

FURBEARER MANAGEMENT GUIDELINES

MINK *Mustela vison*



Since 1926, separate trapline areas in British Columbia have been assigned and registered to individuals licensed to harvest the province's plentiful fur resources. To obtain a licence, trappers must successfully complete a three-day course that focuses on humane trapping methods, fur handling, and trapline management. The trapline management component includes knowledge of, and fosters respect for, provincial trapping regulations, adherence to professional and ethical standards established by the Ministry of Water, Land and Air Protection and the BC Trappers Association, and practices that help to manage and maintain furbearer populations. There are approximately 2900 registered traplines in British Columbia, and 19 mammal species are officially classified as furbearers.

For management purposes, the mink is a Class 1 species, which means that it has a home range that is small enough for a sustainable population to be contained within one trapline area and can therefore be managed on an individual trapline basis. Other Class 1 species are marten, beaver, muskrat, raccoon, squirrel, weasel, fox, and skunk.

This document is intended primarily to provide British Columbia's professional trappers, government managers, and industry with information on mink biology, and on principles to consider in the sustainable management of the species. The material presented is generalized from the results of many studies conducted over a wide geographic area and local variations and exceptions may occur.

DESCRIPTION

The mink is a member of the weasel family and has the typical long, thin weasel shape, with short legs, a long neck, and short, dense fur. The head is flat with a narrow nose-pad, black beady eyes, and rounded ears that are usually visible but not prominent. The pelage is uniformly some shade of brown, although most minks also have irregular white patches on the chin, throat, chest, or groin. Those markings are distinctive and have been used to distinguish individuals in biological studies. The tail is about half the length of the head and body combined, and is usually a darker shade than the rest of the body, often appearing black toward the tip. While not really "bushy" the tail is well-furred and appears thick when dry. Adult males are 600 to 650 cm in total length, including tail, and weigh 1200 to 1500 g, with the largest specimens coming from coastal habitats. On average, males are about 20 percent larger than females in body measurements and weigh twice as much.



ECONOMIC CONSIDERATIONS

The silky but durable fur of the mink has long been a symbol of luxury and a staple in the fur trade, generating millions of dollars in revenue annually. Influenced by fashion trends and world economics, the reported mink harvest in BC peaked at 46,284 in 1933 (worth \$1.1 million in the floundering economy of the Depression Era), although an unknown (probably small) proportion of that total was from fur farms. Increased world production of ranch mink in the 1960s created a market surplus and "democratized" the status symbol of mink, making it available to consumers with moderate incomes.

Today, quality wild mink is still a valued commodity but makes up only five percent of the

international market for mink products. The volatile nature of mink prices in recent years has caused many trappers to decrease their effort for this species and to focus on more financially rewarding furbearers. In BC, the annual harvest of wild mink has declined from between 10000 to 20000 animals in the 1950s, to an average of less than 5000 from the 1950s through the mid-1990s, and less than 1000 since 1995 (Figure 1).

Wild mink fur sales contributed about half of the total provincial fur revenue in the peak year (1933), but that proportion has averaged less than 5 percent since 1970 and less than 2 percent since 1990. Minks are harvested in all eight of the administrative regions of the province (Figure 2), but the highest numbers are from the northern half of the province (Cariboo, Skeena, and Omineca-Peace regions).

Predation by minks on waterfowl is an issue for marsh managers in some areas, particularly on the prairies. In Europe, where minks have been accidentally introduced by escapes from fur farms (often as a result of vandalism by animal rights activists), the species is considered a major threat to a number of native wildlife species. In BC, seabirds breed in numbers only on islands not occupied by minks, and natural colonization or introductions to those areas could be disastrous. However, specific human conflict with the species in BC is rare, with complaints usually involving the mess and smell from mink middens and latrines in boats or buildings, and occasionally, predation on poultry or at fish hatcheries. Mink trappers can help reduce some of those problems either by general control of populations during trapping operations, or by assisting in the response to specific complaints.

Figure 1: Reported Wild Mink Harvests and Pelt Values, 1950-2000

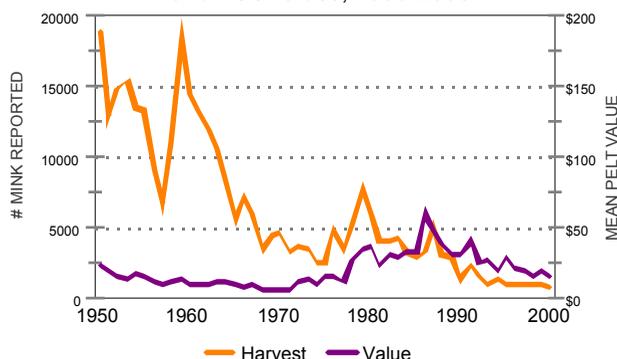
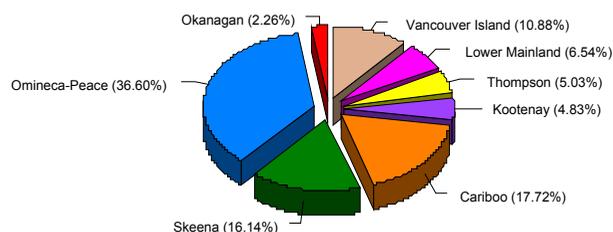


Figure 2: Wild Mink Harvest by Region, 1985-2000.



BIOLOGY

DISTRIBUTION AND HABITAT

Minks are semi-aquatic, and rarely move far from water. They occur naturally along water courses over most of North America, in all but extreme desert and high arctic conditions. Escapees from fur farms have developed thriving feral populations in many European countries and in parts of South America. In British Columbia, the mink is present throughout the entire mainland, although it is rare or absent at higher elevations over much of the province. It also occurs on Vancouver Island and all but a few of the most remote offshore islands, but not on the Queen Charlotte Islands.

There are two subspecies in British Columbia, the most widespread one occurring in freshwater habitats over most of the province and the other living and foraging almost entirely along saltwater shores on islands and along the mainland coast. The actual "boundary" between the two types has not yet been determined. Although they are physically and behaviourally similar, the two subspecies exhibit certain biological differences, which need to be considered in relation to management. Those differences are highlighted in the rest of this document under the terms "Inland" for the predominately fresh water subspecies and "coastal" for the minks found along ocean shores.

Inland minks forage along ditches, streams, and rivers, both in the water and in the riparian zone, and are common in wetlands and along pond and lake shores featuring either good growths of aquatic and marsh plants or thick upland cover. Shores with complex structure in the form of boulders, banks with exposed tree root systems and undercutting, and woody debris generally provide better habitat than do expanses of shoreline composed of small particles (sand or gravel)

and little nearby vegetative or structural cover. The best foraging habitats for coastal mink are shorelines that are protected from heavy wave action and have an abundance of intertidal structure such as boulders, rocky crevices, and marine plants, to provide cover for prey. Included are bays, inlets, lagoons, the lee sides of islands, and some rocky headlands in more exposed situations. Large expanses of sand or gravel beach, especially those regularly exposed to surf, are not good mink habitat, although some transient animals may subsist in those areas for a time by scavenging among beach debris and preying on certain invertebrates.

For most of the year, both inland and coastal minks travel and den primarily in their foraging habitat within a very short distance, often less than 100 m, of the shoreline. They den in soil burrows made by other species such as muskrats and marmots, in natural cavities between boulders and in rock ledges, in hollow trees, logs, and stumps, among the exposed root systems of live trees, in piles of drift debris and abandoned beaver lodges, and in or under human dwellings and outbuildings. An individual coastal mink may use a single den for long periods, when it is situated near a good foraging spot, but inland animals may use several different dens over a period of days or weeks as they travel over their home ranges.

FOOD

Minks eat no plant foods of any kind, and are generalists in their use of animal foods. Inland minks have the most variable diets, hunting in or near water for species such as fish, frogs, crayfish, muskrats, insects such as water beetles, and various waterfowl and shorebirds, but often specializing on more upland species such as voles and mice. On the coast, most foraging is done in the water or in the intertidal zone at low tide, and shellfish (mainly crabs) and small fish are the most important foods. Other invertebrates such as sowbugs are also eaten, and birds are taken as opportunity permits, but coastal minks appear to prey on mammals only rarely.

Minks are very efficient hunters, and often kill beyond their immediate needs. They regularly cache surplus items, a habit that is no doubt beneficial in some seasons, but which results in spoilage and waste in others. More importantly, returning again and again to specific locations where prey may be concentrated, minks can have a large impact on a prey population in a relatively short time.

SOCIAL BEHAVIOUR

Adult minks are solitary except for short periods during the mating season, and when females are accompanied by dependent young. The stable and productive component of a mink population consists of established residents, which are mostly adults with distinct and relatively secure home ranges. The population also includes minks that do not have established home ranges; this component is sometimes large. These "transients" are most often juveniles that have dispersed from their birthplaces, but also include some adults that have been displaced from previously secure home ranges. Such displacement occasionally occurs because a mink is unable to defend its range against a stronger intruder, but is most often a case of forced departure because the local food supply has failed or some other important features of the home range has been lost.

Residents remain solitary and separate as a result of a "territorial" social system in which there is little overlap between the home ranges of neighbouring animals of the same sex, and in which transient animals are prevented from settling. Territorial boundaries are marked with feces, urine, and musks from scent glands, and are sometimes defended with aggressive behaviour.

ACTIVITY AND MOVEMENTS

Minks are active throughout the year. In inland areas, where water bodies freeze over and snow accumulates, they usually travel and hunt beneath the ice and in tunnels under the snow and may leave little sign of their presence during most of the winter. An exception occurs during the mating season, in February to early March, when males are searching for females and may travel extensively on the surface. In most areas and seasons, the bulk of mink activity is undertaken between dusk and dawn, and particularly after dark. However, the daily rhythm of coastal minks is also strongly influenced by the tidal cycle, and they often travel and forage during daylight hours if that happens to be when the lowest tide of the day occurs.

Minks with home ranges that support a rich and concentrated supply of prey, a situation most common on the coast, may move very little throughout most of the year. Such individuals may spend 20 hours or more each day resting, making only occasional, short forays to obtain food or to mark or defend their territories, and their daily movements may amount to only a few hundred metres each day. On the other hand, animals with poorer home ranges may require daily movements of 10 km or more to satisfy daily food requirements. The largest movements on an annual basis are made by males during the mating season, when they will travel well outside of their territories, and by transient animals of both sexes. Most transients are dispersing juveniles, for which movements of up to 45 km have been recorded.

REPRODUCTION

Inland minks breed in late February through March in most areas, but the mating season for coastal animals in BC occurs primarily in late May through mid-June. Pregnancy is characterized by delayed implantation, in which the embryos are carried in a state of arrested development for a time -- up to four or five months inland, but as little as 7 to 10 days on the coast. The actual gestation period, once the embryos have implanted in the uterus, is about 30 days. The timing of birth has not been well-documented for inland minks, but it occurs in the spring, probably in late April through early June. Coastal minks are born primarily in mid- to late July. Litters of up to eight kits are known, but the average in most areas is about four. Females produce only one litter per year.

Most juvenile females are sexually mature by the first breeding season after birth (age 9 to 10 months inland and 11 to 12 months on the coast), but will likely be successful in producing young only if they have obtained a secure home range with a sufficient food supply. In general, the size and vigour of litters is related to both age and nutritional condition of the females. In an untrapped study area on Vancouver Island, males were more abundant than females and appeared to impede production of young both directly, by causing female mortality during mating, and indirectly, by dominating the best hunting spots.

CARE AND DEVELOPMENT OF THE YOUNG

At birth, minks are blind, sparsely furred, and helpless, and weigh about 6 g. As with most mustelids (members of the weasel family), they grow and develop quickly, with the mother providing all parental care. Their eyes open at about 25 days, they are weaned at about five to six weeks, and they begin hunting by eight weeks. However, they remain with their mother until autumn or early winter (six to seven months of age) when they become independent and begin to disperse. At that time, females have attained adult weight, but males continue to grow through at least their first year, and most males do not become sexually mature until they are about 18 months old.

MORTALITY, PARASITES AND DISEASE

Because the health of minks has been a subject of great interest on fur farms, the list of known parasites and diseases to which the species is subject is long. Canine distemper and Aleutian disease, both virus infections, are well known to cause large losses when they occur in the farm situation. However, the incidence and effect of those and most other diseases in wild populations are little known. On the coast of BC, a roundworm that occurs in the sinuses and a mite that causes irritation and open wounds at the base of the tail are both suspected to cause mortality and may occasionally affect population levels, and it has been speculated that paralytic shellfish poisoning ("red tide") may also affect numbers at times. As reported by trappers from many locations throughout the Interior, inland mink populations were low in the 1990s, but have showed evidence of recovery in the early 2000s. During the period of the apparent decline, there were no reports of animals found dead or ill, and the cause of the low numbers is not known.

As predators in aquatic food chains, minks may accumulate high levels of environmental contaminants from industrial spills and discharges, and are often used as bio-indicators in water quality and pollution monitoring. As was discovered on mink ranches, consumption of fish contaminated with relatively low levels of pollutants such as mercury and PCBs can result in reproductive failure and mortality.

Note that trappers are the people most likely to encounter evidence of disease or pollution contamination in wild furbearers, and they are encouraged to report abnormalities and submit specimens to government officials or the BC Trappers Association.

With their ability to hunt effectively on both land and water, minks have a wider range of prey to choose from and generally maintain larger reserves of body fat than is the case for the other small mustelids in BC. However, they have a high metabolic rate and can lose condition quickly if food becomes scarce. Inadequate nutrition can lead to mortality either directly, by starvation, or indirectly, through reduced resistance to disease, and increased exposure to predation as animals spend more time out searching for food. Transient animals, especially dispersing juveniles, are the least likely to have consistent access to productive hunting spots, and are therefore the most vulnerable in that regard. Adult females may also be relegated to a position of nutritional deprivation when the ratio of males in a population is high.

Among known mink predators are bobcats, lynx, coyotes, foxes, wolves, fishers, river otters, and various raptors, including eagles and the larger hawks and owls. The extent of predation is not known but, as suggested above, is probably directed to individuals that are weakened or otherwise insecure for food-related reasons. Direct human-caused mortality of wild minks, (i.e., mortality not due to causes such as pollution), is primarily by trapping, although road kills and removals in human-wildlife conflict situations also occur.

Minks are not particularly long-lived. Those in captivity may reach eight years, but wild animals as old as five years are unusual, and the average longevity for wild animals in most areas is believed to be about three years.



POPULATIONS

Where there is an abundant and predictable food supply, such as in certain wetlands and in areas along the coast, minks may attain fairly high numbers. Because of their affinity for water, minks usually have home ranges that are long, narrow bands of habitat along shorelines, and population density is usually expressed in terms of animals per kilometre of shoreline rather than by area. There have been no population studies of inland mink in British Columbia, but densities of up to six animals per kilometre of shoreline have been reported for fresh water habitats elsewhere. Densities in a study area in coastal BC ranged from one to seven animals per kilometre, depending upon habitat quality, and as many as 12 animals per kilometre have been documented in coastal Alaska.

HARVEST MANAGEMENT

GENERAL CONSIDERATIONS AND OBJECTIVES

Minks are not particularly susceptible to over-harvesting, especially in inland areas subject to freeze-up, where the animals may be inaccessible beneath ice and snow for most of the winter. Although the amount of sign (tracks, scats) encountered during the beginning of the trapping season may provide an indication of relative mink abundance in a particular year, there is no practical

way to assess numbers in sufficient detail to pre-determine the level of harvest to be applied. As outlined below, there are a number of different ways to operate a mink trapline in relation to the species' conservation needs, but all should include continuing assessment of the catch as the season progresses. The overall harvest management plan should address three strategic objectives:

1) SUBSTITUTING HARVEST FOR NATURAL MORTALITY WHEREVER POSSIBLE Since transient animals, mostly dispersing juveniles, are the least likely to survive the winter, they are the component of the population that should be primarily targeted in relation to this objective.

2) MINIMIZING THE CATCH OF ADULT FEMALES Resident adult females with secure, productive home ranges are the core of population productivity. As described below, protecting them may be partly a matter of the location and extent of trapping activity, and partly a matter of timing.

3) CONTROLLING ANIMAL NUMBERS TO REDUCE PRESSURE ON PREY POPULATIONS The likelihood of impacting prey populations to levels below which they can sustain local mink use increases with the number of animals (both minks and other predators) that are taking those prey. The notion that mink populations can be continuously "built up" by not trapping them over a number of years fails to consider this important point.

Addressing the three management objectives listed above while trapping is assisted by natural vulnerability patterns within the mink population. Specifically, the most expendable (transient) members of the population are generally less secure and more likely to be travelling extensively in search of food than are established residents, and are therefore the ones that are most likely to find and enter baited traps (Objective 1). Further, they are the most likely to compete with established residents for the local food supply (Objective 3). Finally, because adult females generally have smaller ranges than those of either transients (both sexes) or resident adult males, they are the least likely class of animals to encounter traps (Objective 2).

TRAPLINE CHARACTERISTICS

While the broad objectives outlined above should form the background for the planning of trapline activities, the level and sustainability of those activities also depends upon a number of physical and other factors that must be considered and assessed for each trapline including:

HABITAT QUALITY AND QUANTITY A trapline with an abundance of fish-bearing streams, lakes, ponds, and marshes will have a higher potential for mink production than one whose water features are mostly rushing mountain streams at high elevation.

IMMIGRATION POTENTIAL The removal of resident mink during trapping operations leaves territories open for transient animals to claim before the next trapping season. The likelihood of that occurring by immigration is higher in areas where water bodies are connected to major fish-bearing streams than in areas with land-locked lakes and ponds or headwater tributaries.

TRAPPER ACCESS AND LOGISTICS The amount and distribution of trapping pressure that can be directed to a local mink population is dependent upon the trapper's ability to get around on the trapline. Areas of extensive wetlands, rivers with non-navigable sections, or potentially dangerous waters on the rugged outer coast may preclude operations in some or even most of the mink habitat on a particular trapline. On others, easier and safer water access or extensive roading by industry may make virtually every mink home range on the trapline potentially accessible.

PLANNING AND INFORMATION CONSIDERATIONS

TIMING Regardless of which of the trapping strategies described below is followed, a decision common to all relates to the timing of operations. Although the legal trapping season for mink begins on 1 November and ends in mid- to late February in most of BC, it will rarely (if ever) be advisable to trap mink over that entire period and it will usually not be possible to do so. At the beginning of the season, some pelts are not fully prime and taking them may

be wasteful in terms of value. In conflict with that consideration, however, is the fact that the primary targets, dispersing juveniles, may be moving from the area and will be missed if one waits too long. Also, in northern inland areas an early freeze-up may end the effective trapping season for mink long before the harvestable surplus can be taken. The decision about when to start trapping after 1 November should be based on local experience in regard to pelt primeness and to normal weather and freeze patterns. Note that in most areas the period of maximum pelt primeness is short, starting in about the second week of November and extending only through early January.

The primary impetus for ending trapping operations is usually freeze-up in many inland areas. On the coast and on the southern mainland, where the end may not be forced by weather, it is recommended that trappers base their decisions on the characteristics of the animals caught (see Harvest Monitoring, below).

HARVEST MONITORING Regardless of the harvesting plan or system, it is advisable to examine the trapped animals on a regular basis. That is important in the early part of the season to assess the year's production and apparent population status. Ideally, the early harvest should be mostly juveniles. If that is not the case, it is likely that the year's reproduction has been poor and an early termination of trapping activity may be indicated. Note: On a trapline which has not been trapped for many years, the population may be in a relatively stagnant or unproductive state characterized by an unbalanced sex ratio (heavy to males). In such a case, where the early harvest consists of few juveniles but is mostly males, continued but judicious trapping may be indicated.

Clearly, harvest monitoring requires the ability to distinguish the ages of the animals caught. The following features and descriptions apply:

MALES

OVERALL SIZE AND ROBUSTNESS Adults usually weight 1200 g or more, and have a thick neck and a relatively broad head.

DEGREE OF TOOTH WEAR The upper canine teeth of juveniles are usually bright and sharply pointed, while those of adults may be somewhat discoloured and distinctly duller (the point worn flat). Age is indicated but not confirmed by this feature.

SIZE OF BACULUM (PENIS BONE) The bacula of juveniles are considerably smaller than those of adults, particularly in the early part of the season, but the difference is not always clear and it takes some experience to make the assessment.

FEMALES

DEGREE OF TOOTH WEAR Same considerations and reliability as for males, above.

PRESENCE OF MAMMAE (NIPPLES) The nipples on winter-caught females are not conspicuous, so some effort is required to locate them. The procedure is to lay the thawed animal on its back and blow into the fur along the lower belly, lightly rubbing a finger in that area at the same time. In general, nothing will be seen or felt on juvenile specimens, while one or more nipples of at least 3 mm length will usually be present on adults.

PRESENCE OF SCARS OR SCATTERED WHITE HAIRS ON THE BACK OF THE NECK These result from injuries caused by the male during mating, and therefore indicate an adult animal, i.e., one that has bred.

It is also recommended that trappers monitor and keep track of animal condition, as indicated by the amount of body fat. That is easily done in reference to a four point scale, (e.g., 0 = no fat, 1 = little fat, 2 = moderate fat, 3 = much fat), and may provide a base for comparison of areas and years, and assistance in judging the current year's population status.

RECORD KEEPING Written records of weather conditions, the performance of particular trap sets, and the date, sex, age, location, and condition of catches are useful over the long term to make trapping activities more efficient and effective. For example, records over several years may show that particular sets or locations almost always produce adult females, and should be discontinued. Written records are also important when a trapper needs to demonstrate the importance of particular areas on the trapline in relation to development plans.

TRAPPING STRATEGIES AND SYSTEMS

At the operational level, trappers may use variations of three main systems to harvest minks sustainably, as follows:

QUOTA SYSTEM Based either on long-term experience in which a particular number of minks has been harvested without apparent effect on the population year-after-year, or on theoretical considerations relating to amount of shoreline habitat, assumed density, and a harvest rate of 30 to 40 percent, this system identifies a harvest goal (total numbers) and trapping is stopped when that goal is reached. The problem is that it is not sensitive to actual productivity in a particular year, especially if the sex and age of animals caught are not monitored. In years of poor production, even a conservative quota may be too high, and in years of average to good production it will almost certainly be too low. An under-harvest both shortchanges the trapper and may reduce an area's long-term productivity by failing to keep the species and its prey in optimal balance.

TIME-BASED SYSTEM Based almost entirely on long-term experience in a particular area, this system develops a schedule in which traps are left set only for a pre-determined period or specified number of trap checks. Although similar to the quota system in most respects, including the potential problems, it is less likely to generate a significant under-harvest in years of high production. If used in conjunction with Harvest Monitoring, which would enable shortening or extending the originally designated schedule based on the sex and age characteristics of the catch, this system has merit.

AREA-BASED SYSTEM Also referred to as a "refuge" system, the basis for this approach is that a portion of the available mink habitat is left untrapped, with the expectation that it will serve as a continuing source for minks that are captured in other parts of the trapline. For many BC traplines, the maintenance of extensive refuge areas is easily accomplished and, in fact, is unavoidable because of topographic and weather-related access constraints. Where that is not the case, trappers may elect to avoid known female areas based on past experience (see Record Keeping, above), may use a very large trap spacing (2 km or more between set areas) in hopes that the untrapped areas between will include female home ranges, or may trap only half or one-third of the available mink habitat in each year of a two- or three-year cycle. The alternate year approach may be the most preferred, since prey populations in "permanent" refuge areas may become depleted over the long term, or in years when the number of transient minks is high. Further, because of the high natural mortality in mink populations, a trapper cannot stockpile mink over several years in hopes that they will build up to provide a large catch sometime in the future.

HABITAT MANAGEMENT

Riparian management guidelines in place throughout the province will generally provide for the streamside cover, food, and water quality requirements of minks in most industrial development situations, and trappers are advised to support those guidelines when the opportunity arises. Management initiatives favourable to fish will generally be favourable to minks and should also be supported, and any circumstance in which fish mortality or habitat degradation is detected should be reported to a conservation officer or the Ministry of Water, Land and Air Protection regional office.

SUMMARY



The mink has a fairly high reproductive potential, with females first breeding as yearlings and with litter sizes averaging about four kits, and populations can sustain harvest rates of 30 to 50 percent. However, primarily because of low pelt prices, the species has been greatly under-harvested in British Columbia in recent years. With access to prey both on land and in the water, minks are efficient hunters and are able to deplete prey populations. For that reason, and because they appear to suffer high rates of natural mortality, the species cannot be "stockpiled" and the best management will involve systematic and regular trapping. Strategies for sustainable harvesting involve substituting harvest for natural mortality wherever possible, minimizing the catch of adult females, and controlling animal numbers to reduce pressure on prey populations.

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SOURCES FOR ADDITIONAL READING

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NOTE: This document has been formatted for insertion into the British Columbia Trappers Association Trapper Education Training Manual and for inclusion in print documents intended for government managers and industry representatives who are involved in furbearer management in British Columbia.