TRAPPING AND FURBEARER MANAGEMENT

IN NORTH AMERICAN WILDLIFE CONSERVATION

Trapping and Furbearer Management in North American Wildlife Conservation

is a compilation of the knowledge, insights and experiences of professional wildlife biologists who are responsible for the conservation of wildlife resources throughout the United States and Canada. It is based on the original *Trapping and Furbearer Management:Perspectives from the Northeast* published in 1996 by the Northeast Furbearer Resources Technical Committee. This expanded North American edition was authored by the following subcommittee of the Northeast Furbearer Resources Technical Committee (NEFRTC): Dr. John F. Organ, Subcommittee Chairman, U.S. Fish and Wildlife Service; Thomas Decker, Vermont Department of Fisheries and Wildlife; Susan Langlois, Massachusetts Division of Fisheries and Wildlife; and Peter G. Mirick, Massachusetts Division of Fisheries and Wildlife.

Acknowledgements

The following professional wildlife biologists critically reviewed drafts of this document and made significant contributions: Buddy Baker, South Carolina Department of Natural Resources; James DiStefano, New Hampshire Fish & Game Department, ret.; Dr. Kenneth Elowe, Maine Department of Inland Fisheries & Wildlife; Loyd Fox, Kansas Department of Wildlife and Parks; Dave Hamilton, Missouri Department of Conservation; George Hubert Jr., Illinois Department of Natural Resources; Neal Jotham, Canadian Wildlife Service, ret.; Greg Linscombe, Louisiana Department of Wildlife and Fisheries; Michael O'Brien, Nova Scotia Department of Natural Resources; Steve Petersen, Alaska Departmant of Fish and Game; Paul Rego, Connecticut Department of Environmental Protection; Christiane Roy, Kansas Department of Wildlife and Parks; and Keith Weaver, U.S. Fish and Wildlife Service Refuge System.

Trapping and Furbearer Management in North American Wildlife Conservation is a publication of the Northeast Furbearer Resources Technical Committee and was coordinated by the Massachusetts Division of Fisheries and Wildlife and the U.S. Fish and Wildlife Service, Division of Federal Aid. The Executive Committee of the Northeast Section of The Wildlife Society reviewed and endorsed this document. Funding was provided by the International Association of Fish and Wildlife Agencies, Furbearer Working Group; the Federal Aid in Wildlife Restoration Program; and The Northeast Section of The Wildlife Society. Layout and design by David Gabriel, Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement.

The Northeast Furbearer Resources Technical Committee

is comprised of professional wildlife biologists from the northeastern United States and Provinces of eastern Canada, and is committed to the study and responsible management of our furbearer resources.

The Northeast Section of The Wildlife Society

is comprised of professional wildlife biologists and resource scientists and managers from eleven northeastern states and six eastern Canadian provinces, and is committed to excellence in wildlife stewardship through science and education.

For further information on Furbearer Management and Trapping in your state or province, contact your local Fish and Wildlife or Natural Resources Department.

Fifth Printing

Cover photo of raccoon by Bill Byrne.

Pictographs on cover portray cave drawings of methods ancient peoples used to capture wild animals.

Introduction

The trapping of furbearers — animals that have traditionally been harvested for their fur — has been an enduring element of human culture ever since our prehistoric hunter-gatherer ancestors devised the first deadfalls, pit traps, snares and capture nets. People were dependent upon furbearers to provide the basic necessities for survival — meat for sustenance, and fur for clothing, bedding and shelter — throughout most of human history. Defining and defending territory where furbearers could be captured to acquire these critical resources united families, clans and tribes long before the invention of agriculture and animal husbandry gave rise to ancient civilizations. While modern technology and agriculture have significantly reduced human dependence on furbearers for survival, people in both rural and developed areas continue to harvest furbearers for livelihood and personal fulfillment. The taking and trading of furbearer resources remain on the economic and environmental agendas of governments throughout the world.

Trapping furbearers for their fur, meat and other natural products presumably began with our earliest ancestors on the African continent. It has a long tradition in North America, dating back to the time the first aboriginal people arrived on the continent. Several thousand years later, fur was the chief article of commerce that propelled and funded European colonization of the continent during the 17th and 18th centuries. Numerous cities and towns founded as fur trading centers during that period still bear witness to the fact that furbearer trapping had a major influence on the history of the United States and Canada.

The utilization of furbearer resources was unchallenged throughout that history until early in the 20th century, when the first organized opposition to furbearer trapping emerged. The focus of that opposition was primarily on development of more humane traps and curtailment of trapping abuses, rather than against trapping itself or continued use of furbearer resources. During the 1920s opposition magnified to challenge the use of steel jaw foothold traps and the wearing of fur.[1] In response to this development, proponents of trapping and the fur industries began organizing to defend themselves. By the 1930s, furbearer trapping had become a recurrent public issue. Since then, the pro- and anti-trapping factions have disseminated enormous amounts of generally contradictory information.

During this same period, new technologies and advances in ecology, wildlife biology, statistics and population biology allowed wildlife management to develop into a scientific profession. State, provincial and federal agencies were created to apply this science to protect, maintain and restore wildlife populations. The harvest of furbearers became a highly regulated, scientifically monitored activity. Trapping and furbearer management — one steeped in ancient tradition, the other rooted firmly in the principles of science — allowed furbearer populations to expand and flourish.

Today, as controversy over the use and harvest of furbearers continues, professional wildlife managers find themselves spending considerable time trying to clarify public misconceptions about trapping and furbearer management. The complex issues involved in that management — habitat loss, animal damage control, public health and safety, the responsible treatment of animals — cannot be adequately addressed in short news articles or 30-second radio and television announcements.

This booklet is intended to present the facts and current professional outlook on the role of trapping and furbearer management in North American wildlife conservation. It is the combined work of many wildlife scientists responsible for the successful conservation of furbearer populations in the United States and Canada.

Photo by Bill Byrne

The Furbearer

Technically, the term **furbearer** includes all mammals, all of which, by definition, possess some form of hair. Typically, however, wildlife managers use the term to identify mammal species that have traditionally been trapped or hunted primarily for their fur. North American furbearers are a diverse group, including both carnivores (meat-eating predators) and rodents (gnawing mammals). Most are adaptable species ranging over large geographic areas. They include beaver, bobcat, badger, coyote, fisher, fox, lynx, marten, mink, muskrat, nutria, opossum, raccoon, river otter, skunk, weasels and others. A few animals that are normally hunted or trapped primarily for their meat or to reduce agricultural or property damage may also be considered furbearers if their skins are marketed.

*A magnified view of red fox fur shows the short, dense **underfur** that provides insulation and water repellent qualities, and the longer **guardhairs** that resist abrasion and protect the underfur from matting.*

Most furbearers possess two layers of fur: a dense, soft **underfur** that provides insulation and water-repellent qualities; and an outer layer of longer, glossy **guardhairs** that grow through the underfur, protecting it from matting and abrasion. A fur is said to be **prime** when the guardhairs are at their maximum length and the underfur is at its maximum thickness. Fur generally becomes prime in midwinter when the coat is fresh and fully grown; the timing for primeness may vary somewhat depending on species, location (latitude) and elevation.

Furs are generally "dressed" (tanned with the hair on), then trimmed and sewn into garments, rugs, blankets and ornaments, and sometimes dyed in a variety of colors and patterns. Furs are also used in fishing lures, fine brushes and other products. Some furs are shaved, and the hair processed into felt for hats and other garments.

Fur is a renewable (naturally replenished) resource, a product of long traditional use, valued by many for its natural beauty, durability and insulative qualities. Fur is only one of many values that people ascribe to furbearers (see page 27).

Photos by Bill Byrne

Photo by Jack Swedberg

Furbearers are a diverse group including several rodents and numerous carnivores (meat-eaters). The muskrat (above, left), a wetland herbivore (plant-eater), is the number one furbearer in the United States and Canada based on the number of pelts harvested each year. The beaver (above, right) is the largest native rodent in North America, best known for its ability to fell trees and dam streams. Facing page, top, the fisher, a member of the weasel family, is an opportunistic predator equally at home in the trees or on the ground. Below, the red fox, like the beaver, has achieved considerable success in adapting to suburban environments.

Photos by Bill Byrne

Issues in Furbearer Management

There are three major issues involving the conservation and management of furbearers today: human population growth with its inevitable degradation and destruction of wildlife habitat; increasing public intolerance of furbearers in populated areas; and opposition from animal rights activists to any harvest or use of wildlife.

Loss of Habitat

The first and most critical issue challenging furbearer conservation today is human population growth and the resultant degradation and destruction of wildlife habitat. Without adequate habitat, wildlife populations cannot be sustained. While no furbearer species is in immediate jeopardy due to habitat loss in North America (because furbearers are typically abundant, adaptable species often covering large geographic areas), the range of some populations has been reduced. Habitat destruction has eliminated the option to restore some species to areas where they once existed.

Among wildlife scientists, ecologists and biologists, no issue is of greater concern than the conservation of wildlife habitat. Every government wildlife agency is directing significant educational and/or financial resources to the conservation of habitat. Habitat conservation is the key to maintaining the viability of all wildlife populations and the ecosystems on which they depend. Unlike habitat destruction, regulated trapping is a sustainable use of wildlife resources, and does not, in any way, jeopardize the continued existence of any wildlife population.

Photo by Bill Byrne

The continuing loss of wildlife habitat is the most critical issue in wildlife conservation today. Unlike regulated trapping, habitat destruction threatens the existence of wildlife populations and the ecosystems on which they depend. Further, as development encroaches on wildlife habitat, adaptable furbearer species create problems for homeowners, increasing public intolerance of these valuable wildlife resources.

Public Intolerance

While habitat loss is a direct threat to wildlife populations, it also has indirect consequences. As wildlife habitat continues to be fragmented and eliminated by development, wildlife managers are confronted with new challenges: coyotes killing pets, beavers cutting ornamental trees and flooding roads and driveways, raccoons invading buildings and threatening public health with diseases and parasites. These kinds of human-wildlife conflicts reduce public tolerance and appreciation of furbearers. While **Biological Carrying Capacity** (population level an area of habitat can support in the long term) for a furbearer species may be relatively high, the **Cultural Carrying Capacity** (population level the human population in the area will tolerate) may be lower.[2] Wildlife managers, responding to public concerns, have implemented furbearer damage management programs at state and federal levels.

A growing dilemma is that furbearers, while of great recreational, economic, and intrinsic value to society, are also increasingly a public liability. The challenge — magnified in and near areas of dense human population — is to satisfy various constituents with different interests and concerns while conducting sound wildlife management. Wildlife agencies typically use an integrated approach involving education, barriers, deterrents and lethal techniques to address specific problems, while fostering public tolerance for wildlife that causes damage. The combination of as many feasible options as possible provides for the most successful program. Wildlife agencies have long relied on the free services provided by the public who trap to assist landowners suffering damage caused by furbearers. Unfortunately, due to various environmental, economic and sociological factors, traditional fur trapping — which reduces animal damage at no cost to the public — tends to be a rural activity. The number of people newly involved in this cultural activity has declined in recent years, particularly in suburban and urban areas.

Photo by Bill Byrne

Nuisance animal control is becoming a growth industry in many areas as development fragments wildlife habitat and traditional fur trapping declines. This trend is of concern to wildlife biologists, for it indicates that a growing segment of the public is losing its tolerance and appreciation for some wildlife species, viewing them as problems that should be removed and destroyed, rather than as valuable resources that should be utilized and conserved.

With the decline of traditional fur trappers, "nuisance animal control" has become a growth industry. Businesses specializing in trapping and removal of "problem" animals are thriving in many areas. This trend is of concern to wildlife biologists, for it indicates that a growing segment of the public is coming to view furbearers as problems that should be removed and destroyed, instead of valuable resources that should be utilized and conserved. Regardless, regulated trapping provides an important and effective method to meet the public's demand for reduction of furbearer damage.

Animal Rights

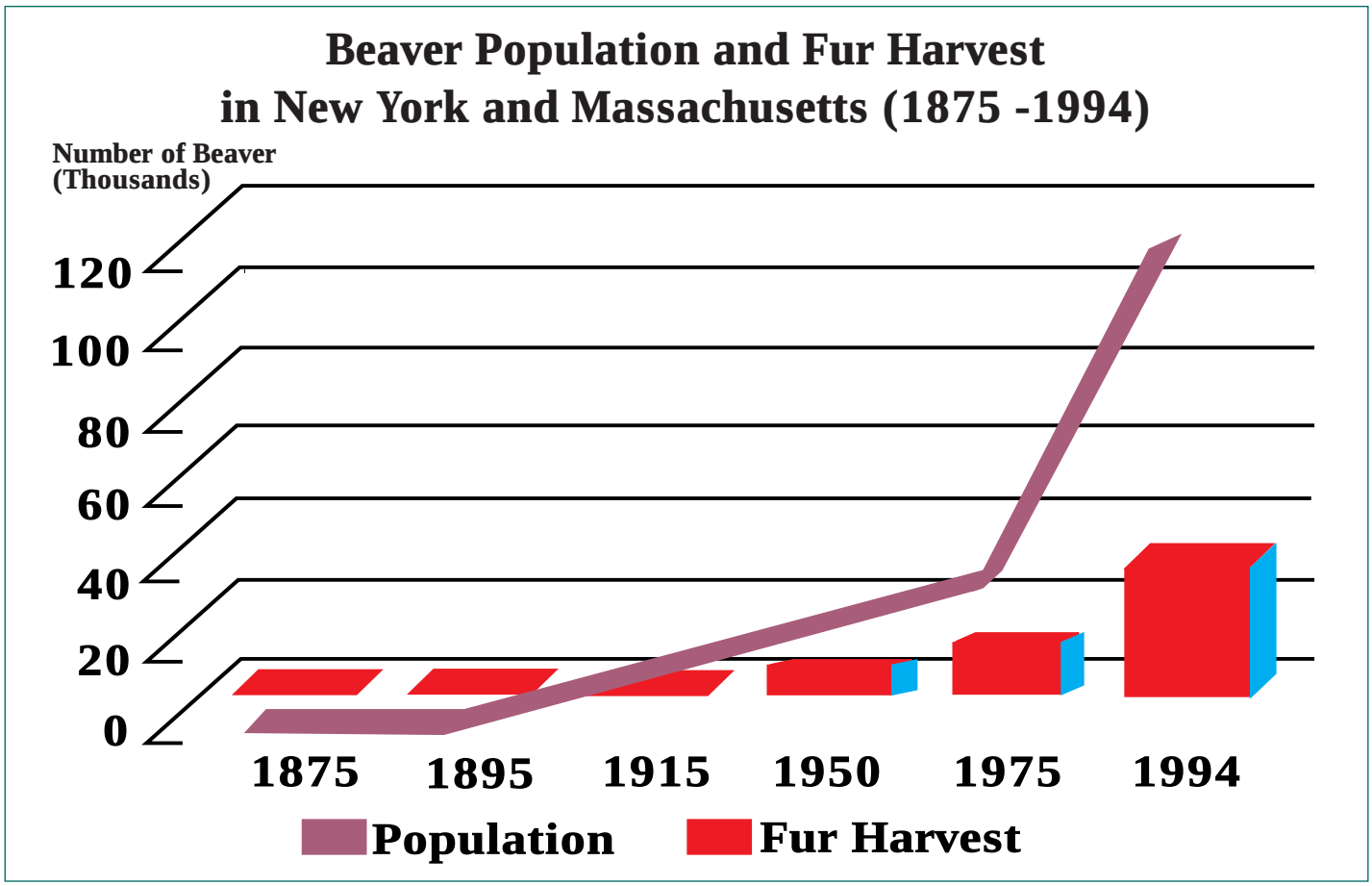
As wildlife managers are faced with having to rely more on regulated trapping for furbearer population management and damage control, animal rights activists demanding an end to trapping are appealing for public support. Those advocating "animal rights" would eliminate all trapping and use of furbearers. Without regulated trapping, the public would have far fewer reliable and economically practical options for solving wildlife damage problems associated with furbearers.

Public Wildlife Agencies Manage Our Wildlife Resources

Furbearer management programs in the United States and Canada are primarily conducted by state and provincial wildlife agencies. Current management programs respond to and respect the diversity of people and cultures and their values toward wildlife resources. In the United States, most funding for furbearer management comes from two sources: hunting and trapping license revenues, and federal excise taxes on firearms, ammunition and archery equipment (federal aid). Most wildlife management is not funded with general tax dollars. Federal aid — now amounting to over 200 million dollars in some years among the 50 states, territories and the Commonwealth of Puerto Rico — has been provided since passage of the Federal Aid in Wildlife Restoration Act (also known as the Pittman-Robertson Act) in 1937. Federal funds and the assistance of certain federal agencies are also available for wildlife damage management programs within each state.

State and provincial wildlife agencies manage furbearer populations for the benefit of a public with diverse opinions. Wildlife managers must therefore balance many objectives simultaneously. These objectives include preserving or sustaining furbearer populations for their biological, ecological, economic, aesthetic and subsistence values, as well as for recreational, scientific and educational purposes. It is sometimes necessary to reduce furbearer populations to curtail property damage or habitat degradation, or to increase furbearer populations to restore species to areas where they have been extirpated (eliminated within an area).

Professional wildlife biologists meet the public's objectives by monitoring and evaluating the status of furbearer populations on



Nearly extirpated prior to the start of the century, beaver populations have responded to applied wildlife management in a dramatic fashion.[3] Like many other furbearer species, the beaver has been restored to much of its former range while sustaining considerable, scientifically regulated public fur harvests.

Photo by Bill Byrne

Many states and provinces require that the pelts of certain species of furbearers taken by trappers must be officially examined and tagged (sealed or stamped) before they may be sold. This allows wildlife biologists to closely monitor harvest rates of some species while collecting invaluable data on population trends. When biologists need more information, regulations may be adjusted to require that trappers turn in the carcasses or certain parts of their harvested animals. This allows biologists to examine such things as reproductive rates, food habits, sex and age ratios and other information that is often useful in managing furbearer and other wildlife resources.

a regular basis, and responding with appropriate management options. Much of the information known about furbearer populations — as well as the management of furbearer populations — has been derived from trapping. Accounting for yearly variation in the numbers, sex and age of animals caught by licensed trappers, along with variation in effort provided by trappers, is an economical way to monitor population fluctuations. In many cases, biologists acquire information directly from harvested animals. More intensive (and expensive) research projects are initiated when additional information essential to management is needed. Many jurisdictions adjust trapping regulations in response to population changes to either increase or decrease the population in response to the public's desires.

Management plans and regulations restrict trapping seasons to periods when pelts are prime and the annual rearing of young is past. Historical records demonstrate how applied wildlife management sustains regulated harvests: populations and harvests of most furbearing species have generally increased in North America during this century. Beaver, for example, were almost eliminated from the eastern United States and greatly reduced in parts of eastern Canada by the middle of the 19th century. Today they number in the millions, thriving throughout that range wherever sufficient habitat remains and the public will allow their presence. They have been restored to this level while sustaining a substantial, annual, regulated public harvest.[4]

Multiple Uses of Furbearers

If we look back in human history, all of our ancestors once depended on furbearers for survival. Native peoples traditionally used furbearers for food, clothing, medicines, perfumes and other items. Today, many people living in rural and suburban environments throughout North America continue to live close to the land, utilizing furbearers to maintain a sense of self-reliance, remain in touch with their heritage, and participate in a favorite, challenging, outdoor activity. In a free society, such lifestyle decisions are a matter of personal choice.

Photos by Bill Byrne • Nutria dish photo courtesy of Lousianna Dept. of Wildlife & Fisheries

Wildlife managers in many states and provinces have reintroduced extirpated furbearer species. Extirpation was ultimately caused by widespread degradation and loss of habitat associated with the colonization of North America and subsequent growth of human populations. In some instances this was combined with excessive exploitation because there were no wildlife agencies to establish and enforce regulations designed to protect furbearer populations. Where habitat and public support are available, the reintroduction of extirpated furbearers has been remarkably successful. In both the United States and Canada, species such as beaver, river otter, fisher and marten have been reintroduced and restored throughout much of their historical range.

The time when furbearer species could be extirpated due to excessive, unregulated harvest is long past. Today, professional wildlife biologists are responsible for furbearer management. Most have devoted years of academic, laboratory and/or field research to the study of furbearer species. Their mission is the conservation of furbearer populations. They have been highly successful in that mission as evidenced by the restoration and current abundance of furbearer populations.

Harvested furbearers have many uses today, reflecting the utilitarian values of many of the people who harvest them. Pelts are used for clothing such as coats, hats, mittens (made by craftspeople in Maine, left) and blankets, and are also used to make moccasins, banjos, rugs, wall hangings and other forms of folk art. Fur is also used in fine art brushes, water repellent felt for hats, and high quality fishing lures. Some people use the meat of furbearers such as raccoon, beaver, nutria (prepared by a Louisiana chef, above) and muskrat for tablefare or as a food source for pets. It is delicious and nutritious, high in protein and low in fat. The glands of beaver are used in perfume, and glands and tissues from these and other furbearers are used to make leather preservatives, scent lures, and holistic medicines, salves and moisturizers. Even the bones, claws and teeth of harvested furbearers are sometimes used to make jewelery.

Principles of Furbearer Management

The goal of furbearer management is the conservation of furbearer populations. The main tenet of conservation is this: **Native wildlife populations are natural resources — biological wealth — that must be sustained and managed for the benefit of present and future generations.** If those wildlife populations are furbearer species, one important public benefit conservation provides is the opportunity to harvest some animals for food, fur or both. The harvest of animals for these purposes is among the most ancient and universal of human practices. Today, under scientific wildlife management, harvests are controlled and regulated to the extent that the survival of furbearer populations is never threatened. No furbearer species is endangered or threatened by regulated trapping. **North American wildlife conservation programs apply three basic principles in establishing and managing harvest of wild animals: (1) the species is not endangered or threatened; (2) the harvest techniques are acceptable; and (3) the killing of these wild animals serves a practical purpose.**[5]

It is important to understand that the aim of professional wildlife management is to perpetuate and ensure the health of wildlife populations; not the survival of individuals within those populations. Wildlife management does not generally focus on individuals because individuals have short life spans. On the time scale that conservation is pledged to address, individuals do not endure. Populations *do*. Populations — provided with sufficient habitat and protected from excessive exploitation — are essentially immortal. Wildlife managers apply scientific methods to maintain

furbearer species as viable, self-sustaining populations.

Population Dynamics

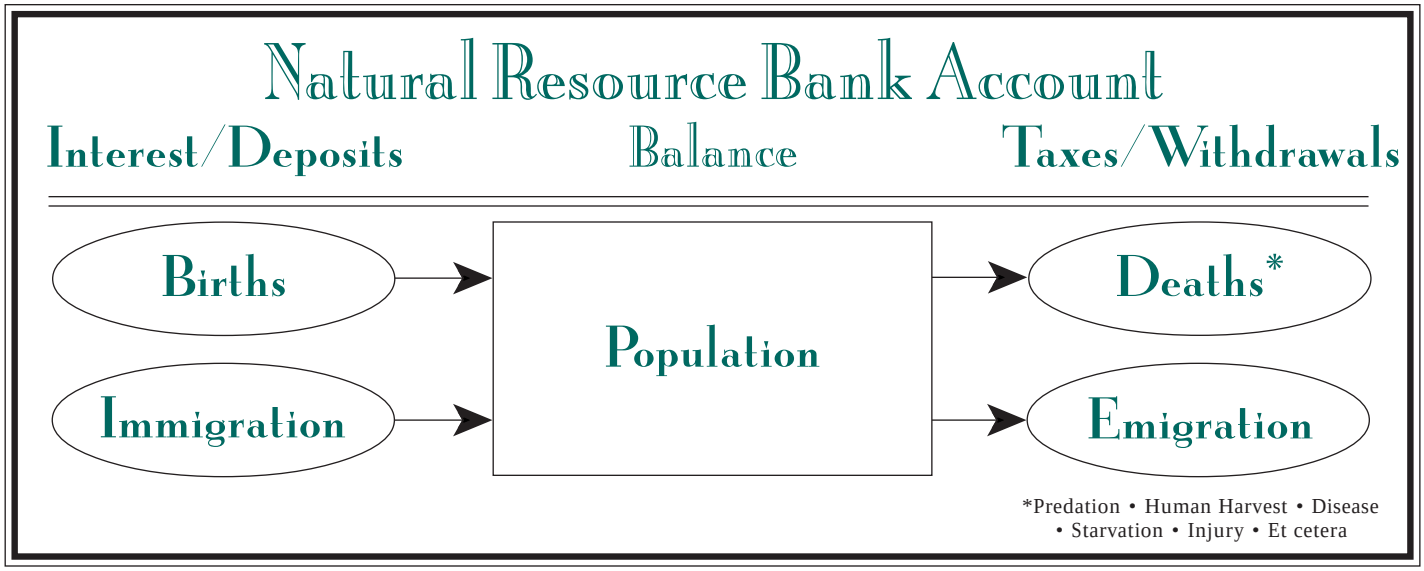
Like all populations, those of furbearers are dynamic. They are always in a state of flux, interacting directly and indirectly with other animal, plant, bacterial and viral populations. In response to these interactions and a host of other environmental factors — many of which are today related directly to human actions — furbearer populations increase and decrease in density (number of individuals in any given area) and range. Wildlife managers monitor wildlife populations to determine if they are increasing, decreasing or stable; to identify factors that affect those population trends; and to manipulate some of those factors to achieve the goals of conservation.

The laws of evolution and survival demand that the reproductive rate (the number of individuals born) of any population must equal or exceed its mortality rate (the number of individuals that die). If, over time, births do not equal or outnumber deaths, the population will become extinct. As a result, all species have evolved to produce a surplus of young during each generation. Furbearer species are no exception; many are capable of *doubling* their populations within a single year.

Because they produce a surplus of young, populations should theoretically grow continuously. The reason they do not is because as populations grow, various **limiting factors** slow or stop population growth. Resources required for survival — food, water, shelter and living space — are limiting factors. As a population grows, one or more of these resources may become scarce to the point that some members of the population fail to acquire them and therefore die, disperse or fail to reproduce. Other limiting factors include communicable diseases and predation. These are **density-dependent** factors — that is, they increase as the density of the population increases.

Photo by John Organ

Professional wildlife biologists are responsible for furbearer management today. They have been highly successful in their mission because they use the best scientific information available to ensure the present and future health of furbearer populations.



In a simple example (excluding habitat-related factors such as carrying capacity), a stable furbearer population can be compared to a bank account: interest and deposits (births and immigration) increase the balance (population) every spring and summer; taxes and withdrawls (mortalities and emigration) decrease it by roughly the same amount every fall and winter. Accountants (wildlife biologists) monitor the bank statements and advise the owner (the public) on when and how much of the balance can be withdrawn (harvested) that would otherwise be lost to taxes (other forms of mortality).

Other limiting factors are **density-independent**. These include weather extremes, habitat destruction and other catastrophic events. These reduce populations regardless of density. Some limiting factors such as road mortality (killed by vehicles) may be both density dependent *and* independent. Road mortality, for instance, is likely to increase as population density increases; however, it also will increase as more roads are built, regardless of population density.

Healthy furbearer populations cycle (increase and decrease about equally) on an annual basis. Most increase in the spring and summer with the birth of young; decrease in the fall and winter as natural mortality and emigration increase. Annual cycles are most dramatic in furbearer populations with high reproductive rates. Muskrat populations, for example, can decline by 75 percent during winter — and rebound completely by the following fall![6]

Banking Resources

Wildlife managers normally set furbearer trapping seasons to allow use of a portion of the individuals that would otherwise be lost to disease, starvation, predation and other mortality factors. The standard regulated harvest is **compensatory** mortality: it *replaces* mortality factors that would otherwise have reduced the population by a similar amount. A scientifically regulated, annual harvest can be sustained indefinitely because it removes only the surplus, leaving sufficient reproducers to restore the surplus.

As a simplified example, imagine a stable furbearer population as a bank account. The balance (population) is a continually shuffled stack of bills (individuals). The account accumulates interest (the birth of young) every spring. Taxes (predation, disease, etc.) are always taking a few bills out of the pile. If the interest is allowed to accumulate, taxes increase dramatically every winter. However, if the interest is withdrawn (hunted or trapped) by the owners (the public), taxes do not increase. Either way, through taxes or withdrawals, the balance remains about the same from year to year. Wildlife managers are the accountants who advise the owners on when and how much interest can be withdrawn from the account.

Furbearer Population Management

Wildlife biologists manage furbearer populations in much the same way they manage other fish and wildlife populations such as bass, deer and eagles: they monitor the populations, determine the best management goals for each population (i.e. should it be increased, decreased or stabilized in the best interests of the public and conservation), and then set harvest regulations/restrictions accordingly. Under most circumstances, the aim is to keep populations stable over time.

Year	1	2	3	4	5	6	7	8	9	10
Adults	2	2	2	6	10	14	26	46	74	126
2 Yr Old	0	0	4	4	4	12	20	28	52	92
1 Yr Old	0	4	4	4	12	20	28	52	92	148
Kits	4	4	4	12	20	28	52	92	148	252
Total	6	10	14	26	46	74	126	218	366	618

In the absence of limiting factors such as inadequate habitat, disease, predation and human harvest, beaver populations are capable of very high rates of growth. Regulated trapping helps control furbearer population growth and reduce furbearer damage at no cost to the public, and does not threaten the viability of furbearer populations.

Under some circumstances — when a furbearer population is causing damage by threatening the survival of endangered species, damaging fish and wildlife habitat, or creating a hardship for landowners or agricultural producers — it may be desirable to reduce furbearer populations within some areas. In these situations, wildlife managers may adjust trapping and hunting regulations to increase the harvest beyond surplus production. When population reduction is the objective, the harvest adds to the annual mortality rate. This controlled **additive** mortality will cause the population to decline.

Conversely, there are situations when it is desirable to increase furbearer populations. These occur when efforts are being made to restore an extirpated species, or when a severe population reduction has taken place. In such cases wildlife managers might restrict or prohibit harvests for a time to encourage a rapid population increase.

The beaver is an excellent example of a furbearer that warrants intensive management. Wetlands created by beaver are highly productive systems with an abundance of water and nurients. They support a huge diversity of plants and invertebrates, and provide habitat for hundreds of fish and wildlife species. If the management objective is to maintain species abundance and diversity, it is prudent to manage beaver for its positive wetland values.

However, beaver populations often require control to reduce conflicts with humans. Although problems with beaver flooding roads and damaging property are widespread, the problems would be more intense, and the economic impacts greater, without the harvests of beaver during regulated trapping seasons. Almost half a million beaver are harvested from the states and provinces in any given year.[7] This reduction is important in controlling the growth of beaver populations and reducing property damage. It does not threaten the viability of beaver populations or their positive wetland values.

Muskrat, nutria and beaver are the only furbearers in North America that, like deer, can significantly lower the quality of their habitat (by consuming a high percentage of the vegetation) if their populations are not maintained at an appropriate level. Additionally, lowering nutria populations may be a legitimate goal in making marsh habitats more suitable for other wildlife species and in preventing erosion and the loss of marsh vegetation.

Regulated trapping is the most efficient and practical means available to accomplish regular population reductions, and it does so at no cost to the public.

Although the populations of some furbearer species are prone to attain high local densities, and then to "crash" dramatically as density-dependent limiting factors (e.g. food availability and disease) are activated, most furbearer

Pitcher Plant

species become relatively stable once their populations reach a given density. However, that density may be beyond what the human population can tolerate. If the level of human-furbearer conflicts (or conflicts with other wildlife species and habitats) becomes too great, population reduction can be a responsible management alternative.

While furbearer population reduction is not a goal for most furbearer management programs, population reductions in specific areas can control the frequency of furbearer conflicts with humans, lessen predation on rare, threatened or endangered species, or reduce negative impacts on habitats and property.

The case of the piping plover, a beach nesting bird, provides a good example of how furbearer population reductions can assist in the restoration of a rare species. The piping plover, a federally listed threatened shorebird protected by both U.S. and Canada endangered species legislation, is vulnerable to predation by foxes and other predators while nesting. Trapping in and around piping plover habitat has reduced local predator populations, allowing enhancement of the dangerously low plover population, while the predators can be utilized as valuable, renewable, natural resources.[8]

Trapping Protects Rare & Endangered Species

Foothold traps are sometimes used to capture rare or endangered species unharmed so that the animals can be introduced into favorable habitats to reestablish healthy populations (see page 34). However, foothold traps also play an important role in protecting the health and viability of many established or newly re-established populations of rare and endangered species. Foothold traps are particularly important management tools for protecting rare or endangered species from undesirable levels of predation caused by fox and coyote.

The following is a *partial* list of endangered or threatened plant, reptile, bird and mammal species in North America which are being protected and managed through the use of modern foothold traps:

Rare Species Under Restoration	Species Trapped to Aid Restoration
Pink Lady Slipper	Beaver
Pitcher Plant	Beaver
Desert Tortoise	Coyote
Sea Turtle	Raccoon
Alleghany Wood Rat	Raccoon
Aleutian Canada Goose	Arctic Fox
Attwater's Prairie Chicken	Coyote
Brown Pelican	Coyote
Mississippi Sandhill Crane	Coyote
Alabama Beach Mouse	Red Fox
Columbian White-tailed Deer	Coyote
San Joaquin Kit Fox	Coyote
Whooping Crane	Coyote, Red Fox
Least Tern	Red Fox, Raccoon, Coyote, Opossum
Black-footed Ferret	Coyote (taken for disease monitoring)
Piping Plover	Red Fox, Raccoon, Mink, Striped Skunk

Photos by Bill Byrne

Piping Plover

The target animals trapped during these operations to reduce habitat damage or predation on the rare species are either removed or relocated after capture. The trapping may be carried out by federal, state or provinicial wildlife biologists and animal control agents, or by private, regulated trappers.

Protecting America's Important Wetlands with Regulated Trapping

The coastal wetlands along the Gulf coast of Louisiana are among the most productive and important fish and wildlife habitat types found in the United States. The largest expanse of wetlands in the contiguous U.S. occurs in Louisiana, comprising 25% of the freshwater marshes and 69% of the saltwater marshes of the Gulf Coast. This translates to 15% and 40% of these important ecological areas remaining in the United States. Louisiana's wetlands provide a multitude of functions and important values including:

1. Habitat for a diverse array of fish and wildlife species including ***15 million water birds***, ***5 million wintering waterfowl***, over ***1 million alligators*** and ***11 Threatened or Endangered species***;
2. Groundwater recharge, reduction of pollution, and nutrient and sediment reduction;
3. Storm buffer, erosion control and protection from floods;
4. Commercial and recreational marine fisheries with a total economic effect of $ 3.5 billion

In the State of Louisiana over 3.6 million acres of coastal marshes now exist. However, these coastal wetlands are threatened by degradation and destruction through overpopulation of nutria, an exotic rodent found throughout these wetlands.

Nutria are large semi-aquatic rodents native to South America. The Gulf Coast nutria population originated in Louisiana during the 1930s when captured animals were released or escaped into the wild. These animals established a population and began to thrive in coastal wetlands. Nutria weigh an average of 12 pounds each, average 4-5 young per litter, and have several litters each year. Nutria are herbivores that eat wetland plants and vegetation. They will pull and eat plant roots that anchor into the marsh. High populations of nutria foraging on marsh vegetation have resulted in vast areas of marsh becoming entirely void of plants. When vegetation is removed from the surface of the marsh, the very fragile organic soils are exposed to erosion through tidal action. If damaged areas do not revegetate quickly, they will become open water as tidal scour removes soil and thus lowers elevation. Frequently, the plant root systems are also damaged, making recovery through regrowth of vegetation very slow. When a marsh is denuded of plant life by nutria, it is called an "eat-out."

The first region-wide aerial survey to estimate nutria herbivory damage was conducted in 1993 because reduced trapping resulting from lower fur prices allowed nutria, and eat-outs, to increase. Each year the

Coastal wetlands in Louisiana are threatened by high populations of nutria, which can denude or "eat out" large areas of vegetation (below), leaving fragile marsh soils susceptible to erosion and destruction. Inset of fenced area shows what healthy marsh vegetation should look like.

Photo courtesty Louisiana Dept. Wildlife & Fisheries

Photo courtesty Louisiana Dept. Wildlife & Fisheries

Nutria are large, semi-aquatic rodents with prodigious appetites. Regulated trapping of nutria helps prevent erosion of fragile wetlands while providing trappers with valuable food and fur.

number of eat-outs and severity of the damage continue to increase, with only a small portion of the damaged acres demonstrating vegetation recovery. In 2000, wetland damage in Louisiana attributable to nutria was conservatively estimated to exceed 100,000 acres. The estimate is conservative because only the worst, most obvious damage can be detected from aerial surveys. The number of acres being impacted is certainly much higher.

The long term effect of these eat-outs is permanent. Vegetation damage caused by overpopulation of nutria aggravates other erosional processes. Coastal marshes are being lost at an alarming rate as a result of erosion, subsidence (lowering of land), saltwater intrusion, and the lack of silt-laden river water available to continue the process of marsh-building. Once gone, these acres of productive marsh cannot be replaced, and all their positive benefits and values are lost with them. Nutria also cause damage to rice and sugarcane fields, as well as to drainage canal dikes and roadways. In some areas they have severely reduced success of wetland restoration efforts by feeding on planted grasses and trees.

Because of the tremendous destruction of this important habitat type that is home to literally hundreds of species of birds, mammals, reptiles and amphibians, control of nutria is among the top priorities of the Louisiana Department of Wildlife and Fisheries (LDWF). Regulated trapping is the predominant method used in management of nutria populations. Licensed trappers harvest nutria during regulated seasons. If nutria are valuable enough, licensed trapper effort — and therefore nutria harvest — increases, resulting in reduced herbivory damage to the coastal wetlands.

To enhance this economic incentive, the LDWF has taken two approaches. One has been to develop a market for nutria pelts, and the second is to develop a market for the human consumption of nutria meat. The sale of the pelt for clothing, and the additional sale of nutria meat for human consumption, can provide a valuable additional incentive to keep more licensed trappers in the marsh helping to maintain nutria populations in balance with habitat. In the past, the harvest of nutria during regulated seasons in the fall and winter months has resulted in harvests between 390,000 to over 1 million nutria annually. Such controlled and managed utilization of wildlife allows managers to protect coastal wetlands by keeping nutria populations at levels suitable with existing habitat conditions.

The importance of the regulated harvest of nutria cannot be overstated: between 1962-1981 over one million nutria were harvested each year in Louisiana. During this time there was no damage to coastal wetlands. When changing market prices result in lower nutria harvests, coastal wetland damage from nutria becomes a problem. Alternatives to using regulated trappers to control nutria can be costly (if even practical) to society.

Photo by Bill Byrne

A red fox displays the fatal results of sarcoptic mange. The disease is density-dependent in that the mites which cause it must be spread by direct contact with an infected animal or its bedding. When population densities are high, animals come into contact more frequently, and diseases such as mange spread rapidly.

Disease Control

The influence of trapping on the occurrence and spread of wildlife diseases has not been established definitively, despite claims by both opponents and proponents of trapping. However, disease occurrence in wildlife populations is often associated with high densities of animals.[9] Reducing local densities of furbearer populations through harvests can reduce disease transmission and potential for human contact. While the disease may persist in the population, the intensity of outbreaks may be reduced. In a study conducted in Canada, severity of fox rabies outbreaks were reduced by heavy, government-funded trapping, while normal fur harvests showed little effect. However, it was also noted that high levels of regular trapper harvest in southern Ontario decreased the severity, if not the frequency, of rabies outbreaks in red foxes.[10] Intensive, government-funded trapping was also shown effective in controlling an epizootic of skunk rabies in Alberta.[11]

The only definitive statements that may be made on the subject of disease control at this time are that regulated trapping will not (and is not designed to) eradicate diseases; very intensive trapping may help control diseases; and the relationship of normal harvests to disease occurrence and intensity in wildlife populations is not yet well understood.

Regulated Trapping on National Wildlife Refuges

In 1903, President Theodore Roosevelt ordered that a small shell- and mangrove-covered island in Florida's Indian River be forever protected as a "preserve and breeding grounds for native birds." Paul Kroegel, a sometime boat builder, cook and orange grower, was hired to watch over this three acre sanctuary. His mission was clear: *protect the island's pelicans from poachers and plume hunters*. With this simple promise of wildlife protection, the National Wildlife Refuge System was formed.

The System now encompasses more than 92 million acres in the United States managed by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas and other designations for the protection and conservation of fish and wildlife, including those that are threatened with extinction. The mission of the National Wildlife Refuge System is:

Photo by Tom Decker

"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Regulated trapping is recognized as a legitimate activity and sustainable use of wildlife resources within the Refuge System, and has been an important tool for the accomplishment of refuge management and restoration programs for many years. A comprehensive evaluation of Refuge trapping programs conducted by the Service in 1997 documented the importance of this activity in helping Refuges meet the mission stated above. The study examined mammal trapping programs on the Refuge System that occurred between 1992 and 1996.[12] The study identified 487 mammal trapping programs on 281 National Wildlife Refuges during the 5-year period. The Service report went on to say **"This report demonstrates the importance of trapping as a professional wildlife management tool"** and **"Mammal trapping also provided important benefits for public health and safety and recreational, commercial, and subsistence opportunities for the public during the period."**

Eleven reasons for trapping on Refuges were identified in the following order (most common to least common): recreation/commercial/subsistence, facilities protection, migratory bird protection, research, surveys/monitoring, habitat protection, endangered species protection, public safety, feral animal control, population management, and disease control. A variety of trap types were used in these programs: quick-kill traps were used on 171 refuges, cage traps were used on 157 refuges, foothold traps were used on 140 refuges, snares were used on 74 refuges, and other devices were used on 66 refuges.

The variety of trap types used reflects the diversity of environmental and weather conditions; refuge-specific needs, objectives and regulations; and of course the different wildlife species which are found from the Arctic National Wildlife Refuge in Alaska to wetland areas of Gulf Coast Refuges to the forest lands of Refuges in Maine. Trapping activities on Refuges are regulated; the public who participate are required to be licensed and to follow many enforced rules to ensure that their activities are conducted appropriately and in accordance with existing laws and regulations.

Photo by Benjamin Tuller NYDEC

The Facts on Regulated Trapping

People have continuously used furbearers in North America for clothing, food and religious ceremonies for the past 11,000 years. Fur resources had a greater influence than any other factor on European settlement and exploration of the continent. Many cities and towns in North America, including Quebec, P.Q., Albany, NY, Chicago, IL, St.Louis, MO and Springfield, MA, were founded as fur trading centers where Europeans bartered with Native Americans for furs. The trapping and trading of furbearer resources is a heritage that still continues as an important component in the lifestyles of many people in our society. Whether in an industrial, urban, rural, or remote setting, trapping and fur are still of cultural and economic importance and furbearers continue to be utilized and managed as valuable renewable natural resources.

The economic impact of managing furbearer resources is enormous: the multi-billion dollar fur industry annually generates millions of dollars to North American trapper households, wholesalers, processors, garment makers and the retail clothing industry. There are also economic values derived from reduced damage to property and agriculture; personal uses of fur, hides, meat and other products; license revenues; goods and services sold to the public who trap and hunt; and the enhancement of economic activity and the redistribution of wealth into rural communities. Many remote communities in Alaska and northern Canada are dependent on the sale of pelts.[13]Trappers in South Carolina report that 9.3 percent of their family income is derived from trapping.[14] The food value of furbearers can be equal to or greater than the market value of their pelts. Even in an industrialized state like Massachusetts, 28% of trappers report they use furbearers as a food source for themselves or their pets.[15]

In addition to economic values, trapping has many social values. In Vermont for example, gardening, child care, fire wood gathering, harvesting of wild

Trapping is a Lifestyle

Historically, people in the United States and Canada looked to the land to secure food and provide for their households. Being independent, self-sufficient and hard working, providing for one's family, being a steward of the land — these values and lifestyles are traditionally and distinctly part of the fabric of our society and culture, and they remain present today.

Trapping is an annual seasonal activity in which many people in North America currently participate. Sociologists and other researchers have begun to document the importance of trapping in the lives of these people who still look to the land — including the utilization of wildlife — as part of their lifestyle. This lifestyle is often not understood by the larger segment of society whose members no longer hunt, trap, fish, raise their own vegetables, cut their own firewood or look to the land in other ways to provide for their households.

People who trap in the arctic and sub-arctic regions of the continent often fit our image of traditional trappers. In Canada and Alaska more than 35,000 aboriginal people participate in the trapping of furbearers. These trappers are motivated by the need to secure sustenance (food and clothing) for their families. Fur trapping can be particularly important to them due to the remoteness of their communities, and may provide an essential source of income during certain times of the year. Many of the cultural values and traditions of these people are passed along from generation to generation through the seasonal rituals of trapping. Trapping teaches their youths survival and subsistence skills and provides a meaningful fall and winter activity that helps instill a sense of responsibility to their families and communities.

The attitudes of trappers in the more developed areas of North America mirror the motives of their northern contemporaries. Approximately 270,000 families in the United States and Canada derive some income from trapping, but households that embrace a trapping lifestyle are often not apparent in suburban areas with a diverse mix of cultures. Researchers have documented and described a very vibrant trapping culture even within the urbanized northeastern United States. People who trap in this region list several motives for why they participate in trapping: lifestyle orientation, nature appreciation, wildlife management, affiliation with other people, self-sufficiency, and income (sometimes complimentary, sometimes critical, to the household budget). A universal theme expressed by many trappers is that trapping is a principal component of their lifestyle: it defines them and has deep meaning as an enduring, central life interest.

Trapping in today's society has often been referred to as "recreational" in the context of a "sport," yet as the sociological studies have revealed, the term is a misnomer. It fails to consider the motives of the hundreds of trappers surveyed. People who trap tend to express strong support for conservation programs and environmental protection. They may also cut firewood, raise their own vegetables, hunt and fish. For these people, the opportunity to harvest fish and wildlife contributes to a sense of self-reliance and independence. Studies in New England and elsewhere reveal that trappers barter furbearer pelts, products and trapping services (to remove nuisance wildlife causing property damage) in exchange for childcare, automobile repair, vegetables and other goods and services.

Whether they are aboriginal people living in Canada and Alaska, or people living in suburban or rural areas of New England, Louisiana, or industrialized southern Ontario, a common link among all trappers is that they value the capability of the land to produce wild animals and plants they can use to bring sustenance into their households (e.g. meat for food, pelts for clothing, and/or money to buy household goods). For many, trapping is an integral part of their life, a link to the land, a crucial element in their relationship to nature. With proper management of wildlife resources, people today can still choose to participate in this lifestyle as societies have done since the beginning of time. This is a unique opportunity and experience for people in the United States and Canada that can no longer be pursued throughout most of Europe or the rest of the industrialized world.[16]

Trapping is Highly Regulated

Within the United States and Canada, state, provincial or territorial fish and wildlife agencies have legal authority and pass laws governing furbearer resources. There are various types of laws that apply to trapping within each jurisdiction, and they are enforced by local environmental police, conservation officers and/or game wardens. Laws that regulate trapping by various means include the following:

- Mandatory licensing of trappers
- Mandatory daily checking of traps
- Mandatory trapper education
- Restricted seasons for trapping
- Restrictions on the size of traps
- Restricted areas for trapping certain species
- Restrictions on the types of traps
- Mandatory tagging of traps to identify owner

Professional wildlife biologists monitor the populations of furbearing animals. Scientific studies are conducted to ensure that these species are managed properly. In addition, research focused on the traps themselves identifies which traps work best with each species, and which need improvements. New and improved traps are continually being developed.

foods, home and automobile maintenance, animal husbandry, and community volunteer work are bartered for trapping and furbearer products in some communities.[17] This "hidden economy" may have social and economic significance in many rural communities all over the continent.

Trapping, along with the heritage and self-sufficient lifestyle it represents, has a cultural and social role in today's society and is much more than a "consumptive use" of wildlife. **Trapping can instill a strong appreciation for wildlife and the environment**. Sociological studies show that trappers have an exceptional degree of factual understanding of animals and are outstanding and unusual in their knowledge of wildlife. Trappers, through their outdoor experience and use and knowledge of wildlife, are unique. The relationship they have with land and wildlife underlies a strong sense of stewardship for the environment.[18]

Traps & Technique

The capture and harvest of furbearers has changed markedly since early times. Modern trapping is not comparable to the reckless exploitation of the 17th, 18th and 19th centuries. Today trapping is heavily regulated, involving some of the most complex laws that deal with wildlife, enforced with stiff fines and penalties that ensure the integrity of the activity. Overall, the regulations are designed to protect furbearer

Photo by Bill Byrne

Environmental Police Officers, Conservation Officers or Game Wardens enforce trapping laws and regulations throughout the United States and Canada.

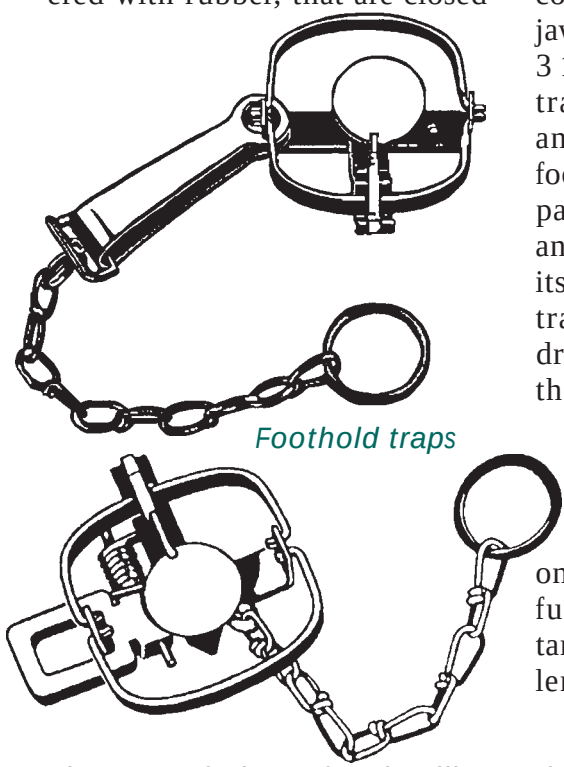
populations and make trapping as humane and efficient as possible.

Many people unfamiliar with modern trapping think of traps as big, powerful devices with jack-o'-lantern teeth on the jaws. This stereotypical image of the trap is based on the obsolete designs that were used to capture bears many years ago. Those old bear traps are collector items today. Such dangerous and destructive devices have no use in modern fur trapping. Today, sizes and types of traps and their use are regulated, and many sizes and types of traps are no longer allowed. Trappers must check their traps within specific time intervals and are restricted or prohibited from setting traps in certain areas. Most jurisdictions require that live-restraining traps be checked daily.

Basic Trap Designs

Modern traps fall into two main categories: quick-kill type traps and live-holding traps. Kill type traps are designed to quickly kill the captured animal, much like a common mousetrap. Live-holding traps can be separated into cage traps and foothold traps. Cage traps are baited wire enclosures with one or two doors that close and lock when the animal steps on a pan or treadle. They work well for animals that are not averse to entering holes or cages, but are ineffective for capturing wary species such as foxes and coyotes. Cage traps come in a variety of sizes designed to catch animals from mice to raccoons. They are expensive though, bulky, heavy to handle, and are not practical in many trapping situations.

Foothold traps typically have two metal jaws, sometimes covered with rubber, that are closed by springs released when the animal steps on the trigger pan. Other foothold devices — most notably the specialized "EGG" trap (see box, page 24) and passive or spring-loaded snares — are also available for use in certain states and provinces.



Foothold traps

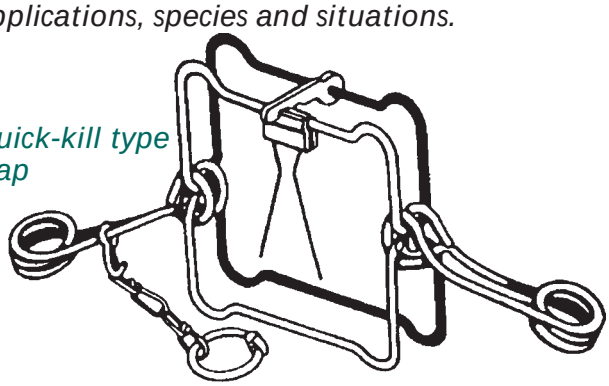
Typical foothold traps are categorized by the type of spring (e.g. coil, jump, or long spring), and are made in different sizes appropriate for catching animals as small as weasels and as large as coyotes and lynx. When set, the jaws of foothold traps range from 3 1/2 to 7 inches in spread. These traps are designed to hold an animal by gripping the toes or foot across or just above the foot pad. This prevents the captured animal from slipping the trap off its foot. As an option, foothold traps can be set submerged to drown a captured animal, and can thereby function as kill traps.

Choosing the Appropriate Trap

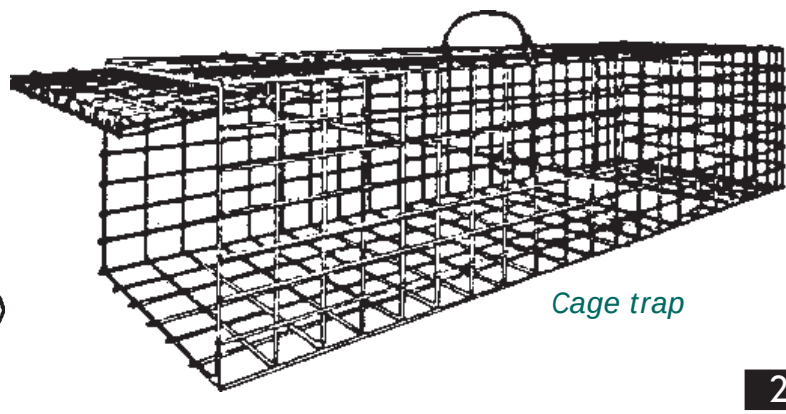
Choice of trap style depends on the specific situation and the furbearer species that is being targeted. Cage traps are an excellent choice for raccoon, skunk

continued, page 25

There are three basic trap designs and many variations of each. Kill-type designs (below, left), also known as quick-killing traps, dispatch furbearers quickly with a hard blow to the head, neck or body, in the same manner that a common mouse trap kills a mouse. Foothold traps (two models above) are live-holding traps that typically have a set of spring-activated jaws designed to close on an animal's foot across or just above the foot pad. Set under water, they can also function as kill traps. Cage traps (below, right) are live holding traps that restrain an animal in a portable cage. Each design is superior to the others for certain applications, species and situations.



Quick-kill type trap



Cage trap

Using Science To Identify the Best Traps for Animal Welfare

Best Management Practices

State fish and wildlife agencies are conducting a national effort to develop Best Management Practices (BMPs) for regulated trapping in the United States. This effort is being made to identify and promote the very best technology available to capture wildlife. [19] These BMPs address five specific points relative to the use and performance of traps. These components are: the welfare of animals, the efficiency of the traps, the selectivity of the traps, the safety of trappers and other members of the public, and the practical application of various types of traps.

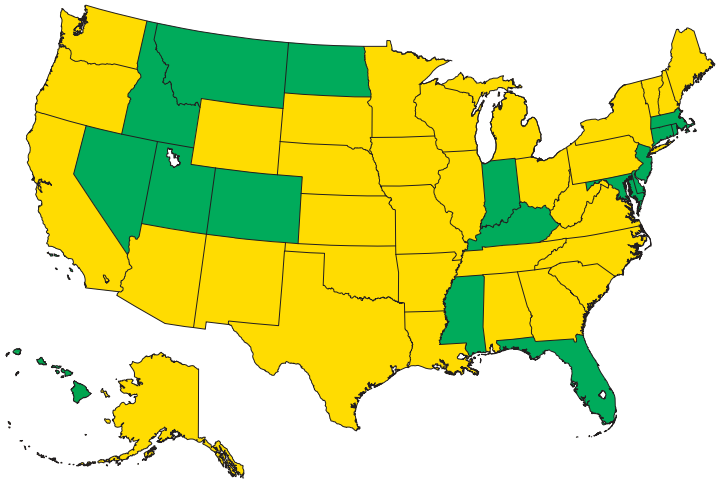
BMPs will provide the information that will help make a trap and trapper function together in a manner that is safe, humane, effective, and selective. They will describe the different types of traps and what training may be needed for people who trap with them. BMPs will be recommended to all state fish and wildlife agencies for incorporation into regulated trapping programs and trapper education.

State wildlife biologists cooperating with specially trained wildlife veterinarians are designing and conducting trap research projects to identify the best traps available. All types of traps are being tested, including cage traps, snares, foothold traps and killing type traps. Trap testing programs involving dozens of trapping systems are being conducted from Alaska to Maine to Louisiana. Since 1997, millions of dollars have been spent on trap testing programs to initiate the development of BMPs. State fish and wildlife agencies have dedicated thousands of hours of wildlife professionals' time to the successful completion of these projects. The testing is conducted under actual trapping conditions, on working trap lines, by experienced trappers accompanied by trained wildlife technicians.

Everyone — managers, biologists, veterinarians and the public who trap — is interested in using the best technology available for the responsible capture of furbearers. Working towards this goal, state wildlife agencies will persist in their trap research efforts and continue developing BMPs. Basing BMPs on sound scientific and biological data will measurably improve the welfare of captured wildlife in the United States.

Testing Traps in Canada

Canadian wildlife authorities are understaking an approach similar to the BMPs through a cooperative effort among provincial/territorial agencies. The Canadian Trap Certification Protocol uses parameters of trap efficiency, humaneness and safety to approve traps for use in Canadian trapping and furbearer management programs. This program is coordinated by provincial wildlife agencies. Under the program, any provincial government authority may certify a trap according to the procedures prescribed in the Protocol. All traps used to capture furbearing species in Canada must be certified according to the Protocol by 2007. The provincial/territorial agencies have agreed that all other authorities will mutually recognize the certification of a trap by any one authority. As trap testing results become available, additional traps will be certified for use in capturing various species.



Traps are subjected to intensive scientific evaluation in a continual effort to develop the best possible designs. As of 2007, 34 state fish and wildlife agencies have participated in field evaluations and trap testing for BMPs. Areas marked in yellow denote states that have participated to date. All 50 state fish and wildlife agencies support the development of trapping BMPs.

Research & Development

Improving Traps with Science

Wildlife agencies, as well as the public who trap, have long been interested in developing and refining traps and trapping techniques to further improve the welfare of furbearers captured for research, damage control, fur and food. The overriding goal has been to design traps that will hold target species unharmed, or in the case of kill-type traps, dispatch them as quickly as possible. Foothold, snare, cage and kill-type trap designs have all been improved substantially in these respects since the turn of the century, and new and improved models are replacing older designs. While the production of a new trap once required little more than some imagination, engineering and marketing skills, today all trap improvements must be based on sound scientific information.

Photo courtesty Fur Institute of Canada

Modern trap evaluation is a comprehensive process that begins with mechanical evaluation, followed by computer simulation (left). Continual research has resulted in design modifications. These include double jaws (above), offset jaws and wide-edge jaws (combined on the trap below).

Trap performance can only be verified through a comprehensive process that evaluates all components of a trapping system. In order to ensure the scientific credibility of results, trap research programs must incorporate appropriate study designs and include rigorous multi-stage testing. Today, various stages of trap research may include: (1) mechanical evaluation of traps; (2) trap performance testing using computer simulation models; (3) study of how animals approach traps; (4) trap performance testing in fenced enclosures; (5) trap performance testing in the field; and finally (6) confirmation tests utilizing independent trappers. Many trap designs have been evaluated to this degree and tested under a variety of conditions throughout the United States and Canada. These evaluation studies have provided important contributions to animal welfare by improving the performance of trapping systems.

Ongoing scientific research aimed at the development of improved traps has resulted in entirely new designs such as the EGG trap (at left in photo), a modern foothold design used specifically to take raccoons. Soft-catch (at right in photo) is a modern update of a traditional foothold design. This trap system not only incorporates specially padded jaws, but also a shock-absorbing spring and double swivels proven to reduce the chance of injury to captured animals.

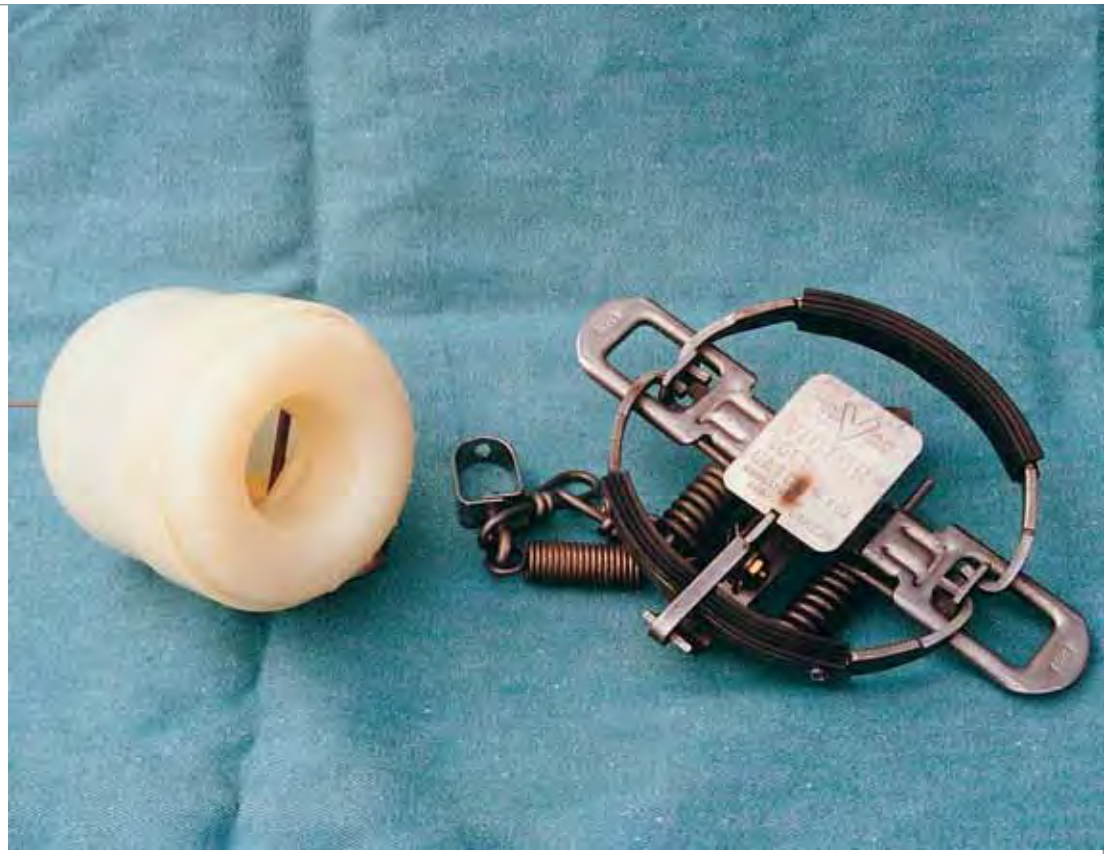


Photo by Bill Byrne

While many people and organizations talk about improving trapping, only a few have provided funding for developing new traps and improving older designs. Trap research in North America has been funded jointly by the governments of Canada and the United States, the International Fur Trade Federation, state and provincial wildlife departments, and the Fur Institute of Canada. Wildlife agencies utilize the research findings of trap studies funded by these organizations to assess and incorporate new information into trapping regulations and trapper education programs. While research has provided the information to develop and test entirely new trap designs (such as the "EGG" trap) for particular species, modifications to existing kill traps and foothold traps are also of great importance. Adjusting chain length, adding swivels to the chain, providing for adjustable pan tension, and/or replacing standard jaws with offset, laminated or padded jaws can improve the welfare of captured furbearers, and researchers continue to explore other new and innovative design possibilities. Everyone is interested in using the best technology available for the responsible capture of furbearers.

Performance evaluation and the testing of killing and restraining traps in both the United States and Canada follow methods approved by the International Organization for Standardization (ISO). These testing standards ensure that countries have internationally comparable data for evaluating trap performance. Modern trap evaluation is conducted in a framework that applies science to ensure the use of humane and safe traps whether for scientific study, animal management programs, protection of endangered species, or the sustainable utilization of wildlife resources by the public.

Trap research efforts today are well coordinated among the state and provincial wildlife agencies, cooperative Universities and federal agencies in the United States and Canada. Wildlife biologists, statisticians, engineers and specially trained wildlife technicians oversee trap-testing efforts conducted in North America. In the United States, 31 state wildlife agencies have participated in a coordinated national trap-testing program. In addition, the United States Department of Agriculture Wildlife Services program has conducted important research on improving trapping devices. In Canada, trap-performance testing, research and development is conducted by the Trap Research and Development Committee (TRDC) of the Fur Institute of Canada (FIC) with participation of provincial/territorial wildlife agencies and trappers. Much of this work is conducted at the Alberta Research Council in Vegreville Alberta, the most comprehensive and extensive trap research center in the world. Trap evaluation and testing programs under field conditions are often conducted in cooperation with provincial/territorial wildlife agencies and cooperating trappers. Research findings from the FIC-TRDC program are used both in the United States and Canada.

and opossum when trapping near residential areas in wildlife damage management situations. Quick-kill type traps — or body-gripping traps as they are sometimes called — are very effective when used for marten, mink, fisher, muskrat, otter and beaver. Kill-type traps are considered to be efficient and humane because animals rarely escape, and loss of consciousness and death are rapid. However, kill-type traps do not allow for release of "nontarget" animals (animals the trapper does not want to harvest). Also, fox and coyotes will rarely enter kill-type traps. For these species especially, foothold traps remain the most effective trap (and allow for release of nontarget animals).

Foothold traps do not have to be big and powerful in order to hold an animal. **A foothold trap of the right size, correctly set, will typically catch and hold the target animal without significant injury**.

Photo by Dan Harrison

Foothold traps need not be large to be effective, as demonstrated by the trap used to capture this coyote. Foothold traps typically capture and hold animals without significant injury and have been used to capture river otter and gray wolves (below) for reintroduction and restoration efforts in portions of the United States. The foothold trap is the only effective device, except for snares, for capturing certain furbearers such as coyote, wolves, and foxes.

Trappers Are Selective

The placement of the trap in relation to the lure and/or bait (as well as the type of bait or lure) greatly affects the selectivity of the trap set. An effective trapper wants to catch the animal targeted, instead of a nontarget species. Knowledge of animal behavior allows placement of traps on the target animal's line of travel such that, in many cases, the trapper needs no bait or lure at the set (blind set). Different lures used at other sets are usually attractive only to certain species of furbearers, and can be used to draw the target animals to the set. Trappers strive for enough knowledge of the target animal's habits to allow efficient capture while avoiding nontarget animals. This is the essence and challenge of trapping. The personal satisfaction and even the economic return depend on having this knowledge and efficiency (see "Trapper Education" page 26). With the selection of the right size trap, trapping location, the correct setting of pan tension, and the proper use of the device in concert with lure and bait, trappers are extremely selective in what species their traps will capture. So, while traps as devices

Photo courtesy of U.S. Fish & Wildlife Service

Photo courtesy of New York State Dept. of Environmental Conservation

The art of trapping is often a family tradition, handed down from generation to generation.

have some degree of selectivity, trappers further improve that selectivity.

Concern has been expressed over the relative risks of trapping to pets. As stated above, proper trap selection and placement will minimize nontarget captures. Trappers generally seek landowner permission (required in many jurisdictions) when trapping on private land, and scout for animal sign and presence before the trapping season. Most trappers avoid areas with evidence of domestic animal use because it interferes with opportunities to capture target species. Pets that are allowed to range freely and unsupervised are at greater risk from predators, automobiles and other health threats than they are from traps. Regardless, in the few instances when pets or domestic animals are accidently caught in foothold or box traps, they can usually be released unharmed.[20]

Trapper Education

There was a time when new or young trappers could easily find a friend or relative to teach them how to trap. To become effective, the trapper must learn animal behavior, wildlife habitat, types of traps, trap preparation, sets and lures for different animals, and care of the pelts. This knowledge allows the trapper to become efficient; that is, to be able to set the

Acquiring the base knowledge from experienced trappers starts beginners off right. To ensure that all new trappers know the proper skills and understand the activity, its many regulations, and their role in scientific wildlife management, first-time trappers in many states and all Canadian provinces and territories are now required to complete an official trapper education program.

Photo by Bill Byrne

Photo by Thomas Decker

The art of trapping is a lifelong learning experience, often requiring trappers to enter habitats few people ever visit. Trapping may instill a strong appreciation toward wildlife and the environment. It typically fosters an exceptional understanding and knowledge of animals and a close relationship with the land.

Values* Of Furbearers

Economic Values:

Many people benefit economically from the use of furs and other furbearer products.

Many people suffer economic loss from damage or depredation caused by furbearers.

Ecological Values:

Furbearers as predators and as prey help keep ecosystems in balance.

When ecosystems become unbalanced and the existence of certain species is endangered, predation by furbearers may increase their risk of extinction.

Beaver, and to a lesser extent, muskrats, alter habitat, often to the benefit of many other wildlife species. They, along with nutria, can also degrade habitat to the detriment of fish and other wildlife.

Cultural Values:

Trapping is a part of our cultural heritage. Its traditional skills, including respect for and knowledge of the outdoors, are passed along in many families from generation to generation.

Some members of the public retain a cultural heritage of utilizing furbearer meat to directly sustain their families and pets. Many use furbearer products and trapping to barter for other essentials.

Biological Values:

Furbearers can help us better understand human health problems, such as effects of environmental pollutants.

Furbearers can pose risks to humans through exposure to diseases and parasites.

Aesthetic Values:

Many people enjoy fur and furbearers.

Many people enjoy observing furbearers and their works (beaver ponds).

*Values can be both positive and negative.

Selectivity of the Trap-Trapper Unit

A trap is a mechanical device that, once set, will close only on objects heavy enough to release the trigger. Observing this, those unfamiliar with trapping may assume that traps are not selective; that they will catch anything. This is not a correct assumption unless the trapper — the person required to set the inanimate device in the first place — is removed from consideration. Trap and trapper are part of the same equation; one cannot function without the other. Once this relationship is acknowledged, it is recognized that the trap-trapper unit is actually very selective in terms of what it will catch. Regulated trappers and wildlife researchers invariably set their traps in such a way that only the species (or sometimes even only the *individual* animal) they are targeting is likely to be captured. The numerous techniques trappers use to ensure their trap sets are selective include the following:

- **Location:** Where a trap is located determines to a great extent what animals are likely to enter it. Traps may be located underwater, in trees, near den sites, travel routes and loafing areas, or within other specific habitat types where nontarget species are never found or are unlikely to be found.
- **Type of Trap:** The use of certain types of traps virtually eliminates the chance that certain species will be captured. Foxes and coyotes, for instance, will rarely enter cage or kill-type traps.
- **Size of Trap:** The size of the trap determines to some extent what size animals it will capture.
- **Pan Tension:** Pan or trigger tension is adjustable on many traps. As a result, traps are often set so that only relatively heavy animals (such as beavers or coyotes) can spring them.
- **Lure or Bait:** Specific baits and lures, often used in conjunction with trap sets, are attractive to specific species of animals. Sweet corn, for instance, is attractive to raccoons, but not to bobcats. Lures in the form of urine or scent gland extracts are particularly attractive to the species from which the scent is derived; may even repel other species.
- **Position of Trigger:** Trigger configuration on kill-type traps can be set to allow nontarget species to pass through without setting off the trap.
- **Trap Set:** How a trap is handled or placed influences what animals can be captured. Wary species will avoid any trace of human scent, while others such as raccoons and skunks may be attracted to it. Fencing or other obstructions placed around a trap can prevent some species from approaching the trap.
- **Timing:** The timing of when traps are set during the trapping season can influence which gender and what age class of animals will be captured.

These same elements, all of which make traps highly selective in terms of what animals they will capture, are used not only in fur harvest trapping, but also in the live capture of animals for research and conservation programs, and for problem animal control and property damage situations.

proper trap in the appropriate manner and catch the intended animal. Certainly trappers are continually learning, but there is a base level of knowledge that is much easier to learn from an experienced trapper than by trial and error on one's own. Trapper education programs have been instituted in many states and all Canadian provinces and territories to ensure that beginning trappers acquire this fundamental knowledge before they set traps on their own.

Trapper education programs teach basic trapping techniques in both field and classroom situations with a strong focus on the responsible treatment of animals, trapping regulations, the avoidance of nontarget animals, safety, selective trapping, trespass laws and ethical trapper behavior. Trappers are taught how to select and set the smallest and most effective traps for whatever furbearer species they wish to target. These programs are strongly supported by experienced trappers who often teach the courses in conjunction with wildlife agency personnel. The ethical and even spiritual ideals of trapping — to take every animal with dignity, admiration and respect — are widely embraced. Information taught to beginning trappers provides them with a larger view of their role and the importance of trapping in an effective, responsible, and ethical manner.

Trapping and Public Safety

Opponents of trapping frequently charge that people, especially children, are in danger of being caught and injured in traps. These charges naturally tend to heighten public concern about trapping. However, a nationwide search for all recorded incidents of human injuries resulting from traps during the past 20 years documented only three that were associated with legal fur trapping.[21] None resulted in serious injury. Trapping does not threaten public safety because the size, placement and use of traps are regulated to ensure the safety of humans and animals (see box, page 20).

Furbearer Management Options

The use of traps and trapping in furbearer management programs other than traditional fur harvesting can be divided into three major categories: **Wildlife Damage Management**, **Wildlife Research**, and **Reintroduction of Extirpated Wildlife**. Among these categories, which may be broad or narrow in geographic scope, there are a number of options, along with trapping, that wildlife biologists can consider to achieve the management objective. Selection of any option must take into account its practicality, effectiveness, legality, safety and cost.Typically, a combination of two or more techniques is used in most management situations in order to achieve maximum effectiveness and cost efficiency. The various technique options available to wildlife biologists for the three categories of furbearer management programs are presented below:

Options for Wildlife Damage Management

Wildlife damage management is typically undertaken as a response to a citizen's concerns over animals causing loss or other damage to personal property or resources. Livestock predation by coyotes and foxes, flooding by beavers, and agricultural crop damage by raccoons and muskrats are common examples of wildlife damage. Several management options, both lethal and nonlethal, are available, but no single method or combination of methods is applicable in all damage situations.[22] Management options to curtail various forms of wildlife damage include the following:

Guard Animals

Animals, such as guard dogs, llamas and donkeys, have been used to protect livestock from coyotes and other predators. Guard dogs are typically special breeds, such as Great Pyrenees and Komondor, that are imprinted after birth on the livestock breed they are assigned to protect. Neutered males are most commonly used. Success has been achieved in some areas with guard dogs, although they are expensive and last an average of only 3.3 years due to the rigors of life in the outdoors. Their effectiveness is best in a paddock situation, and diminishes on open pastures. Use of guard dogs can require a great deal of attention by the herder, particularly on an open range, where more effort is required to ensure the dog is properly fed and attended. Guard dogs may indiscriminately kill other species of wildlife (such as deer fawns) they encounter.[23]

Llamas and donkeys have an advantage over dogs in longevity and feeding, but have also been documented injuring and killing sheep. More research and experimentation is necessary before their effectiveness can be fully evaluated.[24]

Risk to humans from all types of guarding animals can increase a livestock owner's liability.

Exclusion / Habitat Modification

There are a number of management techniques that, under the proper conditions and with adequate funding for installation and routine maintenance, can be used to prevent or reduce various types of wildlife damage:

Water Flow Devices and Exclusionary Fencing: Specially designed "beaver pipes" are placed in road culverts or through beaver dams to reduce water level and associated flooding. These pipes must be placed in such a manner that the beaver cannot sense the sound or flow of water (which triggers their instinct to dam the flow), or must have adequate baffles to prevent the animals from blocking the flow. In situations where the gradient allows installation and function, beaver pipes can be effective at reducing beaver flooding. The devices may be expensive, however, and require routine cleaning and maintenance. Site characteristics may nullify the effectiveness of these devices in some situations.[25]

Exclusionary fencing can be installed in front of, or around, the intake of road culverts to physically prevent beaver from plugging the culverts. Exclusionary apparatus is a preventive measure that varies markedly in expense and ease of installation, requires regular maintanance, and does not regulate water level.[26]

Livestock Fencing: Permanent or portable fencing, including electric fencing, can be used as a barrier to prevent predators from killing or damaging livestock. Fencing must be a minimum of 5.5 to 6 feet high and frequently maintained in order to exclude coyotes.[27] The cost of fencing has limited its application because many people who own sheep or other livestock simply cannot afford to fence an area large enough to adequately pasture their animals.

Photo by Guy Connolly USDA/APHIS

Photo by Thomas Decker

Photo by Bill Byrne

There are many options to deal with damage caused by furbearers, but the effectiveness, efficiency, and cost associated with a particular option will determine its appropriateness for a given damage situation. When coyotes kill sheep and other livestock , farmers may resort to fencing (exclusion), but it must be tall, or it will be ineffective (above). When fencing is impractical (as it can be due to cost) specially bred guard dogs (above, right) or other guard animals are options, but these too have their drawbacks (see text). A well constructed baffle pipe (right) can help control flooding damage caused by beaver, but it requires regular maintenance and will not work in many situations.

Contraception

Past research has shown that hormone injections or implants can be successful in controlling the reproduction of individual animals. The technique requires repeated injections or surgery; consequently it is extremely expensive and difficult to apply to large numbers of animals. Some fish and wildlife agencies and animal welfare groups are now supporting research to develop a wildlife contraceptive that is inexpensive, relatively easy to administer, and long lasting. New advances in genetic engineering have opened the door to *immunocontraception* as a possible solution. Immunocontraception uses vaccines that target specific hormones or reproductive tissues. This research is in its infancy, and field experiments have been limited. While immunocontraception may have some value as a wildlife management tool in the future, it is not available today and will remain a rudimentary tool in the near future.[28] To put this in perspective, zoo veterinarians and reproductive biologists interested in controlling the reproduction of captive animals have not yet developed an effective contraceptive vaccine for most species. Some of the technical problems include:

- Safe and effective application requires animals to be individually vaccinated.
- Delivery systems (e.g. dart guns and blow guns) have limited range, making it necessary to get within close range of every animal targeted for the vaccine.
- Two or more boosters may be required to cause infertility.
- Application that would be extensive or effective enough to control population growth may never be possible.
- Legal hurdles of government environmental and drug regulatory agencies and assessment of overall environmental impacts may delay availability for many years.

Most wildlife damage situations require immediate control of offending animals. Immunocontraception will not eliminate damage in the short term: sterile beavers still have functional teeth and will cut trees and build dams.

Oral Vaccines

There are several active programs developing and testing oral vaccines for the purpose of reducing the number of terrestrial mammals infected with rabies. Oral vaccines designed to prevent rabies in coyotes, raccoons and foxes have shown promising results during experimental trials in the U.S., and have been used successfully in Canada. Ongoing field tests will continue to refine our understanding of the benefits and drawbacks of oral vaccines.

Questions regarding the safety, cost, and overall effectiveness of this technique in limiting the spread of rabies still remain, but when used in conjunction with trap-vaccinate and trap-euthanize programs around local outbreaks of raccoon rabies, it appears to be effective in limiting the spread of the disease.[29]

The control of rabies and/or other communicable wildlife diseases would also remove a natural limiting factor of predator populations. This may impact prey populations (turtles and migrant songbirds for example) that may have evolved reproductive strategies to take advantage of periodic, disease-induced declines in predator density.

Toxicants

The use of toxicants (poisons) to control wildlife damage involves killing animals causing damage with specific, Environmental Protection Agency-registered pesticides. Historically common in use, toxicants were misused widely enough to create public concern that has now greatly restricted their availability and use.[30] There is a great deal of variation in how individual states and provinces regulate and control toxicant application, in addition to federal oversight. There are some toxicants that can be applied by private citizens, but concerns over public health and safety and nontarget animal exposure restrict many applications to licensed government officials. Despite limited use, toxicants remain a valuable tool to wildlife managers for special projects and emergency situations.

Shooting

Shooting the depredating animal or animals requires one or more shooters to stake out the area where the damage is occurring. Shooting can be a highly selective control method, provided that the shooter correctly identifies the offending animal, and is positioned for an accurate, killing shot. Shooting nocturnal animals such as coyotes, raccoons and beavers is difficult and may require expensive night vision equipment to maximize efficiency. Shooters — particularly those targeting coyotes — must also be skilled hunters: the wary nature of the animals requires a shooter to have considerable knowledge of the animal's sign and habits in order to be in position for a shot without the animal being aware of the shooter's presence. Shooting often requires several days of effort for each damage situation, making it costly and limiting the number of damage situations that can be dealt with. Where damage occurs in close proximity to roads or buildings, shooting may not be a legal option, particularly at night.

Trapping

Use of traps to solve wildlife damage problems involves the capture of the animal or animals causing damage. The effectiveness of trapping to solve wildlife damage problems can depend on the skill and experience of the trapper. Knowledge is required to accurately determine what species is causing the damage; what trap type is required to ensure effective capture with minimal potential for injury to the animals; and where and how the trap(s) should be placed so as not to capture nontarget species. Trapping does not require the trapper to be present when the damage occurs, allowing several damage situations to be addressed simultaneously. If the species causing damage is a furbearer and the damage occurs during the legal fur trapping season, a licensed fur trapper may be willing to remove

the offending animals at no cost. If foothold or cage traps are used, the trapper has the discretion of releasing trapped animals unharmed.

Traps used by either agency personnel or registered trappers recruited to assist with programs, may be used in conjunction with other techniques to address wildlife damage problems. Trappers from Ontario have played a key role in efforts to prevent the spread of raccoon-strain rabies into Ontario.

No Action / Tolerance

This would be a decision to let the damage occur uncontested; "live with the damage" so to speak. Such a decision would have to balance many factors. In some cases, the wetlands created by beaver provide valuable functions to society and wildlife, and these must be balanced against economic losses to individuals and communities. Rabies outbreaks that periodically reduce certain furbearer populations may temporarily reduce property damage and benefit some wildlife populations (such as birds and turtles that incur heavy nest predation by furbearers), but also present a public health threat requiring public education programs and expensive medical treatment for individuals thought to be exposed to the disease. Ultimately, society's level of tolerance towards wildlife damage will determine where no action can prevail.

An increased public understanding of wildlife natural history and behavior will often lead to a more tolerant view of wildlife. Providing information regarding wildlife species causing damage may decrease the need and urgency for corrective action. However, the magnitude and tolerance of damage is highly variable among the public. Threats to public health and safety or substantial damage to public and private property often reach unacceptable levels. When this threshold is crossed, management techniques must be employed. Wildlife managers do not want to see society's tolerance reach the point that furbearers become perceived as pests and threats, rather than as valuable natural resources that should be enjoyed, appreciated and perpetuated.[31]

Photos by Bill Byrne

A certified trapping instructor demonstrates how to set a quick-kill beaver trap beneath the ice. This set includes a special frame that allows the trapper to raise and lower the trap to various depths.

Options for Wildlife Research

Research on movements, survival rates, habitat use and other life-history factors is often needed to develop management programs to ensure a population's continued existence, or to find solutions to wildlife damage problems. This may require the capture, marking, and immediate release of animals that are subsequently monitored for extensive time periods. Options for capturing wildlife include:

Live-Trapping

Cage Traps: Cage traps are the largest, heaviest, and most expensive capture devices, limiting the number that can realistically be used on any given research project. Though generally less useful than foothold and kill traps, cage traps have proven effective for capturing fisher, marten, raccoon and beaver, less effective for capturing bobcat. They are ineffective for capturing coyotes, foxes, wolves and river otter, although a specially designed cage trap for beaver equipped with additional modifications has had limited success in capturing otter.[32]

Foothold Traps: Foothold traps have proven effective for capturing fisher, marten, bobcat, lynx, mink, raccoon, beaver, river otter, foxes, coyotes and wolves unharmed. In the Northeast, over 343 coyotes, 844 red and gray foxes, 76 bobcats, 49 fishers and 79 river otters have been live-captured with foothold traps and released unharmed during research projects conducted from 1980 to 1994.[33] Eighteen lynx and over 50 coyotes have been captured in foothold traps and released unharmed during 1999 and 2000 in an ongoing research study in Maine. The small size, light weight and relatively low cost of foothold traps makes them highly desirable for field research. Recent advances in foothold trap design and use have enhanced selectivity and minimized injuries related to capture. This includes restraining snares designed to capture and hold animals such as wolves, coyotes and bobcats by the foot or leg.

Chemical Immobilization

Chemical immobilants have been used successfully to safely handle wild animals. In many cases the animals are restrained prior to injection of the chemicals. Restraint methods include trapping the animal or treeing it with hounds. Dart guns, powered by compressed air or powder charges, provide an effective remote delivery system for chemical immobilants, but they are much more limited in range and accuracy than conventional firearms, while having similar constraints (see *Shooting*, page 31). It is generally easier and less costly to capture animals with other techniques. Dart guns are efficient for animals that predictably gather in specific areas.

Alternative to Capture

Techniques that do not involve capturing animals, such as track counts and aerial surveys, typically yield limited information that cannot be used in assessing life-history parameters, and may not be practical to conduct in areas without extensive snow cover. Conversely, direct observation of animals is costly, difficult, and impractical.

Ultimately, if no effort was made to capture wildlife for research or fur harvesting, wildlife biologists would have to rely on information derived from the number of road kills and damage complaints to draw inferences about furbearer population characteristics. This can be analogous to assembling a puzzle with only a few pieces. Management actions would have to be extremely conservative because available information would lack the sensitivity needed to detect shifts in population trends in a timely enough manner to allow responsive actions. An inability to capture wildlife would greatly reduce the ability of government wildlife agencies to meet their public resource protection mandates that have been established by law.

Options for Wildlife Reintroductions

In some areas the public desires to reestablish wildlife species. Fisher, marten, river otter and beaver are some of the species that were once extirpated from many parts of North America and subsequently reintroduced by capturing individuals from areas where they are abundant, and releasing them in suitable but unoccupied habitat. These reintroductions involved the use of foothold and cage-type traps. For instance, since 1976, more than 4,000 river otters have been captured in foothold traps, relocated, and released to restore populations in 18 states.[34] If biologists did not facilitate expansion, species would have to enlarge their current ranges into unoccupied habitat on their own. The length of time necessary for this depends on species mobility and distance. In many cases range expansion is difficult or impossible due to insurmountable geographical features or human-created barriers such as major roadways and urbanized landscapes.

Trapping for Research and Reintroduction Programs

Modern foothold traps have been — and continue to be — used successfully to capture a wide variety of wildlife species in order to study the characteristics of individuals and populations. In fact, research conducted with the use of foothold traps has provided much of the information leading to our present understanding of biological and ecological phenomena. Wildlife biologists typically use these traps to capture animals that are then instrumented with radio-collars and released unharmed. The released animals are then carefully monitored, revealing information on their movements, habitat requirements and reproduction that can be acquired in no other way. The coyote pictured on page 25 is one of many captured with foothold traps, examined and released.

The river otters pictured below were all caught with foothold traps in marshes in Louisiana where they are abundant, and were released unharmed into areas of Missouri to restore otter populations where they no longer occurred. Similar otter restoration programs have been successful in 18 other states including Alaska, Arizona, Colorado, Kentucky, Iowa and New York. Many states now have thriving river otter populations thanks to capture and reintroduction efforts made possible by the use of foothold traps. *These are the same traps used by the public to harvest furbearers.*

Foothold traps and snares are generally the only effective traps for catching elusive species such as wolves, coyotes, foxes and lynx. As a result, they are almost always the trap of choice when any of these famously wary species are targeted for capture by either the public or wildlife researchers. Lynx reintroduced in some western states were captured with foothold traps in Canada (Yukon). Another example is the ongoing, important role foothold traps are playing in the restoration of several endangered wolf populations. Red wolves are captured, examined and relocated to reestablish new populations; Mexican wolves are captured for a captive breeding program that will provide healthy animals for a reintroduction program; and stock-killing gray wolves are captured and relocated to reduce damage and maintain public support for their continuing restoration.

Photo by Jim Rathert Missouri Dept. of Conservation

Right, live-trapped river otters are released as part of a restoration program. Foothold traps with offset jaws, above, were used to capture the animals unharmed.

Otter Restoration Around the Nation

State	No. Released	Years	State	No. Released	Years
Missouri	845	1982-1992	New York	279	1995-2000*
Tennessee	487	1983-1994	Ohio	123	1986-1992
Kentucky	355	1991-1994	Pennsylvania	105	1982-1999*
Illinois	346	1994-1997	Colorado	86	1976-1991
Indiana	303	1995-1999	Maryland	80	1990-1999*
North Carolina	267	1990-1995	Arizona	46	1981-1983
Iowa	261	1985-1999*	Minnesota	21	1980-1982
West Virginia	249	1984-1997	Oklahoma	20	1984-1985
Nebraska	159	1986-1991	Kansas	19	1983-1984

*Ongoing Releases

Animal Welfare

The concept of "Animal Rights" is distinct from the concept of "Animal Welfare." Animal Rights is based on personal values and philosophy, while the agenda for Animal Welfare is based on science. The Animal Rights and Animal Welfare agendas represent entirely different perspectives on human/animal coexistence.[35]

Animal Welfare proponents believe that human use of animals is appropriate as long as practical measures are taken to ensure that human use does not cause any undue pain and suffering to animals. Wildlife biologists and all responsible trappers and hunters are staunch supporters of Animal Welfare.

Animal Rights proponents oppose *any* human use of animals. They believe animals have the same rights as humans, and therefore should not be used, eaten or owned by people.[36]

The primary concern of Animal Welfare advocates is the well-being of animals. The primary concern of Animal Rights advocates is the moral obligation of people. The well-being of animals is a secondary concern for Animal Rights advocates.[37]

Professional wildlife biologists advocate Animal Welfare. The International Association of Fish and Wildlife Agencies (IAFWA), noting that "the worldwide growth of the animal rights movement threatens all traditional uses of animals," adopted the following position in 1989:

"The IAFWA acknowledges that humans have an inseparable relationship with all other parts of the natural world. Furthermore, humanity is answerable to another set of laws and concepts that is uniquely a product of human society. Animals cannot be subject to those laws and concepts and therefore do not have the rights of humans. It is agreed,

Photo by Bill Heatherly Missouri Dept. of Conservation

Adaptable and always ready to take advantage of any food sources, raccoons can reach extraordinarily high population levels in developed areas, a situation that increases public health problems, property damage and predation on other wildlife species.

Coyotes frequently prey on livestock and house pets throughout North America. Regulated trapping helps to minimize this depredation by removing individual problem animals, and the animals are utilized as valuable natural resources rather than destroyed as useless pests.

Photo by Guy Connolly USDA/APHIS

nonetheless, that animal welfare is a realistic and desirable concept which we support. Humanity does have responsibilities to animals: ensure ecological integrity, preserve genetic diversity and sustain species and ecosystems. All animals use other animals for their existence. The responsible human use of animals is natural and appropriate."

Professional wildlife biologists have concerns about the implications of the Animal Rights philosophy. Human use of, and dependence on, renewable natural resources, including animals, may foster stewardship over those resources. Millions of acres of wildlife habitat have been acquired, protected and managed for wildlife by public and private natural resource management agencies. Much of this has been made possible through funds generated by licensed hunters, trappers and anglers who collectively have a stake in the perpetuation of wildlife resources. Under the Animal Rights agenda, there would be no wildlife management, and subsequently, many species of wildlife would decline or become extirpated without the protection afforded by management. Other species would explode into burgeoning populations, escalating human-wildlife conflicts.

As our society becomes more urban, we become removed from natural systems and the processes that function within them. Our understanding and appreciation of those natural processes diminishes. We no longer have to harvest our own food, and as a result, we do not see the death involved in processing meat. We do not notice the loss of habitat, pesticide use or lethal control of animals required to produce crops and livestock. We do not witness the destruction of habitat required to extract nonrenewable natural resources that are the basis for most of the synthetic materials we use.

Rural components of our society recognize the high turnover in many wild animal populations that have naturally high death rates. The death of an individual animal is not shocking when one realizes that it is a normal, natural, and regularly occurring event, and that species have adapted reproductive strategies to compensate for these natural losses. These reproductive strategies evolved over millennia under a suite of mortality factors, including human predation. When a human uses a wild animal, the death is therefore natural, and an interest in the preservation of the wild animal population is often fostered.

We should all be aware that our lifestyles — regardless of where we live, our economic status, or our degree of "environmental correctness" — are closely and inexorably linked to animals. Animals have always provided the material and spiritual sustenance that maintains us as individuals and societies. Our need and use of them for food, clothing, art, medicine and companionship are eternal, our dependence on them complete. We must continue to support conservation efforts that ensure sustainable use.

Calamity by Design: The Prohibition of Regulated Trapping

Chelmsford, Massachusetts is located about 20 miles northwest of the city of Boston and encompasses approximately 23 square miles. The first European settlement in the area was a fur trading post, established due to the abundance of beaver in the local wetlands. Today there are still approximately 870 acres of wetlands within the town, but it is now a densely settled suburban community with over 31,000 residents (1,357 per square mile). Local government is conducted through open town meetings and administered by five elected selectmen.

During the late 1980s, a national animal rights group developed a "model" for getting trapping ban initiatives passed by town, county and state governments. The model guidelines encouraged animal rights activists to disguise regulated trapping as a public safety/animal welfare issue. Exactly in accordance with such direction, an article to ban trapping was introduced at a Chelmsford town meeting in 1988.

State wildlife experts reminded residents that regulated trapping was not a public safety issue, and warned that if regulated trapping were banned, there would be numerous undesirable consequences in the form of property damage and wildlife habitat degradation. Despite the warnings, the article was passed, and the trapping of furbearing mammals within the town was prohibited.

Prior to passage of the trapping ban, there were usually one to three complaints of beaver damage in the town each year. Following the ban, the beaver population, unchecked, began to grow rapidly, and the animals began to move into many previously unoccupied wetlands. Beaver dams began to flood houses and roadways. In 1992, state wildlife biologists working at the request of town officials investigated 25 beaver complaint sites. Two of these complaint sites were municipal wells which had been shut down (at a cost of $25,000) because of beaver flooding, and four other municipal wells were threatened. Individual landowners in town had incurred tens of thousands of dollars in damages to private wells, septic systems, lawns and roadways. The increasing beaver population and increasing property damage were directly related to the decision of the town's citizens to ban regulated trapping and allow uncontrolled beaver population growth to commence.

State wildlife officials offered the town several recommendations: (1) use water flow devices to reduce flooding in some areas, (2) get permits to breach beaver dams in other locations, and (3) rescind the trapping ban bylaw to allow beaver populations to be brought under control. The town took positive steps to implement these recommendations. The state issued permits to breach beaver dams that were disabling wells and septic systems. State wildlife personnel installed water flow devices (beaver pipes) at two sites and assisted town water department personnel with a third pipe. At a special town meeting in September, 1992, town citizens voted by a two-to-one margin to allow regulated public trapping to resume. During the regular trapping season later that fall and winter, four fur harvesters working with homeowners and town officials removed 87 beaver. Today, with public, regulated trapping restored, Chelmsford again has only one to three beaver complaints per year. These are handled as they had been prior to 1988, under an effective and responsible program incorporating state wildlife officials and local licensed trappers.

In Massachusetts, the state wildlife agency has a well developed management plan for beaver. The goals of this plan are to manage beaver resources as assets, not liabilities; perpetuate beaver populations for future generations; keep the beaver population at levels compatible with suitable habitat; minimize property damage caused by beaver; manage beaver for their positive wetland values, and allow people the sustainable use of public resources.

Chelmsford residents were confounded by animal rights activists who had promised in 1988 and again in 1992 to install water flow devices and proposed to "sterilize" beaver in the town (a technique that is not feasible on a free-roaming beaver population - see *Contraception* page 30). Over the four years of the trapping ban, the activists never acted on their promises and were never held accountable for the statements they put forth.

Photo by Bill Byrne

Typical beaver damage

Epilogue - A State Ballot Referendum

The case study on the previous page was written several years ago. In November, 1996, the state of Massachusetts passed a ballot initiative that severely restricts trapping. As a result, complaints about property damage and health concerns related to beaver activity have dramatically increased. A biologist from the Massachusetts Division of Fisheries and Wildlife has provided the following update:

Subsequent to the town of Chelmsford reinstating regulated trapping as a management tool to control the beaver population, a coalition of several animal rights organizations gathered the signatures required to place a statewide anti-trapping referendum before the voters on November 5, 1996. They spent $1.2 million on an ad campaign featuring graphic images which were a misleading representation of regulated trapping in Massachusetts. The campaign further implied that traps in common use in Massachusetts had teeth and were a threat to pets and children, despite the fact that toothed traps had not been legal to use for many years, only softcatch (padded jaw) traps were allowed for use on land, and no case of an adult or child being caught or injured in a legally set trap had ever been recorded in Massachusetts.

The referendum was passed, with the result that restrictions similar to those in the original Chelmsford anti-trapping bylaw went into effect statewide. The new law dramatically changed the types of traps that the public could lawfully use to control beaver populations statewide.

The net effect of the new law maximizes the number of beavers found in Massachusetts. A maximized beaver population significantly increases property damage, threatens public health and safety in regards to drinking water supplies and road stability, and increases other beaver related problems incurred by citizens.

In short, the same conditions that were evident in Chelmsford during its trapping ban have now been expanded throughout the state. The statewide beaver population has grown significantly from an estimated 24,000 in 1996 to more than 52,000 in 1999. Citizen complaints related to beaver activity continue to increase from an average of 310 per year (1991-96) to 615 per year since the law came into effect. Beaver populations can no longer be maintained at reduced levels.

The state's beaver management program has historically been proactive – maintaining the beaver population at levels compatible with suitable wetland habitat and human needs. The new law constitutes a major change in the way beavers are managed, however, eliminating proactive, regulated management, and yielding an uncontrolled expansion of the beaver population. Like the previous Chelmsford bylaw, it only allows citizens to take reactive measures to beaver causing property damage. Instead of viewing beaver as valuable wildlife, more and more people are viewing beaver as a pest to be eliminated.

Trapping and trapping devices have been a legislative issue ever since the referendum passed. Due to the increase in the beaver population and the related increase in health and safety concerns and property damage, several bills have been introduced into the state legislature to repeal or significantly change the existing statewide law. On July 21, 2000 an amended version of the trapping law was passed. It directs local boards of health to issue permits for the use of body-gripping, cage and box traps if beavers are causing problems deemed to be a threat to the public. In addition, legislation has appropriated funds to address some of the property damage caused by increasing beaver populations. The appropriation of monies was not needed in the past when proactive management programs employed regulated trapping to control beaver populations and address property damage problems. The amended law maintains the current ban on trapping for animal population control purposes.

A Final Word

Professional wildlife management has successfully restored, preserved and ensured the continuing viability of wild furbearer populations in North America. The harvest and utilization of some individuals within those populations by the public does not threaten the continuing survival of those populations. In fact, the harvest and use of some individuals has contributed most of the funding to study and manage those populations, including protecting the habitats and ecosystems critical for their survival.

Without regulated trapping, wildlife managers could not adequately or economically monitor furbearer populations; they could not undertake the restoration programs that have restored so many species to areas where they have not prospered for centuries; they would have fewer options to offer the public significant relief from agricultural and property damage, or to protect human health and safety; and they could not ensure the continued public use of furbearer resources.

Furbearer management is a complex scientific subject. The Wildlife Society — an international nonprofit scientific and educational organization serving professionals in all areas of wildlife ecology, conservation, and management — has published a policy on traps, trapping, and furbearer management that best represents the views of wildlife biologists.

Photo by Bill Byrne

The Wildlife Society Position on Traps and Trapping

Internationally accepted principles of natural resources conservation stipulate that resource management activities must maintain essential ecological processes, preserve genetic diversity, and ensure the existence of species and ecosystems. Regulated trapping in North America is consistent with all three criteria and is a versatile, safe, effective, and ecologically sound method of harvesting and managing species of furbearers.

Trapping provides income, recreation, and an outdoor lifestyle for many citizens through use of a renewable natural resource. It is a part of the North American heritage. It is often vital to the subsistence or self sufficiency of peoples in remote regions who have few other economic alternatives. Trapping is a primary tool of most animal damage control programs and an important technique in wildlife research. In some situations, trapping is important in management or is effective in reducing or suppressing wildlife diseases.

Despite the values of trapping, portions of the public oppose it, or at least perceive problems with some aspects of it. Some object only to certain trapping methods, particularly the foothold trap on land, but others have moral objections to killing animals. Much of the opposition to trapping is associated with urban-oriented cultures, particularly those dominated by tertiary (service-oriented) employment. Those who approve of, practice, or benefit from trapping are primarily from rural cultures or are from areas where primary (land-based) employment predominates. This dichotomy of lifestyles and values, combined with a general lack of objective information about trapping, creates barriers to understanding and resolving the controversial issues associated with trapping.

References Cited

1. Gerstell, Richard. 1985. The Steel Trap in North America. Stackpole Books, Harrisburg, PA. 352 pp.
2. Decker, D. J. and K.G. Purdy. 1988. Toward a concept of wildlife acceptance capacity in wildlife management. Wildl. Soc. Bull. 16:53-57.

   Deblinger, R. D., D. W. Rimmer, J. J. Vaske, G. M. Vecellio, and M. P. Donnelly. 1993. Ecological benefits and hunter acceptance of a controlled deer hunt in coastal Massachusetts. Northeast Wildlife 50:11-21.

   Ellingwood, M. R. and J. V. Spignesi. 1986. Management of an urban deer herd and the concept of cultural carrying capacity. Trans. Northeast Deer Tech. Comm., Vt. Fish Wildl. Dep. 22:42-45.

   Organ, J. F. and M. R. Ellingwood. 2000. Wildlife stakeholder acceptance capacity for black bears, beavers, and other beasts in the east. Human Dimensions of Wildlife. 5:63-75.

   Strickland, M. D., H. J. Harju, K. R. McCaffery, H. W. Miller, L. M. Smith, and R. J. Stoll. 1994. Harvest Management. Pages 445-473 *in* T. A. Bookhout, ed., Research and management techniques for wildlife and habitats. (5th ed.) The Wildlife Society. 740 pps.
3. Organ, J. F., R. F. Gotie, T. A. Decker, and G. R. Batcheller. 1998. A case study in the sustained use of wildlife: the management of beaver in the northeastern United States. Pages 125-139 *in* H.A. van der Linde and M.H. Danskin, eds., Enhancing sustainability - resources for our future. SUI Technical Series, Vol. I, IUCN, Gland, Switzerland and Cambridge, UK. 178pp.
4. Kallman, Harmon., ed., Restoring America's Wildlife 1937-1987. 1987. U.S. Dept. of the Interior, Fish and Wildlife Service. 394 pp.
5. Hamilton, D.A., B. Roberts, G. Linscombe, N.R. Jotham, A. Noseworthy, and J.L. Stone. 1998. The European Union's wild fur regulation: a battle of politics, cultures, animal rights, international trade and North America's wildlife policy. Trans. No. Am. Wildl. and Natur. Resour. Conf. 63:572-588.
6. Smith, H. R., R. J. Sloan, and G. S. Walton. 1981. Some management implications between harvest rate and population resiliency of the muskrat (Ondatra zibethicus). Pages 425-442 *in* J.A. Chapman and D. Pursley, eds., Proc. Worldwide Furbearer Conf., Frostburg, Md. 2056 pp.

   Brooks, R. P. 1980. A model of habitat selection and population estimation for muskrats (Ondatra zibethicus) in riverine environments in Massachusetts. Ph.D. Thesis. Univ. Massachusetts, Amherst. 113 pp.
7. Linscombe, G. R. 1995. U.S. fur harvest and fur value: statistics by state and region. International Assoc. of Fish & Wildlife Agencies.
8. Boggess, E. K., S. B. Linhart, G. R. Batcheller, D. W. Erickson, G. R. Linscombe, A. W. Todd, J. W. Greer, D. C. Juve, M. Novak, D. A. Wade. 1990. Traps, trapping, and furbearer management. Wildl. Soc. Tech. Rev. 90-1. 31 pp.
9. MacInnes, C. D. 1987. Rabies. Pages 910-928 *in* M. Novak, J. A. Baker, M. E. Obbard, and B. Malloch, eds., Wild Furbearer Management and Conservation in North America. Ontario Ministry of Natural Resources. 1150 pp.

   Todd, A.W., J.R. Gunson, and W.M. Samuel. 1981. Sarcoptic mange: An important disease of coyotes and wolves of Alberta, Canada. Pages 706-729 *in* J.A. Chapman and D. Pursley, eds. Proc. Worldwide Furbearer Conf., Frostburg, Md. 2056 pp.
10. Voight, P. R. and R. L. Tinline. 1982. Fox rabies and trapping: a study of disease and fur harvest interaction. Pages 139-156 *in* G. C. Sanderson, ed., Midwest Furbearer Management. Proc. 43rd midwest Fish & Wildlife Conf., Wichita, Kans. 195 pp.
11. Rosatte, R. C., M. J. Pybus, and J. R. Gunson. 1986. Population reduction as a factor in the control of skunk rabies in Alberta. J. Wildl. Dis. 22:459-467.

    Payne, N. F. 1980. Furbearer management and trapping. Wildl. Soc. Bull. 8:345-348.
12. Mammal Trapping within the National Wildlife Refuge System 1992-1996. USFWS, Division of Refuges, 4401 N. Fairfax Drive, Arlington, VA 22203. June 1997
13. Todd, A. W. and E. K. Boggess. 1987. Characteristics, acitivities, lifestyles, and attitudes of trappers in North America. Pages 59-76 *in* M. Novak, J. A. Baker, M. E. Obbard, and B. Malloch, eds., Wild Furbearer Management and Conservation in North America, Ontario Ministry of Natural Resources. 1150 pp.

    Wolfe, R. J. 1991. Trapping in Alaska communities with mixed subsistence-cash economies. Tech. Paper No. 217. Juneau, AK: Alaska Dept. Fish & Game.
14. Baker, O. E. South Carolina Dept. Natural Resources. Personal communication.
15. Decker, T. A. 1991. Trapping and furbearer management in Massachusetts. Mass. Wildl. 41:18-27.

16. Muth, R. M., J.J. Daigle, R.R.Zwick and R.J. Glass. 1996. Trappers and Trapping in Advanced Industrial Society: Economic and Sociocultural Values of Furbearer Utilization in the Northeastern United States. Sociological Spectrum 16:421-436.
Brown, T.L., D.J. Decker and J.W. Enck. 1995. Preliminary Insights about the Sociocultural Importance of Hunting and Trapping. HDRU Series No. 95-2. Ithaca, NY: Human Dimensions Research Unit, Cornell University. 90 pp.
Organ, J.F., R.M. Muth, J.E. Dizard, S.J. Williamson, and T.A. Decker. 1998. Fair chase and humane treatment: Balancing the ethics of hunting and trapping. Trans. No. Am. Wildl. and Natur. Resour. Conf. 63:528-543.
Wolfe, R.J. 1991. Trapping in Alaska Communities with Mixed, Subsistence-Cash Economies. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper Number 217.
Todd, A.W., and E.K. Boggess. 1987. Characteristics, activities, lifestyles, and attitudes of trappers in North America. Pages 59-76 *in* M. Novak, J. A. Baker, M. E. Obbard, and B. Malloch, eds., Wild Furbearer Management and Conservation in North America. Ontario Ministry of Natural Resources. 1150 pp.
17. Mason, D. A. 1990. Vermont's other economy: the economic and socio-cultural values of hunting, fishing, and trapping for rural households. M.S. Thesis. Burlington VT: Univ. of Vermont. 98 pp.
18. Kellert, S. R. 1981. Trappers and trapping in American society. Pages 1971-2003 *in* J.A. Chapman and D. Pursley, eds. Proc. Worldwide Furbearer Conf., Frostburg, Md. 2056 pp.
19. Batcheller, G. R., T.A. Decker, D.A. Hamilton and J. F. Organ. 2000. A vision for the future of furbearer management in the United States. Wild. Soc. Bull. 28 (4):833-840.
20. Bishop, P. G. 1991. Unpublished report. New York State Dept. of Environ. Cons.
21. Bishop, P. G. 1990. Traps, trapping and furbearer management in New York State. New York State Dept. of Environ. Cons. 12pp.
22. Slate, D., R. Owens, G. Connolly, G. Simmons. 1992. Decision making for wildlife damage management. Trans. N.A. Wildl. & Nat. Res. Conf. 57:51-62.
23. Green, J. S., and R. A. Woodruff. 1991. Livestock guarding dogs protect sheep from predators. U.S. Dept. Agric., Agric. Info. Bull. No. 588.
24. Green, J. S., ed., 1987. Protecting livestock from coyotes: a synopsis of the research of the Agricultural Research Service. Natl. Tech. Info. Serv. PB 88 133590/AS. 105 pp.
Meadows, L. E. and F. F. Knowlton. 2000. Efficacy of guard llamas to reduce canine predation on domestic sheep. Wild. Soc. Bull. 28 (3): 614-622.
25. D'Eon, R. G., R. LaPointe, N. Bosnick, J. C. Davies, B. MacLean, W. R. Watt and R. G. Wilson. 1995. The Beaver Handbook: A guide to understanding and coping with beaver activity. OMAR Northeast Science & Technology. FG-006. 76 pp.
Miller, J. E., 1983. Control of beaver damage. Proc. Eastern Wildlife Damage Control Conf. 1:177-183.
26. Langlois, S.A. and T.A. Decker. 2001. The use of water flow devices in addressing flooding problems caused by beaver in Massachusetts. Massachusetts Div. Fisheries & Wildlife. 16pp.
27. Green, J. S., F. R. Henderson, and M. D. Collinge. 1994. Coyotes. Pages C-51 to C-76 *in* S. E. Hygnstrom, R. M. Timm, and G. E. Larson, eds., Prevention and control of wildlife damage. Univ. Neb. Coop. Ext. Serv.
28. Muller, L.I., R.J. Warren, and D.L. Evans. 1997. Theory and practice of immunocontraception in wild animals. Wildl. Soc. Bull. 25(2):504-515.
29. Rosatte, R., D. Donovan, M. Allan, L. Howes, A. Silver, K. Bennett, C. MacInnes, C. Davies, A. Wandeler, and B. Radford. 2001. Emergency response to raccoon rabies introduction in Ontario. J. Wildl. Dis. 37(2):265-279.
30. Jacobs, W. W. 1994. Pesticides federally registered for control of terrestrial vertebrate pests. Pages G-1 to G-22 *in* S. E. Hygnstrom, R. M. Timm, and G. E. Larson, eds., Prevention and control of wildlife damage. Univ. Neb. Coop. Ext. Serv.
31. Siemer, W. F. and D. J. Decker. 1991. Human tolerance of wildlife damage: synthesis of research and management implications. Human Dimensions Res. Unit Publ. 91-7, Dep. Nat. Resources, N.Y.S. Coll. Agric. and Life Sci., Cornell Univ., Ithaca, NY. 24pp.
32. Melquist, W. E., and M. G. Hornocker. 1983. Ecology of river otters in west central Idaho. Wild. Monogr. 83. 60pp.
33. Decker, T. A. Vermont Department of Fisheries and Wildlife. Personal communication.
34. Hamilton, D. 1999. Controversy in times of plenty. Missouri Cons. 8pp.
35. Herscovici, A. 1985. Second nature: the animal-rights controversy. CBC Enterprises, Toronto. 254 pp.
Francione, Gary L. 1996. Rain without thunder:the ideology of the animal rights movement. Temple Univ. Press, Philadelphia. 269pp.
36. Kellert, S. R. 1984. Urban American perceptions of animals and the natural environment. Urban Ecology. 8:209-228.
37. Thompson, T. R. and G. D. Lapointe. 1995. Learning from animal activists: a workshop approach. Wildl. Soc. Bull. 23:588-593.