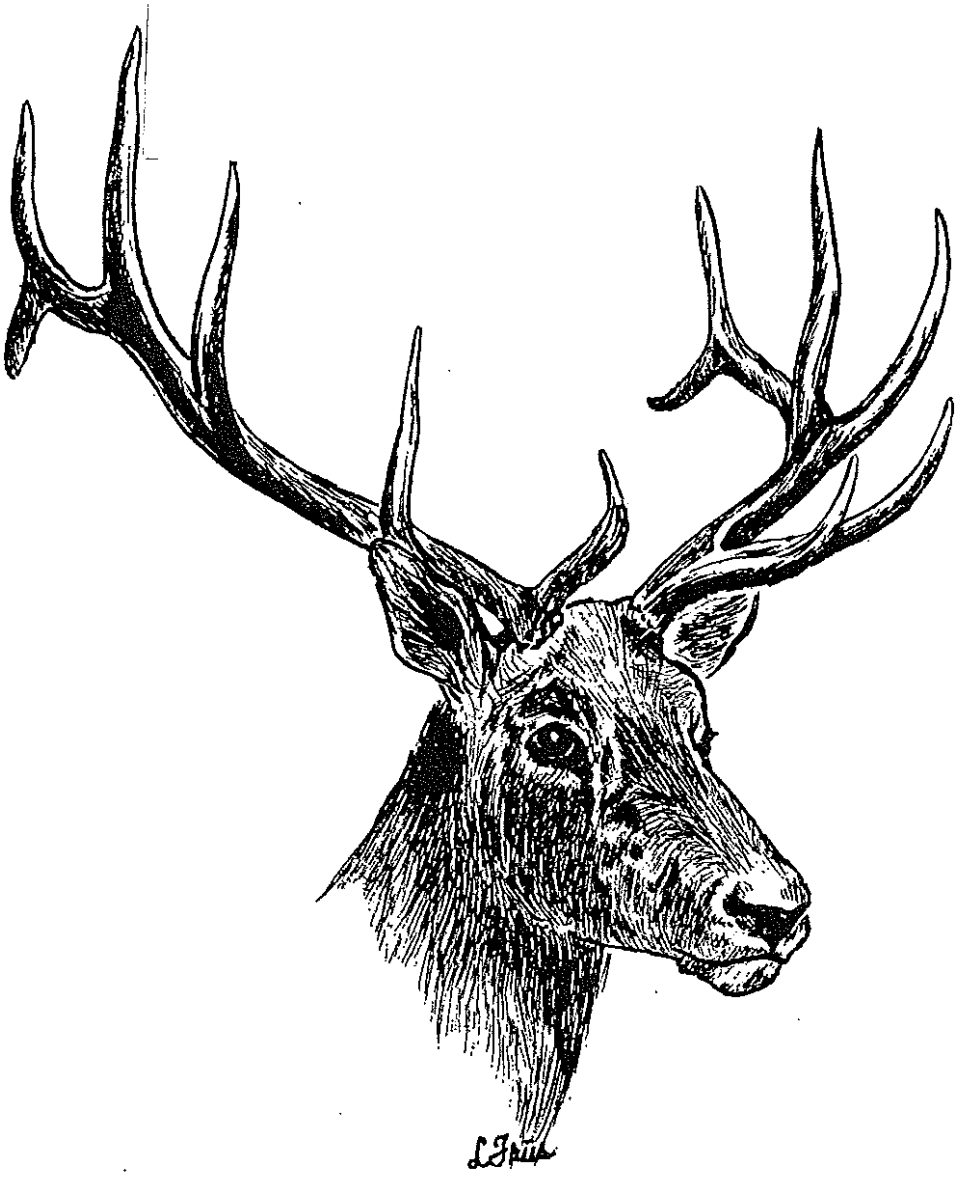
Preliminary Elk Management Plan for British Columbia



Province of British Columbia
Ministry of Environment

PRELIMINARY
ELK MANAGEMENT PLAN
FOR
BRITISH COLUMBIA

Fish and Wildlife Branch
Ministry of Environment
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PREFACE

Some of the information contained in this plan was selected from material prepared in 1972 by R.A. Demarchi and in 1976 by D.W. Janz. Additional information was selected from data compiled in 1976 by P.S. Petticrew. D. Blower compiled information for the distribution and abundance map. P.S. Petticrew and M. Fyfe drafted and W.T. Munro edited the plan. The typing of all drafts was ably and cheefully done by Lynne Foxall, Fish and Wildlife Branch.

SUMMARY

The elk is the second largest member of the deer (Cervidae) family. Although widely distributed, the elk was not historically abundant in British Columbia. Two subspecies of elk occur in B.C.: the Roosevelt on Vancouver Island, and the rocky mountain in the Kootenays and elsewhere in the interior. Elk have a low to moderate reproductive rate. The elk population in B.C. is estimated to be about 24,000 ± 20% (with about 3,000 Roosevelt and about 21,000 rocky mountain elk).

OBJECTIVES

1. Increase elk populations to a minimum of 36,000 (32,500 rocky mountain, 3,500 Roosevelt) animals distributed in traditional habitats throughout B.C.
2. Provide opportunities for people to view elk in their natural habitat.
3. Provide 140,000 hunter days of recreation and an annual sustained hunter kill of about 3,500 animals.

POLICY

Although elk will be managed as an integral part of wild ecosystems, they will also be managed as a game species. Management for hunting will be on an area or herd basis and harvest rates will generally be less than 15% of the fall populations depending on the herd status and management objectives for the area. Some populations will be managed for quality hunting. Some particularly accessible herds may be closed to hunting and managed primarily for observation.

MANAGEMENT PRESCRIPTIONS

1. Identify and protect critical elk habitat. In winter this consists of valleys and windswept south and west-facing grassy slopes for rocky mountain elk and mature forests, bogs, meadow areas with streams and estuaries for Roosevelt elk. Spring ranges (sunny areas where early spring plant growth appears) and migration routes between ranges are also critical.
2. Identify elk habitat and provide guidelines for developments which might otherwise destroy it. Where elk habitat is threatened with development that jeopardizes elk without offering commensurate benefits, the development will be opposed.
3. Enhance elk production through improved grazing systems, controlled burning, fertilization or seeding with emphasis on those areas where elk production is considered the highest priority.

4. Develop regional management plans for major elk herd.
5. Designate and manage certain accessible elk populations primarily for observation, and advertise their location.
6. Designate key areas where elk production for human consumption is considered of highest priority, and manage those areas on a maximum sustained yield basis; also designate certain wilderness areas for the production of quality animals.
7. Maintain harvest levels below recruitment for those herds or populations which have room for expansion and for those herds recovering from low numbers.
8. Transplant or re-introduce elk to historical ranges where such introductions would not conflict seriously with other land uses.
9. Reduce predator populations in key elk areas if they are proven to be depressing the recovery of an elk herd and if high predator numbers are not required for other purposes at that particular location.
10. Reduce elk/agriculture conflicts.
11. Consider winter feeding for some elk in some circumstances.

PROBLEMS

1. Elk habitat, especially winter range, continues to be alienated and debilitated by overgrazing, logging, mining, agricultural developments, subdivisions, hydroelectric impoundments, recreational developments and transportation corridors.
2. Elk may cause agricultural damage (i.e. damage to haystacks, crops, fences, etc.) to private property which is adjacent to or was formerly elk winter range.
3. Some elk habitats are not occupied.
4. There is opposition to the transplanting of elk to historic ranges, mainly because of the view that grazing competition between elk and domestic animals will occur especially where past domestic overgrazing abuses have only recently been controlled.
5. Inventory information is inadequate for most herds.
6. Forest succession or maturation coupled with increased forest fire protection has resulted in some habitats declining in quality.
7. New access roads coupled with resource extraction operations (e.g. logging, mining) are making some elk populations vulnerable to overhunting (legal and illegal).
8. Severe winters can substantially reduce herds even under favourable habitat conditions.

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INTRODUCTION

This plan is one in a series of draft management documents being prepared by the Fish and Wildlife Branch on individual species or groups of species. Comments from interested individuals are welcome within three months of the release of this plan and will aid in its revision. After revision, the plan will guide elk management in British Columbia for the next five years consistent with management goals.

The goals of wildlife management in B.C. are:

1. *To maintain the diversity and viability of species representative of the major biophysical zones of the Province; and*
2. *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.*

To meet these goals; objectives, policies and management prescriptions have been developed. This plan describes how and why they were derived for elk. In addition it confirms and provides guidelines for the development of Regional Wildlife Management Plans which will present in greater detail regional objectives for numbers and distribiton of elk, uses to be made of elk, and the cost of meeting those objectives. It also provides the reader with general information on which the management of elk in B.C. is based.

THE RESOURCE AND ITS HABITAT

TAXONOMY AND DESCRIPTION

Elk is the name given by early white settlers in North America to the second largest member of the deer (cervidae) family found on this continent. It is also known by the name "Wapiti", a Shawnee Indian name meaning "white rump" or "white deer" (Banfield, 1974; Boyd, 1978). Elk will be the term used throughout this plan.

There is some confusion regarding the classification of elk. Although the elk is the New World representative of the species, red deer (Cervus elaphus), elk in North America had formerly been classified as a separate species, C. canadensis. However, since a reclassification in the early nineteen seventies (reported in Boyd, 1978), the nomenclature, C. elaphus, has been accepted for elk in North America. Of the ten subspecies which originally occurred on this continent, four subspecies remain today. Two of these subspecies are found in British Columbia: the Roosevelt or Olympic elk (C. e. roosevelti Merriam) and rocky mountain elk (C. e. nelsoni Bailey).

The elk is a large-sized, sturdy deer which has a long head, neck and legs. Body colouration varies from yellowish grey to tawny to a dark yellow or reddish brown; the head, neck, mane and legs in both sexes are darker than the rest of the body. A large, whitish, heart-shaped rump patch surrounds the tail. Mature males or bulls may vary in weight between 270 and 450 kg (600 - 1,000 lbs.) while mature females or cows vary from 180 - 270 kg (400 - 600 lbs.) (Banfield, 1974). The most distinctive feature of mature males is the set of antlers which consist of long (± 2m, ± 6 ft.) sweeping cylindrical beams extending upwards and backwards with two to six tines or points facing forward. Females do not develop antlers. The antlers begin to develop each year in spring (April or May) and are shed in late winter (February - March). Antler development begins at one year of age; successive sets are usually larger and maximum development may be reached between five and seven years (Peck, 1980 and Flook, 1970 respectfully).

DISTRIBUTION AND NUMBERS

The present distribution of elk in North America is dramatically different from the time European settlers came to this continent. Elk were once the most widely distributed members of the deer family in North America but are now confined mainly to the western United States and the four western Canadian provinces. Population lows were reached in the early 1900's as a result of market hunting and agricultural activities

(Boyd, 1978). In British Columbia elk were historically widely distributed but were not abundant. This distribution was and is probably related to their ability to occupy a variety of habitat types and to utilize a variety of forage species.

The current distribution and abundance of elk in British Columbia are shown in Figure 1. Roosevelt elk occur on Vancouver Island and occasionally find their way to the Lower Mainland from Washington State. Rocky mountain elk occur mainly in the Kootenays (The Rocky Purcell Selkirk and Monashee Mountain Ranges) and further north (Omineca-Peace Resource Management Region) in the lower Peace River area (the Murray - Wapiti River drainages) and the Muskwa - Prophet River drainages on the eastern slope of the Rocky Mountains. Although Rocky Mountain elk were prehistorically abundant and widely distributed in the Cariboo - Chilcotin and Thompson-Nicola areas, elk declined for unknown reasons and today only small, widely scattered herds remain in the Cariboo-Chilcotin and introduced populations in the Thompson-Nicola. Small relict herds also occur in parts of the Omineca - Peace Region; little is known about these herds (Demarchi, 1972). Prior to transplants, elk were not indigenous to the Okanagan and Skeena Resource Management Regions. Elk (rocky mountain) transplants have been carried out through the years beginning in 1917 with elk released in the Bridge River area near Lillooet and followed by releases of elk near Naramata in 1927; the Tlell Valley (Queen Charlotte Islands) in 1929 and 1930; Princeton in 1932 and 1933; McNab Creek (Howe Sound) and Adams Lake in 1933; Lardeau in 1948; Christina Lake in 1971 and 1972; Deer Park in 1971 and Lytton in 1973.

The recent population estimates and their relative accuracy are outlined by Resource Management Region in Table 1. The existing provincial population of elk is estimated at about 23,000 animals, an increase over the mid 1970's figure. The Kootenay Region has the largest portion of the provincial elk population (55%).

Elk populations do not necessarily inhabitat a single management unit nor stay within provincial, national or park boundaries. Thus some populations are shared with the Province of Alberta and Parks Canada and the states of Washington, Idaho and Montana.

BRITISH COLUMBIA

WILDLIFE DISTRIBUTION MAPPING
GENERALIZED BIG GAME SERIES

ELK

DISTRIBUTION AND RELATIVE ABUNDANCE

- NOT PRESENT
- FEW/VERY FEW
- MODERATE/PLENTIFUL
- RARE OR OCCASIONAL SIGHTING
- PROVINCIAL BOUNDARY (LIMIT OF MAPPING)

SUBSPECIES DELINEATION

ROOSEVELT ELK (Cervus canadensis roosevelti) — ROCKY MTN. ELK (Cervus canadensis nelsoni)

Compiled by B.C. Fish and Wildlife Branch
and B.C. Resource Analysis Branch, 1978.
Drafting by B.C. Surveys and Mapping Branch

Scale
40 30 20 10 0 40 80 120 160 MILES

MARCH, 1978.

Drawn and Produced by the Map Production Division, Surveys and Mapping Branch, Victoria, British Columbia

MAP NO. 1S

Table 1 Population Estimates for Elk

	RESOURCE MANAGEMENT REGION	ESTIMATED NO. OF ELK	ESTIMATED OUTSIDE LIMITS	% OF TOTAL ESTIMATE
1.	Vancouver Island	2,700 (R)	(1,500-4,000)	11
2.	Lower Mainland	10 *(R)	(5 - 30)	◄ 1
3.	Thompson-Nicola	180	(130-300)	1
4.	Kootenay	13,400	(11,000-15,000)	56
5.	Cariboo	20	(10-50)	◄ 1
6.	Skeena	100	(50-150)	◄ 1
7.	Omineca-Peace	6,500	(2,500-7,500)	27
8.	Okanagan	950	(700-1,200)	4
TOTAL ALL REGIONS		23,900	(15,900-28,200)	100%

R - Roosevelt elk

* All transients

Although elk may have been prehistorically abundant in some areas of the Province, elk have not been abundant historically (Demarchi; 1972) and probably reached a provincial population low in the early 1900's. In the first annual report of the Provincial Game and Forest Warden (1905), concern is expressed about the future of elk in light of indiscriminate killing, the ease with which elk may be hunted at certain times of the year and the effects of severe winters. Thus extensive closed seasons for elk followed intermittently by open seasons in some areas were commonplace until the mid-1950's. At that time it was felt that elk populations had increased sufficiently to allow hunting even though surveys had not been undertaken. In the late fifties and early sixties seasons were liberalized leading to an over-harvest of elk in some localized areas (increased access). This overhunting occurred in combination with habitat destruction and alienation and for some herds, predation and thus some populations decreased again. However, as this species received considerable management attention over subsequent years, the reaction to perceived declines was season reductions or closures, special antler regulations and efforts to improve habitat conditions through coordinated resource planning. Presently elk populations are increasing in most areas.

BIOLOGY

For elk, the breeding season or rut generally occurs September through October peaking about mid-September (Struhsaker, 1967). The bulls are polygamous. Breeding bulls divide bands of cows and calves into harems which are then defended against other bulls. The gestation period is about 255 days (8½ months) and generally a single calf is born in late May or June; twins are rare even under favourable conditions (Flook, 1970). The calf condition at birth depends largely on the range conditions (quality) during the last half of the gestation (Thorne et al, 1976). Prior to calving the cow seeks out an area which offers forage, cover (security) and water; the cow may remain isolated for up to 3 weeks after parturition (Schlegel, 1976) but often nursery bands or small groups are joined much sooner on summer ranges (Carbyn, 1974). The calves are "fawn-coloured" and spotted; day-old calves weigh about 17 kg, range 11-22 kg (37 lbs; range 25 - 48 lbs.) (Schlegel, 1976). By one month of age, the calf is eating forage and by three or four months of age, the calf is often weaned. The calf remains with the cow during the first winter but it is on its own by calving time the following year.

Bulls are usually sexually mature at about 16 months old but do not normally participate in breeding until they are at least 3 years old because of the dominance of older bulls. Some cows mature sexually at 16 months but most do not breed until they are about 26 months old.

Cows are longer lived (up to 21 years) than are bulls (12 - 14 years). Bulls of age 7 years or older may be prone to late winter mortality because of low energy reserves (Flook, 1970). Thus, although the sex ratio at birth is 1 to 1, cows predominate even in unhunted populations.

Recruitment to the yearling class can vary considerably for different populations and between years. On Vancouver Island for example late winter cow/calf ratios have varied from 15 calves per 100 cows to 42 calves per 100 cows from 1975 to 1980 (Janz, 1980b).

Although elk are considered to be gregarious, they may be found as single animals, in small groups, or in fairly large aggregations. Herd or aggregation size and sex and age composition vary throughout the year, appearing not to remain constant. While bulls are dominant during the rut, the leaders in elk herds are the older cows. After calving, cows and calves form nursery bands; at this time mature bulls may be solitary or have formed bachelor groups. Later on in the summer, spikes and 2½ to 3½ year old bulls join cow groups, the aggregations becoming fairly large. As the rut approaches, the young bulls

leave the cow groups which decrease in size as the rut peaks and increase in size as the rut ends (Struhsaker, 1970); harems may range in size from 1 - 20 cows. Large herds of cows and calves and some yearling and spike bulls form on winter ranges; bulls and bull herds usually remain separated from cow groups. With the approach of spring elk herds break up, becoming smaller once again for the migration to summer ranges.

Natural mortality factors for elk include predation, malnutrition, disease, parasites and accidents acting singly or in combination (e.g. rutting injuries, drowning). While the large size of adult elk normally deters predators, adult bulls weakened after the rut or young animals in poor condition may succumb to predators during the critical winter months especially in years of heavy snowfall. During June and July, elk calves may be subject to heavy predation mortality under some habitat conditions (Schlegel, 1976, 1978). Predators of elk include: cougar, wolves, bears, coyotes, bobcats and occasionally lynx. Important parasites are the winter tick and the lungworm.

The most important man-caused factor leading to reduced populations is the continuing alienation and destruction of elk habitat throughout the Province; this factor is discussed in the Habitat and Conflict sections. Another man-caused mortality factor which dramatically affected some herds (in combination with other factors) in the past is hunting (legal and illegal). Elk hunting in areas of new access roads and without special hunting controls can adversely affect some herds. However, access is currently considered in setting the hunting regulations. Accidental mortality on highways and railways may be high where they cross elk winter ranges or travel routes. Human harassment may be critical at certain times of the year.

Elk are adaptable in their feeding habits, utilizing a wide variety of forage species. In summer they take advantage of the available plant species such as grasses, sedges, and forbs. Browse may also be an important part of the summer diet depending on the abundance of the aforementioned plant foods. Winter food habits are hard to generalize, however, where grasses are scarce or hard to obtain browse becomes more important. On Vancouver Island preliminary investigations indicate that western hemlock, cottonwood, ninebark, salal, Oregon grape, willows, elderberry, deer ferns and some evergreen forbs are important overwinter foods for Roosevelt elk (Janz, 1980b). In spring and early summer when elk shift to wet seepage sites, (bogs/wet meadows and snowslide areas) the new growth of ferns, grasses and deciduous browse is important. Food habits for elk in other habitats in B.C. have not been studied but probably vary depending on the source and habitat. Variations in food habits of elk in other parts of North America have been reviewed by Boyd (1978).

HABITAT

The preservation, maintenance or enhancement of a species is directly related to the condition and extent of its habitat.

Elk are adaptable and in British Columbia occupy a variety of habitat types from the coastal forest at sea level to high elevation meadows in the alpine zone. While elk in different habitats have different requirements, all elk require areas for winter range (with food and cover), spring/summer/fall range, calving, post-calving, feeding and bedding areas, shelter, mineral licks, rutting, post-rutting and travel or migration routes all of which are coupled with the appropriate associations of forage plant species. Concealment cover used for escape and hiding is also extremely important for elk.

In the Kootenays winter range is generally Douglas fir - Ponderosa pine stands mixed with aging grasslands and shrub communities. Hudson et al (1975) examined ungulate winter and spring habitats in the Premier Ridge area. Elk were found to exploit areas which were not effectively utilized by other wintering ungulates; they were generally at higher elevations than other wild ungulates and in open forest and shrub communities which had fairly high quality stands of bunchgrass but deeper snow cover. While the elk remained at those higher elevations where green up was delayed, in the spring they sought out the southwesterly exposures.

In northeastern B.C. in the Muskwa-Tuchodi area on the east side of the Rocky Mountains, elk and other ungulates generally winter in the foothill areas on the south and west facing slopes.

USES

Native Indians used elk where they were available and elk and parts thereof were a valued item of trade. The early explorers, miners, settlers and trappers also made use of elk for food, clothing and trophies ("tusks" or "canine" teeth and antlers).

In the late 1800's and early 1900's the indiscriminate killing for market ("tusks", antlers and meat) coupled with a series of severe winters, led to drastic declines in elk numbers in British Columbia as noted in the early annual reports; similar declines were also taking place in other areas of North America (Boyd, 1978). Because of the concern for the future of elk in this Province, many restrictive regulations were introduced and lengthy closed seasons imposed (see Appendix A); thus elk management began.

Until the mid-1950's hunter interest and participation in elk hunting was limited with extensive closed seasons and only intermittent open seasons. From 1954 to 1970

seasons were liberalized. In 1963 a peak resident harvest of 3,600 elk was reached; peak hunter numbers (about 15,000 hunters) were also reached in the mid-1960's but have since declined (see Appendix B). Currently elk are hunted for the meat, trophy and recreational experience (see Appendices C & D). As in the past, most of the harvested elk are taken from the Kootenay Resource Management Region.

Although the aesthetic value of elk cannot be measured, this value is high. Many people enjoy viewing elk in their natural habitat and as part of the wilderness scene. Elk are particularly observable at certain times of the year on winter ranges, at mineral licks or in rutting groups. Many people have also thrilled by the sight of a bull elk with antlers in velvet or at the sound of bulls bugling during the rut.

CONFLICTS

There are five main areas of conflict, some of which have been mentioned previously. These are the use of elk habitat for alternate purposes (habitat loss); the deterioration or decline in forage quality with maturation or plant succession coupled with improved forest fire control; increasing access; the use of the elk resource; and elk versus people and their interest.

The first conflict centres around the destruction or alienation of critical elk habitat such as winter range, calving areas, migration or travel routes. As a result of past and current land use practices, many of the best elk winter ranges have been altered or destroyed and the carrying capacity thus reduced. Land use practices such as mining and associated activities, extensive logging, intensive agriculture (expansion) transportation corridor construction (powerlines, highways, railways), hydroelectric impoundments, recreational developments, and urban/rural expansion are currently affecting elk and other wildlife populations. Many of these developments may act as barriers to traditional movements and may lead to the disruption in life cycles of elk over a large area. Elk range is being alienated as Crown land is sold or designated for development or leased for cattle grazing; this latter activity is detrimental to elk and other wildlife if the habitat has not recovered from past abuses or if cattle are permitted to overgaze in the fall the plant foods which are utilized by elk throughout the winter. Private land in the middle of elk range makes it difficult to carry out habitat enhancement (prescribed burning, selective logging or rotational grazing).

In addition to habitat loss, there has also been a decrease in the carrying capacity of some habitats with reduced plant quality. In the Kootenays for example many of the logged, burned over and cleared areas which once produced high quality elk foods have

become too mature to support elk herds. This is also the case on Vancouver Island where overstocked immature fir and hemlock stands (2nd growth, 21-40 years old) will have to be thinned in order to provide adequate forage or cover for elk (Janz, 1980a). In addition these aging ranges and forests are not being replaced because of improved fire protection.

The third conflict is the increasing access to wilderness areas throughout elk range because of development and associated human activities. Thus in some cases elk herds have become more vulnerable to overhunting (legal and illegal) and winter mortality during severe winters (loss of habitat necessary for overwinter survival) and the added stress of coping with recreational activities such as snowmobiling. In areas of high public use (by non-hunters and hunters), human disturbances or harassment of elk may reduce overwinter survival, affect reproduction and increase post-natal mortality all of which affect the productivity, recruitment and general welfare of elk herds.

The fourth conflict centres around the use of the elk resource for hunting, for non-hunting purposes and by predators (elk for predators or elk for people). On a provincial bases only about 15% of the elk harvest is by non-residents. Historically, in northern B.C. non-residents harvested most of the elk, however, since 1976 the resident and non-resident harvest have been roughly equal. As for other species, it is expected that with increasing access to the northern elk herds resident and non-resident conflicts and resident hunters and guide conflicts will continue to increase (see Peck, 1980b). The non-hunting use of the elk resource has increased in many accessible areas of the Province and hunting may be curtailed in some of the areas depending on the other land uses. In addition, predation may equal recruitment in some areas (e.g. Vancouver Island) so there may be no surplus elk for hunters if herds are to maintain their numbers or increase, thus the conflict of elk for predators or elk for people.

The last conflict relates to competition between elk and agricultural enterprises. Elk can compete with domestic animals for forage on rangelands and, in some circumstances can cause damage to haystacks and crops.

In the Kootenays, during the 1960's rangelands were overgrazed by cattle and forests were encroaching on range because of fire suppression, thus reducing the capability of range to support animals, both cattle and wild ungulates including elk. During the 1970's through co-ordinated resource management planning controlled rotational grazing by cattle and physical improvement of rangeland allowed the rangeland to recover so that it can now support reasonable numbers of elk and cattle. If elsewhere in B.C. agricultural expansion in the form of grazing is encouraged it will be at the expense of wild ungulates including elk unless it is accompanied by good range management and range improvement.

MANAGEMENT

Management is directed towards maintaining a resource within prescribed limits and regulating its use for the benefit of man. The management principle for use is to provide quality recreational experiences.

OBJECTIVES

Three objectives have been identified for elk management in British Columbia.

The first objective is to increase the elk population to a minimum of 36,000 animals (32,500 Rocky Mountain and 3,500 Roosevelt elk) distributed in traditional habitats throughout B.C. The 36,000 elk figure is judged to be the level possible to attain in five years with reasonable enhancement efforts. The continual loss of elk habitat due to development and expansion of human activities will reduce some herds. The maintenance of and increase in population numbers will be met by acquisition of prime elk habitat currently under private ownership, transplants or re-introduction of elk to former range, the application of habitat enhancement techniques, and improved coordinated resource management and land use planning processes. In the event of a series of severe winters drastically reducing the provincial population, harvest reductions and closed seasons may be required to allow populations to increase.

The second objective is to provide opportunities for people to view elk in their natural habitat and is the result of public demand for the non-hunting use of this resource. The Branch will provide for this use in some Regions. Viewing areas may be located in parks, ecological reserves, nature conservancies or wildlife management areas. Some areas will be located adjacent to highways for the driving public.

The third objective is to provide 120,000 hunter days of recreation and an annual sustained hunter kill of about 3,000 animals. This objective is based on the demand for elk hunting, the reproductive rate of elk and allows for some populations to have no hunting.

POLICIES

While elk will be managed as an integral part of wild ecosystems, the first priority for use of elk will be hunting. As a big game species elk are relatively easy to manage or manipulate in terms of populations and thus may be managed more intensively than some of the other ungulates. Generally hunting use, because of its restricted time frame, is

compatible with observational use. However in some areas hunting will be to allow better viewing possibilities. Management for hunting will be on an area or herd basis and will be conservative to allow for herd increases where appropriate or depending on which component of the herd is to be harvested. The productivity and recruitment rates for populations will be established and considered wherever possible prior to the development of harvest rates or regimes. Generally, the harvest rate will be less than 15% of the fall population; lower rates (e.g. 6%) will be used if bulls only (having certain antler characteristics) are to be harvested. As elk population composition is naturally distorted in favour of cow elk, care will have to be taken so as not be distort the age and sex ratio of populations in ways which would interfere with successful reproduction.

The second priority for use will be for observation. Some accessible herds will be managed for observation and may be closed to hunting. Certain areas, such as those adjacent to highways, near human settlements or in high outdoor recreational use areas, will be set aside for viewing this species in its natural habitat and provisions made for interpretative material. Use of viewing areas may be restricted at certain times of the year in order to reduce disturbance of elk during critical times.

Other uses permitted, in order of priority, are scientific, subsistance and commercial. Scientific research will be encouraged.

MANAGEMENT PRESCRIPTIONS

In spite of the concern expressed throughout the first half of this century regarding the future of elk in British Columbia, managment of elk was not conservative when biological and inventory information were not available. Many herds apparently declined in the late nineteen fifties and early sixties because of habitat alienation, deterioration and destruction which was coupled with localized overhunting. Although elk have been studied in many areas of North America, elk in B.C. have only recently received attention; many gaps in information remain. The Fish and Wildlife Branch will thus encourage research on elk in different habitats so that management regimes and plans may be made accordingly. In addition, elk currently share many habitats with a variety of human activities. Integration of elk management with these other land uses will require greater knowledge of the size, characteristics and distribution of elk ranges, the populations they can support as well as the nature and timing of elk movements and their response to various types of disturbance. Although elk have a low to moderate reproductive rate, they are able to increase their numbers quickly when habitat conditions and management permit.

The preservation of critical habitats is an important element in maintaining and increasing elk populations.

The Fish and Wildlife Branch recognizes the need for continuous inventory of elk and their habitat. Further research is required to gain knowledge of elk-predator relationships, and of the various factors limiting elk. Some applied research may be carried out by the Branch but universities and other research institutions will be encouraged to carry out basic elk research.

Elk are adapted to successional and climax plant communities depending on the location in B.C. They are able to respond to habitat manipulations or disruptions more quickly than wildlife adapted only to climax plant communities. While successional plant communities provide high quality food which is necessary if elk populations are to be enhanced, climax communities provide food and cover necessary for overwinter survival in years or areas of heavy snowfalls. The Fish and Wildlife Branch will cooperate with all agencies in coordinated resource planning and management and will provide guidelines for developments (e.g. transportation corridors, logging, mining) in order to minimize their impacts on elk populations, to prevent destruction of critical elk habitat or to promote land use practices which will enhance elk range where possible. Where elk habitat is threatened with development that jeopardizes elk without offering commensurate benefit the development will be opposed. The Branch will identify and make every effort to protect by legislation, critical elk habitats against alternate or destructive forms of land use. Such areas include winter ranges, migration routes, or traditional concentration areas. Various degrees of protection may be achieved through assignment of nature conservancy, ecological reserve, park or wildlife management area status to selected lands or through improved coordinated resource management or land use planning processes. In addition, a formal designation for wilderness areas will be sought to provide for the long term security of complete ecosystems which can serve as benchmark areas. An understanding of seasonal movements and a knowledge of land uses outside "protected" areas is essential to elk management. There is little point in protecting one component of elk range when the destruction or alteration of another will have an adverse impact on an elk population. The success of habitat protection will be dependent upon new legislation and the extent of co-operation of other agencies.

As more roads for logging, mining and other developments open up wilderness areas, the impact of increasing use of such areas for recreation must be assessed. Harassment of elk and other wildlife must be minimized during critical times of the year. The development of new access will also require greater restrictions on hunting activity through special controls such as limited entry hunting, non-resident quotas, or designated sex/age licences or seasons.

In some parts of B.C. extremely severe winters can cause high mortality in elk. In some instances winter feeding may be conducted to maintain an elk population at desired levels. Winter feeding on a regular operational basis will not be done as it produces artificially high populations and interferes with natural wild systems. Artificially high populations can affect the diversity of other species which it is our goal to protect.

Habitat enhancement and management will be implemented for elk where this is the best use of the land and where such management would not normally occur in the course of other resource management. Such enhancement may include improved grazing systems, controlled burning, selective logging, mechanical alteration of vegetation, fertilization, or propagation of desirable forage species. It should be noted that enhancement of habitat of an area will not be undertaken without consideration of the needs of other wildlife species. It is estimated that by utilizing habitat enhancement and other intensive management techniques, the elk population may be increased to about 30,000 animals distributed in traditional or historic habitats in B.C.

The public should be informed of the value of elk and of the need for sound management. The Branch will provide information on elk and their habitat as well as the results of research studies on such subjects as habitat needs and elk-predator interactions. Areas where elk may be observed at various seasons of the year will be identified. An information programme for elk hunters would be beneficial in areas where special restrictions are applied regarding age/sex of animals or antler configuration.

Elk hunting is a valuable social and economic asset (see Appendix D) to this Province. The Branch will emphasize the value of hunting in some of its information programmes and will promote the use of effective preventive measures to reduce elk damage to agricultural operations. Public education may be used to reduce the illegal kills and to promote compatible or beneficial land use practices.

Areas will be designated primarily for observation of elk and closed to hunting; to this end public assistance will be necessary. Thus the Branch will work closely with public organizations prior to the designation of viewing areas in order to assess and to respond to demands for viewing opportunities. Viewing areas will be established in different habitats. On some elk ranges, particularly those transected by roads, opportunities now exist seasonally to veiw elk in their natural state. The Branch will monitor the use of these areas as a means of determining future needs. In addition, the Branch will discourage in most instances the feeding or taming of elk and other activities which induce atypical behaviour and pose a problem of survival at other times of the year. The Branch will enhance viewing areas by installing, or encouraging other agencies to install viewing aids (i.e. highway pull-outs, information signs, etc.).

Harvestable surpluses will be determined for various elk herds and regulations (seasons, bag limits, area closures, limited entry hunting, or special age, sex, or antler regulations) will be established to maintain harvests within those levels and to provide balanced herds. The total annual sustained harvest may be increased to 3,500 elk (about 15% of the present population estimate or about 10% of the projected population figure) provided: local population estimates are sufficeintly accurate; the total annual harvest does not exceed the optimum sustainable harvest level (15%) with the inclusion of illegal kills and accidental mortality and harassment induced mortality; major habitat alterations or alienations do not cause a substantial reduction in elk numbers throughout the Province; and severe winters do not seriously decrease the population.

Harvest programmes will be designed primarily to produce the most desirable compromise between the quantity and quality of animals produced, the status of the population and the quality of recreational experiences relating to hunting and non-hunting. In addition, public access, local elk population status, the fall behaviour of elk (i.e. their vulnerability during the rut) and land uses are a few of the many factors considered in setting management objectives. In certain areas, specific and narrower objectives may be desirable and therefore the Branch may designate key areas where elk production for human consumption is considered the highest priority and manage these areas for high sustained yields (as high as 15%). Certain wilderness areas may also be designated for the production of animals having certain antler characteristics and the aesthetic value of the hunt or wilderness experience. Harvest levels for those herds or populations which have room for expansion or are recovering from low numbers will be maintained below recruitment. The regulations to meet management objectives may vary from seasons with no restrictions as to sex or age of animals to be harvested, to short seasons for animals of designated age, sex or antler characteristics. The Branch will encourage hunting on herds that are underharvested or that cause damage to fences, haystacks and agricultural crops. Farmers will be encouraged to minimize conflicts with elk by using farming practices which prevent damage. Hunter information programmes will have to be combined with specialized seasons.

It is possible to restore elk to some areas of their former range by transplants. Before transplants are initiated it will be determined if the factor or factors leading to the extirpation of the population can be controlled so that sufficient elk habitat remains to support a population. The most important consideration politically and socially is whether such re-introductions would unduly conflict with existing land use. Coordinated resource management planning may resolve land use conflicts. There should also be a determination that sufficient elk habitat remains to support a population. Because elk

are social animals, special care must be taken to assure their adaptation to the transplant site.

In the summary for elk in the "Proposed Wildlife Management Plan for British Columbia," the Branch proposed the pilot development of commercial elk ranching on fenced private land. Until such time as there has been adequate review and public discussion of "game ranching," this management prescription will not be considered for elk.

Regional Wildlife Management Plans are being prepared which will provide detailed and specific objectives for elk by Region. In addition, these plans will include proposals and costs for work to be done on elk over the next few years. As part of an ongoing programme, all existing data on elk will be analyzed regionally to provide better information on which to base elk management.

In summary, the Branch recognizes the present uses of and priorities for the elk resource and while they may not be those of the future, they will maintain the resource so that most options for management and use in the future will be available. The Branch will consider and evaluate public demands in formulating management plans and objectives.

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APPENDIX A
History of Regulations for Elk
In British Columbia

The exact dates and nature of the earliest hunting regulations are obscure but legislation to regulate the killing of elk was gradually introduced in the late eighteen hundreds. Because of the indiscriminate killing of elk ("market" hunting) which led to declines in elk numbers in several areas, extensive closed seasons were introduced in the early nineteen hundreds to protect elk populations so as to allow numbers to increase. Thus the beginnings of elk management; this was the first game species to receive such consideration. Briefly outlined below is the history of elk regulations.

1892 Fall season: September 15 to December 31; bag limit of 2 bull elk.
Closed season: January 1 to September 14 (varied each year).

1895 Provision made for the sale of the meat of elk and other ungulates for a specified period each fall in certain areas of the Province, discontinued in the early 1900's (exact date unknown).
Cow elk protected.
Penalties instituted for shooting elk during the closed season, $50/animal and for taking more elk than the bag limit, $50/animal.

1898 Young elk of both sexes protected ("calf under 2 years").

1904 The first closed season for elk in the County of Kooteny for a period of 5 years.

1905 It became illegal to buy or sell the heads or teeth of elk.

1909 Penalties increased for shooting elk during the closed season, $250/animal and for taking more elk than the bag limit, $250/animal.
Further protection given to elk: in the Kootenays the season was closed in 3 electoral districts; and the southern third of Vancouver Island the season was closed for 5 years and then the Island was closed until 1913. It appears that the Island was closed to elk hunting until 1954.

1911 Seasons for elk on the mainland closed until 1914 but probably, extended until 1923 (a short season in 1919).

1914 Fur dealers prohibited from possessing elk hides.
Bag limit reduced to 1 bull over 1 year of age.

1917 The first transplant of elk (Rocky Mountain) to the Bridge River area near Lillooet. Other transplants listed in the Distribution and Numbers section.

1918 First open season in the Kootenays (3 electoral districts) since 1908; closed until 1923. This patterns of short open seasons followed by long closed seasons (i.e. several years at a time) continued into the 1950's.

1927-48 Following the establishment of transplanted elk at several locations in southern B.C. and the Queen Charlotte Islands, short open seasons were periodically permitted.

1948 Trophy fees for non-residents increased: elk - $50.

1949 A combination moose/elk tag ($1) introduced; bag limit changed to 1 moose or 1 elk (male only over 1 year of age) but not both.

1952 The moose/elk tag fee increased to $2.

1954 Open seasons more extensive than in the past including the first open season on Vancouver Island in 45 years.

The first "cow" (over 1 year of age) season introduced in 2 electoral districts in the Kootenays.

1955 "Cow" seasons changed to "either sex of any age"; in 1956 changed to "antlerless" (includes cows and all animals under 1 year oaf age).

1960's Open seasons for elk became more liberalized.

1961 The first elk season for the northern populations (Peace River area and north).

1964 Trophy fees for non-residents increased: elk - $60. Separate elk tags initiated.

The aggregate bag limit for moose and elk removed; bag limit 1 elk throughout the Province.

1966 Antlerless seasons reduced slightly in some areas.

1968 Tag fee increased for elk ($5).

1971 Beginning of a reduction in elk hunting seasons, especially for antlerless animals.

1973 The first season on bull elk having certain antler characteristics (branched antlers) introduced in the Kootenays. In 1977 (Okanagan) and 1978 (Vancouver Island), other seasons were accompanied by a similar regulation.

1974 Elk licence fee increased: resident - $10, non-resident - $100.

Regional bag limit of 1 moose or 1 elk (but not both) introduced in the Kootenays.

Seasons closed in 4 Regions.

1975 Change to 7 Resource Management Regions and 217 smaller Management Units.

1977 Limited entry hunting (residents only) introduced for elk on Vancouver Island and in the Kootenays; in 1978 limited entry hunting expanded.

An open season for bulls having at least 1 branched antler (at least 3 tines each of which is at least 3" long) in 7 management units in the Okanagan portion of the Thompson-Okanagan Region.

1978 An open season for bulls having 4 or more tines on at least 1 antler in 2 management units in the Vancouver Island Region.

1980 Preliminary Elk Management Plan prepared.

APPENDIX B

Hunter Harvest

Elk are adaptable. They are generally able to respond to intensive management and are able to sustain a fairly high annual harvest in spite of their moderate reproductive rate. Although management interest in this species has always been high, adequate information on which to base management strategies was not available in British Columbia until the nineteen seventies. While the literature suggests that harvests may range from 10-20%, the provincial elk harvest during the mid-seventies has been less than 5% of the provincial population estimate and elk have increased.

The harvest of elk by hunters from 1965 to 1977 is shown in Figure 1 and was compiled from the Hunter Sample and Summary of Guided Hunter Activity. Although not shown, a peak resident harvest of about 3,600 elk was reached in 1963; non-resident harvest peaked at about 230 animals in 1969. The total harvest declined steadily from the 1963 high to less than one-fifth this figure in 1974/75 (726 animals) but has subsequently increased.

The resident and non-resident elk licence sales and harvest are outlined in Table 1. There was no separation of elk tag sales for resident and non-resident hunters until 1974. The 1970 to 1973 hunter numbers have been derived from licence sale totals and guided hunter activity figures. The resident harvest figures are derived from Hunter Sample calculations based on tag licence sales to December each year. The non-resident harvest figures are taken from the records of guided hunter activity. Prior to 1974 there were more (on average ➤9,700) potential elk hunters purchasing licences. After 1974 there was a drop (~ 20%) to approximately 7,700 potential elk hunters. While the success rate for resident hunters has declined slightly from 1970, that of non-residents has increased by 10%.

From 1965 to 1973 inclusive, non-resident hunters harvested an average of 191 elk and resident hunters harvested an average of 1,599. The total average legal harvest was about 1,790 per year during that period. From 1974 to 1977 inclusive, non-resident hunters harvested an average of 141 elk and residents harvested an average of 921 animals for a total average legal harvest of 1,062 elk per year during that period.

In looking at the downward trend in the elk harvest from 1965 to 1977, a number of factors and their combined effects must be considered. Those factors include: late summer, fall and winter weather conditions affecting hunting and the overwinter survival of elk increased access but decreased hunter numbers (until 1975); habitat alienation and

destruction, especially of winter range; hunting regulation changes, in particular shorter seasons combined with special antler regulations, area closures, limited entry hunting only, and access and transportation restrictions; possible wolf and bear predation; and illegal harvest.

Although age composition of bulls hravested is not known on a provincial basis, Peck (1980a) analyzed a small sample of teeth from the non-resident harvest in the Tuchodi drainage. Results indicate an average age of 5.76 for bulls with an antler set of 6 x 6 points.

Table 1 Resident and Non-Resident Elk Licence Sales and Harvest, 1970-77

	1970*	1971	1972	1973	1974	1975	1976	1977
	Resident Elk Licence $5.00 Non-Resident Elk Licence Non-Resident Elk Trophy Fee $60.00				Resident Elk Licence $ 10.00 Non-Resident Elk Licence $100.00			
# Resident licences sold	9,487	8,162	8,467	10,081	7,445	6,888	6,808	8,266
# Non-Resident licences sold	690	691	639	739	417	339	342	428
TOTAL	10,177	8,853	9,106	10,820	7,862	7,227	7,150	8,694
Resident harvest	1,638	1,526	933	1,061	603	1,041	760	1,278
Non-Resident harvest	198	200	159	174	123	131	135	176
TOTAL	1,830	1,726	1,092	1,235	726	1,172	895	1,454
Resident success %	17	19	11	11	8	15	11	15
Non-Resident success %	27	29	25	24	30	38	39	41
% taken by Non-Residents	11	12	13	14	17	11	15	12

* Years 1970-1973 inclusive: Resident licence sale figures derived from licence sale totals and non-resident activity figures.

APPENDIX C

Hunting Effort for Resident Hunters

The number of hunter days per animal killed is calculated by dividing the number of reported days of hunting by the reported kill. This information has only been requested of elk hunters since 1976 and is not yet available for non-resident hunters.

HUNTER DAYS

YEAR	TOTAL	PER ELK KILLED
1976	48,000	63
1977	58,600	46

APPENDIX D
Economic Value of Elk Hunting

PROVINCIAL REVENUE

In 1974 the cost of the resident elk licence increased from $5 to $10 and the resident general hunting licnece increased from $4 to $7. The tag ($5) and trophy fee ($60) system for non-residents was replaced by a $100 elk species licence and the non-resident general hunting licence was increased from $25 to $75. Table 1 outlines the provincial revenue gained through elk licence sales and trophy fee payments before and after the change within the licence system in 1974. Since 1974, about 9% of those non-residents (including Canadians from other provinces) purchasing a licence to hunt fall game, game birds and to carry firearms, also purchased an elk species licence. About 5% of all resident hunters purchased a elk species licence.

TOTAL BENEFITS

British Columbia residents spent less than 5% of their total hunting effort on elk hunting in 1976 and 1977. Resident elk hunters averaged 53,300 hunter-days per year in hunting elk during that time. The value to resident hunters of one day of elk hunting was $28.73 (1977 dollars; based on Quadra Economic Consultants (1977) figures). The average annual resident value of elk hunting including licence fees, in 1976 and 1977, was $1,609,000; it was $116,500 for non-residents during that same time.

Outlined in Table 2 are the present and projected benefits from elk hunting to the Province. The projected revenue figure is based on resident participation only and the revenue will increase with an increase in the number of non-residents allowed to hunt. The revenue figure for the 1976/77 average includes the non-resident value.

TABLE 1 Provincial Revenue Gained Through Elk Licence and Trophy Fees Before and After the Changes in the Licence and Fee System in 1975/75*

Resident Elk Licence Fee $5
Non-Resident Elk Licence Fee
Non-Resident Trophy Fee $60

Year	Licences Sold+	Trophy Fee Paid	Provincial Revenue: Licence Fees	Provincial Revenue: Trophy Fees	Total
1970/71	10,220	192	51,100	11,520	62,520
1971/72	8,876	192	44,350	11,520	55,900
1972/73	9,109	157	45,545	9,420	54,965
1973/74	10,820	168	54,100	10,080	64,180

Resident Elk Licence Fee $ 10
Non-Resident Elk Licence Fee $100

Year	Resident Licences Sold	Non-Resident Licences Sold	Provincial Revenue: Resident Licence Fees	Provincial Revenue: Non-Resident Licence Fees	Total
1974/75	7,445	417	74,269	41,700	115,969
1975/76	6,888	339	68,880	33,900	102,780
1976/77	6,808	342	68,080	34,200	102,280
1977/78	8,266	428	82,660	42,800	125,460

* Species licences only, does not include a portion of the general hunting licence.

\+ Includes elk licences sold to both residents and non-residents.

TABLE 2 Benefits From Elk Hunting in 1977 Dollars
(Numbers in Thousands)

	Population	Harvest	Revenue
1976/77 Average	18	1.5	$1,726
Projected	36	3.5	$4,315