

## STATUS OF BIGHORN SHEEP OF BANFF NATIONAL PARK

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Abstract: Helicopter censuses from 1984 to 1987 during October and March for Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*) in Banff National Park resulted in a summer estimate of 2200 and a winter estimate of 1930 bighorns for 1986-87. Several factors (modest lamb production, low lamb mortality, stable herd composition, recent mild winters and no major sources of mortality) account for a very slow annual increase in the population. Between 20 and 30% of the summer park herds migrated eastward to use Alberta winter ranges. Three major eastern slope watersheds, Bow, Cascade - Panther - Dormer, Red Deer - Clearwater, were used by park bighorns.

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This study was initiated to gather basic inventory information to assist in management of bighorn sheep by Banff National Park (BNP) and the province of Alberta. The time frame of the study was from May 1984 to May 1987. The study area was primarily the eastern slopes of BNP. In addition, there was some surveys of provincial lands along the entire length of the east park boundary and the western half of BNP. The main study objectives were to: estimate summer and winter populations, identify migration routes, determine the percentage of the population that migrated outside the park, identify important park and provincial habitats, determine the percentage of the population that is harvested through hunting and estimate other mortality sources.

### METHODS

A Bell 206 jet ranger helicopter with rear bubble windows was used for aerial census during October and March of each year. Flight lines were established so that all known and potential ranges were censused as completely as possible. Aerial surveys were flown in accordance with a survey methodology outlined in the Wildlife Monitoring Plan (Jacobson and Kunelius 1983: Appendix 1). Maximum flight speed was 50 mph (80 km/hr) and herds were approached from below so that animals ran uphill. Yearlings could not be clearly identified and were counted as adult females.

Through repetitive surveys, trained observers, extensive knowledge of the area from 40 years of warden patrols, several biological studies, and the fact that bighorn sheep inhabit open alpine terrain the helicopter census work was judged to be 85% effective in counting the actual animals present. This assessment is close to the opinion of Stelfox and McGillis (1977) of a 75% observation rate. Thus the park population estimates were raised by 15%. October flights counted bighorn sheep before they left the park, while the March survey counted animals on winter ranges.

Twenty-four areas within BNP, 14 of which had a provincial land component had ground surveys. These land units, seasonal-year round range or travel corridors, varied in size due to terrain features but overall averaged 8 square miles. A full, one day ground inspection occurred once a month from June to November. The interval between surveys was 3 to 5 weeks. The park warden assigned to survey the area observed and reported on sheep numbers, movements, habitat uses, predators and related influences.

Additional population data was obtained from: incidental wildlife observations of park wardens, Alberta Fish and Wildlife survey and hunting harvest statistics, personal communication with field and academic wildlife experts.

## RESULTS

By using a combination of helicopter and ground counts to census BNP in 1986-87 the minimum summer and winter bighorn populations were 1906 and 1682, respectively. These numbers were maximum counts, with no chance of duplication within the count. Based on an 85% observation rate, the estimated populations for BNP were 2200 and 1930 animals.

The 3 year trend for the bighorn sheep population was a slow increase, under 5% annually. Summer classified ground counts for the 1984-86 period resulted in an average production rate of 25 lambs per 100 females. Based on helicopter surveys, good overwinter survival of lambs was evident as there was only a 25% reduction from fall to spring. Herd composition along the eastern slopes average 44% male, 47% female and 9% lambs. A ratio of 94 rams/100 ewes was similar to the ratio of 90/100 reported by Geist (1971) in BNP.

A population reduction of 12% from October to March based on helicopter surveys in the park does not accurately reflect population changes due to migration. Bighorns periodically moved back and forth across the eastern park boundary in spring and fall. In April and May they used low elevation provincial ranges extensively (Morgantini 1988). During the fall hunting season, the park appeared to be used as a sanctuary. At the end of August when the season opened, there was a westward movement into the park. After the end of October when the season closed, there was an eastward movement across the park boundary. The majority of the late season migration was composed of rams that wandered extensively during the breeding season. They filtered through numerous mountain passes along the eastern park boundary to access ewe bands.

## DISCUSSION

Overall, the trend points toward a gradual population increase. Winter range appears to be a critical limiting factor that should become manifest during a severe winter in the future. The estimate of the migratory component of the park population was doubled above seasonal helicopter count differences. Marked and radio-collared bighorns plus field knowledge and observations indicated that more than 12% of the park population used Alberta bighorn sheep ranges.

Alberta Fish and Wildlife statistics show that approximately 65 trophy rams (4/5 curl) are harvested every year near Banff's eastern park boundary. Between the migratory park rams and provincial resident rams, this is roughly 10% of the ram population for the region. An additional 1% of the ram population or 10% of the legal take is estimated to be lost through wounding/crippling by hunters (Eldon Bruns, Alberta Fish and Wildlife, pers. comm.). Non-trophy sheep (male lambs or any female) that potentially use BNP are harvested at an approximate rate of 22 animals per year. Native harvest within the same region averages at least 10 bighorn sheep per year.

Bighorn sheep populations generally experience an annual mortality rate of less than 10% from natural predators, primarily cougar, coyote and wolf (Stelfox 1974). Other natural mortality is extremely variable but may average 10% annually over the long term. Built into this long term estimate is the fact that a die-off of about 75% of the population has occurred every 25-40 years since the 1800's in the mountain parks of Alberta (Stelfox 1974).

Poaching activity in BNP has rarely been observed but it is thought that 2 to 5 large trophy rams are taken every year. An average of 11 bighorn sheep per year are lost to highway mortality.

The percentage of the ram population harvest was based on several estimates; i.e., the estimated park ram population and the number that migrate into the province, the estimated resident provincial ram population and the hunter information given during mandatory registration of legal rams. Heavy hunting pressure exists along the eastern park boundary, but the harvest is not excessive. Other mortality sources (non-trophy and native harvest, predation, winter starvation and die-offs) were based on local experience and a number of field studies (Geist 1971, Carbyn 1973, Stelfox 1974, Schmidt and Gunson 1985).

Canadian Parks Service, formally called Parks Canada, is concerned about a number of issues, that affect bighorn sheep as well as other wildlife. Some subjects which require future consideration are: assessment of impacts of development within important wildlife habitats and the enactment of appropriate mitigative measures; the problems of bighorn sheep habituation to national park visitors; protection of our large trophy animals from poaching; unobstrusive and alternative methods for capture, handling, marking and studying wild animals in their natural environment; a set of standards for monitoring and collecting data when a major bighorn sheep die-off occurs; co-operative studies that include sharing manpower, equipment, expertise and funding to efficiently produce high quality information on animal populations; development of an Eastern Slopes Management Plan so that the federal and provincial governments can jointly manage migratory wildlife.

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