Wild Furbearer Management and Conservation in North America

Edited by Tim L. Hiller, Roger D. Applegate, Robert D. Bluett, S. Nicki Frey, Eric M. Gese, and John F. Organ

Chapter 10: Harvest Management of Furbearers

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HARVEST MANAGEMENT OF FURBEARERS

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Harvest management is a cornerstone of wildlife management in North America, particularly for state, provincial, and tribal fish and wildlife management agencies. Yet, there seems to be a paucity of comprehensive works dedicated to practical guidance decisions for harvest management. The management of furbearers is no exception. To be most effective in dynamic systems, harvest management should be considered a learning process (Conroy 2021, Runge 2021) because decisions must be made and revised as conditions change. The complexity of these ecological systems, coupled with uncertainty in outcomes, may result in conservative decisions related to harvest. The challenges of collecting data for a diverse set of species may make harvest management of furbearers especially prone to conservative decisions (Hiller et al. 2021*a*).

Furbearers may be defined pragmatically using a management-based approach as, "…the group of mammalian species either currently or historically harvested primarily for their pelts" (Hiller et al. 2018:117). Such an approach is not ecologically based, and our definition is not all inclusive in many states, provinces, and territories for what we generally perceive to be furbearing species. For example, some jurisdictions use legal definitions of furbearer, unprotected mammal (or unprotected wildlife), predator (or predatory animal), or others for which the non-furbearer classifications typically denote fewer restrictions (e.g., no closed season) associated with harvest. These classifications may be in place to allow for real or perceived damage to life or property attributed to these species to be more readily addressed.

Such legal definitions are sometimes defined in state, provincial, or territorial statutes to which jurisdictional agencies must adhere when developing and implementing regulations. For our purposes, we will focus on the broad array of mammalian species that are harvested for their pelts, which excludes other species (e.g., American alligator [*Alligator mississippiensis*], American black bear [*Ursus americanus*], mountain lion [*Puma concolor*], pinnipeds, white-tailed deer [*Odocoileus virginianus*]) that may be utilized for pelts or skins, but typically are classified differently (e.g., big game) by jurisdictional wildlife agencies.

Based on our approach, there are at least 27 furbearing species in North America, which includes species within the orders Carnivora, Didelphimorphia, and Rodentia (Hiller et al. 2018). The most popular (and widespread) species targeted by U.S. trappers include northern raccoon (*Procyon lotor*), coyote (*Canis latrans*), muskrat (*Ondatra zibethicus*), North American beaver (*Castor canadensis*), red fox (*Vulpes vulpes*), and bobcat (*Lynx rufus*; Responsive Management 2015). In Canada, the list is similar, with the addition of American marten (*Martes americana*), North American river otter (*Lontra canadensis*), fisher (*Pekania pennanti*), and Canada lynx (*Lynx canadensis*). Furbearers include a diverse group of taxa with substantially different life histories. Therefore, managers often use some level of species-specific (or at least within-group) harvest management.

Our focus is on harvest management of furbearers, although some of the information contained in this chapter may be applicable to harvest management in general. Furbearer management presents some aspects that are unique, particularly at the global scale. For example, the pelts of furbearers have economic value, and therefore there is some level of commercial use that should be integrated into some decisions (e.g., potential for revising regulations and harvest based on fluctuating conditions of global markets). Also, there are international agreements in place such that capture devices are tested based on several criteria, including animal welfare, and use of approved (or certified) devices is either mandated nationally via coordinated and consistent provincial-territorial regulations (Canada) or may be voluntarily integrated into regulations at the individual state level (U.S.). Further, this chapter is focused primarily on state, provincial, territorial, and Tribal-First Nations management authority for harvest of furbearers in North America. However, certain federal regulations may affect harvest management of furbearers and therefore are also included. Finally, we include harvest management as it relates to avocational or vocational harvest, with limited discussion about topics specifically associated with damage management. Damage management, which ideally addresses specific species that cause

issues (e.g., livestock depredation) in specific locations, is an important component of furbearer management programs (Menke and Vantassel 2024 [Chapter 11]), but the general goal of harvest management of furbearers is to ensure that long-term harvest remains sustainable.

The fur trade in North America became expansive and is credited for financing continental exploration, influencing political boundaries, transforming cultures and traditions of indigenous peoples, and engaging trade relations on and beyond the continent as never before (Ray 1987, Ray 2024 [Chapter 20]). However, the early era of the fur trade was also unregulated, and led to substantial population declines and local extirpations (e.g., North American beaver, sea otter [*Enhydra lutris*]) and unfortunately, extinction for a very few furbearing species (e.g., sea mink [*Neovison macrodon*]; Manville 1966, Ray 1987, Ray 2024 [Chapter 20]). Beginning in 1907, the U.S. Department of Agriculture, Bureau of Biological Survey, started predator-control programs that focused on addressing livestock depredations and predation on big-game species in western states and territories (Young and Goldman 1944:381–385). These control measures were responsible for widespread population declines, particularly of large carnivores (e.g., gray wolf [*Canis lupus*]) in that region (Robinson 1953, Boyd et al. 2023 [Chapter 32]). Recent population recovery efforts for several of these species of large carnivores have been successful throughout western North America, although this sometimes presents a challenging management scenario in terms of available habitat, coexistence with humans, and other factors (see Peek et al. 2012).

Given that furbearers are harvested primarily for their pelts, but may also provide food and other benefits, their importance to the global economy can be substantial, even despite fluctuating markets. At the global scale, the value of the fur trade (wild and farmed) has fluctuated annually by about US$2–7 billion in raw pelts during 2000–2020, and about US$20–30 billion in retail sales during 2012–2021 (Hansen 2017, 2021; Cahill et al. 2024 [Chapter 24]). The human societal value that accrues from the management (through harvest and sustainable use) of certain furbearing species (e.g., coyotes, gray wolves, North American beavers, northern raccoons) is less tangible and more difficult to quantify, but nonetheless significant. Such a value is created when harvest reduces what would otherwise be substantial risk, conflict, and damage to agriculture (crops and livestock), infrastructure (roads and other property), and human health (International Association of Fish and Wildlife Agencies 2005).

Finally, to assist with interpretation of discussions that follow, we clarify the difference between animal rights and animal welfare using descriptions that seem to be acknowledged by those that adhere to either set of principles. Animal rights is the concept that animals have the same, or similar, rights as humans, and animals may not be used by humans for any purpose, including food, clothing, entertainment, or experimentation. Conversely, animal welfare is the concept that such use of animals by humans is acceptable if humane standards are followed (see Truth About Fur 2017, People for the Ethical Treatment of Animals 2023).

THE ROLES OF FUR HARVESTERS

People who trap (trappers, those who use trapping devices to harvest animals) or hunt (those who use primarily firearms, and to a lesser extent, archery equipment) furbearers may collectively be called fur harvesters. Trapping furbearers involves a wide range of capture devices (e.g., bodygrip traps, cable restraints, foothold traps, snares) and deployment techniques (sets; see Krause 2007), which are highly regulated by jurisdictional agencies. Several traps and sets have been developed to be species specific or to target a narrow group of furbearing species. Hunting furbearers involves two primary methods: predator calling (using mouth-operated or electronic sounds to attract predatory species within shooting range) and use of trained dogs (primarily to track, pursue, and tree a particular species). The use of trained dogs is popular for species such as bobcats, coyotes, and northern raccoons. State, provincial, territorial, and tribal regulations vary substantially for trapping and hunting of furbearers, and should be consulted for details and periodic revisions.

The mean annual income for fur harvesters from trapping is <US$1,000, with 80% of U.S. trappers indicating that trapping does not provide an important source of income (Association of Fish and Wildlife Agencies 2015*b*). Rather, motivation of fur harvesters often includes factors such as interaction with nature, self-sufficiency or subsistence, and a rural lifestyle (Daigle et al. 1998, Zwick et al. 2006, Dorendorf et al. 2016). Thus, in the U.S., fur harvesting is similar to other consumptive activities such as fishing and hunting, in that financial incentive is less of a factor that motivates individuals (Gruntorad and Chizinski 2021). However, the harvest of furbearers and subsequent sale of pelts is an important source of income for many trappers in Alaska, the western U.S., and many areas of rural Canada, particularly for indigenous and other communities in northern and other more remote areas (Responsive Management 2015).

Although there is some annual variation, up to 50,000 trappers may be engaged in commercial fur harvesting in Canada in any given year (Fur Institute of Canada, unpublished data). The contribution to family and community incomes varies regionally and annually, but tends to be most important in rural and northern regions. Income from fur harvesting is often an additive component to other seasonal natural-resource-based income sources, such as timber harvesting and commercial fishing. Regardless, the close connection to the outdoors and direct interaction with nature associated with successful trappers may explain why they generally are considered to be highly knowledgeable about nature (Kellert 1980), which allows for application of their expertise by serving as highly effective citizen scientists, including assisting with conservation and management efforts (e.g., Webb and Anderson 2016).

Management of the human component of harvest often includes interactions between agencies and stakeholder groups. Wildlife management agencies and trapping and hunting organizations strive for and make substantial efforts to maintain collaborative and cooperative working relationships. Such an approach proactively avoids extreme negative relationships and interactions that might affect decisions for harvest management. Each Canadian province

and territory and each U.S. state typically has at least one state- or provincial-level trapping organization, and perhaps one or more within-state or province chapter or local council organization. In addition, there is currently one national organization (Canadian National Trappers Alliance) in Canada, and two national organizations (Fur Takers of America, National Trappers Association) in the U.S. About 32% of U.S. trappers are members of at least one trapping organization (Responsive Management 2015).

Each organization may play a different role in harvest management decisions, and the relationship between a management agency and a given organization may range from little interaction to extremes of positive or negative, depending on the jurisdiction (see Hastings et al. 2024 [Chapter 21]). Positive interactions may include close coordination for any management or conservation decisions designed to benefit conservation and sustainable use of wildlife, including an organization suggesting or supporting informed and science-based decisions on regulatory changes (including more restrictive, when warranted). Trapping organizations also facilitate their members becoming directly involved with capture of furbearing species for data collection, reintroduction efforts, or research activities. Additionally, members of these organizations are often involved in other conservation activities, such as focused captures of common furbearing species that may be negatively impacting endangered species or that may require capture to reach other goals for population management.

The most recent estimate of >176,500 trappers in the U.S. during 2015 was an increase of 24% compared to the estimated number during 2004. Over half of trappers in the U.S. are located in the Midwest region (Responsive Management 2015; Fig. 10.1). Other survey results included mean number of days trapped/trapper was 36.7 for the 2014–2015 season, although 10% of trappers surveyed did not trap during that season; the mean number of traps set was 27.6/day. In Canada, there were approximately 41,000 licensed trappers during the 2015–2016 harvest season (Fur Institute of Canada, unpublished data). Overall estimates are in the range of 50,000 active trappers for Canada after accounting for additional indigenous community trappers in jurisdictions where indigenous trappers may not be required to be licensed.

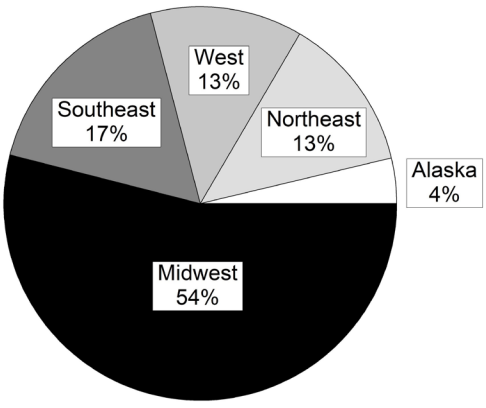

Fig. 10.1. Distribution of furbearer trappers in the U.S. during 2015, based on an estimated total of 176,573 trappers (Responsive Management 2015).

TRAP TESTING AND ITS INFLUENCE IN NORTH AMERICA

In North America, formal testing of capture devices, including to quantify and improve efficiency and animal welfare, has been conducted for many decades (Novak 1987*a*, Barrett et al. 1988, Boggess et al. 1990, Jotham and Phillips 1994, White and Canac-Marquis 2024 [Chapter 23]). During the 1990s, the European Union passed and implemented the Wild Fur Regulation EEC 3254/91, which would have eliminated the importation of furs and fur-related goods to Europe from Canada, the U.S., and other countries if certain stipulations were not met (see Hamilton et al. 1998, Harrop 1998, White et al. 2021). This included that countries allowing the use of foothold traps must show that the specific devices allowed met internationally agreed-upon humane trapping standards (European Commission 1991, Hamilton et al. 1998, Andelt et al. 1999).

In Canada, the Agreement on International Humane Trapping Standards was negotiated by the Government of Canada, and with the support of the Canadian provinces and territories (with whom the authority for management of most non-migratory wildlife and, in particular, most furbearing mammal species resides), was ratified in 1999 (Fur Institute of Canada 2022). Beginning with the 2007–2008 fur harvest season, the provinces and territories have modified harvest regulations to require trappers to use capture devices certified through the Agreement on International Humane Trapping Standards (which currently includes >200 different types of traps) for the 12 furbearing species listed within the Agreement (European Commission 1998*a*, Fur Institute of Canada 2022).

In the U.S., international treaties and trade agreements are negotiated at the federal level, and the management authority for wildlife resides primarily with states and tribes. The realities of history and the relationships of the states to the federal government made this process of concluding an agreement much less straightforward in the U.S. Ultimately, the U.S. and the European Union signed a non-binding bilateral understanding called an Agreed Minute (European Commission 1998*b*), which referenced the standards described in the Agreement on International Humane Trapping Standards and outlined a commitment by the U.S. to evaluate trap performance and advance the use of improved traps through development of Best Management Practices for Trapping for 23 furbearing species (White et al. 2021, Association of Fish and Wildlife Agencies 2022*a*). The Best Management Practices for Trapping program serves to provide information on program-approved capture devices to state fish and wildlife agencies, trappers, researchers, and others. The program's resources and information may be used to support revisions of regulations, but the program itself has no regulatory authority.

The results of trap testing in Canada have led to many mandated regulatory changes to require, at the species level, the use of traps certified as meeting the Agreement on International Humane Trapping Standards. In the U.S., trap testing helps guide management decisions, including selection of devices for capture during research projects, avocational trapping, and damage management. For example, the Agreement on International Humane Trapping Standards Certified Trap List (Canada) and

the Best Management Practices for Trapping (U.S.) can be relied upon by animal care and use committees for approval of capture devices for research purposes. Results have also either confirmed selection of or provided guidance for appropriate styles of trap jaw (e.g., double, laminated, offset) of the numerous models of foothold traps based on one or more target species. Interestingly, the innovations of trappers have led to numerous improvements in capture devices and techniques, with trap testing more often serving the role of determining what works best as opposed to directing the actual innovations (White and Canac-Marquis 2024 [Chapter 23]).

HARVEST REGULATIONS

Some regulations associated with harvest management are common to harvest management of other species, whereas some regulations are quite unique for furbearers. We describe the former as general regulations, which include licensing, season timing and length, hunting, harvest limits, and harvest-data reporting. We describe the latter as trapping-specific regulations, which include restrictions and specifications on traps and trapping equipment, trapping sets, trap-check intervals, registered traplines, and management of incidental take. The enactment of a particular regulation may be related to ensure sustainable harvest for some species. However, the abundance of many furbearing species is such that sustainable harvest is not the primary concern. For example, some regulations are designed to minimize or prevent incidental capture of non-target species (e.g., ungulates, raptors, threatened or endangered); to address potential concerns about animal welfare (e.g., trap-check intervals); to prescribe appropriate, tested traps or trapping-device categories for various species; or to manage the distribution of trappers for social reasons (e.g., registered traplines). Finally, some regulations (e.g., season timing) may be purposefully consistent for multiple furbearing species because trappers often target multiple species on their traplines.

General Regulations

Licensing, Permits, and Tags

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) entered into force in 1975, with the goal of protecting species from unsustainable trade; currently, CITES has a membership of 184 parties, including Canada, Mexico, and the U.S. (CITES 2023). In North America, the furbearing species listed under CITES include the bobcat, Canada lynx, gray wolf, and North American river otter. Although the brown bear (*Ursus arctos*) is also listed as a furbearer by the U.S. Fish and Wildlife Service for CITES purposes (U.S. Fish and Wildlife Service 2023*a*), the American black bear is considered both a big-game animal and a furbearer in Canada (Government of Canada 2023), and pelts of the polar bear (*Ursus maritimus*) resulting from regulated sustainable harvest may be traded and legally exported from Canada, none of the bear species will be discussed here. Regardless, all North American furbearing species that are listed under CITES are classified as Appendix II species, which has been described as either: 1) a species that is not currently threatened, but may become so if trade controls are not in place, or 2) a species that physically resembles (i.e., look-alike species) one or more listed species and therefore needs to be regulated to effectively control trade of the latter. However, the concept of look-alike species (e.g., the bobcat compared to the rare Iberian lynx [*Lynx pardinus*]) has been challenged based on the opinion that these species do not fall under authority of CITES.

The process for exporting pelts of a CITES-listed species from the U.S. to, for example, an international fur auction first requires an approved program between the relevant state fish and wildlife managment agency (or the tribal government of a particular jurisdiction) and the U.S. Fish and Wildlife Service. Many state fish and wildlife management agencies also have state-level tagging programs for furbearing species not listed under CITES. This essentially serves the same purpose: to monitor legally harvested animals, collect additional data on those species, and increase the effectiveness of enforcement of regulations.

In Canada, the export of any wildlife carcass or parts thereof (including meat, untanned pelts, beaver castoreum, or other parts) between provinces or to another country requires a provincial wildlife export permit (Government of Canada 2023). Harvest tags may be part of provincial or territorial harvest reporting regulations (particularly for big-game species), but are generally not a requirement for export of furbearer pelts. The provincial export permit system also provides the necessary background paper trail to assure legal harvest origin for issuance of CITES export permits for pelts of furbearing species listed under Appendix II of CITES for pelts exported from Canada. Tagging pelts, collecting data, and the export permit process allow for a paper trail to track the legal harvest of CITES-listed species in North America. Ultimately, these data are used to ensure that trade is not detrimental to the survival of a particular species.

Season Timing and Length

Pelt primeness is a primary consideration of the various pelt characteristics that determine value (e.g., color, size, quality of handling). A fully prime pelt is one where, "…both the guard hairs and the underfur have reached maximum length and density" (Obbard 1987). The annual cycle of pelt primeness varies somewhat by species, latitude, and other factors, but pelts are generally prime between November and March (Stains 1979). Consequently, harvest seasons typically fall within this annual period, although seasons are often similar among many furbearing species to allow fur harvesters flexibility with their activities (Table 10.1). However, when season dates include early or late periods in pelt primeness, trappers typically avoid capturing those species during the periods when pelt value is expected to be less.

Season timing and length may be refined based on other ecological, enforcement, social, or political factors. For example, some jurisdictional agencies may allow harvest earlier for common furbearing species (e.g., northern raccoons) that may also be utilized as food. Seasons may also be further refined by activity (e.g., hunting with the aid of dogs, general trapping, use of snares), such that they largely overlap, but certain periods may

Table 10.1. Examples of harvest regulations for selected furbearing species in Oregon, USA, during 2022–2024. Refer to Oregon Department of Fish and Wildlife (2022) for other components of regulations such as area closures, requirements for trapper education and harvest reporting, requirements for licensing requirements, and models of traps and use restrictions.

Species	Region	Harvest season	Harvest limit[1]	Potential reason for regulation
Bobcat (*Lynx rufus*)	Eastern OR	1 Dec–28 Feb	5	Season length and timing based on pelt primeness; harvest limit based on relatively lower population densities and relatively high harvest effort due to higher pelt value.
	Western OR	1 Dec–28 Feb	No limit	Season length and timing based on pelt primeness; no harvest limit based on relatively high population densities and relatively low harvest effort due to lower pelt value.
American mink (*Neogale vison*) Muskrat (*Ondatra zibethicus*)	Statewide	15 Nov–31 Mar	No limit	Abundant semi-aquatic species; trappers often target both species simultaneously with same tools and techniques.
North American beaver (*Castor canadensis*) North American river otter (*Lontra canadensis*)	Statewide[2]	15 Nov–15 Mar		Often locally abundant; trappers often target both species simultaneously with similar tools and techniques, although some species-specific approaches are implemented when required or desired.
American badger (*Taxidea taxus*) Coyote (*Canis latrans*) North American porcupine (*Erethizon dorsatum*) Nutria (*Myocastor coypus*) Striped skunk (*Mephitis mephitis*) Virginia opossum (*Didelphis virginiana*) Western spotted skunk (*Spilogale gracilis*) Weasels (e.g., *Neogale frenata*, *Mustela erminea*)	Statewide	1 Jan–31 Dec	No limit	Fewer restrictions for species that are invasive, may cause damage (e.g., agricultural damage, livestock depredation, timber production).
Canada lynx (*Lynx canadensis*) Fisher (*Pekania pennanti*) Kit fox (*Vulpes macrotis*) Ringtail (*Bassariscus astutus*) Sea otter (*Enhydra lutris*) Wolverine (*Gulo gulo*)	Statewide	No season	0	Species of conservation concern (e.g., state listed, federally listed) within the state; extirpated or possibly extirpated; very low abundance.

[1]Defined as the maximum number of individuals that may be harvested by an individual fur harvester,
[2]See regulations for specific areas closed to harvest, and other details.

be activity-specific to avoid potential conflicts. In some instances, timing and length of harvest seasons may also be adjusted somewhat to avoid potential conflicts among different consumptive-user groups (e.g., big-game hunters, upland gamebird hunters, trappers) as well. For example, the opening of deer (*Odocoileus* spp.) season for hunters that use firearms is typically very popular, but is often scheduled prior to when pelts may be prime, so balancing these seasons accordingly often minimizes the potential for any conflicts.

We know of no extensive studies that evaluated the potential effects of relatively minor changes in season length on harvest level. Essentially, season length typically is not used to directly manage annual harvest levels, except in specific situations, e.g., when very brief periods of harvest are coupled with harvest limits to ensure sustainable harvest while allowing harvest of lower-density species in a given jurisdiction or management unit.

Hunting Regulations

Legal weapons for hunting furbearers can include a wide variety of handguns, rifles, shotguns, muzzleloaders, and archery equipment (including crossbows). These vary depending on species, safety constraints, and to some extent, popularity among users. Jurisdictions are variable on their allowance for hunting during nighttime. In 2018, 44 or 50 U.S. states permitted hunting at night, and 42 of those allowed use of artificial light (Association of Fish and Wildlife Agencies 2022*a*). Hunting northern raccoons with the aid of dogs and artificial light is often widely accepted in Canada and the U.S., whereas hunting coyotes with predator calls and artificial light is not always accepted because of safety concerns and concerns that those using lights may be poaching deer. Our experience is that such restrictions may primarily be the result of social influence, as we know of no data that consistently support illegal activity.

In an effort to avoid potential conflicts between hunters using dogs (e.g., upland gamebird hunters) and trappers, some management units may include restrictions on when or where hunters with dogs may hunt, different opening dates for hunting and trapping seasons, and educational efforts for hunters to quickly release dogs in the rare event their dog is captured in a trap (e.g., Idaho Department of Fish and Game 2019). Thus, the relationship between hunters and trappers is an important consideration for managers of furbearer harvest, especially on multiple-use public lands meant for use of both activities. Hunters using dogs are also restricted on when and where they can train

dogs and conduct field trials. Training and trialing pose different management challenges because these can occur outside the open hunting seasons for furbearers. Trappers also need to use good judgment when selecting specific trapping locations.

Another regulatory consideration is hunting of animals for damage management. Hunters pursuing animals associated with damage may be given more flexibility in their activities than those hunting for other reasons. State and provincial jurisdictions do this in an effort to help agricultural producers address livestock and crop depredations during the periods when the damage is occurring. The principles for damage management were articulated by Nagel et al. (1955), especially the concept of removal of a specific offending animal as opposed to attempts at elimination of populations (see also Menke and Vantassel 2024 [Chapter 11]). For example, landowners attempting to mitigate damage may be allowed to hunt at night, or use calls, toxicants, or other methods, whereas those hunting for recreation often may not (Woolsey 1985; Connolly 1988, 2004; Blom and Connolly 2003; Mitchell et al. 2004).

Harvest Limits

When harvest limits related to furbearers are implemented, they may be categorized as individual limits (i.e., bag limit, the maximum number of a given species harvested by an individual trapper or hunter during a given season) or season limits (i.e., quotas, where a maximum number of individuals of a given species may be harvested within a particular area or jurisdiction by all fur harvesters, and no further harvest is allowed during the remainder of that season if the quota is reached). Harvest regulations for other species (e.g., small game) often use daily and possession limits to manage harvest levels. Many furbearing species are so abundant that harvest limits are not imposed, but annual harvest levels are monitored to help ensure sustainable levels of harvest. When harvest limits for furbearing species are imposed, it is often designed to regulate harvest to better ensure sustainability of a species that is relatively less abundant, has a restricted geographic distribution in a given jurisdiction, or both.

Harvest-data Reporting

Most jurisdictions implement harvest-data reporting in the form of either mandatory or voluntary individual reports from trappers and hunters, with reports due soon after the end of most furbearer-harvest seasons. For example, jurisdictional agencies acquire data on furbearer-harvest levels and harvest effort (e.g., number of days hunted or trapped to estimate catch-per-unit effort [CPUE]) by several means for the purpose of monitoring harvest and potentially implementing regulatory adjustments. Currently, the most common type of reporting in the U.S. is by mailed questionnaires (Association of Fish and Wildlife Agencies 2022*a*).

Other methods include reports of pelts purchased or sold by licensed fur buyers, total numbers of pelts exported from jurisdictional export permits, numbers of animals tagged with CITES or state-required tags, and individual trapper or hunter reports (Erickson 1982) via either online or mail-in report card (which may be either mandatory or voluntary; Erb and White 2024 [Chapter 9]). In the U.S., fur-buyer reports from those within the state may not include direct sales of pelts from trappers to out-of-state fur auctions, and animals tagged with CITES tags may not be assignable to a specific year. Fur-dealer reports and CITES-tag reports may at best be considered indices of harvest, whereas mandatory reports from individual fur harvesters and numbers derived from mandatory jurisdictional export permits may provide the most accurate estimates of harvest, depending on compliance rates and other factors. In the U.S., all available harvest data collected during 1970–2018 were acquired from state fish and wildlife management agencies, compiled, and organized into an online database, but these should also be considered minimum harvest values (Association of Fish and Wildlife Agencies 2022*b*). Statistics for harvest of wild furbearers in Canada were formerly collected from provincial and territorial wildlife agencies and compiled by Statistics Canada. This task is now coordinated by Fur Institute of Canada.

Trapping-specific Regulations

Restrictions on Traps and Equipment

Some state fish and wildlife management agencies have adopted trapping regulations based on results of the Best Management Practices for Trapping program (Association of Fish and Wildlife Agencies 2022*a*), related to the most humane and efficient trap sizes and models. Agencies may place restrictions on certain traps in certain areas because of concerns for capturing pets or domestic animals. For example, bodygrip and foothold traps may not be allowed in areas where people may legally walk dogs, or near other certain areas (e.g., hiking trails, campgrounds, boat-launch ramps) because pets are likely to be present in these areas. Regulations may also be adjusted to help manage damage problems caused by species such as muskrats burrowing into pond dams or North American river otters depredating fish at aquaculture facilities or hatcheries.

Regulations on Trapping Sets

Agencies may regulate the types of sets that are appropriate for trapping in terrestrial versus aquatic systems. Agencies may also restrict bait usage when there are concerns for potentially capturing non-target species, including pets. However, the use of bait may be warranted, for example, to effectively trap North American beavers in areas where capture of North American river otters should be avoided. Set types may be regulated based on recommendations by the Best Management Practices for Trapping program for the target species, or in Canada, by recommendations from the guidelines on Best Trapping Practices (Fur Institute of Canada 2014). For example, large-sized bodygrip traps may not be permitted on land unless they are set a minimum distance above the ground, or placed inside of a cubby or bucket or within some other form of exclosure. Other restrictions, such as minimum setbacks from the opening of the exclosure, may be required to further reduce accidental captures of non-target species. In some jurisdictions, when using foothold traps for muskrats, only drowning sets may be used. In essence, the reasons for various regulations on trapping sets are just as varied, but often relate to social considerations, concerns about animal welfare, and avoidance of capture of non-target species.

Trap-check Intervals

The maximum amount of time legally allowed between two consecutive events of checking traps for any captures is called the trap-check interval. Regulated intervals currently range from at least once every 24 hours to no required interval, but there are also differences in required intervals for restraining versus lethal traps (or sets) in some jurisdictions (Responsive Management 2016). Some western and northern jurisdictions allow trappers greater intervals for checking traps compared to the rest of Canada and the U.S., generally to allow for greater distances traveled in these more remote areas, the potential for harsher winter weather, and other factors often associated with access. This situation has routinely resulted in challenges (typically from those opposed to any form of trapping activity) to decrease trap-check intervals via legislative action, rule-making, and other approaches. Jurisdictions typically set regulations associated with trap-check intervals to balance concerns about animal welfare, logistics associated with travel (e.g., greater distances traveled and effects of inclement weather during winter in northern climates), and other factors.

Registered Traplines

Registered traplines are a means to better regulate harvest levels to ensure sustainability by granting exclusive trapping rights within an area of public land to one trapper and their authorized helpers. Many registered trapline systems originated in the first half of the twentieth century when harvest was unregulated and therefore negatively impacting furbearer populations and in turn, impacting the economies of the trapping communities. In Canada, trapping is more often open to all trappers on any lands which are open to trapping of furbearers in the eastern provinces and in southern and more populated, agricultural-rural landscapes of other provinces. In the western provinces and more remote areas, registered traplines are common.

The holder of a registered trapline is authorized for exclusive right to trap furbearers on a specified area of public land, and manage the furbearer resources of that area accordingly. They are expected to be active on the trapline and manage their harvests sustainably, but they do not otherwise have exclusive right to the land or other natural resources. The trapline holder will have certain mandatory requirements to retain their trapline allocation, which may include minimum harvest effort for certain species (e.g., North American beaver), mandatory harvest reporting, regulatory compliance (e.g., appropriate use of Agreement on International Humane Trapping Standards for certified traps), and other responsibilities. Failure to fulfill responsibilities could result in license suspension or loss of rights to the trapline and associated cabin, although this would probably occur only under extreme conditions (e.g., abandonment of trapline, conviction of serious non-regulatory compliance). The handling of furbearer trapping by indigenous trappers varies across the provinces and territories and may be influenced by various treaties and land-claims agreements. Certain trapline lands may be available only to indigenous communities for trapping by indigenous trappers in some Canadian jurisdictions, such as the Northwest Territories and the Yukon. For more details on on registered traplines, see Carmichael (1973), Anderson (1987), Novak (1987*b*), and Berezanski (2004).

Management of Incidental Take

The U.S. Endangered Species Act of 1973 (16 U.S.C. §1531 et seq.) defines take as, "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Incidental take can therefore be described as take while engaged in otherwise lawful activities. Specific to furbearer management, this typically relates to unintentional capture of a wild (e.g., raptors, deer) or domestic (e.g., domestic cat, domestic dog) non-furbearing species or the capture of a protected furbearer species (e.g., Canada lynx or wolverine [*Gulo gulo*] in the coterminous U.S.). Here, we describe regulatory examples and processes designed to minimize incidental captures during otherwise legal harvest activities.

Trappers must minimize incidental captures of species of conservation concern, such as those listed under the U.S. Endangered Species Act. Consider the example of incidental take of Canada lynx during trapping efforts for bobcats and fishers. The Canada lynx is distributed across most of Canada and Alaska, with its southern periphery in very limited areas in the northern coterminous U.S., including marginal habitat in northern Maine and northeastern Minnesota. Although the Canada lynx is currently listed as threatened in the coterminous U.S., the U.S. Fish and Wildlife Service proposed delisting in 2018 due to recovery, but lawsuits resulted in settlement agreements, including a recovery plan finalized by December 2024 (U.S. Fish and Wildlife Service 2023*b*, Cardoza et al. 2024 [Chapter 37]). The Maine Department of Inland Fisheries and Wildlife (2023) delineated a lynx protection zone to minimize incidental take, and to increase the probability of releasing captured Canada lynx with minimal or no injuries. Regulations within this zone included several trapping restrictions (e.g., maximum jawspread of foothold traps used on dry land, minimum number of swivels in trap chains for foothold traps, use of capture-exclusion device for Canada lynx [see Association of Fish and Wildlife Agencies 2017] on certain bodygrip traps set on dry land), and required any person who captures a Canada lynx to call an established telephone hotline. Further, educational brochures have been developed to disseminate information about how to avoid incidental captures of Canada lynx (Golden and Krause 2003) and wolverines (Hiller and White 2013).

Certain species, such as American marten and Canada lynx which are common in more northern areas, are species of conservation concern and may be listed as provincially endangered in some of Canada's eastern provinces. Efforts similar to those used in the U.S. have been implemented to avoid incidental captures, promote release, and encourage sighting reports from trappers and the public. Incidental take of furbearers outside of open seasons or in excess of established harvest limits generally results in the requirement of those animals to be surrendered to the regulating agency if the captured animal cannot be released alive.

Numerous other effective regulations are in place to minimize the probability of capturing non-target species, or to increase the probability of being able to release those species with no or minimal injuries. For example, many jurisdictions in Canada and the U.S. require the use of setbacks, a regulation that specifies any traps

set on public (or private) lands must be a minimum distance from trails, campgrounds, and other areas of high levels of human use, to avoid any potential conflicts (e.g., capturing unleashed dogs). Many midwestern U.S. states and some Canadian jurisdictions restrict the use of bodygrip traps set in cubbies on dry land to be recessed a certain distance inside the cubby enclosure to avoid capture of dogs (see Association of Fish and Wildlife Agencies 2017, White and Canac-Marquis 2024 [Chapter 23]; Fig. 10.2).

The use of cable restraints or snares on dry land may also be regulated to include minimum sizes for loops, break-away devices, and techniques to minimize capture of deer, moose (*Alces alces*), and other non-target species (e.g., Roy et al. 2005, Association of Fish and Wildlife Agencies 2009, Gardner 2010). A final example is the omnipresent regulation that prohibits either large exposed baits (e.g., carcasses of large animals) or setting traps within a certain distance of such baits to avoid capturing raptors. Several other techniques and approaches are listed in regulations and are used by trappers to minimize incidental captures, or even allow for species-specific sets, such as pan-tension devices on foothold traps, tension devices or trigger modifications on bodygrip traps, use of foot-encapsulating traps, and first and foremost, general avoidance of areas where an incidental capture is likely to occur (e.g., Association of Fish and Wildlife Agencies 2017, White et al. 2021, White and Canac-Marquis 2024 [Chapter 23]).

There are no accurate and complete data sets associated with number and species of incidental captures of non-furbearing animals. In many instances, trappers simply release non-target captures if the non-target animal seems to have minimal or no injuries, or they report the capture to the appropriate jurisdictional fish and wildlife agency for assistance, especially if legally required. Incidental take of threatened or endangered species can be minimized with proper regulations in place and the use of good judgment by trappers. For example, during trap testing under the Best Management Practices for Trapping program, no individuals of any federally threatened or endangered species (e.g., Canada lynx, San Joaquin kit fox [*Vulpes macrotis mutica*], wolverine) where listed were captured over a 21-year period that included >230,000 trap-nights across much of the U.S. (White et al. 2021), despite the potential or actual occupancy of those species in the vicinity.

EVALUATING HARVEST REGULATIONS FOR FURBEARERS

Harvest management of furbearers is typically multi-species management, which increases the complexity of evaluation of regulations. Trapping and hunting seasons are set for species with different biological characteristics, population ecology, and interests of trappers and hunters. Economic considerations, such as pelt value and interest in managing damage or nuisance, also play into such decisions. Conversely, big-game species, such as bighorn sheep (*Ovis canadensis*), black bear, elk (*Cervus elaphus*), mountain goat (*Oreamnos americanus*), and white-tailed deer, are managed as single species (Diefenbach et al. 2021), which may allow for more straightforward evaluations of harvest regulations.

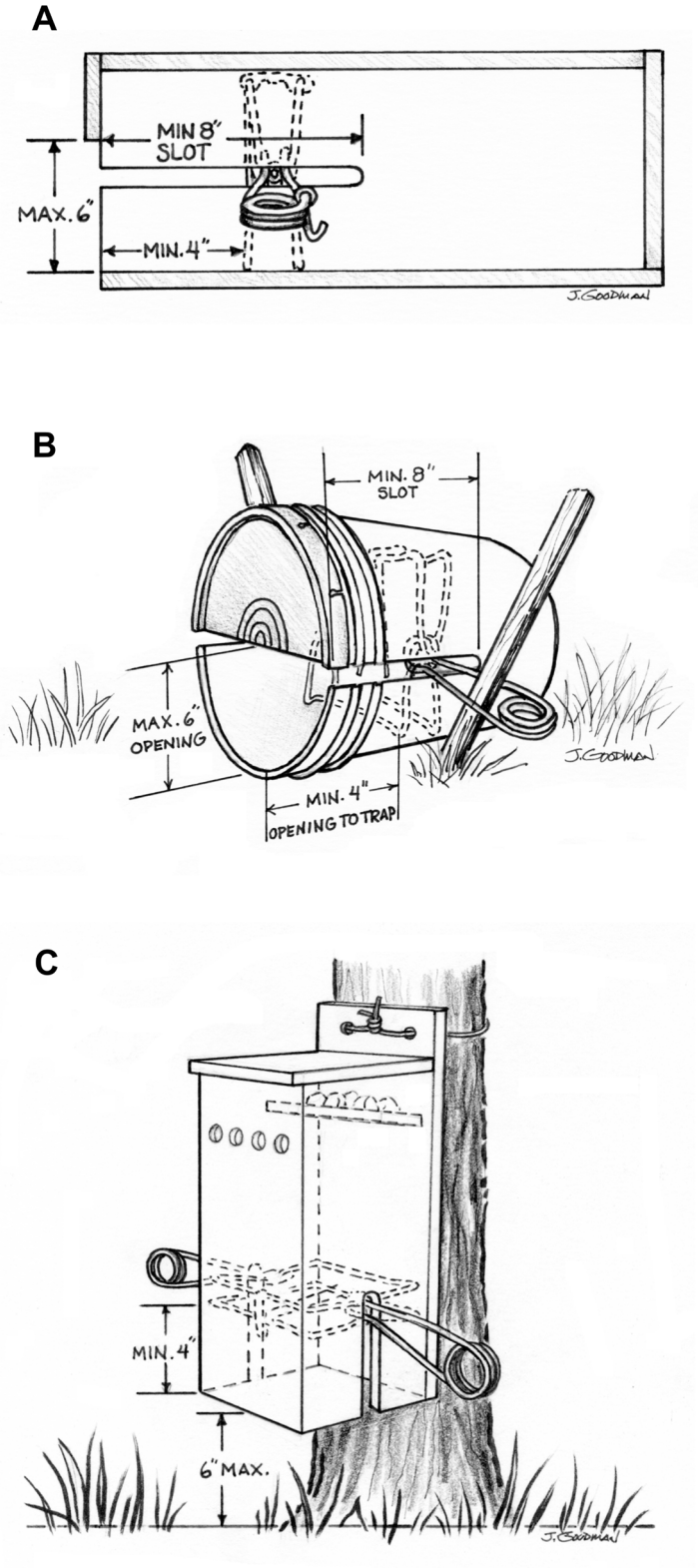

Fig. 10.2. Several state fish and wildlife agencies require specific dimensions or designs of enclosed cubby sets on dry land that include bodygrip traps, which may include A) recessed trap, B) partially restricted entrance, and C) vertically mounted design. Image by Joe Goodman, and used with permission from Association of Fish and Wildlife Agencies (2022*a*).

Harvest management of furbearers has been among the more controversial aspects for jurisdictional agencies. Despite the public attention, data collection and analyses to support informed decision making for furbearer management have often lagged behind that for more popular big-game species due to limited resources and the difficulty of monitoring the diverse array of furbearing species, among other factors (Hiller et al. 2018). However, heightened interest in data collection and application of contemporary statistical methods to support defensible decisions (Conroy 2021, Cummings and Bernier 2021, Runge 2021) should shift this paradigm for furbearer management. Mandatory harvest and activity reporting is an important tool and basic step to better understanding harvest and population trends.

There have been several efforts for developing models to guide furbearer management. Frederick and Cobb (1992) constructed a simulation model of populations of northern raccoons that included hunting and trapping harvest, illegal harvest, disease, and habitat. Most jurisdictions will have harvest data and can obtain habitat data, but will not have disease prevalence or estimates of illegal harvest. In spite of this, the model has merit if the comprehensive data needs are obtained. Another model was developed by Thompson et al. (1996) for 23 species of furbearers in New Mexico, USA. This model relied on harvest data and ecological zone to develop a basis for using habitat to estimate harvest of the 23 species. The authors believed that demographic data were needed to properly assess harvest of bobcats and red foxes. Neither of these models have seen application in furbearer-management programs. In contrast, programs such as Deer Camp (Moen et al. 1986), POP-II (Bartholow 2000), and OnePop (Gross et al. 1973) have been used by agencies for managing big game (e.g., elk; Williams 1991; see also Clark and Powell 2023 [Chapter 5]).

THE FUTURE OF FURBEARER HARVEST MANAGEMENT

Social and political challenges to harvest management of furbearers, large carnivores, and other wildlife species will undoubtedly continue to occur through ballot initiatives, litigation, and other means that bypass management authority of agencies (Hiller et al. 2021*b*). Furbearer management is particularly subject to such challenges. We offer some thoughts, in the context of the social and political dynamics described, on what furbearer managers and agency leadership might expect in the future (see also Kluge et al. 2024 [Chapter 26]). We also offer thoughts on how to potentially address those issues to ensure the tenets of the North American Model of Wildlife Conservation remain in place, particularly that science is the proper tool to discharge wildlife policy (Organ et al. 2012).

The potential for controversy surrounding harvest management for furbearers creates a current need for increased use of monitoring data collected on furbearers (Cummings and Bernier 2021, Erb and White 2024 [Chapter 9]). Indeed, it becomes increasingly difficult in the current social and political climate to make informed and defensible science-based decisions without collection and utilization of data. Agencies can provide the evidence demanded by stakeholders and the general public when data are available, although we recognize that is only one piece of the puzzle. Financial and logistical constraints will continue to cause disparities in priorities for data collection for furbearers relative to other harvested species. However, conservationists have been working to increase opportunities for federal funding for wildlife conservation and management (e.g., Recovering America's Wildlife Act; The Wildlife Society 2023), which may have substantial benefits for monitoring and managing furbearing species.

The decision-making process for harvest management of furbearers is embedded in a social matrix. Thus, wildlife managers need effective communication strategies to demonstrate, understand, and articulate the societal-level benefits and value of sustainable management and use of furbearers (e.g., Kahan et al. 2012), which includes the human societal value that accrues from the management of certain furbearing species that otherwise would create substantial risk, conflict, and damage. Such benefits to local stakeholders have potential to be seen as more relevant to decision makers than the general campaign activities of animal-rights groups that oppose furbearer harvest with substantial resources relative to agencies and consumptive-user groups. Further, although public education efforts are considered beneficial, we should also consider the benefits of targeted communication efforts at smaller scales. For example, a focus on administrators and politicians, those who make decisions and policy, may be the focus for increased efforts. Interestingly, it may be possible that the dissemination of more information about a controversial topic (e.g., climate change) across wide audiences may increase cultural polarization independent of scientific literacy (Kahan et al. 2012). Although the controversy associated specifically with furbearer harvest may not be on the scale of climate change, the humane use of animals could be described as omnipresent.

Global drivers cause concerns about impacts and influences of animal-rights-based interests go beyond local and state-provincial levels to the highest fora of international wildlife conservation, including such venues and critical policy drivers as CITES and the International Union for the Conservation of Nature. For example, the COVID-19 pandemic has caused tremendous global turmoil, concern, and human suffering at the time of this writing, the likes and scale of which the world has not known for many years.

As a fuller understanding of the origins of the virus unfolds, it will likely bring quite justifiable and intense scrutiny on the sustainability and safety of use and trade in certain wildlife species and products and the inadequate hygiene and safety protocols and practices of so-called wet markets. The outfall of this new scrutiny has already provided considerable opportunity for animal-rights organizations and interests to promote massive generalizations and broad-stroke actions to advance their goal of reducing or banning legitimate, regulated, sustainable use of wildlife in the guise of necessary action for public health and safety and biodiversity conservation. Our author team is aware of reports coming out of China as to possible actions to be taken, which may provide an opportunity for overreach of reactionary restrictions on unregulated animal trafficking that could impact regulations for harvest management of furbearers.The concern of furbearer managers is the potential loss of the opportunity to legally harvest furbearers, but also the loss of an effective tool for management of furbearer populations.

Amidst a landslide of controversy generated in Europe during the 1990s, Decker and Batcheller (1993:153) stated, "It is likely that the import of furs to the [European Union] (75% of the North American fur market) will end in the future." Although that statement was made over a quarter century ago, there are certainly no guarantees that substantial changes to harvest management of furbearers will not occur in the future, even notwithstanding the benefits associated with the Agreement on International Humane Trapping Standards and the Best Management Practices for Trapping programs. These programs have undoubtedly helped guide managers with additional science for informed decision making. However, we believe that we must also increase our monitoring (and other data collection) efforts for furbearers and use those (and existing) data appropriately to guide harvest management (Erb and White 2024 [Chapter 9]). Fortunately, the past several years has seemingly resulted in an initiation of a paradigm change toward greater efforts for collection and utilization of data, which is critical to continue.

The future of harvest management for furbearers will mirror efforts for other programs for which the inclusion of social components for regulations, including the formal expression of objectives related to human dimensions, has been critical (Kaemingk et al. 2021, Vrtiska 2021). State and provincial agencies will need to consider greater efforts toward furbearer management by increasing budgets and dedicating more personnel to management of these species. Furbearer-management programs are often led by agency staff that have multiple primary duties that may too often lead to less support for spending more time on data collection and development of management programs.

As a group, furbearers are typically relatively low in priority for funding of research. Also, such efforts must include broader messaging and stakeholder involvement in this dynamic decision-making environment. Perhaps ironically, a program for harvest management that is primarily housed within state and provincial agencies will undoubtedly need to gain increasing coordination at the federal and global levels in light of global dynamics that affect this unique form of harvest management. Regardless of whether fur markets continue to drive management of furbearers, there is an obligation to conduct data-driven management. Evolution of furbearer harvest management must occur at some level to help ensure its persistence and success.

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