of their annual cash income from their involvement with trophy hunting: only a few had held casual wage-paying jobs for more than two months in the preceding year. A Resolute guide is paid \$9000 for his services on a 14-day hunt, almost twice the sum paid to guides in Clyde River. Gratuities from satisfied clients provide on average an additional \$740 per hunt. Some trophy hunters reward guides and hunt assistants with expensive and useful gifts, including rifles, binoculars, GPS instruments, and hunting bows and arrows. In some communities, local outfitters also pay cash bonuses to the best guides and assistants.

Communities receive additional economic benefits from these local conservation hunting activities (Table 3). The meat from the bears is almost all distributed within the

TABLE 3. Recent economic benefits from polar bear trophy hunts in selected communities (in Canadian dollars).

Community	Year	Number of Trophies	Wages and Gratuities	Country Food and Gifted Equipment
Resolute	2001	20	\$313 690	\$40 000
Clyde River	2001	10	\$108 845	\$20 000
Taloyoak	2000	10	\$94 500	\$15 000 (estimated)

community. The economic value of the approximately 140 kg of edible meat obtained from an average-sized polar bear represents between \$800 and \$900 (based on the local import-substitution price of beef). Remuneration paid to other community members for sundry services is variable: some examples are \$70 for a pair of caribou skin mittens, \$1000 for a caribou skin set of clothing, \$750 for skin clothing repairs, and \$300–400 for preparing the polar bear hide for shipping south (Wenzel and Bourgouin, 2002).

Although the polar bear trophy-hunting season may be short, often only about eight weeks in the spring (or more rarely, the fall), outfitters and some guides also accommodate sport hunters seeking other big game animals at other times of year. Some outfitters offer services to enable visitors to enjoy hunting, fishing, nature viewing, cultural tours, or adventure tours. For example, the annual caribou trophy hunt in the Northwest Territories is valued at \$8.5 million, with 900 licensed hunters participating. In Nunavut, the caribou trophy hunt is valued at \$500 000, and a muskox trophy hunt with 120 licensed hunters is valued at about \$300 000 (Notzke, 1999; Anonymous, 2003).

NON-ECONOMIC CONSIDERATIONS

Incentives

Several incentives draw trophy hunters to the Canadian Arctic to hunt polar bear, the first being that most areas formerly providing the opportunity, such as Alaska or Svalbard, are now closed to sport hunters. The Canadian trophy hunt provides a rare outdoor experience. Hunts, on average, take from 10 to 14 days. Hunters are required to hunt using dog teams, although if the hunting area is distant from the community, they may travel part way on a sled pulled by a motorized toboggan. Surveys indicate high hunter satisfaction with the experience, and as the best advertising for individual outfitters and guides is positive word-of-mouth reports, the community, the outfitter, and the guide have every reason to provide high-quality service.

A majority of trophy hunters succeed in taking a bear (Table 4), and in most cases it is a preferred animal, namely, a large-sized male (Table 1). A survey in the eastern Canadian Arctic indicated that almost all hunters (99.6%) who successfully took a bear believed the cost of the hunt was justified, and just over half the sample (55.6%) declared that the cost would be justifiable even if no bear had been taken (Wenzel and Bourgouin, 2002).

A number of non-economic incentives attract Inuit to become involved in outfitting and guiding non-resident hunters. In addition to providing economic benefits, becoming a guide or an outfitter enables the individual to engage in an occupation that remains strongly associated with subsistence-related pursuits that many Inuit continue to value and enjoy in a profoundly personal way (Wenzel, 2005). These pursuits include maintaining a dog team and hunting seals, walrus, and whales for dog food: satisfying activities that ensure a supply of healthy, customary foods enjoyed by extended family members and other community residents.

Social Considerations

As noted earlier, some Inuit may remain ambivalent about the allocation of polar bear tags to non-resident hunters rather than to community subsistence hunters. However, it appears that a satisfactory resolution of any differences is reached after appropriate discussion of the issue within the community (Wenzel, 2005). Communities are aware that among the main economic beneficiaries of the trophy-hunting enterprise are the guides and assistants, who are often the best local providers of the fresh food that the community still requires. In Inuit communities, local food continues to be distributed by hunters, without charge, to people who need it (Wenzel, 2000). The price of equipment and supplies means that hunters incur high costs to obtain meat, so their remuneration as guides or assistants indirectly benefits the entire community.

Throughout the Arctic is widespread awareness that a significant threat to Inuit culture and socio-economic security has resulted from animal protectionist campaigns, which have reduced the market for animal pelts and ivory, as well as art, handicrafts, and clothing made from these local resources. As the hunting economy declined, few incentives remained for young Inuit men to become hunters, for hunting requires considerable investment of money and time (Wenzel, 2005). Guiding non-resident hunters requires knowledge and skill in hunting, traveling, and the associated survival skills that Arctic communities need to maintain, and it also provides enough financial return to make that occupational choice rational and rewarding. The interest that young men express in guiding trophy hunters (Notzke, 1999) is an important social asset, as are the value-added economic benefits that the activity brings into the local communities. The presence of visiting sport hunters in these isolated Inuit communities is also appreciated as an affirmation that not all Southerners share animal protectionists' opposition to Inuit cultural values.

TABLE 4. Success rates (percent) for recent polar bear trophy hunts.

Year	Western Arctic	Central Arctic	Hudson Bay	Eastern Arctic
1996–97	73	100	—	96
1997–98	50	75	100	93
1998–99	84	56	100	87
1999–2000	89	93	100	93

and subsistence practices, an opposition that has added demoralizing insult to economic and social injury.

Future Prospects

Polar bear conservation hunting as presently constituted is likely to remain sustainable, although it is to be expected that Inuit communities may, at any time, decide to increase (or decrease) the number of tags allocated to visiting hunters. As mentioned earlier, the proportion of the community quota allocated to trophy hunters has increased since the early years of the program (Table 2), and for the past several years there has been an annual waiting list of non-resident hunters wanting to obtain a trophy. At present, some hunters remain on the waiting list for up to five years, a demand for services that allows outfitters to invest in their businesses with a high degree of confidence in the future. The closure of some areas to sport hunters from the United States because of the MMPA import restrictions and the lack of opportunities to hunt polar bears outside the Canadian Arctic also contribute to assuring future demand.

Despite this unmet demand, the situation may not be so favorable to guides, as in some communities the growth in the number of guides has not been matched by an increase in the number of tags allocated to non-resident hunters. Recently, the Inuvialuit Game Council in the Northwest Territories restricted the allocation of tags available to trophy hunters to a maximum of 50% of the community quota (Pokiak, F., 2005). However, even as some guides become under-employed, the price of polar bear trophy hunts is steadily increasing, so that guides may receive greater remuneration for each hunt they guide. In Clyde River, for example, the price charged for a polar bear hunt increased by 21% between 1999 and 2001. On the other hand, the current strategy of underpricing the hunts (inferred from the substantial waiting lists) is a significant business asset and is one that may likely constrain future price increases.

A further potential for increasing the economic return from each trophy hunt is for a larger portion of the visiting hunters' costs to flow to the community. At present, local outfitters secure their clients through the services of outside wholesalers, who pass on to local outfitters only 38% to 61% of costs charged to the hunter. (The smaller percentage was received in a community that had only recently begun its conservation hunting program.) Variable

commissions paid to wholesalers contribute to the differences in revenue from bear hunting shown in Table 3.

In general, an outfitter who has established and sustained a long-term business relationship with a particular wholesaler can obtain a larger share of the client's fee, and wholesalers will also be prepared to remit more of the fee if the outfitter can make more tags available. One factor that decreases the transfer of revenues from wholesaler to outfitter is the quality of service offered: some wholesalers specialize in offering expensive imported foods, single accommodation, and other features not offered by their competitors, all of which reduce the revenue flow to the local community.

In recent years, the sustainability of current levels of polar bear hunting has been questioned because of observed changes in sea-ice conditions that affect polar bear nutrition, and hence natality, population numbers, and distribution. Concern about such environmental changes, correlated with climate warming in the Arctic, has been expressed by scientists (e.g., Stirling et al., 1999; Derocher et al., 2004) and hunters (Keith et al., 2005; Pokiak, J., 2005) alike. As the size of community quotas, the proportion of those quotas allocated to non-resident hunters, and the importation of trophies into the United States are all affected by changes in the conservation status of regional polar bear populations, such environmental changes may affect polar bear hunting in the future (e.g., George, 2005b, c). Such changes will likely result in fewer tags allocated to non-resident hunters, a higher monetary value for each trophy animal hunted, and longer waiting lists for hunters.

CONSUMPTIVE VS. NON-CONSUMPTIVE WILDLIFE USE

Polar bear conservation hunting brings significant amounts of new (outside) money to the nine Nunavut and six Northwest Territories communities that support this particular activity. In the year 2000–01, the nine Nunavut communities secured an estimated \$814 000 by allocating a locally acceptable proportion of their community's polar bear quota to non-resident hunters. This sum is significantly more than is generated each year by all other tourist and visitor activities in the territory.

Policies and programs to support "community-based tourism" in the Canadian North have shown positive results in several locations (Notzke, 1999). Arguably the two biggest problems to be overcome when developing tourism in Inuit communities are the high cost of reaching these remote communities and the present lack of tourist infrastructure within them. Most communities are small, with 120 to 1800 residents; only three of the more than 30 Inuit communities have more than 2000 residents, and only one of these can be accessed by an all-weather road.

Despite these structural problems, the potential for nature-based or eco-tourism in Canada's North is considered good. The Arctic seascapes and landscapes and the

flora and fauna are novel for most visitors, and for many, visiting the Arctic is an unforgettable and exotic experience. In the summer, small numbers of tourists visit the isolated northern national and territorial parks, others canoe or kayak on rivers and lakes, or come ashore from visiting cruise ships, or engage in nature viewing near communities where they are accommodated. However, since meal services, museums, cinemas, and other public facilities are scarce in northern communities, tourist incidental spending is limited to snack foods, canned drinks, inexpensive souvenirs, and carvings.

Polar bear trophy hunters, on the other hand, tend to require few or none of the usual tourist amenities or infrastructure. Hunters arrive in small numbers (or alone) and spend nearly all their time away from the community, out on the land or sea ice. Most will leave the community almost immediately after returning from their hunt, so the absence of tourist infrastructure is not a significant consideration. The season for hunting polar bears, during spring and more rarely in autumn, is outside the time when other tourists visit, so hunters are a welcome off-season source of revenue for the local establishments catering to visitors.

Some have argued that since most current and potential future tourists are attracted to the Arctic by "unspoiled" nature, the existence or promotion of trophy hunting might create a disincentive for non-consumptive users of wildlife to visit. However, there is no evidence that tourists engaging in non-consumptive wildlife-based tourism are in any measurable sense opposed to the consumptive use of wildlife. Indeed, tourists have chosen to visit, and in many cases try to get to know better, people who regularly hunt and eat whales, seals, walrus, caribou, a variety of game birds, and in some cases also trap furbearers, as well as using the skins of these animals to clothe their families. It seems that cultural tourism, as much as nature-based tourism, is what attracts visitors to the Arctic, and this tolerance, if not appreciation, of cultural diversity is unlikely to foster negative feelings toward those who assist sportsmen and sportswomen engaged in licensed recreational pursuits.

DISCUSSION AND CONCLUSIONS

There appears to be no evidence that non-resident trophy hunting of polar bears in the Canadian Arctic is detrimental to polar bear conservation or has caused any significant negative impacts upon indigenous communities where bears are still hunted for subsistence. Although some communities continue discussing the number of bears that can be transferred from subsistence hunters to visiting trophy hunters, an acceptable allocation is decided wholly within those communities. That the local hunting community decides this important aspect of management, which affects both subsistence and conservation hunts, is likely critical to ensuring that potential conflicts over the allocation of a scarce and valued resource engender minimal social discord.

The economic benefits of conservation hunting are significant in these small, remote communities, with several direct and indirect benefits spread throughout the community. Local community-based outfitters provide seasonal employment and, to the greatest degree possible, source their goods and services from within the community, thus maximizing community economic benefits derived from conservation hunting. The conservation hunt also contributes significantly to local food production, as paid guides and assistants are also community food providers throughout the year, and their earnings contribute to their ability to provide preferred local meat to community members. The meat from trophy animals is also distributed widely throughout the community, strengthening local cultural norms and social ties.

Polar bears in Canada are managed under a co-management system that takes into account both Western science and local knowledge, with the goal of ensuring that hunts are sustainable. The annual take is maximized, within sustainable limits, by setting the gender composition at two male bears for each female bear taken. The skill of Inuit hunters in distinguishing male from female bears and the preference of trophy hunters for large male bears ensure that breeding females make up only a small proportion of animals taken in these hunts. A further conservation feature is that once the required tag is assigned to a trophy hunt, it cannot be reassigned to a subsistence hunter if no trophy bear is taken, although it can be used to offset a nuisance or defence kill, should one occur in the following year. Thus the potential for not using up the community quota is enhanced in the case of conservation hunting, as no such prohibition against re-assigning tags exists in the subsistence hunt.

Inuit in Canada, through the provisions of their land-claim agreements, serve on land-use planning and environmental impact review committees and boards, and so can influence decisions concerning industrial development activities that could have negative impacts upon polar bear habitat and bear populations. The advent of polar bear conservation hunting, by adding increased economic value to the continuing high cultural, social, and dietary value placed on polar bears by the resource users and community-based stewards, contributes to the protection of this valued resource and its critical habitat (Freese, 2000).

The co-management regimes in place allow annual reassessment of the quota, which can be increased or decreased depending on the male-to-female ratio of animals taken, and the non-use of tags when a trophy animal is not taken on an authorized hunt. It seems very likely that the high degree of compliance with quotas (introduced about 30 years ago) is due to the incentives to comply contained in a management approach that is reasonable, participatory, and rewards both compliance and traditional knowledge and skills.

Questions arise concerning the possible long-term effect of selectively removing more large male bears than

females from polar bear populations (Derocher and Stirling, 1992; Stirling and Øritsland, 1995). However, little research has been directed to this issue at this time.

These findings suggest that other rural communities and wildlife conservation agencies managing species with potential sport or trophy hunting value might consider the Canadian polar bear conservation hunting program as a model to adapt to their own local circumstances. We conclude that the wildlife conservation and community social, economic, and cultural benefits associated with these polar bear hunts justify the emerging practice of referring to such regulated recreational hunts as "conservation hunting."

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REFERENCES

- ANONYMOUS. 2003. Mad cow woes could hurt sport hunt. *Caribou News* 7(1):4.
- BERKES, F. 1999. *Sacred ecology: Traditional ecological knowledge and resource management*. New York: Taylor and Francis.
- BROWER, C.D., CARPENTER, A., BRANIGAN, M.L., CALVERT, W., EVANS, T., FISCHBACH, A.S., NAGY, J.A., SCHLIEBE, S., and STIRLING, I. 2002. The Polar Bear Management Agreement for the southern Beaufort Sea: An evaluation of the first ten years of a unique conservation agreement. *Arctic* 55(4):362–372.
- DEROCHER, A.E., and STIRLING, I. 1992. The population dynamics of polar bears in western Hudson Bay. In: McCullough, D.R., and Barrett, R.H., eds. *Wildlife 2001: Populations*. London: Elsevier Science Publishers. 1150–1159.
- . 1995. Estimation of polar bear population size and survival in western Hudson Bay. *Journal of Wildlife Management* 59: 215–221.
- DEROCHER, A.E., GARNER, G.W., LUNN, N.J., and WIIG, Ø. 1998. Polar bears: Proceedings of the 12th Working Meeting of the IUCN/SSC Polar Bear Specialist Group, 3–7 February 1997, Oslo, Norway. Gland, Switzerland, and Cambridge, England: International Union for the Conservation of Nature.
- DEROCHER, A.E., LUNN, N.J., and STIRLING, I. 2004. Polar bears in a warming climate. *Integrative and Comparative Biology* 44:163–176.
- EWINS, P.J. 2005. Conservation and hunting in northern regions: Community-based hunting as a conservation tool. In: Freeman, M.M.R., Hudson, R.J., and Foote, L., eds. *Conservation hunting: People and wildlife in Canada's North*. Occasional Publication No. 56. Edmonton, Alberta: Canadian Circumpolar Institute. 14–21.
- FERGUSON, M.A.D., and MESSIER, F. 1997. Collection and analysis of traditional ecological knowledge about a population of Arctic tundra caribou. *Arctic* 50(1):17–28.
- FIKKAN, G., OSHERENKO, G., and ARIKAINEN, A. 1993. Polar bears: The importance of simplicity. In: Young, O.R., and Osherenko, G., eds. *Polar politics: Creating international environmental regimes*. Ithaca, New York: Cornell University Press. 96–151.
- FREEMAN, M.M.R. 1975. Assessing movement in an Arctic caribou population. *Journal of Environmental Management* 3:251–257.
- . 1996. Polar bears and whales: Contrasts in international wildlife regimes. In: Oakes, J., and Riewe, R., eds. *Issues in the North*. Occasional Publication No. 40. Edmonton, Alberta: Canadian Circumpolar Institute. Vol. 1:174–181.
- . 1997. Issues affecting subsistence security in Arctic societies. *Arctic Anthropology* 34(1):7–17.
- . 2001. Culture, commerce and international co-operation in the global recovery of polar bears. *Pacific Conservation Biology* 7:161–168.
- FREESE, C.H. 2000. *The consumptive use of wildlife species in the Arctic: Challenges and opportunities for ecological sustainability*. Toronto, Ontario: WWF-Canada and Oslo: WWF-International Arctic Programme.
- GEORGE, J. 2005a. Nunavut increases annual polar bear quota by 115. *Nunatsiaq News*, January 14.
- . 2005b. Polar bear sport hunt under threat from U.S. *Nunatsiaq News*, July 15.
- . 2005c. Nunavut IQ on polar bears not documented. *Nunatsiaq News*, August 5.
- GISSING, D. 2005. Managing polar bear sport hunting in Nunavut. In: Freeman, M.M.R., Hudson, R.J., and Foote, L., eds. *Conservation hunting: People and wildlife in Canada's North*. Occasional Publication No. 56. Edmonton, Alberta: Canadian Circumpolar Institute. 76–80.
- HULME, D., and MURPHREE, M., eds. 2001. *African wildlife and livelihoods: The promise and performance of community conservation*. Portsmouth, New Hampshire: Heinemann.
- IUCN (INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE). 2001. Press Release, 13th Meeting of the IUCN SSC Polar Bear Specialist Group, Nuuk, Greenland. <http://pbsg.npolar.no/>
- KEITH, D.E., ARQVIK, J., KAMMOOKAK, L., AMERALIK, J., and the GJOA HAVEN HUNTERS' AND TRAPPERS' ORGANIZATION. 2005. *Inuit qaujimaningnit nanurnut: Inuit knowledge of polar bears*. Solstice Series Number 4. Edmonton, Alberta: Canadian Circumpolar Institute.
- LLOYD, K. 1986. Cooperative management of polar bears on northeastern Baffin Island. In: Green, J.G., and Smith, J., eds.

- Native people and renewable resource management. Edmonton, Alberta: 10th Annual Symposium of the Alberta Society for Professional Biologists. 108–116.
- LUNN, N.J., SCHLIEBE, S., and BORN, E.W. 2002. Polar bears: Proceedings of the 13th Working Meeting of the IUCN/SSC Polar Bear Specialist Group, 23–28 June 2001, Nuuk, Greenland. Gland, Switzerland, and Cambridge, England: International Union for the Conservation of Nature.
- MINOGUE, S. 2005. Greenland hunt threatens Nunavut polar bear quota. *Nunatsiaq News*, June 17.
- MROSOVSKY, N. 1997. IUCN's credibility critically endangered. *Nature* 389:436.
- NADASDY, P. 2003. Reevaluating the co-management success story. *Arctic* 56(4):367–380.
- NOTZKE, C. 1999. Aboriginal community involvement in wildlife tourism: The Canadian experience. In: Treseder, L., Honda-McNeil, J., Berkes, M., Berkes, F., Dragon J., Notzke, C., Schramm, T., and Hudson, R.J., eds. *Northern Eden: Community based wildlife management in Canada*. International Institute for Environment and Development, Evaluating Eden Series No. 2 and Occasional Publication 46, Canadian Circumpolar Institute. 45–62.
- POKIAK, F. 2005. Co-management and conservation hunting in the western Canadian Arctic. In: Freeman, M.M.R., Hudson, R.J., and Foote, L., eds. *Conservation hunting: People and wildlife in Canada's North*. Occasional Publication No. 56. Edmonton, Alberta: Canadian Circumpolar Institute. 52–56.
- POKIAK, J. 2005. Sport hunting in the western Canadian Arctic. In: Freeman, M.M.R., Hudson, R.J., and Foote, L., eds. *Conservation hunting: People and wildlife in Canada's North*. Occasional Publication No. 56. Edmonton, Alberta: Canadian Circumpolar Institute. 22–24.
- POSEY, D.A., ed. 1999. *Cultural and spiritual values of biodiversity: A complementary contribution to the Global Diversity Assessment*. Nairobi, Kenya: United Nations Environment Program and London: Intermediate Technology Publications.
- PRESTRUD, P., and STIRLING, I. 1994. The International Polar Bear Agreement and the current status of polar bear conservation. *Aquatic Mammals* 20:113–124.
- STIRLING, I. 1990. The future of wildlife management in the Northwest Territories. *Arctic* 43(3):iii–iv.
- STIRLING, I., and ØRITSLAND, N.A. 1995. Relationships between estimates of ringed seal (*Phoca hispida*) and polar bear (*Ursus maritimus*) populations in the Canadian Arctic. *Canadian Journal of Fisheries and Aquatic Sciences* 52:2594–2612.
- STIRLING, I., LUNN, N.J., and IACOZZA, J. 1999. Long-term trends in the population ecology of polar bears in western Hudson Bay in relation to climatic change. *Arctic* 52(3): 294–306.
- TURNER, R.L. 2004. Communities, wildlife conservation, and tourism-based development: Can community-based nature tourism live up to its promise? *Journal of International Wildlife Law and Policy* 7:161–182.
- USHER, P.J. 1997. Common property and regional sovereignty: Relations between aboriginal peoples and the crown in Canada. In: Larmour, P., ed. *The governance of common property in the Pacific region*. Canberra, ACT: National Centre for Development Studies, Australian National University. 103–122.
- VAN DER LINDE, H.A., and DANESKIN, M.H., eds. 1998. *Enhancing sustainability: Resources for our future*. Gland, Switzerland, and Cambridge, England: International Union for the Conservation of Nature.
- WALL, W.A. 2003. Key components of conservation-hunting programs and their relationship to populations, ecosystems, and people. Paper presented at the 3rd International Wildlife Management Congress, 1–5 December 2003, Christchurch, New Zealand.
- . 2005. A framework proposal for conservation-hunting best practices. In: Freeman, M.M.R., Hudson, R.J., and Foote, L., eds. *Conservation hunting: People and wildlife in Canada's North*. Occasional Publication No. 56. Edmonton, Alberta: Canadian Circumpolar Institute. 8–13.
- WENZEL, G. 1991. *Animal rights, human rights: Ecology, economy and ideology in the Canadian Arctic*. Toronto, Ontario: University of Toronto Press.
- . 2000. Sharing, money, and modern Inuit subsistence: Obligation and reciprocity at Clyde River, Nunavut. In: Wenzel, G.W., Hovelsrud-Broda, G., and Kishigami N., eds. *The social economy of sharing: Resource allocation and modern hunter-gathers*. Senri Ethnological Studies No. 53. Osaka: National Museum of Ethnology. 61–85.
- . 2005. Nunavut Inuit and polar bear: The cultural politics of the hunt. In: Kishigami, N., and Savelle, J., eds. *Indigenous use and management of marine resources*. Senri Ethnological Series No. 67. Osaka, Japan: National Museum of Ethnology. 363–388.
- WENZEL, G.W., and BOURGOUIN, F. 2002. Outfitted polar bear hunting, community economy and species conservation in the Kitikmeot and Qikiqtaaluk regions of Nunavut. Final Report to the Department of Sustainable Development, Iqaluit, Nunavut, Canada. Available from the Department of Environment, Government of Nunavut, P.O. Box 1000, Stn. 1300, Iqaluit, Nunavut X0A 0H0.
- WENZEL, G.W., and DOWSLEY, M. 2005. Economic and cultural aspects of polar bear sport hunting in Nunavut. In: Freeman, M.M.R., Hudson, R.J., and Foote, L., eds. *Conservation hunting: People and wildlife in Canada's North*. Occasional Publication No. 56. Edmonton, Alberta: Canadian Circumpolar Institute. 37–45.