BASIC ELK ECOLOGY AND POPULATION STATUS

Rocky Mountain Elk

BRITISH COLUMBIA

Ministry of
Forests, Lands and
Natural Resource Operations

Elk (*Cervus elaphus*) are the second-largest member of the deer family (Cervidae) in North America. Typically, adult bulls have a shoulder height of about 140 cm and range from 265–410 kg while cows are slightly smaller, with a shoulder height of about 130 cm, and range from 170–290 kg. Elk are tan to reddish-brown in colour with a darker mane and white rump patch. A unique trait of elk is the presence of large rounded canine teeth, or "elk tusks," in both sexes. Bulls have large spreading antlers with main beams that sweep back over the shoulders. These large antlers are shed in the late winter (Feb-March) and begin regenerating soon after.

Like caribou, elk are social animals and range in herds. For the majority of the year, elk segregate into separate bull groups and cow-calf groups, with social hierarchies established on the basis of age. During the fall breeding season in September bulls seek out cows; bugling (a whistle-like vocalization), thrashing vegetation with their antlers, and sparring with rival bulls to assert dominance. Dominant bulls will protect and breed with a group of cows during that breeding season. Cows are able to reproduce at two years-of-age and generally give birth to a single calf each year in late May to early June.

Although primarily a grazing species, elk utilize a wide variety of forbs, shrubs, and tree species as forage. This adaptable diet enables elk to occupy a range of habitats including forested stands, grasslands, and mountainous alpine and sub-alpine areas. During winter, when snow depths exceed 30–60 cm, elk seek out areas of lower snow accumulation for easier access to forage and to minimize energy losses caused by moving through deep snow.

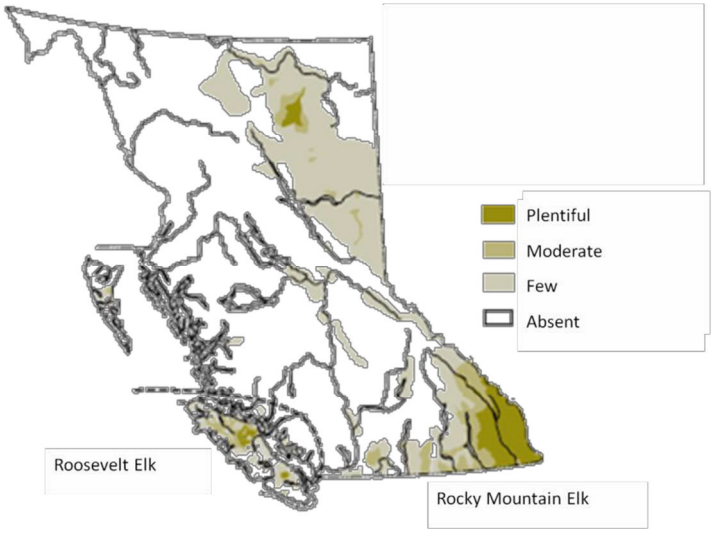
Seasonal migrations between distinct summer and winter habitats are common in many elk populations. The migrations are associated with seasonal variations in forage quality and availability, as well as predator and insect avoidance (DeGroot 2002). Typically, animals move to higher elevations in the spring and summer following plant green up, then move to lower elevations in the winter when snow begins to accumulate (Skovlin 2002). Migration distances for elk can vary from a few kilometers up to 150 km (Irwin 2002). Generally, elk show high fidelity to their summer and winter range (Raedeke et al. 2002).

In some instances, elk become non-migratory, remaining in lower elevation wintering areas year round. This non-migratory behaviour is often attributed to local availability of abundant forage in fields and gardens and a lack of predators, both as a result of human settlement. These non-migratory groups are often involved in human-elk conflict due to crop-depredation, increased risk of elk- vehicle collisions, and aggressive encounters with elk during the breeding and calving seasons.

Distribution and status of elk populations across B.C.

Two sub-species of elk are native to the province of British Columbia; Roosevelt elk (*C. e. roosevelti*) and Rocky Mountain Elk (*C. e. nelsoni*) (Shackleton 1999; BC Conservation Data Centre 2013). Rocky Mountain Elk are the most widespread and abundant sub-species of elk in the province, with approximately 43,000 animals occupying a variety of habitats from dry interior grasslands and forests (Hudson et al. 1976) to northern mountainous areas (Bergerud and Elliot 1998, Gillingham and Parker 2008) to wet temperate forests (Poole and Mowat 2005).

Populations are most abundant in the southeast and northeast portions of the province with smaller scattered populations occurring in the interior (Figure 2). Roosevelt elk are less common, with approximately 6,600 animals (Wilson 2012) inhabiting the southwest coast region (Figure 2) where they occur in high forage areas adjacent to security cover such as mature forest edge and riparian areas (Brunt 1990, Quayle and Brunt 2003).



The distribution of Roosevelt Elk and Rocky Mountain Elk within British Columbia

The abundance and distribution of elk we see today in B.C.—with the exception of the Kootenay and Northern Rocky Mountains regions—is considerably reduced relative to 150 to 200 years ago (Spalding 1992). Reaching North America one million years ago, elk re-colonized B.C after the recession of the last ice-age; expanding their range north and west as several thousand years of warm dry weather resulted in the conversion of glacier covered areas to grasslands and forests (Spalding 1992). Throughout the 1700s, to early 1900s, elk were the dominant large ungulate throughout much of the province, including the interior plateau region. From the mid-1800s through the mid-1900s, elk numbers began to decline in many parts of B.C. The causes of these declines are not clear but working in concert, disease, severe winters, predation and intensive hunting were likely among the primary contributing factors (Spalding 1992).

Population size and distribution of elk is dependent on a number of natural or human related factors. Predators, the quality and availability of forage and thermal cover, and environmental conditions such as winter severity naturally regulate the size of elk populations. Human related factors including hunting, habitat change, road and railway kills also influence population size and distribution. Some land uses decrease the quality and quantity of forage and cover resources available to elk, which can lead to population decline or habitat abandonment. Other land uses can create a relative abundance of high-quality natural forage, which can lead to population growth and changes in distribution and behaviour. In many areas of the province, elk populations are increasing and expanding their range for a variety of reasons, including species conservation efforts, (i.e., regulation of hunting, establishment of protected areas and game reserves, habitat

enhancement, and the reintroduction of elk to historic ranges); warmer, less severe winters; and increased forage due to wildfire, logging activities, and agriculture.

Historic and current status of elk in the Cariboo-Chilcotin

Historically, elk ranged across much of the grasslands and forests of the Cariboo Region from the Fraser River west to Choelquiot and Anahim Lakes, south to the Chilcotin River and Meldrum Creek areas, and east to Canim and Mahood Lakes. First Nations oral history and reports from early explorers indicate the presence of elk in the 1800s and 1900s. Archaeological evidence supports the presence of elk as far back as 500 BC (as indicated by carbon dating of antlers found in local wetlands).

As the dominant game species for several centuries, elk were a critical species supporting predator-prey systems, and were highly valued by First Nations for traditional uses. As in other parts of the province, elk populations in the Cariboo-Chilcotin declined from the mid-1800s through the mid-1900s with no clear cause of decline (Spalding 1992). Following the decline, elk populations in the Cariboo Region were reduced to small relict herds southeast of Nazko, in the Canim and Mahood Lakes area, along the Quesnel River, and in the Clinton area (Spalding 1992).

Elk are becoming more numerous and are increasing their range in the Cariboo Chilcotin, most likely due to a series of mild winters, the increase in early-seral stands resulting from wildfire and forestry activities. During the last 5 years elk sightings have been recorded near Bridge Lake, Canim Lake, Horse Lake, Beecher's Prairie, Alexandria, Narcosli, Likely, Horsefly, Kersley, Soda Creek, 150 Mile House, and Bluff Lake. In aggregate, these smaller herds likely account for an estimated 50 to 100 animals. In addition to these smaller herds, an estimated 200 elk range in larger herds near the Cottonwood/Fraser confluence, along the Quesnel River to Gravelle Ferry, Beavermouth and into the Skelton Valley.

Elk management in B.C.

Consistent with measures for other native wildlife species, management strategies for elk must balance conservation needs with a range of other ecological and social considerations. As a species that is native to the province and Cariboo Region, elk populations help maintain historic species assemblages and increase biodiversity. Elk are a popular wildlife viewing attraction, and increase people's interest for and awareness in wildlife resources while generating revenue through wilderness tourism and backcountry recreation. In areas where populations are sustainable, elk are highly sought as a game species; enabling First Nations to fulfill their sustenance needs, and providing high quality hunting opportunities for both resident and non-resident (guided) hunters.

The presence of elk populations can result in negative socio-economic and environmental impacts, particularly if populations become overabundant. Elk herds can consume significant amounts of forage in the form of grasses, shrubs, forbs, and young deciduous trees; in some instances leading to overgrazing. Overgrazing may result in damage to vegetation and soil communities, leading to negative impacts on other natural resources, wildlife and plant species. If

elk overgraze agricultural or range land, producers may experience direct financial losses through crop depredation and competition with livestock. Other potential negative impacts include damage to fences and equipment, possible transmission of disease to and from domestic livestock, increased risk of elk-vehicle collisions, and potentially aggressive encounters with elk during rut and calving seasons.

Provincial management strategies for elk vary depending on management objectives, elk population density, the landscapes occupied and their ecological condition, and the level of elk-land use conflicts. In several regions of the province, elk management zones (broad areas where elk populations are continuous and management objectives are relatively consistent), have been created to focus management actions and allow for competing management objectives to be fulfilled within the same region. For instance, in elk management zones remote from areas of human conflict, elk are managed much like other game species: to ensure that populations remain self-sustaining and that overharvest does not occur.

Conversely, where elk have become locally overabundant in agricultural or range areas, special hunt zones with liberalized hunting regulations (i.e., increased number of permits, extended seasons, or the introduction of an antlerless hunt) have been adopted to reduce local elk densities. In addition to altering hunting opportunities in high conflict areas, there are a suite of other management actions available to be utilized by wildlife managers to influence elk population size and distribution (Appendix A).

In regions where the impact of wildlife on agriculture is elevated, the provincial government may develop initiatives under the Provincial Agricultural Zone Wildlife Program (PAZWP). PAZWP facilitates stewardship partnerships to prevent and mitigate crop damage, identify and implement safe hunting opportunities in agricultural areas, and promote effective enterprise between hunters and land owners. Prevention and mitigation options include fencing projects, hazing, creation of special hunting opportunities in agricultural areas, and capture and assisted dispersal of wildlife.

If necessary, the program also coordinates work among management authorities to carry out controlled culls of persistent problem wildlife. This type of multi-facetted wildlife management program will evolve following on the development and implementation of an elk management plan for the Cariboo Region. Financial compensation programs for crop depredation by wildlife are managed by provincial agencies in partnership with federal agricultural authorities, and are only available for crop-loss situations where mitigation and prevention efforts are being carried out (with hunting and hazing considered as the prevalent mitigation measures).

Elk management in the Cariboo region

In the Cariboo Region, elk are currently being managed conservatively as a recovering species (i.e., currently there is no hunting of elk). The preferred outcomes for management of elk in the Cariboo region are:

1. A sustainable elk population, in balance with the habitat carrying capacity of the region
2. A reduction in the economic impacts caused by elk

3. Cost effective, sustainable and responsive elk management strategies
4. Equitable opportunities to use elk for consumptive and non-consumptive purposes.
5. Protection of Aboriginal rights by avoiding material negative impact on the abundance and distribution of wildlife.

Current elk management issues

Over the past three decades, herds of elk in the Quesnel and Cottonwood River areas have become accustomed to the high value forage available on agricultural lands, where there is relative safety from predation. The persistence of elk on these agricultural lands is resulting in negative impacts including crop depredation and damage to farm infrastructure. Initiatives to address the situations in the Quesnel area must be carried out in a manner that:

1. Accounts for the social or economic impacts to all land-users
2. Is cost effective and sustainable for all stakeholders over the long term

Further, potential management actions, or a combination of actions, need to be evaluated against provincial wildlife policy (Appendix B) and regional elk management objectives set out on Page 5. Government must consider whether actions that cause material impact on the abundance and distribution of elk, may adversely affect First Nations rights to hunt. Infringements must be justified. Adverse impacts to aboriginal rights may need to be accommodated.

Management options

The future abundance and distribution of elk in the Cariboo region is unknown. There are many areas of suitable habitat where elk would be not expected to materially impact agriculture. Where specific issues occur, applying a range of management options (Appendix A) can assist in reducing the impacts of elk on agricultural lands. Applicability of the management actions will vary depending on the size and behaviour of the elk herd, the landscapes occupied, and the land users affected. For instance, where elk conflicts are limited to a small area, but the costs resulting from the damage is high (such as a feed storage area or small field of high value crops), fencing may be a cost-effective long-term option. In large areas of high elk densities, other options, such as removal of elk, (through hunting, relocation, or culling) combined with attempts to change the distribution of the remaining elk through fencing, hazing, or enhancement of habitat outside of the conflict areas may be most logical.

During 2014, stakeholders will be encouraged to propose management options not yet identified in Appendix A, and share any concerns they may have about management of elk. The insights gained in these meetings help to confirm regional elk management objectives as set out on Page 5. Public engagement will be critical to assessing the cost, practicability and effectiveness of the various management options, and will help determine which of the proposed management tactics are applicable to different circumstances on the land.

Working toward an elk management plan for the Cariboo region

The Ministry of Forests, Lands and Natural Resource Operations will be working on a joint resource stewardship initiative with First Nations, agricultural producers, land-owners, wildlife interest groups, and other government ministries to develop an Elk Management Plan for the Cariboo Region. The goal of the Management Plan will be to assist in achieving the region's elk management goals: a self-sustaining regional elk population that provides wildlife viewing, public education opportunities, and harvest opportunities for First Nations, resident, and non-resident hunters, while reducing negative impacts to other resources and land uses. All stakeholders will be encouraged to participate in the development and implementation of the elk management plan to ensure that the plan is guided by the best available scientific, local, and traditional ecological knowledge, with consideration for social, cultural and economic values.

There is still much to be learned about elk in the ecosystems of this region, so it is important that the species management plan is built to be flexible and adaptive to change. Through ongoing elk population monitoring efforts and an adaptive management approach, we can monitor population objectives and the effectiveness of applied management strategies, while making any necessary changes to ensure that elk populations continue to provide a balanced range of benefits.

Throughout 2014, provincial ministries will continue engagement with First Nations and hold focused meetings with stakeholder groups to review the range of management options for elk management within the region. Through broad public engagement, the ministry will ensure that the public is well informed of proposed elk population objectives and management strategies. Following the distribution of this information, there will be a period where the public will be encouraged to submit commentary and offer inputs through either online web-based interfaces, or personally through engagement with the regional wildlife staff as may be arranged through Front Counter B.C.

While the management plan is being developed, the ministry may be compelled to undertake specific management actions to address the elk-agriculture conflicts occurring in the agricultural lands in the Quesnel and Cottonwood River areas. With regard to this situation, the ministry will continue to engage with First Nations, communities and stakeholders to review the available management options and chart the tactics that will be employed to manage elk in these localities in the short term.

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Appendix A: strategies used to manage and prevent elk conflicts

The tables on the following pages list some of the mitigation and prevention strategies used to manage elk in the province. For each option a brief description of the method is offered, with preliminary indication of benefits and limitations of each method.

HAZING

Repeatedly expose elk to negative stimuli (loud noises, visual cues, etc.) to displace them from the conflict areas (i.e., crop storage areas, agricultural fields).
Benefits:
▪ Alleviates crop depredation by changing elk distribution in the short term. ▪ May encourage dispersal if there are available habitats nearby. ▪ Humane alternative to lethal mitigation measures.
Limitations:
▪ Requires sustained effort and investment over a large land area considerable distances in order to have material effect. ▪ Not a cost effective or sustainable long-term strategy as elk adapt to continued disturbance. ▪ Elk will likely return to conflict area unless there is equally high value habitat available.

FENCING

Construct wildlife fences of suitable design to exclude elk from elk conflict area (i.e. crop storage areas). The minimum height for a woven wire elk fence is 7 feet, and 6.5 feet for an electric fence design.
Benefits:
▪ Alleviates crop depredation by preventing access to crops/stored forage. ▪ Elk are prevented from frequenting winter livestock feeding areas. ▪ Modifies elk distribution by preventing habituation to cropland. ▪ Effective as long as fences are maintained ▪ Fencing costs may pay for themselves in comparison to economic impact of continued crop losses and unsustainable compensation arrangements. ▪ Encourages continued dispersal to available habitats. ▪ Increased stand longevity and long-term crop benefits. ▪ Humane alternative to lethal mitigation measures.
Limitations:
▪ High initial costs of suitable fence construction. ▪ Requires maintenance through time. ▪ Alters movement and distribution of other wildlife species, such that fences should be constructed to conform to wildlife corridors/migration paths. ▪ Can shift problem wildlife to adjacent agriculture and range holdings if those areas remain unfenced.

▪ May increase highways conflicts when elk seek out forage along roadsides outside fenced areas.

RELOCATION—ASSISTED DISPERSAL OF ELK WITHIN THE REGION

Problem elk in conflict areas are captured and relocated to areas away from agricultural crop lands and settled areas within the regional boundaries. **NOTE: Transport of elk to locations beyond regional boundaries is strictly limited by policy. Relocated elk must be disease tested prior to relocation to prevent spread of disease to other cervids or domestic livestock.**
Benefits:
▪ Directly reduces elk density on agriculture lands. ▪ Elk can be relocated from agriculture crops and private land to locations where First Nations use, hunting and wildlife viewing opportunities are more readily accessible. ▪ Alternative to lethal control measures. ▪ Allows for elk conservation and relocation to available habitats.
Limitations:
▪ High cost of relocation. ▪ Relocations would need to be implemented on a regular schedule to maintain reduced elk densities as remaining elk will continue to use agricultural crop land, population will continue to expand locally. ▪ Likely unsustainable in absence of proper fencing. ▪ Relocated elk may have decreased survival. ▪ Relocated animals may eventually move to other agricultural land, which requires that prevention tactics are in place prior to relocations. ▪ Adequate forage required at relocation site to avoid movement of elk to problem areas. ▪ Relocated elk may compete for resources with other cervids or domestically ranged livestock. ▪ Establishing elk populations in other areas may impact predator densities, which could in turn affect the density of other prey species on the landscape (i.e., apparent competition).

CULLING

Problem elk in conflict areas are captured and humanely dispatched. Culling is not carried out by hunting.
Benefits:
▪ Reduces elk density on agricultural lands. ▪ Culls that provide sustenance may provide broad social benefits (food banks and/or First Nations communities), if there is compliance with meat inspection laws.
Limitations:
▪ Remaining elk will continue to use and impact agricultural crop land unless elk are eradicated or reduced to a target level, or other prevention or mitigation is employed.

- Culling would need to be implemented on a regular schedule to maintain reduced elk densities.
- Inconsistent with conservation, hunting or wildlife viewing objectives.
- May adversely affect aboriginal rights by impacting availability and distribution of elk.
- Attracts focused social reactions (market interference, protests) that may result in impacts to provincial economic interests.

HUNTING

Hunting opportunities are increased in areas where elk negatively impact natural resources. As with other game species, a sustainable population must be attained before hunting opportunities are granted. Once conservation needs are met, First Nation's hunting has priority over resident and non-resident hunting. Once First Nations aboriginal rights to hunt have been addressed, B.C. resident hunters may be provided with hunting opportunities, followed by guide outfitters whose guiding area overlaps the areas requiring elk management.

Requires an effective working partnership between enforcement agencies (RCMP and Conservation Officer Service), First Nations, land owners and hunters, that allows for safe use of heavy firearms by qualified persons, and reasonable access to agriculture crop lands.

Benefits:

- Directly reduces elk density on agricultural lands.
- Can increase wariness of remaining elk, potentially discouraging animals from using areas in future.
- Provide hunting opportunities consistent with First Nations rights.
- Provides economic returns from hunting opportunity.

Limitations:

- Effect on elk distribution and behaviour is not immediate. Hunting has not been demonstrated to reduce elk use of agriculture lands, and may only result in localized population reduction.
- Cannot be limited only to BC resident hunters from within the local community
- Programs may need to be developed for allowing access to private property (similar to mineral and oil extraction under private land).
- Use of high powered firearms in agriculture zones poses public safety challenges.
- Attracts focused social reactions that may result in impacts to provincial economic interests.
- Wildlife often adapt to hunting activities eventually reducing hunting effectiveness. The regulations would need to be changed frequently to maintain hunting as an effective contribution to longer term solutions.

Financial Considerations for Prevention and Mitigation Strategies

Elk-conflicts including crop depredation, competition with livestock, and damage to equipment result in financial costs to affected landowners. In some instances, prevention and mitigation options in response to elk-conflicts will also include a cost to establish and maintain prevention and mitigation measures. The cost versus benefit of prevention or mitigation measures will be an important factor determining the feasibility of management options. While the province provides

some compensation funds for crop-loss and other damages due to wildlife, land owners must prove that mitigation and prevention measures are being implemented. Financial compensation in the absence of prevention tactics would be unsustainable, and would allow the current situation to persist and potentially expand from the currently impacted localities.

Private land-owners harbouring growing populations of elk may also seek out compensation through proof of supplying ecological goods and services. In this instance, private landowners may seek out compensation from outside, conservation-based funding agencies for providing wildlife (elk) habitat. Although such programs have not yet occurred in the Cariboo region, they do exist elsewhere, and can take the form of land acquisitions or conservation easements.

Appendix B: Wildlife Program and ministry policy references.

Vision of the provincial Wildlife Program

"Naturally diverse and sustainable wildlife supporting varied uses for current and future generations."

Goals and objectives of the Wildlife Program

In order to support the three goals of the Wildlife Program, 11 objectives have been identified. The objectives are aligned under the applicable goals and identify the set of strategies and activities that must be undertaken to effectively deliver the Wildlife Program. The objectives are not stand-alone areas; they are interdependent and must be delivered together in order to achieve our vision and goals.

Goal 1: Deliver a coordinated and proactive Wildlife Program

The Wildlife Program framework needs to be transparent, adaptive, and informed by the various user interests, and must establish regulations that promote and facilitate compliance by those who enjoy and affect the province's wildlife. The framework must also foster productive relationships with First Nations, delivery partners, and stakeholders so that policy, scientific and cultural knowledge, and management efforts are effectively co-ordinated. Together, these will build the necessary capacity for achieving success in the remaining two goals.

Objectives under Goal 1:

- Evaluate and modernize the existing regulatory framework for wildlife management.
- Improve compliance to protect and manage wildlife and wildlife habitat.
- Improve wildlife management through effective engagement of First Nations.
- Improve wildlife management through the effective engagement of stakeholders, clients and the public.
- Inform wildlife management decisions with science and ensure that they are made in a structured and transparent manner.
- Manage wildlife and terrestrial information so that it is easy for capture, maintain, access and use.

Goal 2: Conserve species and maintain the health of wildlife populations in collaboration with our partners

The Wildlife Program has adopted the cross-government Conservation Framework, a goal-based set of methods and tools used to prioritize species and ecosystems for conservation action.

The Conservation Framework has the following three goals:

1. Contribute to global efforts for species and ecosystems conservation.
2. Prevent species and ecosystems from becoming at risk.
3. Maintain the full diversity of native species and ecosystems.

Healthy wildlife populations are fundamental to sustaining B.C.'s wildlife heritage. The Wildlife Program must work with other Ministry programs, agencies, First Nations, and stakeholders to design wildlife management actions that conserve, preserve, or maintain healthy species populations. Engaging others in becoming stewards of wildlife is critical to the success of the program.

Objectives under Goal 2:

- Conserve and restore native wildlife species and their habitats in BC.
- Maintain the health of wildlife in BC
- Foster shared stewardship of BC's native wildlife.

Goal 3: Provide a variety of opportunities for the use, enjoyment, and appreciation of wildlife

Meeting constitutional obligations for First Nations and creating sustainable and valued wildlife use opportunities that satisfy public and commercial interests are responsibilities of the Wildlife Program. Hunting and trapping are an important part of British Columbia's heritage and form an important fabric of present-day life for many British Columbians. Hunting and trapping are legitimate forms of recreation and are important resource management tools for managing wildlife and controlling selected species and populations that are not threatened or at risk. Changing demographics and competing opportunities for recreational time are affecting the numbers of people who actively participate in the use and enjoyment of wildlife. This, combined with the urbanization of the human population, has resulted in people becoming increasingly disconnected from nature, which makes it more challenging to engage the public in opportunities for using, enjoying, and appreciating wildlife.

Objectives under Goal 3:

- Provide and manage sustainable uses of wildlife.
- Prevent or reduce negative effects of wildlife-human encounters.

Ministry policy for the Wildlife Program

Policy 4-7-13.01: Goal of Wildlife Management

It is the Policy of the Ministry:

1. That the ***goal*** of the wildlife management programme is to maintain the diversity and self-sustainability of species representative of the major biophysical zones of the province and to ensure that, within the constraints of land capability and biological limits of each species, wildlife is available in sufficient abundance to meet the social, recreational, ecological and economic needs of society.

2. Consistent with that goal, the ***objectives*** of the wildlife management program are to:

    - Maintain the natural diversity of wildlife species and their habitat.
    - Manage wildlife populations and habitat to provide consumptive use of wildlife consistent with program plans.
    - Manage wildlife populations and habitat to provide non-consumptive use of wildlife consistent with program plans.
    - Minimize the danger to life and damage to private property caused by wildlife.
    - Promote new commercial uses and the maintenance of existing commercial uses of wildlife, such as trapping and guiding industries.

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