# Forest Succession and Wildlife in Wells Gray Provincial Park

**R.W. Ritcey**
Regional Wildlife Biologist, Fish and Wildlife Branch,
B.C. Ministry of Environment, Kamloops V2C 5Z5

## Introduction

**Photo: R.W. Ritcey (???)**

Wells Gray Provincial Park, which occupies 534,000 hectares in south-central British Columbia has escaped major habitat disturbances by man. However, natural fire and subsequent forest re-growth or secondary succession have been followed by major changes in mammalian populations. My purpose in this paper is to describe some of the observed changes in abundance of several species of large mammals in the 1950-1981 period and relate these to forest re-growth.

The biogeoclimatic zones (Krajina 1965) have been mapped. The largest, the subalpine Engelmann spruce-subalpine fir zone, occupies 321,000 hectares at mid-elevations. Above this is 45,000 hectares of alpine tundra and 3000 hectares glaciers while low elevations are largely encompassed by 154,000 hectares of the interior western hemlock zone. A fourth zone, interior Douglas-fir, occurs in small isolated patches but is not mapped.

The park has a history of fire with most of the interior western hemlock zone having been burned in fires in the 1920's and 1930's. Edwards (1954) described changes in mammalian populations brought about by the 1926 fire that deforested 200 square miles in only a few days. The changes included a crash in the caribou population some ten-years after the burn, a rapid increase in the mule deer population and, later, a similar increase in the moose population.

## MOOSE

The preferred food of moose, upland willow, is an effective invader of large burns in both the interior western hemlock zone and the subalpine zone. Its light seed travels much farther than that of conifers and is less likely to be consumed by birds or rodents. Willow regenerated heavily following the 1926 fire.

The increase in both moose and deer was dependent on a vastly increased food supply. However, few moose had reached southern British Columbia by 1926 so an immediate population response to increased forage was not possible in Wells Gray Park. The increase must have been rapid however, because by 1952, after an aerial survey (Edwards 1952) estimated that 2300 moose were wintering in the park. Assuming that there were only two dozen moose in the park in 1926, a 20% annual increase would be needed to achieve this population by 1952, a not unlikely rate of increase. Three population estimates of over 2000 in 1954, 1957, and 1958 were obtained by equating the ratio of

tagged moose to the total population (Petersen Index). A fourth Peterson estimate in 1959 gave about 1600 animals. In the sixties and early 1970's, a continuation of the downward trend was evident with declining hunter harvests and fewer moose reported on aerial surveys.

The underlying cause of the moose decline was a reduction in the amount of winter forage available to moose. A series of fall measurements of available annual growth in 90 willows recorded this decline from 1951 to 1966 and on a sample of these willows in 1974 (fig. 1). The decline in moose harvests (fig. 2) parallels the decline in available willow forage and is a good barometer of the declining population.

Utilization of available willow did not decline appreciably during the study period (fig. 3). There were always enough moose to consume about 60% of the annual growth in a normal winter with utilization being dependent on the severity of the winter.

The decline in willow production was unrelated to severity of browsing. Some willows were crowded, shaded, or otherwise out-competed by larger tree species. Other grew out of reach. The winter range was simply aging or undergoing successional changes leading to a permanent, or climax vegetation.

We found that it was possible to retard succession and to duplicate high browse production of earlier burns by slashing vegetation or by burning it. Prescribed fires in 1968 covered several of the willow lines that had been measured annually. On these fires, production rose from 7133" in 1967 to 15,095" when remeasured in 1974, a gain of 112%. On five lines not burned, production fell from 23,516" to 10,661", a loss of 55%.

However, benefits were short lived especially in the slashed areas. It is unlikely that original moose populations could be restored to the levels of the 1950's by burning because variability in fuel loading would make it impossible to equal the size of the regional burns. In addition, intensity of secondary burns would be much less than in the original burns. In smaller burns early, seral stages are quickly replaced by coniferous species.

## CARIBOU

The woodland caribou in southern British Columbia is dependent on climax or old growth coniferous forests at high elevations. In Wells Gray Park fire drastically reduced the size of caribou winter range in the 1920's and 1930's as described by Edwards (1954). The populations could no longer be supported in numbers that existed prior to the burns and a decline was noted some years after the fires. The exact mechanism of population reduction is not known although predation, hunting, emigration, and starvation have all been suggested. Indeed, these factors may have temporarily depressed the population below the long-term ability of the range to support it.

**Figure 1: Annual growth in inches of 90 marked willows: Wells Gray Park.**

**Figure 2: Moose harvests in Wells Gray Park.**

**Figure 3: Trend in browse utilization from 90 marked willows in WGP.**

Population size prior to the decline is unknown. However, from reports of herd sizes in the southern park, I would estimate that at least 700 animals were in the park prior to the extensive burns of the 1920's and 1930's. After Caribou population recovery was well underway, in 1954 I estimated 220 caribou in the southern part of the park. In retrospect I consider this number to be optimistic.

Hunting of caribou was re-opened in 1955 after a closure of 15 years and rising harvests indicated a general increase in numbers as did field observations.

The first attempt to obtain a caribou population estimate for Wells Gray Park came in 1964 when a census of July snow patches by Super Cub located 140 caribou in 8 ½ hours; in 1965 the survey was repeated using helicopter but poor weather was encountered and only 51 caribou were found in 9 ½ hours. In 1970, a helicopter survey supplemented with fixed wing aircraft located 338 animals from a population I estimated at between 350 and 400 animals. Subsequent summer surveys in 1975 and 1980 located only 97 and 79 animals. There results combined with those of winter range surveys suggest a rather drastic population decline.

Overhunting has been suggested as a cause of the decline in numbers. However, the peak census figure of 338 in 1970 came after the period of highest winter harvest recorded. Subsequent legal harvests were curtailed by restricting season length, hunting areas, and finally a complete closure of the season in Wells Gray. Illegal harvests are suspected to be responsible for reducing population size in the Trophy-Raft-Avola Mountain areas immediately outside the park.

My interpretation of these changes in numbers is that caribou declined in the 1930's as a result of range lost to fire as described by Edwards (1954). Caribou probably over-utilized their shrunken ranges before their numbers dropped. This prevented an early recovery. The exact cause or causes of mortality are not known but the question is academic for the population that once existed could no longer be supported by the range available to it.

Recovery of ranges produced population increases in the 1950's and 1960's despite natural and hunter predation. The population decline noted through the 1970's was coincident with further habitat loss to fire within Wells Gray Park and to fire and logging of winter ranges adjacent to the park. Illegal hunting may have depressed the population below the number which could be sustained by the present range. However, the population cannot increase to its former numbers because of the reduced area of suitable habitat now available.

## LARGE PREDATORS

Predators have followed changes in abundance of ungulates. Cougar were abundant prior to the collapse of the deer population in the late 1940's. Timber wolves were numerous until the late 1940's when poison and hunting reduced their numbers. From 1952 to 1965 their numbers in the moose winter range remained fairly constant at somewhat less than 20. Much of their winter food was carried on during the time of high hunter harvests and it appears that they had little influence in controlling moose abundance.

Probably changes in other mammalian populations have been even more marked in the ungulates and large carnivores. Columbian ground squirrels were once abundant in the open burn areas of the lowlands but are now mainly confined to fields and openings around natural meadows.

## OVERVIEW

Species composition and age of forest stands, in other words, successional stage, are dominant factors in determining abundance and species composition of wildlife in Wells Gray Provincial Park. Forest management in much of British Columbia is eliminating old-growth climax vegetation through the use of short rotations. On the other hand, by effective control of wildfires, replanting burns and logged areas with conifers it has reduced both the extent of early stage vegetation and the length of time it can persist.

Parks such as Wells Gray provide areas where natural forest succession can occur on a grand scale. Old growth forests of sufficient size will remain to support woodland caribou. In addition, given an enlightened fire management plan, wild fires could over time be permitted to produce burns large enough to support high populations of wildlife dependent on early seral vegetation.

Without such large wild areas, we would no longer be witness to the almost tidal ebb and flow of deer and moose populations in response to fire. Nor, in all probability, would we be able to preserve the woodland caribou, a species dependent on large areas of climax vegetation.

## LITERATURE CITED

Edwards, R.Y. 1954. Comparison of an aerial and ground census of moose. J. Wild. Manage. 18: 403-404.

Edwards, R.Y. 1954. Fire and the decline of a mountain caribou herd. J. Wild. Manage. 18: 521-526

Krajina, V.J. 1965. Biogeoclimatic zones and classification of British Columbia. In V.J. Krajina, ed., Ecology of Western North America, University of British Columbia.