

# FURBEARER MANAGEMENT GUIDELINES

## LYNX

*Lynx canadensis*



Since 1926, separate trapline areas in British Columbia have been assigned and registered to individuals licensed for the purpose of harvesting 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 lynx is categorized as a Class 2 species, which means that it is considered sensitive to harvest and, because home ranges are large relative to the size of most traplines, population management cannot only be applied at the individual trapline level. Thus, while the input and cooperation of trappers are important, Class 2 species are managed primarily by application of provincial government regulations. Other Class 2 species are river otter, bobcat, wolverine, and fisher.

This document is intended primarily to provide British Columbia's professional trappers with information on lynx 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 lynx is a medium-sized, short-tailed cat. With its thick fur, long legs, and conspicuously large, well-furred paws, it is much better adapted to extreme cold and deep snow conditions than is its close relative, the bobcat. The basic body colour is greyish to silver, especially in winter, but individuals may show undertones of buff to reddish-brown on the head, tail, and lower legs in winter and overall in summer. Lynxes are generally less conspicuously spotted than are bobcats; dark spots or bars, if present, are usually confined to the paler and longer belly fur, but in some cases may show faintly on the legs. The lynx's face is rimmed with a furry ruff, including beard-like clumps of white and black hairs beneath a white chin, its ears are edged with black, and are tipped with conspicuous 4 to 5 cm long black tufts, and its tail has a solid black tip. The sexes are similar in colour and general appearance, but adult males are larger than females by about 15 to 20 percent (most weighing 9 to 15 kg, versus 7 to 12 kg for females).



## ECONOMIC CONSIDERATIONS

Since the early 1800s, when records of fur sales were first kept, lynx harvests have shown distinct highs and lows, with peaks occurring approximately every 10 years. In British Columbia, the peaks have generally occurred in the second or third year of each decade since the 1960s (Figure 1). The 1962-63 peak was the highest on record, with a harvest of more than 12,500 lynxes. The next cycle had a double peak (1972-73 and 1973-74), each representing a harvest of more than 8500

animals. The last major peak, which occurred in 1982-83, was smaller at about 6200. There was no significant peak in the 1990s, although the largest recorded harvest in that decade (2017 animals) was in 1991. The general trend of decreasing peak harvests since the 1960s has occurred throughout western Canada, but early evidence indicates that the present decade (2000s) may again feature a strong peak.

In most years since the mid-1970s, the lynx has consistently been one of the top three British Columbia furbearers (with marten and beaver) in terms of both total value of pelt sales and average price received per pelt. At over \$1.9 million, the 1982-83 lynx harvest contributed slightly more than half the total provincial fur revenue (all species) in that year, and the average pelt value of \$672 for lynx in 1984-85 was the highest ever for any BC furbearer. Most of the lynx harvest in BC is in the three northern administrative regions of Omineca-Peace, Skeena, and Cariboo (Figure 2).

In addition to its status as a furbearer, the lynx is also classified as a game animal. Data available since the mid-1980s indicate that hunter harvests of the species probably average less than five percent of the total annual provincial kill, but in the Kootenay and Okanagan regions where hunting with hounds is popular, the hunter take has equalled or slightly exceeded that by trappers in some recent years.

As a medium-sized carnivore, the lynx is an important component of northern and high elevation ecosystems in many areas of the province. Occurring primarily in remote habitats, lynxes are rarely involved in conflict situations with humans. An exception to that may occur following the cyclic crash of the primary prey (snowshoe hares), at which time large numbers of hungry lynxes may disperse widely outside of normal ranges and habitats and some may end up preying on pets or small livestock.

Figure 1: Reported Lynx Harvests and Pelt Values, 1920-2000.

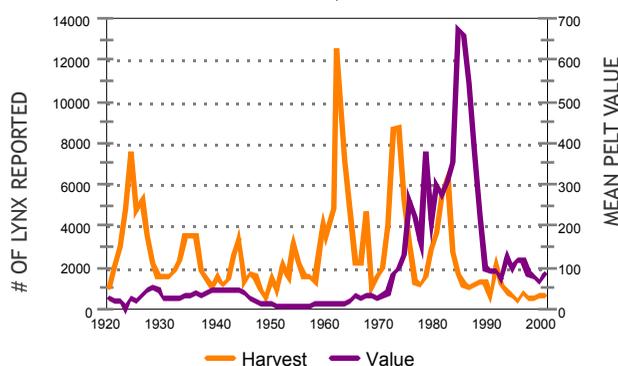
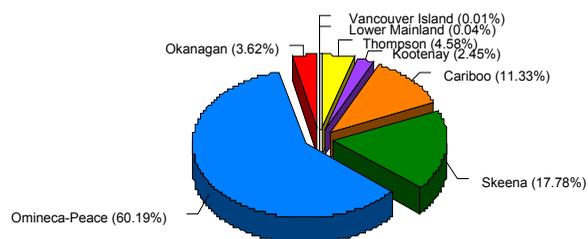


Figure 2: Lynx Harvest by Region, 1985-2000.



## BIOLOGY

### DISTRIBUTION AND HABITAT

The lynx is basically a northern animal, occurring in boreal forest habitats in Alaska and coast-to-coast across Canada. It is not common south of the border and may never have been, except temporarily and locally in the aftermath of post-hare-crash dispersals. In British Columbia, lynxes occur over most of the province, but not on the coastal islands and only rarely in the wet forests west of the Coast Range and the Lower Mainland west of Hope. The areas of most predictable occurrence and greatest abundance are the boreal and sub-boreal forests in the northern third of the province and the dry upland forests of the Nechako, Fraser, and Thompson plateaus.

The well-known relationship between the lynx and its primary prey, the snowshoe hare, is a point of reference in most aspects of lynx life history. The best hunting habitats are in dense cover where hares thrive, particularly in young (15 to 40 year-old) forests regenerating after wildfires, high-elevation riparian thickets, and both deciduous and older coniferous forests which are open enough to support a thick undergrowth of shrubs and saplings. Regenerating forest cutblocks, particularly those with pine, may also be good for hares and lynxes if stem density and ground vegetation are not greatly altered by silvicultural practices.

Although foraging primarily in younger forest types, lynxes often use older forests for resting and denning, finding shelter from weather and larger predators at the bases of thickly branched trees and among tangles of coarse woody debris resulting from blowdown and deadfall.

### **FOOD**

Studies in many areas across North America have found snowshoe hares to be the primary prey of the lynx in all seasons, even when hare populations are low. When they are abundant, often reaching densities of over 500 animals per km<sup>2</sup> in the north, hares usually constitute 80 percent or more of the diet, especially in winter. In summer and at low hare densities in the north, other common prey species such as red squirrels, grouse, and voles are eaten frequently, and lynx predation on ungulates (Dall's sheep, caribou) and other carnivores (red fox, marten, mink, other lynx) has been recorded. In the southern portions of its range, the diet appears to be more varied and also includes prey such as marmots, ground squirrels, and several species of birds. Although appearing to prefer fresh kills, lynxes will also eat carrion if alternatives are not readily available and there are records of them feeding at moose, caribou, and deer carcasses. The individual pictured on the first page had claimed the carcass of a hunter-killed grizzly bear in October of a low hare year, and was continuously at or near that carcass for at least 15 days.

Lynx hunting behaviour appears to be particularly attuned to hares, and the success rate (the proportion of pursuits resulting in kills) is highest for that species. In one Alberta study, success rates in different years averaged 16 percent for hares, 12 percent for grouse, and eight percent for red squirrels. Individual lynxes averaged 0.42 kills per night in that study, and about one kill per night in a Nova Scotia study. Lynxes usually hunt alone, either stalking or waiting at some strategic location in ambush, and then engaging in a short, explosive pursuit. However, family groups (females with mobile young) typically "fan out" while moving through their hunting habitat, likely increasing the chances that a prey animal flushed by one lynx will move toward and be caught by one of the others.

### **SOCIAL BEHAVIOUR**

Lynxes are essentially solitary, except when in family groups (mother with dependent kittens) and during the breeding season when adult pairs may travel together for a few days. When the food supply is adequate, lynx populations are usually composed of two social classes, residents and transients. The residents (mostly adults), occupy distinct home ranges or "territories" which overlap very little with those of their neighbours of the same sex, and are maintained separate by mutual avoidance, perhaps facilitated by scent marking. The transients (mostly dispersing juveniles and displaced adults) do not have stable home areas and are wandering in search of them. Individual residents may use the same core areas and general home ranges over several years, but will have to abandon them if local prey populations fail. In the north, following the cyclic crash of snowshoe hare populations, most of the lynxes may be forced into transient status.

Documented lynx home ranges have varied in size from about 8 km<sup>2</sup> to 783 km<sup>2</sup>, with differences depending upon geographic area, habitat features, sex and age classes, seasons, and stages of the hare cycle. Males generally have larger ranges than females and, in most cases, home ranges are smallest when hares are abundant. In a study area in southern British Columbia, where hares do not attain the high densities characteristic of northern populations, home ranges of resident adults were relatively large, averaging about 220 km<sup>2</sup>. In comparison to those farther north, lynxes in the southern half of the province are in greater competition and more frequent confrontation with other medium-sized carnivores, especially bobcats and coyotes, and are thought to be dominated by both.

### **ACTIVITY AND MOVEMENTS**

As with most cats, lynxes are active primarily at night. The distance that individuals may move over a 24-hour period is sometimes dictated by weather, but is generally related to the abundance and availability of prey. During periods of food scarcity, such as during the low phase of the hare cycle, a lynx may need to travel extensively to meet its nutritional requirements. Studies in the Yukon have documented average daily movements ranging from about 2.4 km to 20 km at different hare densities. In southeastern British Columbia, at low hare densities, the minimum daily movements of radio-collared animals averaged about 3 km.

The longest movements undertaken by lynxes are during dispersal of young animals from their mother's home range and dispersal of resident adults from their own home ranges when the local food supply fails. In both cases, the animals are in transient status and will either be successful in locating and establishing new home ranges, or will perish. The latter is most often the case when hare numbers are low. In the hare "boom-and-bust" habitats of the north, a number of dispersal movements of more than 500 km, up to a maximum of 1100 km, have been documented. Tagged lynxes from both the Yukon and Northwest Territories have been recovered in British Columbia, and it is well known that the limited lynx populations in the continental United States are augmented by dispersing animals from Canada, sometimes in large numbers.



### **REPRODUCTION**

The lynx breeding season in most areas is in March or early April, and the young are born in late May or early June after a 65 to 70 day gestation period. The species has a high reproductive potential, which is particularly evident in the north when hare populations are high. Under conditions of adequate nutrition, most adult and many yearling females (9 to 10 months old) may conceive, producing litters averaging four to five young. During the low phase of the hare cycle, surviving yearlings do not breed, litters produced by adults are smaller, and most of the young do not survive long enough to emerge from the natal den. The proportion of kittens in a lynx population may be as high as 66 percent when hares are abundant and as low as three percent when hares are scarce. Reproductive performance is also believed to be generally lower in the south, where major peaks in hare numbers do not occur. For example, none of six litters documented in a recent southeastern BC study were known to be larger than two.

### **CARE AND DEVELOPMENT OF YOUNG**

Lynx kittens are blind and helpless at birth, but they grow and develop fairly quickly. Their eyes are open in about two weeks, they take solid food by about six weeks and, although not yet fully mobile, they are apparently able to leave the maternal den shortly thereafter. All parental care is by the mother, which maintains a relatively small activity radius around the den until the young are old enough to follow. Kittens remain with the mother through at least the first winter and occasionally into the next autumn before dispersing.

### **MORTALITY, PARASITES AND DISEASE**

Lynxes have been found to host a number of different parasites, both internal and external, and individuals have been diagnosed with various diseases including pneumonia, distemper, and rabies, but no chronic health problems associated with parasite infestations and no major disease outbreaks that would threaten populations have been documented. The most common cause of natural mortality in most studies to date has been nutrition-related. In three northern radio-tracking studies, 10 of 16 deaths were attributable to starvation, all following hare population crashes, and the remaining six were due to predation (four by other lynx, i.e., cannibalism, and two by wolverines). Predation by cougars, wolves, and coyotes has also been recorded.

In areas closer to human settlements and access, lynx mortality may be mostly due to human causes, including trapping. During the period of vulnerability and widespread dispersal following a hare population crash, many of the animals that were otherwise destined to starve end up in trapper harvest statistics, and some are killed while preying on pets and livestock. Lynxes have been known to live to the age of 22 years in captivity, but wild animals only rarely attain 10 years and the oldest on record was 14.5 years.

## **POPULATIONS**

Recent field studies have confirmed what long-term records of fur sales in North America indicated, that there is a distinct cycle of lynx abundance, with peaks approximately every 8 to 11 years (on average about 10 years). Population peaks do not occur in all areas of the continent at the same time, and they vary both regionally and between cycles in the levels reached. Further, local population peaks may be primarily the result of reproduction in some areas and to immigration in others. The west (Alaska, Yukon, NWT, and the northern halves of BC and Alberta) are generally characterized by extreme fluctuations in numbers and very high peak densities of both hares and lynx during the cycle, while the fluctuations of both species are typically less and densities are consistently lower to the south.

Overall, lynx cycles have a single unifying characteristic, which is their relationship to the 10-year cycle of the snowshoe hare. When hares are abundant, adult lynx may be relatively secure, maintaining good physical condition and high productivity within well-defined home ranges and with minimal activity and effort. A year or two after hare numbers decline, lynx enter a period of relative stress, which may be indicated at the individual or population level by some or all of several symptoms, including deteriorating physical condition, increased activity, increased home range size, abandonment of home ranges, long distance dispersal, decreased productivity, poor kitten survival, cannibalism, and starvation.

Determining actual population numbers is difficult, and has been attempted only for relatively small study areas. Densities of 30 to 45 lynx per 100 km<sup>2</sup> have been documented in optimal, post-fire habitats in the north during cyclic highs, while peak densities in older forest habitats and those farther south are lower, at about 8 to 20 lynx per 100 km<sup>2</sup>. Densities typically drop to below three lynx per 100 km<sup>2</sup> in all areas during the low phase, and in what may be "marginal" habitats in the extreme southern portions of the animal's range. In British Columbia, the highest numbers are attained in the boreal and sub-boreal forests in the inland northern half of the province.

## **HARVEST MANAGEMENT**

### **GENERAL CONSIDERATIONS AND OBJECTIVES**

The lynx is classified as both a furbearer and game species in British Columbia. It is identified as a Class 2 furbearer under BC's Fur Management Program, and harvests are officially regulated (methods, seasons, bag limits, quotas) at the regional level, in consultation with local trapper and hunter organizations. There are no open seasons for either trapping or hunting in the Vancouver Island and Lower Mainland regions (where lynxes do not regularly occur), while the Kootenay region maintains short seasons for both activities (trapping - 1 November to 31 December = 6 weeks; hunting 1 December to 31 December = 4 weeks). In the rest of the province, a 12-week season (15 November to 15 February) applies for trappers, and for hunters in the Thompson, Skeena, and Omineca-Peace regions. The lynx hunting season is shorter in the Cariboo Region (15 November to 31 December = 6 weeks), but is longer in the Okanagan Region (1 November to 28 February = 14 weeks). All areas open to trapping provide for unlimited harvest (a trapper may take any number), while the bag limit for hunters in all areas is one.

Although the final responsibility for management lies with the provincial government, trappers and hunters may play a vital role in the management process by maintaining a level of practice that does not generate or contribute a cause for concern, and by providing information and specimen material if and when requested. In regard to the former, the overall harvest management plan should address three strategic objectives:

- 1) SUBSTITUTING HARVEST FOR NATURAL MORTALITY WHEREVER POSSIBLE** Transient animals, mostly dispersing yearlings, are the least likely to survive the winter and are therefore the component of the population that naturally falls into the category as primary targets in relation to this objective. However, it may also include some adults in late winter of most years, and numbers of adults in severe winters or following local prey population declines.

**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 is partly a matter of the timing, and extent of trapping or hunting activity, but may also involve specific knowledge of locations where family groups are operating.

**3) MINIMIZING PRESSURE ON PREY POPULATIONS** Removals of transient and adult male lynxes and competing species, such as coyotes, may help maintain a prey base that can provide for better survival of the remaining animals, and better support for females through pregnancy and during the rearing of young.

### **PLANNING AND INFORMATION CONSIDERATIONS**

Given adequate food sources and suitable environmental conditions, lynxes are prolific and relatively resilient to harvesting pressure, and are able to sustain harvest rates of up to 40 percent of the fall population. However, since harvesters and managers will almost never have specific information on local population size, planning and managing for a sustainable harvest involves more indirect considerations. With the above three strategic objectives as the general background, the following sections describe some considerations that may apply. Note that for any particular local situation, some of these factors may conflict with each other and decisions about which are the most important will require application of common sense.

**VULNERABILITY TO HARVEST** Addressing the three management objectives while harvesting lynxes is assisted by natural vulnerability patterns within the lynx population. The most expendable (transient) members of the population are generally less secure and more likely to be moving extensively in search of food than are established residents. They are therefore the ones that are most likely to find and enter baited traps, and are probably at least somewhat more likely to be detected by hunters (Objective 1). Transient animals are also the most likely to compete with established residents for the local food supply (Objective 3). Finally, adult females are somewhat less likely than transients (either sex) or adult males to encounter traps (Objective 2) because they generally have smaller ranges. However, the vulnerability of adult females often increases as winter progresses. As their local food supply is depleted or becomes less accessible, they may wander more and even abandon their home ranges, increasing their potential exposure to both traps and to houndsmen.

**FOOD ABUNDANCE** Since the productivity and resilience of lynx populations is related to nutritional status, it is important to be aware of prey status in one's area of operations. In the northern half of the province, that primarily involves knowing the approximate stage of the hare cycle in the year in question. Both there and in the south, the distribution and relative abundance of hares, squirrels, and grouse (all prey species whose presence is usually conspicuous either by direct sightings or tracks in snow) will be important clues as to where lynxes will be and how they may be faring.

**TIMING** Lynx pelts have just begun to prime up when the harvesting season opens in mid-November, and are not yet at full value. Most are fully prime by early December and remain in that condition for about two months, to early February. It generally makes sense to concentrate trapping activity during the period when the animals will provide the highest value per pelt. However, in the one or two years immediately following a hare population crash, and in years with severe early winter conditions, waiting too long may result in missed opportunities for transient animals which may already be leaving the area or succumbing to starvation and predation. The decision of when to stop trapping in a particular year relates primarily to increased vulnerability of adult females, as indicated either by observation of sign or by harvest results.

**COMPETITION FOR HARVEST** The Registered Trapline system specifies who may set traps for lynxes in particular areas of Crown land, but the boundaries of a functional lynx population may result in its being harvested on several traplines, on one or more guide-outfitter territories, and by numbers of resident houndsmen simultaneously. It is the total, combined harvest by all of those interests, not the harvest of any one of them alone, that is the reference for sustainability, so it is advisable for all parties to be aware of and in communication with each

other and, if necessary, to work out practical ways to avoid negatively impacting each other or the population.

**TRAPPING DURING THE LOW OF THE POPULATION CYCLE** Particularly in areas where hare and lynx populations fluctuate from very high to very low levels, trapping of lynx during the low phase will usually be minimal because the monetary return for the effort expended is too low. An exception occurred during the mid- to late 1980s, when the low in lynx numbers corresponded with an unprecedented high in demand. With individual pelts bringing as much as \$1200, it was potentially profitable to pursue any lynx that appeared on one's trapline, and managers were concerned that excess harvest at that time might delay, reduce, or prevent the normal cyclic increase. Accordingly, in BC, a strategy was devised wherein lynx population performance would be monitored by total harvest numbers and the proportion of kittens in the harvest, to ascertain the stage and level of the cycle, and controls (quotas, shortening or closure of seasons) would be established during the low phase.

With the much lower pelt prices that have prevailed since the late 1980s, the level of management concern has decreased. Further, the large movements made by marked lynxes indicate that the recolonization potential is high and therefore the risk of long-term local extirpations is low for this species. Finally, terrain, climate, and the wide spacing of trappers through the Registered Trapline system ensure the existence of numerous *de facto* refuges for lynx during the winter trapping season in British Columbia. It is now apparent that some lynx harvest during the low is supportable, in line with the strategic objectives of substituting harvest for natural mortality (e.g., starvation) and reducing pressure on prey populations. However, trappers and hunters are advised to conduct their activities at that time in ways that will minimize impacts on the lynx population. Some practices that can assist in that regard are as follows:

**RELEASE ADULT FEMALES** In some cases, trappers using restraining traps (e.g., foothold devices) may be able to release adult females alive and uninjured, and hunters almost always have that option, particularly when obvious family groups are encountered. At the low of the cycle, release is strongly recommended. Adult females have high potential value in their role in population increase, but usually have relatively low-value pelts due to the stresses of caring for young and to damage to the belly fur received during nursing. *Note: Members of the South Cariboo local of the BC Trappers Association have extensive experience in live-handling and release of lynxes, gained in providing animals for transplant to Colorado, and can provide applicable advice.*

**USE SELECTIVE TRAPSETS** Baited cubbies are the most likely to take young, inexperienced, and hungry lynx, and to be passed up by animals that are wary or well-fed and secure. Trap sets designed to take even the wariest animals, particularly neck snares in trails and sets using non-food scents, are the most likely to take the animals that would otherwise survive and contribute to the next population increase.

**STOP TRAPPING EARLY** Animals taken in the early part of the season are most likely to be those that are relatively insecure and the least likely to survive the winter in any case, while the likelihood of catching the next year's breeding stock increases after mid- to late January, as adults become more vulnerable with the progress of winter.

**REDUCE COMPETITION** Particularly during the low phase of the lynx cycle, it is important to increase trapping effort for other furbearers, particularly coyotes in many areas, that may compete with lynx for snowshoe hares and other prey.

**HARVEST MONITORING AND ASSESSMENT** Currently, assessment of the lynx harvest by provincial managers is done primarily in reference to fur sales data and information provided directly by trappers and hunters through Compulsory Reporting (required province-wide for all hunter kills, and in Regions 4 and 8 for trapped animals). Lynxes taken accidentally in the Lower Mainland Region and in the mainland management units of the Vancouver Island Region (MUs 1-14 and 1-15) must be submitted (pelts and intact carcass) to a designated Compulsory Inspection authority within 30 days of the kill.

There are three kinds of information that individual harvesters are either required or advised to keep track of both for official management purposes in the long-term, and for within-season assessment and ongoing planning of harvest activities.

**SEX AND AGE OF ANIMALS CAUGHT** This information is required for Compulsory Reporting, and is essential for determining the degree to which the three strategic objectives (above) are being met. Determining the sex of cats, including both bobcats and lynxes, can be difficult. On males, the circular penis opening is farther back than on most other animals and there is no baculum (penis bone), thus males are often misidentified as females. For males, except for very young animals, careful examination will reveal the testicles (usually smaller than might be expected) lying tight against the body near the anus. For females the vulva opening is vertical and located closer to the anus than is the male opening.

Field determination of age can be accomplished only roughly, and is done primarily in reference to body size. First-year kits and yearlings usually appear more slender and dainty than adults, particularly around the head and neck. Note that for assessment of age at the fur sales level, pelts measuring 89 cm or less from nose to rump are considered to be kittens. Adult females are best distinguished by the presence of conspicuous nipples, often ringed by bare patches caused by rubbing during suckling.

**LOCATION AND DATE OF HARVEST, AND OF SIGHTINGS OR SIGN (TRACKS) OF FAMILY GROUPS (FEMALES WITH YOUNG)** Only the harvest location and date are required for Compulsory Reporting, but sightings or sign are also potentially useful in identifying important patterns of occurrence. For example, locations or particular trap sets that consistently produce adult females can be avoided in future operations, and those that most regularly produce young animals or adult males can be re-used with some confidence.

**PHYSICAL CONDITION OF THE ANIMALS CAUGHT** Determined primarily by the amount of body fat observed on the skinned carcass, this information is not required for official reporting purposes but is a good indirect measure of how the population may be doing. If most of the animals caught have little or no fat, and if that corresponds with observations that prey species appear to be scarce, it is likely that the population is under stress. If there are few or no young animals as well, it is advisable to stop harvesting in deference to Strategic Objective 2 (protecting adult females). If the harvest is primarily juveniles, continued harvesting in response to Objectives 1 and 3 (substituting harvest for natural mortality and protecting the food base) is probably justified.

**RECORD KEEPING AND COMPULSORY REPORTING** Although it is possible to conduct the above monitoring and assessments on an informal, non-permanent basis, it is strongly recommended that the information be recorded on paper. That will provide more accurate information for Compulsory Reporting requirements, and a better record for demonstrating long-term patterns.

Compulsory Reporting may be done by mail or telephone or in person, and must be completed within 15 days following the end of the trapping season. As of the 2002-03 season, the basic Compulsory Reporting and Compulsory Inspection information required from both trappers and hunters, in addition to personal contact and licence data, are date, location, and sex of kill. Additional data required from trappers are age of kill, type of trap used, and the number of days the trap was set before the animal was caught.

Trappers are also encouraged to share information about changes in the perceived abundance of lynxes and their prey by responding to the annual Trapper Questionnaire. Responses are an important component of the management of lynxes and other furbearers in British Columbia.

## **HARVESTING STRATEGIES AND SYSTEMS**

At the operational level, when lynx populations are moderate to high, there are three main approaches that may be used in the attempt to harvest from them sustainably, as follows:

**QUOTA SYSTEM** This system identifies a harvest goal of a certain number of animals, and harvesting activities are stopped when that goal is reached. For cases in which that goal is a limit or quota imposed by government regulation or regional policy, there can be no other consideration. Some trappers work under self-imposed quotas, which are usually based on long-term experience in which a particular number of lynxes have been harvested without apparent effect on the population year-after-year. The problem with a quota system 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 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 help keep the species and its prey in optimal balance.

**TIME-BASED SYSTEM** Based either on long-term experience in a particular area or on practical considerations relating to time available, pelt primeness, and normal vulnerability patterns this system develops a schedule in which traps are left set only for a pre-determined period which is shorter than the actual open season. Although similar to the quota system in most respects, including the potential problems, it is less likely to result in a significant under-harvest in years of high production. That is particularly true if used in conjunction with harvest monitoring, which would enable shortening or extending the originally designated schedule based on the nature of the catch.

**AREA-BASED SYSTEM** Also referred to as a "refuge" system, the basis for this approach is that a portion of the available lynx habitat is left unharvested, with the expectation that it will serve as a source for animals dispersing to areas where trapping or hunting does occur. For many BC traplines, the maintenance of extensive refuge areas is easily accomplished and, in fact, is unavoidable because of topographic and other constraints to human travel in winter. The size requirement for an effective refuge has not been determined, but it clearly must be large enough to fully enclose the home range of at least one adult female, and a block enclosing three to five such ranges has been suggested. That would equate to an area of as little as 25 to 35 km<sup>2</sup> in good habitat with high hare density, but would be much larger in poorer habitat and/or during lower-density phases of the hare cycle.

Although the usual concept is that habitat designated as refuge will remain so permanently, an alternative where most of the available habitat is accessible is to harvest only one half of it each year on a rotating basis. Such a system may have a better potential for reducing pressure on local prey populations and maintaining lynx productivity. A longer rotation (e.g., three or four years) may be advisable at the low end of the cycle, but not during the two to three years on either side of the peak, when lynx numbers may be high. While the primary focus of a refuge system is to provide for the maintenance of a stable breeding stock (mainly adult females), it cannot be safely assumed that those animals will not move out of the refuge areas late in some or most years. Further, prey populations in refuge areas may become depleted over the long term or in years when the number of transient lynxes is high. In short, even with the refuge system it is recommended that the characteristics of the harvest be closely monitored and ongoing trapping plans and activities be modified accordingly.

## **HABITAT MANAGEMENT**

Because the lynx and its primary prey, the snowshoe hare, are both forest-dwelling species, the largest potentially negative influence on habitat in most areas result from the activities of the forest industry. Forest and habitat managers are currently more receptive to concerns for resources

other than trees than was the case in past years. Therefore, it is important for lynx trappers and hunters to establish and maintain good working relationships with habitat managers and operators on their areas, and to take every opportunity to provide input and advice on development plans. That involves some consideration of logging practices such as cutblock size (smaller is better), alternative practices (selective logging is preferable), retention of uncut patches, and maintenance of connectivity, but the primary emphasis for lynxes and hares is retention of cover and forage plants after logging. Silvicultural practices such as extensive thinning and the application of herbicides generally reduce the suitability of hare habitat and cover.

At the large scale, probably the single most significant factor affecting lynx population levels over the past 50 years has been forest fire suppression, which prevents renewal of the rich, dense young forests that are most productive of snowshoe hares. To help counteract that trend, trappers and hunters are advised to support “let-it-burn” policies in remote forest areas with low timber values.

A major role of trappers and hunters in habitat management for lynxes and hares is in providing information about where the animals regularly occur, since forest and habitat managers do not routinely gather that information on their own. Written records of harvest locations and sightings of either animals or sign (tracks) are the most useful in that regard.

Given the size of lynx home ranges, it would be difficult for trappers and hunters to enhance or modify habitat directly on a scale sufficient to benefit populations, but there is some potential for enhancing the living situation of individual animals. Habitat for prey species, particularly hares and rabbits, can be improved by cutting over-mature shrubs (especially willow and poplar) to stimulate new growth. In addition, the return of carcasses of trapped animals or road-killed ungulates to areas frequented by lynx, especially family groups, can provide an important food source during winter, since survival of kittens and productivity is closely tied to the availability of food and the condition of the female going into the spring.



## SUMMARY

The lynx has long been one of the most valuable and important furbearers in British Columbia. The dominant feature of its life history, and of related management, is its primary dependence on one prey species, the snowshoe hare. That is most evident in the northern half of the province, where hares exhibit an approximately 10-year cycle of abundance, reaching very high densities at the peak and then declining precipitously. When hares are abundant, adult lynxes may be relatively secure, maintaining weight, condition, high pregnancy rates, and large litter sizes. Adequately nourished kittens survive well and develop quickly, such that females may produce litters in their first year. With such productivity, and apparently lacking any regular non-nutrition-related source of natural mortality, lynx populations have a large potential for increase. When hare numbers decline, the dependent lynxes enter a period of relative stress, manifested at the individual or population level by reduced physical condition, increased activity and movements, increased home range size or abandonment of home ranges, decreased productivity (especially among yearlings), poor kitten survival, and increased incidence of starvation.

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. Those strategies are applicable at both high and low population levels, but much greater care is required when populations are low. In addition to compliance with regulatory changes and assignment of quotas during the cyclic low, trappers and hunters can contribute to population management by voluntary actions such as release of adult females, use of more selective methods and tools, early termination of trapping effort, increased focus on harvest of competing species such as coyotes, and establishment of untrapped "refuge" areas.

To provide for more informed long-term management of lynx populations, trappers and hunters are urged to keep accurate personal records of harvest and sighting locations of the species and relative abundance of prey species such as hares and squirrels, to respond to trapper surveys and requests for other data or for specimens, and to help maintain habitat by providing information and input to local forestry operations and other resource developments as necessary.

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May 2003

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The authors extend their thanks to the Ministry of Water, Land and Air Protection, the Habitat Conservation Trust Fund (HCTF) and the British Columbia Trappers Association for initiating and supporting the development of this Furbearer Management Guideline for lynx. Funding for this publication from the HCTF.

We also wish to express our gratitude for input received from the following trappers: Bob Frederick, Bob Gibbard, Carl Gitscheff, Mike Green, Dr. James Hatter, Jack Lay, Frank Rad, Tom Sabo, Stan Smith, Terry Stocks, Don Wilkins and Pete Wise. Thanks also Helen Schwantje and Mike Badry of WLAP and to Frances Backhouse who edited this guideline.

**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.**

