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Trapping and furbearer management in North American wildlife conservation

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Furbearer Management in North America maintains wild furbearer populations at sustainably harvestable, scientifically determined and socially acceptable levels. Furbearer management impacts numerous wildlife populations and habitats, and human health, safety and property. Achieving balance in the management of furbearers is not always an easy task partly because regulated trapping, a controversial management technique, plays a critical role in this balance. Steps have been taken by wildlife professionals to improve the humaneness of trapping through the development of international standards used to evaluate traps. These efforts will ideally preserve trapping and the many roles it plays in furbearer management and wildlife management in general.

Keywords: Trapping; Furbearer management; Humane trapping standards

Introduction

All mammals have hair, but the term 'furbearer' is generally used to refer to species of mammals of which the skins are commercially valuable in the North American fur trade [1]. Over 4200 species of mammals exist today, but only 27 species are used in the commercial fur trade in North America [2]. Furbearers are in the orders Carnivora, Rodentia and Marsupialia [3]. Because of the rich taxonomic diversity of furbearers, they are found in practically every ecosystem in North America from arid plains and wetlands to sweltering deserts and the frozen arctic. They comprise all types of consumers in the food chain: herbivores, carnivores and omnivores. Furbearers vary in abundance depending on their natural order in the food web of a particular ecosystem. Some occupy the highest trophic level in their ecosystem (e.g. top consumer/carnivore/grey wolf [*Canis lupus*]), which typically results in lower abundance, whereas others occupy lower levels (e.g. primary consumer/herbivore/muskrat [*Ondatra zibethicus*]) and may be extremely abundant in ideal habitats. Home ranges vary between furbearer species from a few hectares to thousands. Some furbearers are terrestrial while others are semi-aquatic. In fact, the only common feature amongst the many species of furbearers is that they produce fur that is valued by humans.

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In North America, prehistoric peoples hunted furbearers for more than 11,000 years [4] and were dependent on these species for meat for food and fur for clothing, bedding and shelter. Before European colonization, Native Americans used primitive trapping techniques such as deadfalls and sinew snares to capture furbearers [5]. With the arrival of colonists, however, steel traps became the prevalent method for capturing furbearers [6] and although trapping was originally used by the colonists as a means of controlling depredations on livestock, gardens and food stores, harvesting of furbearers for their fur soon became an important enterprise [7].

Furbearer pelts were used in trade for other commodities (manufactured goods, foods, etc.) not readily available in North America. European colonization spawned the spread of agriculture, the development of towns, and eventually the densely populated metropolitan areas, sprawling suburbs, and well-populated rural landscapes that, with the exception of the Far North, now extend over a significant portion of North America today. Throughout this time, harvesting wildlife with traps for the fur trade and subsistence continued. As agriculture and human population expanded further, trapping once more became important as an animal damage control mechanism and trapping for this purpose has become a significant part of the animal damage management industry we see across North America today [8–10].

The harvest and trade of furbearers played a major role in colonial economies and in facilitating the initial colonization of North America and the subsequent westward expansion [6,7,11–13]. In the early days, the natural resources of North America were seen as inexhaustible, and unregulated harvest soon resulted in great reductions or extinction of many once common species such as the American beaver (*Castor canadensis*), sea mink (*Neovison macrodon*), great auk (*Pinguinus impennis*), passenger pigeon (*Ectopistes migratorius*) and plains buffalo (*Bison bison*). These excesses spurred the beginnings of conservation (as wise resource use) as early as the mid/late 1600s with regulations restricting the harvest of various wildlife species [14], but systematic conservation efforts took centuries more to develop.

Today, regulated trapping remains an important component of modern furbearer management and wildlife conservation. In this paper, we explore just how regulated trapping is used in the conservation and management of many wildlife species in North America and demonstrate its practical utility in a variety of wildlife applications.

Modern furbearer management goals and techniques

Today in North America, furbearer harvest and marketing of pelts and other products are regulated within scientifically based management programmes. Regulations within these programmes give wildlife managers the tools to balance the incentive of economic gain with the authority to ensure that profit motivations do not result in overharvest and the decline of highly valued species. At the same time, regulated harvest maintains the flexibility for wildlife managers to manage species at levels that are both ecologically sustainable and acceptable. The economic value of raw furs enables wildlife managers to raise quotas for specific species that are exceeding social tolerance with the expectation that licensed harvesters will actually respond by increasing the harvest to desired levels. For most other species of wildlife, such a regime is not possible.

Generally, furbearer management and conservation programmes are based on three principles of sustainable harvest: (1) the species are not endangered or threatened; (2) the

harvest methods are socially acceptable and humane; and (3) harvesting the species achieves a functional objective. Unlike predation management or local eradication programmes, furbearer management prescribes a proportional off-take of the population, during a specified period and with restrictive methods, to achieve a specific management goal that must ultimately protect the long-term continuance of the species [15].

North American furbearer management has been highly effective. Numerous species, such as beaver, river otter (*Lutra canadensis*), grey wolf, bobcat (*Lynx rufus*), fisher (*Martes pennanti*) and marten (*Martes americana*), experienced significant population declines following European settlement of North America. These population declines were the result of unregulated harvests, severe habitat loss and targeted extirpation programmes [16–28]. Despite these early crises, modern furbearer management has assisted in bringing these species back to abundance.

Both the ecological role and economic value of furbearers are primary motivations behind contemporary management programmes [17,20,29]. Modern furbearer management requires estimating population status and trends, controlling and regulating harvest directly through the adjustment and prescription of harvest opportunities, and monitoring the effects of management actions on populations. Hunters and trappers play an important logistical role in helping managers understand population dynamics and the effects of management actions by donating parts of harvested animals (teeth, reproductive tracts, various tissues, etc.) for scientific evaluation. Large sample sizes of donated parts are generally needed to quantify the health of populations, and hunters and trappers provide the only economically feasible method for managers to acquire such data.

Population status information may suggest opportunities for additional harvests or, conversely, needs to restrict harvest to ensure the long-term conservation of a population. Harvest can be influenced by adjusting harvest opportunities, such as the duration of a season, individual or cumulative bag limits, or influencing harvest potential through the regulation of harvest techniques and methods. Understanding population status information informs management actions and assures the public that well-regulated consumptive use activities are not detrimental to the long-term stability of the wildlife resource. For example, in the late 1990s, Missouri's river otter management programme was legally challenged three times by animal welfare organizations arguing that harvest was detrimental to the long-term stability of the population. Catch-per-unit effort data were used to demonstrate that river otter populations were stable during the period in question, despite legal harvests in excess of 1000 animals annually. Similarly, harvest age-structure data, determined from trapper-donated otter carcasses, were used in a population model to indicate a positive projected growth rate for this population. These data reassured the public that the otter trapping programme was sustainable and it further provided a successful legal defence in all three legal challenges [30]. This was a classic example of science-based wildlife management decision-making being rigorously tested by legal process and proven effective.

Furbearer management programme administration

The Public Trust Doctrine is the cornerstone of North American conservation. This principle guides wildlife management by enshrining wildlife as a public resource, held in trust by the government [31–35]. In North America, furbearers are professionally managed by state and provincial agencies. These agencies are responsible for ensuring that harvest of animals is conducted responsibly and ethically. Trapping is arguably the most regulated

outdoor activity in North America. Regulations cover equipment used, timing and duration of harvest seasons, limits on effort and number of participants, limits on individual and cumulative maximum harvests, standards for trapper education and training, licensing and reporting requirements, and a variety of other specific requirements depending on the jurisdiction and the management protocols in place. This wide variety of regulatory mechanisms gives agencies the ability to adapt and quickly respond to changes in furbearer abundance. Certain species are further regulated through rigorous fur trade and export policies and regulations, such as the Convention of the International Trade of Endangered Flora and Fauna (CITES) and the Agreement on International Humane Trapping Standards (AIHTS).

To enforce such an array of regulations, a corps of highly trained wildlife law enforcement officials exists in every jurisdiction where furbearers are harvested. Often called 'game wardens' or 'conservation officers', these individuals undergo extensive training on the laws and regulations related to furbearer management and the procedures for charging offending individuals through the courts. Enforcement occurs at multiple scales, ranging from local field-based personnel to extensive interstate and international cooperation involving numerous agencies. Numerous wildlife forensics laboratories help to support these law enforcement efforts.

Once convicted of an infraction, individuals can face severe criminal penalties, including fines and imprisonment. For most violations, individuals lose trapping privileges for periods that can range from a single season to a lifelong revocation of privileges. In the United States, the loss of trapping privileges often extends nationwide based on the Interstate Wildlife Violators Compact – a cooperative agreement among 42 states that ensures individuals whose trapping rights have been revoked in one state, also have those rights revoked in all remaining 41 jurisdictions [36].

In addition to strong wildlife enforcement, most of the states and provinces have robust trapper education programmes and require successful completion of a certified trapper education course before a trapping licence can be purchased. Trapper education programmes cover applicable laws and regulations, demonstrate recommended equipment and its proper use and provide a solid general view of species biology and harvest management programmes. These programmes also include a review of ethical practices and standards that trappers must apply in their harvest of furbearers.

Research and monitoring in furbearer management

It is notable that wildlife agencies in North America have since the mid-1990s, dedicated over $40 million dollars to research programmes designed to evaluate the humanness of trap devices and for education of trappers in their use. The development of Best Management Practices (BMPs) for mammal trapping is a continual effort by cooperative state, federal and private institutions in the US [37]. In Canada, similar trap research and education has been conducted under the auspices of the Fur Institute of Canada in cooperation with provincial, federal and private partners [38]. BMPs in the US and approved traps in Canada are designed to improve the selectivity, efficiency and humaneness of trapping. Trapping devices and techniques recommended by BMPs and approved in Canada are implemented nationally in both countries through regulations, state and provincial trapper education programmes and other outreach methods. Furthermore, international standards were also developed to evaluate and implement more humane devices and techniques. It is

reasonable to say that no other method of wild animal harvest has developed or implemented testing programmes and international standards to evaluate the humaneness of the harvest or invested such substantial funding to research and develop improved tools and techniques to achieve this high ethical standard.

Furbearer biology has also been intensively studied, and well-published scientific investigations have examined the ecology, habitat requirements, diseases and parasites, and reproductive capacities of furbearers. These efforts have provided a wealth of information that is regularly applied to the conservation and management of these species in the United States and Canada. The literature is rich with management-focused research on furbearers in North America, including compilations such as Chapman and Pursley [39], Chapman and Feldhamer [40] and Novak et al. [41]. Research into the human dimensions of furbearer management represents one of the early applications of this discipline [42]. Understanding the motivations, values and attitudes of fur trappers is integral to implementing successful conservation programmes. Canada led the way in furbearer research during most of the twentieth century, as furbearers have had particular significance in that country's history, economy and culture [43]. For example, there is the pioneering research by Strickland and Douglas [44] on fisher harvest management in Ontario that influenced furbearer management for decades. Provincial and state furbearer biologists meet annually in regional associations to share research findings and management information resulting in an intense collaboration in furbearer management similar to the well-recognized continental efforts in North American waterfowl management.

Monitoring furbearer populations is particularly challenging because of their secretive nature, nocturnal habits, and particularly for carnivores, their relatively low population densities. Traditional monitoring methods included interpretation of harvest data, as they were often the only information available with sample sizes large enough for robust analyses [44]. Increasingly, non-harvest monitoring methods are being developed and employed to assess the status of furbearer populations. These methods include camera trap systems, snow-track surveys, hair snares, scent posts and scat collection using trained dogs [45]. Advances in conservation genetics are also enabling improved population monitoring using less invasive procedures.

Trapping is also a technique frequently employed by wildlife specialists as a means of acquiring specimens for research. Such methods may include the live-capture of animals as well as lethal harvest. In addition, trappers themselves provide resource managers with critical information by donating skinned whole carcasses or parts (teeth, reproductive tracts, etc.) of harvested animals which are then used to evaluate overall population health and numeric trends. This information allows for extremely robust statistical evaluations based on large sample sizes – a free data source that is virtually irreplaceable by other means. This is a primary example of how sustainable use of furbearers contributes directly to their conservation and management.

Funding for furbearer research and monitoring is provided largely through federal, state and provincial sources such as the Pittman–Robertson Wildlife Restoration Program in the United States, and hunting and trapping licence sales in states and provinces, as well as through private sources, including the fur industry [46]. Most state wildlife agencies are largely supported by harvest licence sales and user fees, and much furbearer research conducted both by agencies and universities is funded by grants and cooperative ventures supported by such funds. Indeed, a growing challenge for agencies is the movement of wildlife, including furbearers, to urban, suburban or open space areas where licensed harvest is impracticable or prohibited and where funds for research are severely limited.

Nonetheless, science, as evidenced by robust research and monitoring programmes and a wealth of published studies, is the very foundation of furbearer management in both Canada and the United States.

Benefits of trapping for wildlife conservation and society in North America

Regulated wildlife harvesting activities in North America provide a range of social and economic benefits to society. While the economic value of furbearers provides incentive to harvest overabundant populations, this also helps maintain, at reasonable levels, animal populations that conflict with human interests in various ways. Furbearers have significant negative economic and social impacts through their consumption of agricultural crops and through dam building and burrowing activities on transportation infrastructure. They also have potential to impact human health via the spread of zoonotic disease and via direct threats to human safety. Maintaining animal populations at socially acceptable levels helps build tolerance within the general public, while opportunities to harvest surplus animals helps ensure that trappers will continue to regard furbearers as valuable and continue to lobby for their conservation. Indeed conservation efforts around the world have shown that eliminating wildlife harvest and the potential to legal trade in wildlife parts, even where the harvest/trade can be shown to be sustainable, can lead to a de-valuing of the resource. It also leads to greater wildlife conflict for local people, often with negative impacts to the species involved, and greater challenges for biodiversity conservation [47].

Nutria are a highly prolific non-native aquatic species introduced to North America. At high populations' densities, they have caused significant coastal marsh damage along the Atlantic coast in Maryland, the Gulf Coast sections of Louisiana, and along the Pacific Coast in Washington State [48,49]. These coastal marshes are among the most productive habitats in North America and provide important functions to a diverse spectrum of fish and wildlife, including habitat to over 15 million water birds, 1 million alligators and more than 10 threatened or endangered species [50]. Nutria denude marsh habitat through excessive herbivory. Once stripped of vegetation, marsh habitats are susceptible to erosion that causes gradual marsh conversion to open water, a habitat no longer suitable to marsh dependent wildlife.

In Louisiana, nutria damage had been largely contained for many years by private fur harvest. When fur prices and private trapping declined in the 1980s, loss of wetlands became a growing concern. In 2002, wildlife officials in Louisiana initiated a trapping programme to reduce nutria populations, thus decreasing the level of herbivory and resulting marsh damage and erosion of critical habitat. Although bounty programmes had long been discredited as a useful wildlife management tactic, Louisiana officials devised a creative way to target specific marsh areas for nutria population reduction, supplementing fur values with incentive payments to registered trappers of $4.00–$5.00 per animal. In 2003–2004, 346 trappers recovered 332,596 nutria from target areas [51–53]. Similar targeted comprehensive trapping programmes have been initiated in the Chesapeake Bay region of Maryland, as well as on the West Coast in Washington State. These programmes have been remarkably successful and recovered and saved millions of acres of the fragile costal marsh ecosystem [54–56].

Muskrats, a common native furbearer in North America, are a dominant herbivore in freshwater wetlands [57]. Their populations are cyclic, and at high population levels, they can cause 'eat outs' that reduce or eliminate wetland vegetation, including root systems

and soil-binding substrate, resulting in erosion and loss of marsh habitat. They also cause extensive damage burrowing into marshland dykes and banks [58]. Muskrats in marsh habitat conditions are among the most studied furbearers because of their wide distribution, economic importance and ability to alter habitat quality and quantity [59]. Their wide distribution and local abundance also makes the muskrat one of the most widely harvested furbearers in North America. Historically, and to the present time, the harvest and sale of muskrat pelts have been an important source of income while supporting the management of private wetlands and in many cases, providing public participation in wetland conservation on state and federal wildlife refuges [60]. The fur harvest of muskrats, along with the wetland area in the US, has declined substantially in the past century, but has remained stable in recent decades. In 1914, more than 10 million muskrat pelts were exported to London alone [61], while in 2013, 36 states reported a harvest of 1,622,041 [62].

Beavers, like muskrats, are a keystone species in North American wetlands. Prior to the settlement of North America by Europeans, the beaver population is estimated to have numbered 60 million. By 1900, the population had been reduced to less than 100,000 by unregulated trapping, hunting and habitat alterations. Conservation efforts were undertaken to restore beaver populations in the early 1900s. Beaver captured in live restraint type traps were trans-located from state to state. Creative efforts, such as parachuting beaver from aircraft were used to reintroduce beavers into remote regions. Restoration efforts were given a boost through the Federal Aid in Wildlife Restoration Act passed in 1937 and by the mid-1950s beaver populations had rebounded to the point where limited harvest seasons were allowed by some state conservation agencies [63–65]. Today, over 500,000 beaver are harvested annually across North America [62,66] and trapping plays a critical role in continued conservation and management.

In fact, beaver population management is carried out mostly by regulated trapping and these efforts benefit many wildlife species. Habitat alterations and the associated wetlands created by the dam building efforts of beavers are highly productive for numerous wildlife species (e.g. waterfowl, fish, amphibians). Uncontrolled flooding caused by the construction of beaver dams can, however, be detrimental to agricultural and timbered lands as well as affecting critical habitat for endangered plant species such as pink lady slipper (*Cypripedium acaule*) and sweet pitcher plant (*Sarracenia rubra*) [50]. Potential flooding from dam building by beavers also affects suitable locations for human development and placement of transportation infrastructure (e.g. roads and railroads). Controlling beaver populations and occupancy of wetland sites by beaver is therefore an important conservation objective for wildlife officials. In the absence of trapping, some $16–$32 million of taxpayers' money would be required to control beaver populations at acceptable levels [67].

The importance of managing wildlife damage has grown as human populations continue to increase, and landscapes are altered. Within the US alone, the economic loss caused by wildlife damage is estimated at $22 billion annually [9]. Most furbearers are capable of causing nuisance problems or economic loss [1]. Terrestrial species such as the grey wolf, coyote, red fox, raccoon, skunk and badger create many man/wildlife conflicts. Livestock losses to the sheep and cattle industry in the US equal over $50 million annually from coyotes alone [9]. Owing to control efforts on coyotes, US livestock producer and consumer benefits have been calculated to be $116 million and $251 million annually, respectively [68].

In addition, diseases may be carried by furbearers, some of which are transmissible to domestic pets and livestock as well as human populations. Costs associated with the control of rabies amongst furbearers are already estimated at $450 million annually, but the

number of cases continues to increase [69]. Trapping is often the only way to manage some species (e.g. coyote, fox and raccoon) for disease control because they are generally wary and primarily nocturnal. It is estimated that costs for the control of these species would increase some 221 per cent in the absence of hunting and trapping [67]. Since diseases may be density dependent [70,71], controlling population density may reduce the incidence of disease presence and transmission and the associated economic costs [72–75].

But trapping and furbearer managements have other benefits for society and wildlife as well. Economic value of the trade in fur worldwide is easily estimated at over $40 billion [76]. Fur harvesters profit through the sale of furs for market and the production of ancillary products such as meat that may be used for human and pet consumption [50]. Besides the harvesters, the fur trade also consists of those who manage the flow of furs from collection through the processes of dressing, manufacturing and retailing, activities which provide over 200,000 jobs in North America [77]. Rural communities especially are supported economically through the sale of wild fur and the goods and services sold to the public who participate in hunting/trapping. As a result, the fur trade is a multi-billion dollar industry and benefits society economically and materially [76]. Other benefits to society, provided by trapping within furbearer management programmes, include both recreation [1] and subsistence throughout much of North America. Subsistence trapping, in particular, is an important part of some northern cultures of indigenous aboriginal peoples [78,79].

Trapping has also been used to protect endangered species such as sea turtles and whooping cranes from predation [80–84]. In fact, over thirty endangered species have been protected by trapping and these species include both aquatic and terrestrial species of plants and animals [50,85–92]. Furbearer management has also contributed to some of the greatest success stories in modern wildlife management. Traps have been used to capture wildlife species for reintroduction. This has allowed species once extirpated from portions of their historical range to return, flourish and benefit native ecosystems. Examples of successful reintroductions facilitated by trapping include river otter, grey and red wolves, beaver, fisher, marten and Canada lynx.

Contemporary opportunities and challenges

There are many challenges to modern furbearer management in North America generally and to the use of trapping specifically. With increasing urbanization, increased suburban encroachment on rural land, and the disconnection of youth from the nature [93], there is concern that the inclination, time and skills to engage in trapping and wildlife harvesting and assist in furbearer management/human wildlife conflict mitigation will disappear. Even in Canada, where the human population is very sparse across the expanse of northern lands, the per cent of the population living in urban areas is greater than 80%, about the same as in the United States [94,95]. Similarly, with more and more of the human population concentrated in urban communities, larger proportions of the professionals dedicated to fish and wildlife, biodiversity and natural resource conservation are not coming from backgrounds where they were raised with close ties to the land. The understanding of sustainably managed, regulated harvesting is neither inherent nor a part of their understanding of the natural world. This need to understand the balance of the human use and need for goods and services from the natural world is critical for both our public consciousness and future practitioners and policy makers who will provide direction and sustainable management of wild furbearer populations and all other natural resources.

As people become removed from the understanding of where food and other products that support life are derived, it becomes easier to make simplistic, often ill-informed judgments of what is right and wrong in terms of how natural resources might or should be managed and used (or not used). It is always easier for a person not directly involved or impacted to support or at least not oppose a change in legislation or regulation that negatively impacts another person's or community's privilege to use a natural resource. It is sometimes difficult for the lay observer to sort out the facts from the lobbying rhetoric.

It is interesting to note that soon after a coyote fatally attacked a young woman in Nova Scotia [96], there was increased interest in the provincial government programmes to manage man/wildlife conflict, particularly where human safety was threatened. This was the first adult human fatality from a coyote attack, yet there was overwhelming clear public support for direct action in such situations and for science-based management to deal with local problems and manage potential problem wildlife within social carrying capacity [97].

Animal activism in North America and elsewhere, particularly in urban-dominated provinces and states, has resulted in the ability of well-funded animal rights groups to target legal, highly regulated and sustainably managed wildlife harvest and influence public opinion and sometimes convince government agencies to restrict or eliminate sustainable wildlife harvests. This has led to changes in trapping regulations in various jurisdictions. For example, Canada has a programme in place to test and certify traps permitted for furbearer capture, primarily based on pen tests and computer models [98] for body-grip traps. With few exceptions, the use of foothold traps is no longer permitted. Most US states allow the use of a wider range of animal capture devices, including various sizes of foothold traps. Eight states, however, have highly restrictive trapping laws or regulations, in some cases, banning the use of foothold traps altogether.

In 1996, US state wildlife agencies initiated a programme to develop BMPs for trapping in the US, subsequently funded mainly by the US Department of Agriculture, based on evaluation of animal traps according to accepted international humane standards as well as criteria for efficiency, selectivity, safety and practicality [99]. This extensive effort, by both state and federal government agencies, is one of the most ambitious, nationally coordinated projects in wildlife management undertaken in the US in recent years and has included routine information exchange with other wildlife researchers worldwide [100]. During this continuing programme over 150 commercial trap types (including cage traps and snares) have been tested for 22 species of furbearers in several US regions, via 41 state wildlife agencies, and with the cooperation of nearly 1000 trappers, wildlife technicians and state agency biologists. The programme is coordinated with the parties to the AIHTS (Canada, Russia and the European Union). Although the US is not a treaty participant, the testing standards used are similar, having developed over a long period of time, primarily through efforts organized by the International Organization for Standardization. Canada had first proposed the use of international standards for humane trapping in 1983 to the Conference of Parties of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) [101]. In 1991, the EU established a regulation requiring evaluation of traps by countries exporting wild furs to the EU, effectively tying North American trapping programmes directly to international trade [102].

Public support for modern regulated trapping and the benefits derived from furbearer management is critical for sustaining regulated trapping as a viable wildlife management technique that will continue to benefit both wildlife and the public [99,103]. For the general public, the use of traps to capture wildlife is controversial. Three fundamental issues underlie public attitudes towards trapping: 'the public cares deeply about

America's wildlife resources, the public does not take lightly the killing of animals, and the public is highly uninformed about trapping' [104]. Accordingly, public opinion varies dramatically based on the reasons for trapping and various demographics. It is critical for agencies that use trapping as a wildlife management tool to demonstrate to the public that they are not harming or endangering resources but rather improving valued natural resources in some way, killing animals only when required and using humane techniques.

Wildlife agencies together with trapper/wildlife harvesting interests need to be proactive in ensuring that appropriate laws and regulations and science-based management programmes are in place to answer anti-harvesting advocacy campaigns. Equally important is the need to communicate, inform and engage the full breadth of the public, including the overriding majority of our population that resides in our urban landscape, on the necessity of managing wildlife populations through trapping.

Conclusions

Trapping and furbearer managements play an important role in modern wildlife conservation and contribute not only to sustaining furbearer populations, but healthy populations of many other species as well. There are also significant contributions to the protection of human health, safety and property. In modern times, several key furbearer species have been recovered from the brink of extinction and now are sustainably harvested as a result of modern furbearer management and regulated trapping. Trappers are an important part of this management regime, which is critical to the sustainable use, management and conservation of furbearer species along with numerous other species that may be impacted by furbearers including endangered plants and animals, waterfowl and other species.

Furbearers are found in every ecosystem and impact farmlands, rangelands, wetlands and forests, as well as human settlements of all sizes and configurations. A highly variable, prolific and adaptable group of species, furbearers often come into conflict with human interests. At the same time, furbearers have an intangible aesthetic value and a critical ecological role appreciated by many. Ironically, furbearers' most ardent advocates are both those who harvest them and those who oppose the use of trapping. Yet, both sides see the inherent value of these species and seek to protect them because of it. Furthermore, studies have shown that trapping is usually supported by a majority of the public when the scientific information demonstrates that trapping is necessary, can be done humanely and benefits human beings and wildlife [104].

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