

# WILDLIFE MANAGEMENT BULLETIN



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SURVEYS OF ELK AND OTHER WILDLIFE IN  
RIDING MOUNTAIN NATIONAL PARK, MANITOBA,  
1950-1951, and 1952.

by

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Wildlife Management Bulletins are produced to make available to wildlife administrators the information contained in reports which are submitted by officers of the Canadian Wildlife Service.

The reports do not, in most cases, cover extensive studies and are not written primarily for publication. Recommendations arising from the studies are not included.

## Introduction

The aerial surveys upon which this report is mainly based were carried out during the periods March 22 to 27, 1950, February 19 to 26, 1951, and March 16 to 23, 1952. Through the courtesy of the Royal Canadian Air Force, an aircraft and crew were placed at the writer's disposal in 1950 and in 1951. In 1952, during the writer's absence on educational leave, Dr. A.W.F. Banfield conducted the survey using the same equipment and techniques. Flight lines, or transects, two miles apart were flown, starting at the west side of the park and progressing eastward across it. The Dauphin Airport, situated approximately seven miles north of the north gate of the park, was used as an operating base.

In addition to the above, an aerial survey of the east side of the park and adjacent farming country was made on February 16, 1950, in co-operation with the Manitoba Game and Fisheries Branch. The same area was again surveyed from the air three times in the following winter, on December 16, 1950 and on January 6 and 7 and January 20 and 21, 1951.

The park was also visited during the periods January 3 to 5 and January 25 to 29, 1951, mainly for purposes not connected with this investigation. On the first of these occasions an opportunity arose for a trip into the park by bombardier, accompanying officials of the Manitoba Game and Fisheries Branch. Observations of elk were made on the trip, and other information relating to the investigation was collected as opportunity offered. The period February 8 to 11 was spent in making ground studies in the park, using the same bombardier, on loan from the Branch.

The primary purpose of the investigation was to ascertain as accurately as possible, for administrative purposes, the total number and distribution of elk in the park. It was also desired to obtain information

about the other large mammals, especially moose, deer, wolves, and coyotes. The surveys of the eastern end of the park were undertaken in order to ascertain the status of elk in that area and to gather data regarding damage by the elk to agricultural crops during the winter period.

#### Previous Estimates of the Elk Population

Banfield (1948, 1949) gave the following past estimates of the elk population made by park officials: 1914, 500; 1925, 2,000; 1933, 3,500; 1941, 5,000 to 7,000; 1946, 12,000. Calculating from strip counts made in 1947, he estimated that in January of that year the population per square mile on the concentrated winter ranges was as great as 77, **and that** heavy winter kill reduced this figure to 58.7 by spring. He estimated the total elk population of the park to be 16,800 in 1947.

Fisher (1949) stated that park officials estimated the elk population during the autumn of 1948 and in January, 1949, to be 3,000 to 6,000. They attributed the decrease to heavy winter kill in both **preceding** winters and to movement of the elk out of the park.

Analysis of wardens' and patrolmen's diaries for the months of November and December, 1949, and January and February, 1950, showed that the numbers of reported observations of elk in those months were 5,200, 5,848, 3,720, and 1,838 respectively. Chief Warden Brodie estimated that there were about 6,000 elk in the park in that winter.

#### Methods

##### Aerial Survey, March 22 to 27, 1950.

The transects flown on this survey, numbered 1 to 31, are shown in Figure 1. Because of deep ravines and the steep escarpment on the

far eastern side of the park, no transects were flown in that area, but a check flight was made to ascertain that there were no large concentrations of elk that would greatly affect the census. On the check flight elk were observed in scattered singles and small groups, but in no greater numbers than on Transects 30 and 31.

After experimentation it was found that in the western end of the park it was possible, from an altitude of 75 to 100 feet, to observe one-quarter to one-half a mile from the line of flight. In the eastern end of the park, however, heavy forest limited observation to about one-fifth of a mile. For the sake of uniformity it was decided to restrict the observed strip to about one-fifth of a mile on all the transects, on each side of the aircraft.

The seating arrangement of the aircraft made it impossible for pilot and observer to count on opposite sides. Because of this, all transects were flown in both north and south directions. The strip covered along each transect was, therefore, two-fifths of a mile (about 700 yards) wide. The total number of lineal miles flown was 538.0; and 215.6 square miles, or about 19 per cent of the total park area of 1,148 square miles, was sampled. This coverage was obtained in 25 hours of flying time, completed in five days averaging five hours flying time per day.

The writer counted the animals by entering them in columns on sheets of paper fastened to a clip board. The pilot carried a tally counter and obtained a total count on each flight to check against the writer's totals. When groups were seen, they were circled over to obtain an accurate count. In this way both observers counted the same areas at the same times, and it was believed that very few animals were missed.

It was necessary to complete the survey as quickly as possible

as the snow, which made the animals easily visible for counting, was melting rapidly. The airport runways were covered with six inches of packed snow, which was getting soft. The aircraft was wheel-equipped and sank into the snow, deeply enough on one landing to break the tail wheel.

Aerial Survey, February 19 to 26, 1951.

This survey was carried out to ascertain the 1951 status of elk in the park, and to obtain data to compare with those of 1950. It was conducted in the same manner as the 1950 survey, except that rearrangement of the rear seat of the aircraft permitted observation from both sides at the same time. The pilot covered the left side and this observer the right side. This permitted cutting in half the time required to obtain complete coverage and prevented the possibility of overlap caused by flying north and south on the same line.

The transects were the same as those flown in 1950.

Aerial Survey, March 16 to 23, 1952.

This survey was carried out by Dr. A.W.F. Banfield in the same manner as in 1951. An aircraft with side-by-side seating was available, which facilitated observation.

The transects were the same as those flown in 1950 and 1951, except that Dr. Banfield was able to fly one more line along the eastern escarpment. For comparative purposes, however, only 31 transects are shown for all three surveys.

Transect Data and Population Estimates

The data obtained on the transects flown in the three years is shown in Table 1.

In estimating the total population of elk in the park, the

number counted was divided by 215.6, the area in square miles covered by the transects. This gave an approximate average number of elk per square mile, which was multiplied by 1,148, the total area of the park in square miles. As shown in Table 1, the number of elk observed in 1950 was 886; in 1951 it was 884; in 1952 it was 867. The average population per square mile was thus close to 4.05 in all years, and from this it was concluded that there was about the same number of elk in the park, namely, 4,700.

This result is surprising, since the herd might well have been expected to increase between the surveys. There are several possible explanations. In December, 1950, the Manitoba Game and Fisheries Branch opened a special season for taking elk in the area outside the park, as a measure to prevent damage to agricultural crops. They issued 1,545 licenses and a return of 68 per cent of the licenses showed a kill of 698. From this they estimated that 938 elk were killed during the open season, which was extended to February 28.

In December 1951, the season was again opened around the park area. There were 3,620 licenses issued to residents of the province. Up to May, 1952, 2,626 of these hunters had filed returns indicating a known kill of 1,355 elk. Final returns will no doubt increase this figure somewhat.

In addition to the legal kill, there was undoubtedly a good deal of illegal killing, both in the park and outside of it. These two factors alone could account for the lack of normal increase in census counts.

A check flight was made on March 26, 1950, over country fairly representative of the whole park. The route of the check flight is shown in Figure 1. The total distance flown on the check flight was 95 miles, and the area observed was 19 square miles. From the figure of 4.1 elk per square



mile obtained on the transects, it was calculated that the number of elk which should have been seen on the check flight was 78. Actually it was 76, showing a possible error of 2.5 per cent. Allowance for this possible error in the total estimate of the elk population would reduce it by only about 100, and the estimate is therefore believed to be reasonably accurate.

#### Comparison with Warden Staff Estimate

It will be noted that the 1950, 1951 and 1952 aerial survey estimates (4,700 in each year) are considerably lower than the estimate obtained in 1950 by the warden staff (6,000).

A summary of the observations of elk reported in the warden's diaries during the months of November to January inclusive in the winters of 1949-50 and 1950-51 is shown in Table 2. These data consist of actual sight records of elk in the districts reporting. Thus the same animals may be recorded several times during the same month. Then, too, animals may be grouped on an optimum range or scattered out over a large area, according to winter conditions. All parts of a district are not observed each month, nor is the same part visited each month. In January and February, as the weather gets colder and the snow deeper, the number of observations falls off sharply, as it is harder for the wardens to patrol their districts. These conditions may affect adversely the value of the data obtained.

There would naturally be a tendency to over-estimate the numbers of elk in herds, and hence the number of elk present in each district. A patrolman was in the Long Lake vicinity along Transect No. 17 during the time of the 1950 survey and reported having seen a herd consisting of 400 animals. He was surprised that they were not seen from the aircraft which passed overhead while he was there.

Other wardens were equally surprised that large herds they believed to exist in their districts were not located. If such large herds existed it seems impossible that they could have been missed, especially since large herds are usually found in open country.

The wardens' over-estimate might not be very great individually, yet great enough to raise considerably the total for the whole park. For example, the wardens in the western end of the park, covered by Transects 1 to 9 inclusive, estimated that there were about 1,100 elk in that part of the park at the time of the survey. The transect totals for the same area showed 148 elk in a 33.2 square mile sample area. Taking 180 square miles as the approximate total area covered, it was calculated that there were about 800 elk, 300 less than estimated by the wardens.

Thus it can be seen that differences between aerial survey counts and routine ground counts may easily occur, and merely reflect differences in the purpose and intensity of observation.

#### Distribution

The distribution of elk, in elk per square mile for all years, is shown graphically in Figure 2. This graph indicates the heavily utilized areas of winter range within the park.

In all years the most heavily utilized areas appeared to be those covered by Transects 4 to 18, inclusive, which consist for the most part of prairies, parklands, and open aspen stands (Fig. 5). Elk were found scattered throughout the rest of the park.

#### Age and Sex Classes

During all surveys, 584 adult elk were sexed. These animals were observed in small closely-knit herds or in large scattered

groups. There were 137 males and 447 females, a ratio of 1 male to 3.2 females. It is not believed, however, that this ratio is a reliable indication of the proportion of males to females in the herd of the whole park. There is a tendency for the sexes to segregate in different herds. It was not unusual to see only cows for a considerable period and then to come upon a herd consisting only of bulls. A number of small, apparently late-born, calves was seen in January and February. No explanation for this condition could be deduced from the limited data available.

Due to the fact that calves of the previous year were from 9 to 10 months old, it was found almost impossible to segregate age and sex groups during the aerial surveys. In flying over groups of elk there was only time enough to obtain a total count and to note in some cases the number of elk carrying or not carrying antlers.

#### Range Utilization and Condition of Elk

As previously mentioned, the period February 8 to 11, 1951, was spent in ground surveys of the park, using a bombardier loaned by the Manitoba Game and Fisheries Branch. Some 400 miles were travelled during this period, and the following localities were visited:

Lake Audy Road.  
Whitewater Lake Road  
Gunn Lake Road.  
Birdtail Valley  
Old Gunn Lake Road to Grandview  
warden cabin.  
Molton Meadow - Long Lake area  
Grasshopper Valley

Strathclair Road.  
Kennice Meadows.  
Moon-Edwards Lakes area.  
Elk Lake area.  
Old McCreary Trail - Cowan Lake area.  
Whirlpool Lake area.  
Ochre River Basin area  
Rolling River area.

Particular attention was given during the ground surveys to the availability of food and its utilization.

It was noticeable that all elk observed were in excellent condition. This was attributed to the absence of deep snow and extreme cold on the winter range in 1950-1. The animals were able to obtain food with little effort during that winter.

Many large areas in which there had been heavy utilization of browse in past years were observed. Some stands had been killed completely, but, in general, most browse species were making satisfactory recovery.

Figure 6 shows a typical example of a willow killed by overbrowsing during the extreme conditions in the winter of 1946-7. This photograph was taken along the old McCreary Trail in an area showing heavy past use, especially of willow. Figure 7 is a close-up view of old wounds to poplar, caused by chawing, also during the winter of 1946-7. Such scars were common in many areas where overbrowsing had occurred. In this picture, taken in the same general area as Figure 6, it will be noticed that there are also browse-killed willow, but that hazel has been lightly used. Figure 5 shows an area being heavily used in the winter of 1950-1, where the animals had obtained food by pawing, and where there was little evidence of browsing during that winter.

Areas where former over-browsing was evident were not inhabited by many elk nor did they show frequent signs of recent browsing. Areas of this kind included the Audy, Whitewater Lake and Gunn Lake Roads, Birdtail Valley, Molton Meadow, Old McCreary Trail, and Grasshopper Valley localities.

Most of the large meadows showed signs of recent, but not excessive utilization. The elk were obviously obtaining sufficient food by pawing through the light snow cover. The general impression gained was that the range was holding its own with the existing elk herd, and that, with some further reduction of the herd, there should be little or no trouble with lack of winter range in future.

#### Competition with Farming Interests

A considerable amount of hay had been cut in areas which were among the best elk ranges in the park. The amount of hay-cutting appeared to have decreased in recent years, but in 1950, in three of the better districts in the west part of the park, some 1,500 tons were cut. If fed to elk, this amount of hay would support a fair number of them during a critical winter period and would relieve a good deal of pressure on browse species of plants.

In the same districts some 700 cattle and horses were grazed during the summer of 1950. It was believed that the competition was not so serious in summer as in winter, since the summer elk range is not so limited in extent as the winter range.

#### Damage to Agricultural Interests

##### Investigations of Damage during the Winter of 1949-50.

For several years prior to the 1950 survey, complaints of damage by elk to hay stacks and fields on private land adjoining the park were received. The most serious damage was reported to occur along the eastern side of the park from the Norgate Road to the Dauphin Entrance.

On January 25 and 26, 1950, the Manitoba Game and Fisheries Branch carried out an aerial survey of farm lands adjoining the whole

park. They counted 1,847 elk on private land, 1,087 of them along the eastern side. They reported some hay-stacks destroyed and extensive harm caused by pawing of seeded fields. It was believed by H. Krentz, the Game and Fisheries Branch investigator, that the elk were leaving the park to seek forage. Reports by residents of an abundance of wolves and coyotes led him to believe that these predators might also have influenced the elk to migrate, but no wolves were seen during the survey. Few elk were seen inside the park east of No. 10 Highway. Most of the animals that had strayed outside the park were remaining there during the day.

On February 16, 1950, the writer accompanied another Game and Fisheries Branch investigator, W. Goody, on flights over the area east of the park in a Bell helicopter of the Royal Canadian Air Force. The object was to experiment with the use of the helicopter in taking a census of elk and in driving them and to assess the amount of damage that had been caused up to that time.

A total of 391 elk were counted on these flights, 226 of them outside the park boundaries. The largest herd observed consisted of 103 animals bedded down in open bush. They were not gathered in a closely-knit herd, but were scattered out 50 to 100 yards apart among the trees and paid no attention to the aircraft.

Several cultivated fields showed signs of extensive pawing by elk. In a number of places as many as 60 old beds were observed in a small area. Many hay stacks had been removed by the farmers. Of those that remained, a number had been trampled and torn down by the elk. Few stacks were fenced, but those that were fenced did not show signs of serious damage. In later discussion, park officials stated that hay cut for park animals was always properly fenced and was rarely damaged even

in areas of concentrated elk range. A sturdy pole fence eight feet high was found to be quite satisfactory.

A group of six elk were selected in an experiment in herding with the helicopter. It was found that they could be driven successfully in open country but that it was extremely difficult to drive them through the woods. For reasons of safety the helicopter could not come too near the tree tops and the elk appeared to feel secure among the trees and would not move readily.

The band of six was driven half a mile across open fields. Snow covered the ground to a depth of  $2\frac{1}{2}$  feet and they tired rapidly. When a fence was reached, they attempted to parallel it, but were pushed over with no great difficulty. They were followed a quarter of a mile or more and then left heading in the general direction of the park. An hour later they were found in a nearby woods, chased into the open again, and again headed toward the park. Three hours later they were again checked on and were found in the same general area from which they had first been chased.

The limited range of the helicopter, the rapidity with which the elk tired, and the difficulties experienced in getting close enough to them to keep them moving in broken country and in forest, made it appear that it would not be practical to make extensive use of the helicopter for herding elk. An additional disadvantage was that the elk were scattered out over very large distances.

At one point outside the park the carcasses of four bull elk were observed. Two of these were examined on the ground, the other two from a low altitude. There were slight blood stains on the snow around them.

Hair had been chewed off along the backs and stomachs, apparently by mice, but there were no signs of the carcasses having been fed on and they were frozen solid. No wolf or coyote tracks were seen in the vicinity. It was believed that the elk had been shot, but several farmers in the neighborhood who were questioned gave no information on this point.

It was concluded that the peak of the elk migration from the park had passed, since the number of elk seen outside the park was much less than during the January survey by the Manitoba Game and Fisheries Branch. On the east side of the Park the mountain is covered with spruce and fir and there is little open country. The escarpment on this side is quite steep, and is forested with deciduous trees--aspen, poplar, burr oak, elm, and ash. Several deep ravines lead down to the farm lands, which are greatly broken up by open stands of the same kind of deciduous trees as those found on the escarpment. The long period of cold weather ( $20^{\circ}$  to  $40^{\circ}$  below zero) from mid-December to the end of January had apparently caused the outward movement. Continuing mild weather after February 1 may have caused a return movement.

The helicopter was used successfully in taking an elk census except that on the top of the mountain the height of the coniferous trees made it difficult to approach closely enough to see the animals in the dense undergrowth. It also proved successful for herding elk in open country, but was of little value for this purpose in forested areas. It was very useful for rapid assessment of damage caused by elk.

Investigation of Elk Damage and Migrations during the winter of  
1950-51

December 16. The investigation of damage caused by elk was continued on December 16, 1950, using a chartered aircraft. In all,  $3\frac{1}{2}$  hours of flying time were spent over the principal damage area and the area within the



eastern end of the park that adjoins it. An intensive search for elk in the damage area and a general search over a wider area within and outside of the park was made. The area where damage occurred and details of the flights made are indicated in Figure 3.

Weather conditions and light were ideal at this time. In the area below the escarpment, an altitude of about 300 feet was maintained. Over the forested part of the park, this was increased for safety to about 500 feet. Observations were made on each side of the flight lines for a distance of about one-quarter of a mile. When a herd was seen, it was circled over, in order to obtain a count of the sexes.

Seventy-eight elk were seen, amounting to about 1.5 elk per square mile in the area intensely surveyed. It was estimated that the 50 square miles sampled was about 21 per cent of the damage area and that there were about 300 to 400 elk in the damage area and the immediately adjacent part of the park.

During the general search, 26 elk were seen in the park, scattered along the line of flight. This flight covered about 28 square miles of sample area, and it was calculated that the density of elk in the part of the park included in the general survey was about 1.0 per square mile.

No very large herds of elk were seen. The greatest concentration noted was on the eastern slope of the escarpment inside the park west of Laurier, where 34 elk were seen in about two miles of flight. Tracks were observed in almost all areas surveyed, the greatest number on the farmlands west of Laurier. Some signs of damage by elk was noted, but it was slight in all cases. It was concluded that the number of elk outside the park was as yet much less than in 1950.

January 3 to 5. Riding Mountain Park was next visited by car January 3 to 5, 1951. During this visit it was possible to make some ground observations and some inquiries in connection with the population of elk and their movements into the area where the most damage occurred.

Banfield (1949) described the area east of No. 10 Highway and north of the Norgate Road as transient elk range for the most part. Seen from the air, however, there appeared to be a fairly considerable amount of good elk range in this area, consisting of open uplands and the beds of creeks and rivers. The Manitoba Game and Fisheries Branch had estimated that in January 1950, there were 1,200 elk in the area bordering the park between No. 10 Highway and the Norgate Road. The Wildlife Service survey had shown that there were probably 1,000 elk in the part of the park east of No. 10 Highway in March of the same year, at which time few animals were observed outside the park boundaries. It was the opinion of the Park Superintendent and the Chief Warden that the elk which caused damage on the plains east of the park were year-round residents of the eastern area and that there was no significant movement into the area from west of No. 10 Highway. From the results of other surveys and his own previous observations, the writer had come to hold the same opinion.

In order to check on the possible movement of elk into the area, tracks crossing Norgate Road for a distance of four miles from its junction with No. 10 Highway were counted on January 3, at a time when the road was covered with fairly fresh snow. The number of tracks averaged 80 per mile. Every fourth mile of No. 10 Highway was examined in the same way from Clear Lake to the northern entrance to the park. The number of tracks per mile in this case was about 20. In both cases the number of tracks crossing the road in either direction was about the same and it did not appear that any significant migration over these roads was taking place.

On January 4 it was arranged to accompany E. Eyford and H. Krentz of the Manitoba Game and Fisheries Branch in a patrol by bombardier from Clear Lake along the southern boundary of the park and northwestward to Lake Audy and Whitewater Lake, through areas of marginal and concentrated elk range. The route of the patrol is shown in Figure 4.

No evidence of overbrowsing was obtained on this patrol. Some evidence of poaching was obtained along the southern boundary. At one place a fresh elk hide was found; it appeared to have dropped off a sleigh travelling out of the park. In several places signs indicated that elk had been killed by men.

January 6 and 7. The aerial survey of December 16, 1950, was repeated on January 6 and 7, 1951. The flight lines, shown in Figure 3, were the same as those followed in December. A total of 83 elk were seen during the intensive search in the damage area, as compared with 78 in December, an increase not deemed to be significant. From the number of beds and the signs of pawing seen along the top of the escarpment, however, it was believed that there was a fairly large population of elk which could move out of the park and cause trouble for the farmers if the snow depth increased.

One additional flight was made on this occasion. The north side of the park was followed westward to a point roughly south of Grandview. At this point, the flight turned south to Birdtail Valley, and from there went east and southeast past Gunn Lake, Whitewater Lake, and Audy Lake to Clear Lake, returning north along No. 10 Highway. The route of this flight is shown in Figure 4. The purpose was to check on reports of damage outside the park south of Gilbert Plains, and to see whether there were any

large concentrations of elk along the flight line which passes through areas of concentrated and marginal elk range. This flight also provided a check on the area covered two days earlier by bombardier.

Only 58 elk were seen on this flight and no large herds were noted, but large areas in which extensive pawing had been done and beds in large numbers, sometimes several hundred in an area as small as an acre, were seen. There was ample evidence of a large resident population in such areas, but no signs of hardship due to lack of food caused by overcrowding.

January 20 and 21. The third aerial survey of the eastern end of the park and the damage area was carried out during the above-noted period. A.P. Davey of the Manitoba Game and Fisheries Branch accompanied the writer on this survey, which followed the same flight lines as the two previous surveys, shown in Figure 3.

No important change was noted in the area intensively surveyed. The snow cover remained light and there had been no extended periods of extreme cold. The open season declared by the Manitoba Game and Fisheries Branch may have been a considerable factor in keeping down the number of elk straying out of the park. Little damage to hay stacks and fields had been done.

It was planned to repeat the survey a fourth time at the end of March, but weather and ground conditions forced the abandonment of this flight. However, the weather had remained favorable for the elk, and it is believed that at no time during the winter of 1950-51 were there more than 300 of them in the agricultural area.

#### Large Mammals other than Elk

The numbers of moose, deer, wolves and coyotes seen along the transects in March, 1950, February, 1951 and March 1952 together with other

data and estimates of the total populations of these mammals are shown in Table 3. For a very rough estimate from data secured in the Wildlife Service surveys, the same method was used as in calculating the total elk population, i.e., the total number observed was divided by 215.6, the total transect area in square miles, to obtain an approximate number per square mile, and this figure multiplied by 1,148, the total area of the park in square miles. Mammals other than elk, with special reference to their effect upon the elk population, are discussed in the following paragraphs.

Deer - It will be noted in Table 3 that the Chief Warden's estimate in 1950 was much greater than estimates derived from the aerial survey in the same year. As in the case of elk and for the same reasons, it is believed that the Chief Warden's estimate may have been too high. On the other hand the aerial survey estimate may have been much too low. Deer are considerably smaller than elk, and they generally prefer more cover. It is likely that many more were present than were visible from the air. Certainly there were enough deer in the park to provide significant competition for available forage.

The number of deer observed on the transects was considerably greater in 1951 than in 1950. There was also a noticeable increase in numbers observed in 1952. It was realized that the data did not indicate the actual population in any case, but it was believed that there had been satisfactory increases in the population during the intervening periods.

Moose - Moose are primarily browsing animals, inhabiting swamps and muskegs. It is likely that they cannot be censused accurately by methods used in censusing elk. This may account partially for the great difference between the aerial survey estimate of 1950 and the Chief Warden's estimate in the same year (Table 3).

Clearly, there were enough moose to compete with elk during periods when elk were using browse, as in 1946 and 1947.

The count in 1951 indicated that no significant increase in the numbers of moose took place during the period between the two surveys.

The 1952 survey showed nearly twice as many moose observed along the transect as in 1951. Although the survey techniques are not considered accurate for this species, it did appear that there had been a dramatic increase in the population.

Coyotes - Only 12 coyotes were seen along the transects in 1950. The estimate based on this figure was probably several times too low. The weather at that time was cloudy and cool and coyotes were not likely to be out in the open. In the woods they are hard to see from the air. The Chief Warden's estimate of "several hundred" coyotes appeared to be as accurate as could be made.

In 1950 all the wardens interviewed believed that coyotes were definitely increasing in number. They also believed that many coyotes were destroyed during that winter by hunters outside the park. In the park, 18 "Coyote-getters" were in use, and as a result 12 coyotes were taken during that winter.

Two instances of the indifference of elk to coyotes were noted during the aerial survey. On Transect 13 near Peden Lake, a herd of 62 elk were feeding and paying no attention to four coyotes lazing on the lake at a distance of a few hundred yards. On Transect 12 a group of 12 elk seemed to be quite oblivious of two coyotes sporting in the snow only 100 yards from them.

In 1951, 16 coyotes were seen along the aerial transects and on the ground coyotes were found to be reasonably abundant. One or more were seen during almost every day spent in the park and their tracks were seen frequently. Three coyotes shot during the bombardier trip, February 8 to 11, were fat and in good condition. The stomachs were examined and all were found to contain remains of elk.

During all the ground studies in 1951, 14 coyotes were observed. There was no indication that they had increased since 1950 or that they were detrimental to other animals in the park.

Only seven coyotes were observed during the 1952 survey. Although not much confidence can be placed in these figures, the observations suggest that there had been a decline in the coyote population of the park.

Wolves - During the transect flights only one wolf was seen in 1950, none was seen in 1951 or 1952. However, there was other evidence to show that there were quite a number of wolves in the country. In the autumn of 1949, 11 wolves were seen in one group at Long Lake. During the following winter the wardens reported having seen 13 wolves, and the Chief Warden estimated that there were about 20 of them in the park. He himself had seen the tracks of 11 wolves on the Dauphin Road near Moon Lake.

"Coyote-getters" were set in the park, but no wolves were taken during the winter of 1949-50. All the wardens interviewed in 1950 believed that wolves had recently decreased in number and attributed the decrease to shooting outside of the park. They did not believe that many elk were being killed by wolves.

Although no wolves were seen during the aerial survey in 1951, three sight records were obtained upon other occasions in that year. On January 12, four were seen from the air on a small lake in the southeastern

part of the park. One large gray wolf was seen from the ground on No. 10 Highway on January 28, and four were observed on Whitewater Lake during the bombardier trip on February 8. In addition, tracks of wolves were noted as follows: February 8, four on Lake Audy Road west of Lake Audy and one west of Whitewater Lake (possibly in both cases members of the group flushed from the lake later on the same day); February 11, nine on Whirlpool Lake. In the last case, the wolves had crossed the lake in a group about a day before. A member of the park staff reported seeing four wolves cross Norgate Road during the week February 4 to 10, and these may have been part of the larger group whose tracks were seen on Whirlpool Lake.

At least six wolves are known to have been shot in areas in or near the park during the winter of 1950-51. Two of these were shot by members of the park staff from the group of four seen on Whitewater Lake. One was a large black dog and the other a gray-white bitch. Both were in excellent condition, internally and externally. They measured in length between six and seven feet; the dog was estimated to weigh 100 pounds and the bitch 80 pounds. The stomachs of both contained elk remains.

Allowing for duplication and without considering the two wolves known to have been shot, it was calculated that signs of about 15 wolves had been seen, and it was estimated that there were about 25 wolves in the park at the end of the winter of 1951. Wolves were not believed to constitute a menace to other wildlife in the numbers existing at that time.

There was no reason to believe that there had been any significant change in the status of this species by March, 1952.



Literature Cited

Banfield, A.W.F.

1948 The Elk or Wapiti of Riding  
Mountain National Park. Type-  
written report to Canadian Wild-  
life Service.

1949 An Irruption of Elk in Riding  
Mountain National Park. Journal  
of Wildlife Management, 13 (1):  
127-134.

1952 Third Annual Aerial Game Census  
Riding Mountain National Park,  
March 1952. Typewritten report  
to Canadian Wildlife Service.

Fisher, H.D.

1949 Wildlife Studies, Riding Mountain  
National Park, 1948-49. Type-  
written report to Canadian Wild-  
life Service.

Table 1. Data Obtained on the Aerial Transects  
in Three Successive Years

Transect Number	Lineal Miles	Square Miles	1950		1951		1952	
			Elk	Elk per Sq. M.	Elk	Elk per Sq. M.	Elk	Elk per Sq. M.
1	9	3.6	0	0	3	0.8	0	0
2	9	3.6	2	0.6	2	0.5	1	0.3
3	9	3.6	10	2.8	6	1.6	0	0
4	9	3.6	37	10.3	16	4.4	35	9.2
5	9	3.6	15	4.2	39	10.8	11	3.1
6	9	3.6	19	5.3	7	1.9	22	6.1
7	9	3.6	38	10.6	30	8.3	4	1.2
8	9	3.6	18	5.0	67	18.6	5	1.4
9	11	4.4	9	2.0	18	4.0	4	0.9
10	17	6.8	42	6.2	23	3.3	22	3.2
11	17	6.8	14	2.1	30	4.4	33	4.9
12	17	6.8	23	3.4	28	4.1	9	1.3
13	19	7.6	87	11.4	29	3.8	2	0.3
14	19	7.6	19	2.5	38	5.0	49	6.4
15	19	7.6	38	5.0	37	4.8	37	4.9
16	22	8.8	26	2.9	61	9.2	51	5.8
17	21.5	8.6	56	6.5	22	2.5	20	2.3
18	20	8.0	63	10.4	36	4.5	26	3.3
19	18	7.3	28	3.8	27	3.4	51	7.0
20	19	7.6	45	5.9	18	2.3	24	3.2
21	21	8.4	43	5.1	34	4.4	25	3.0
22	21	8.4	8	0.9	16	1.8	38	4.5
23	24	9.7	9	0.9	24	2.4	45	4.6

Table 1. Data Obtained on the Aerial Transects  
in Three Successive Years (continued)

Transect Number	Lineal Miles	Square Miles	1950		1951		1952	
			Elk	Elk per Sq. M.	Elk	Elk per Sq. M.	Elk	Elk per Sq. M.
24	25	10.0	43	4.3	33	3.3	46	4.6
25	25	10.0	20	2.0	20	2.0	52	5.2
26	23	9.3	61	6.6	60	6.4	29	3.1
27	20.5	8.2	7	0.8	34	4.1	52	6.3
28	21	8.4	16	1.9	27	3.2	36	4.3
29	20.5	8.2	23	2.8	20	2.4	14	1.7
30	22.5	9.0	31	3.4	37	4.1	76	8.4
31	23	9.3	16	1.7	22	2.3	50	5.4
All Transects	538.0	215.6	886	4.1	884	4.1	867	4.0

Table 2. Summary of Observations of Elk  
Reported by Wardens.

Month	1949-50		1950-51	
	Diaries	Observations	Diaries	Observations
November	15	5,200	16	3,931
December	16	5,848	16	2,380
January	16	3,720	8	2,456

Table 3. Summary of Data Regarding Mammals  
Other than Elk.

	Deer	Moose	Wolves	Coyotes
Wardens' observations, November to January, incl.				
1949-50	362	28	12	120
1950-51	304	33	17	85
Chief Warden's estimate of Park population, 1950	2,000	1,500	20	Several Hundred
Number observed on trans- ects, March 1950.	22	46	1	12
Number observed on trans- ects, February 1951.	38	48	nil	16
Increase or decrease over 1950.	+ 16	+ 2	- 1	+ 4
Number observed on trans- ects, March 1952.	- 52	90	nil	7
Increase or decrease over 1951.	+ 14	+ 42	nil	- 9

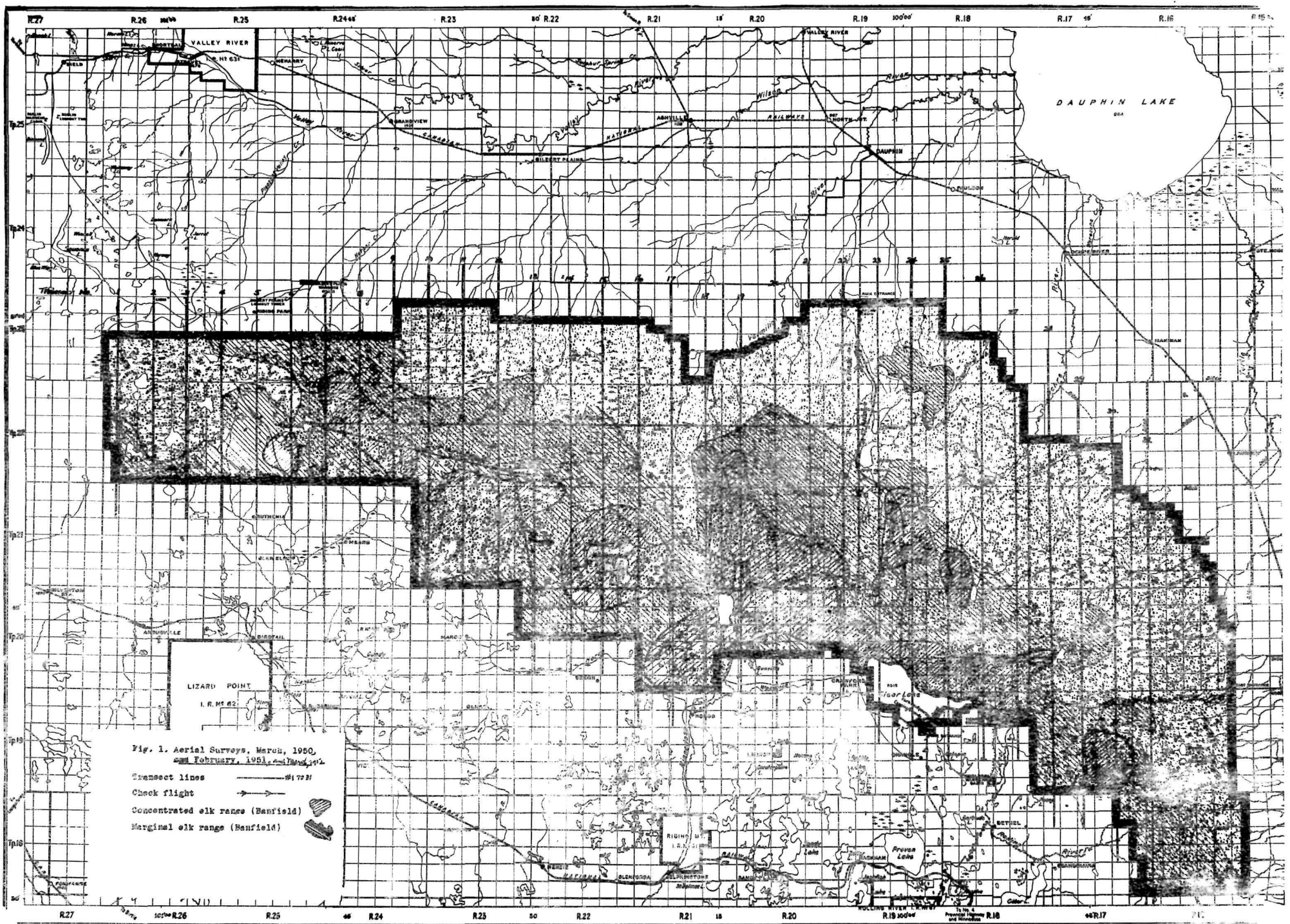
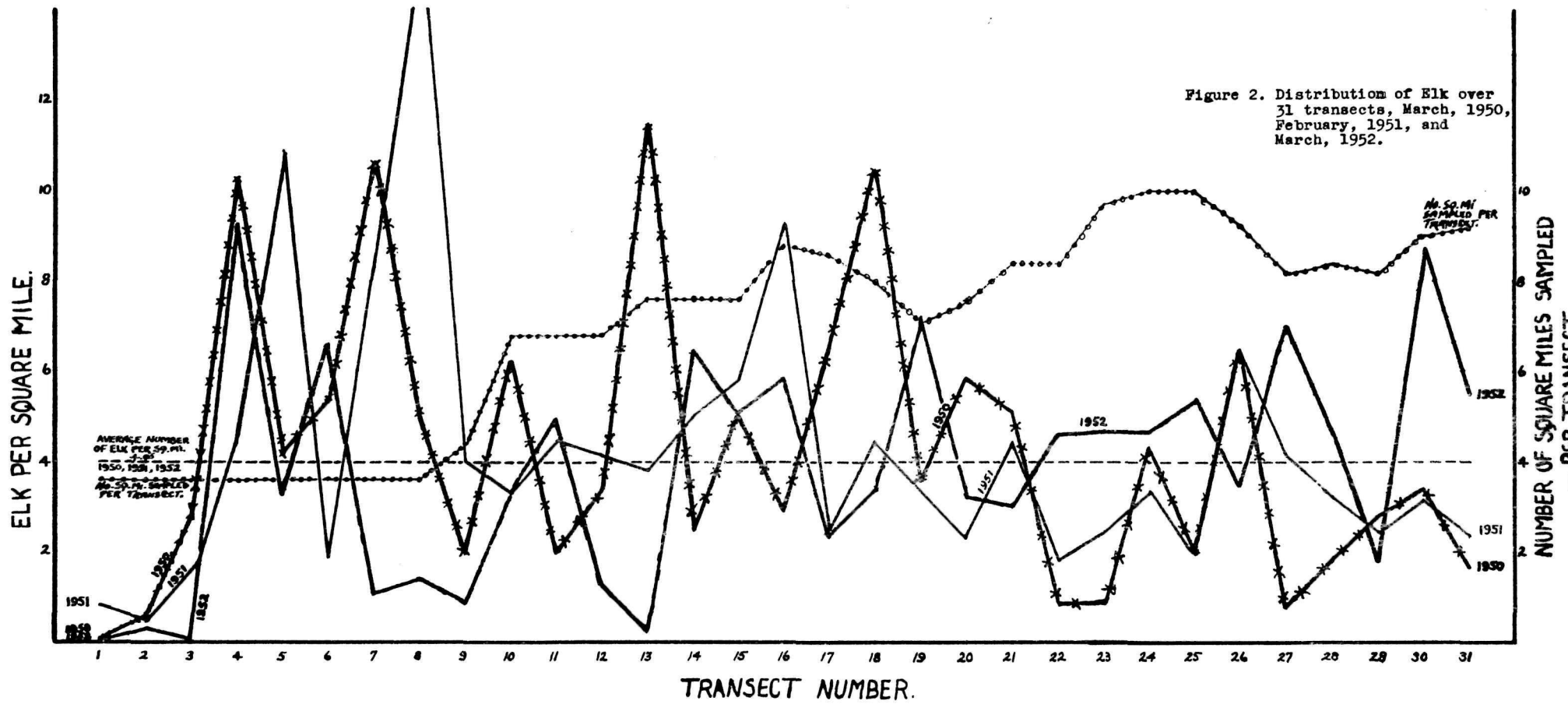


Fig. 1. Aerial Surveys, March, 1950,  
and February, 1951, and March, 1952.

- Transect lines ———— 1/4" = 1/2 MI
- Check flight ————
- Concentrated elk range (Banfield)
- Marginal elk range (Banfield)

LIZARD POINT  
I. R. No. 62



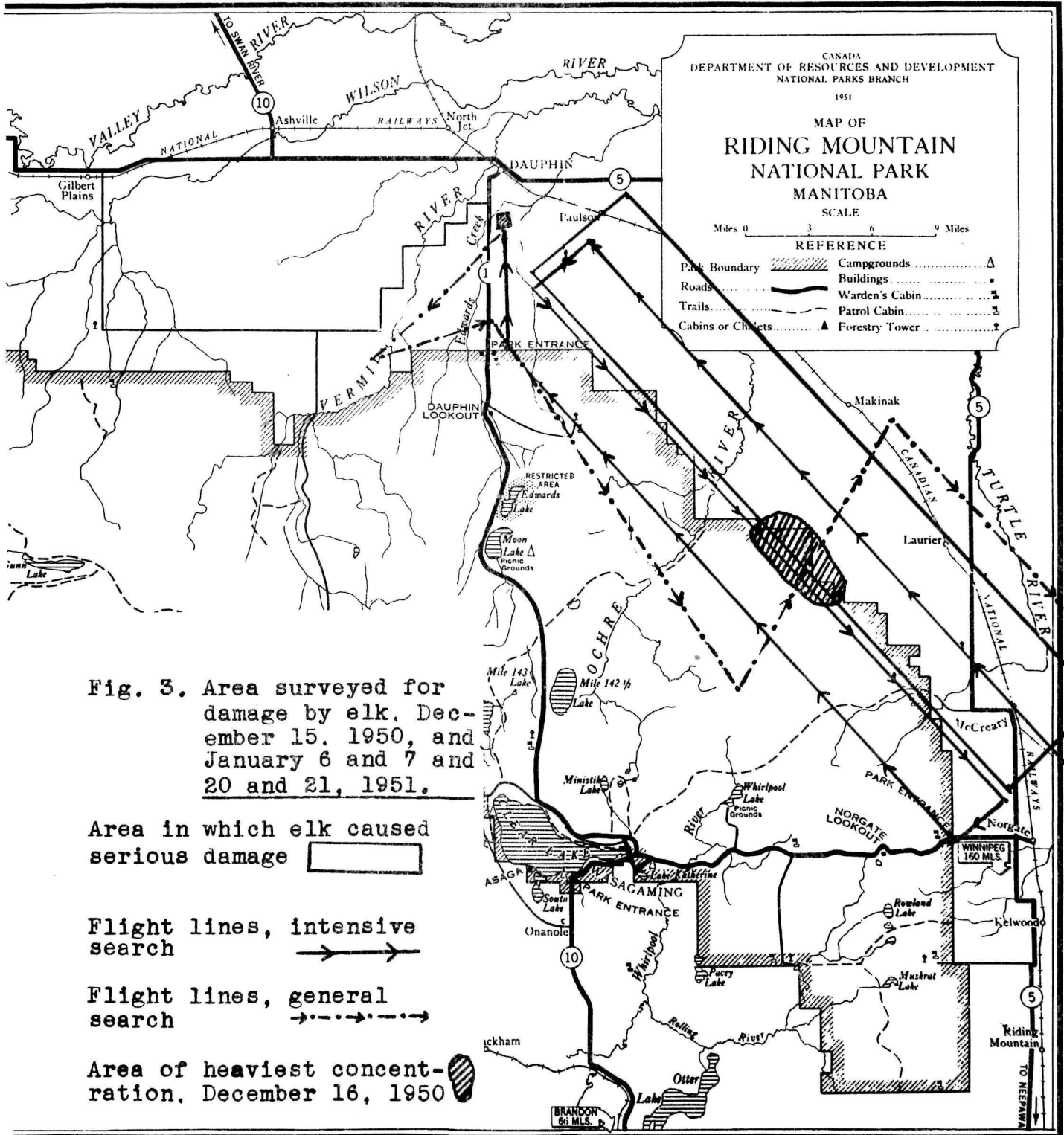
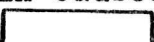
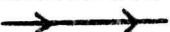
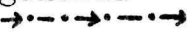



Fig. 3. Area surveyed for damage by elk, December 15, 1950, and January 6 and 7 and 20 and 21, 1951.

Area in which elk caused serious damage 

Flight lines, intensive search 

Flight lines, general search 

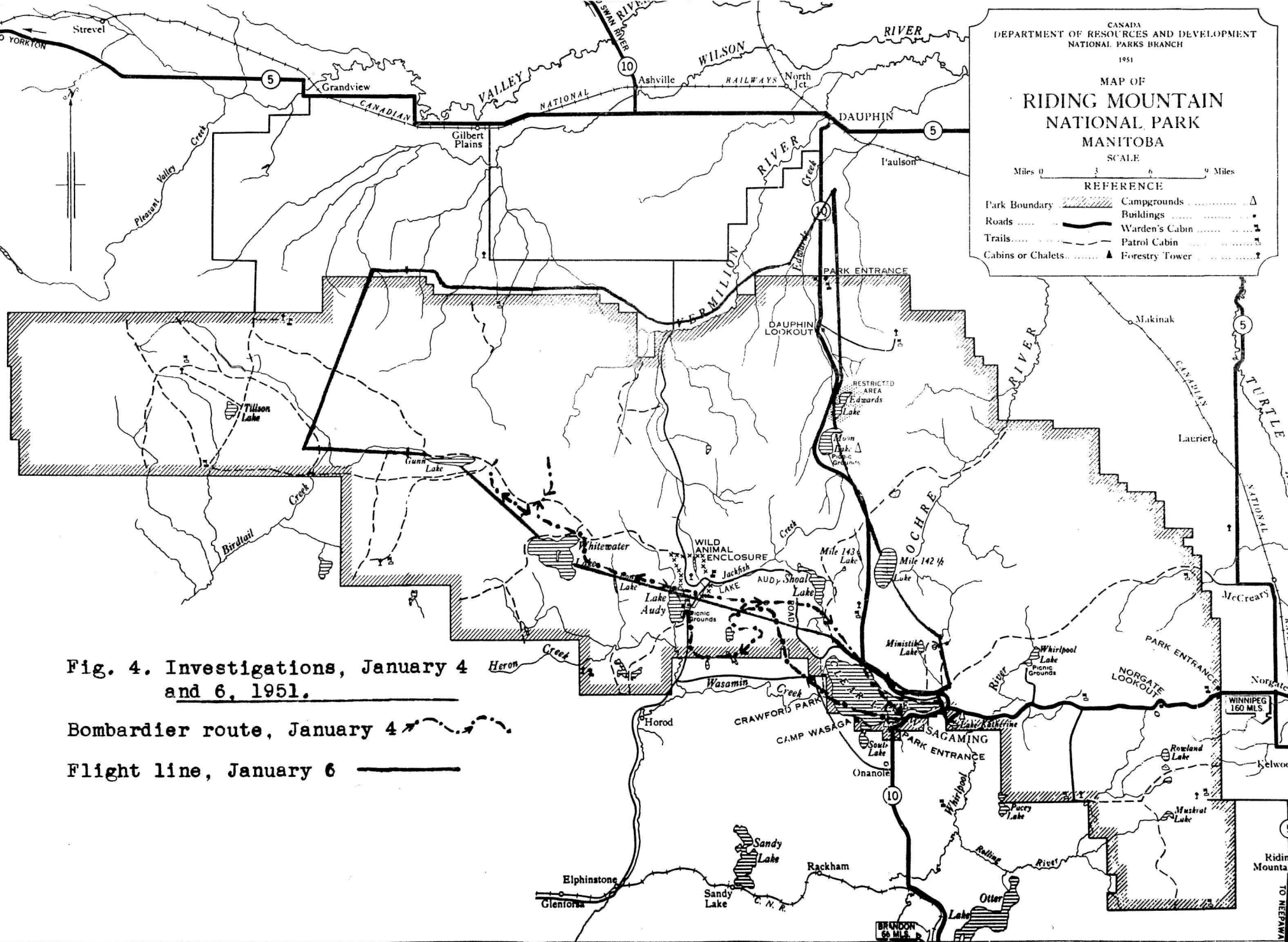
Area of heaviest concentration, December 16, 1950 

MAP OF  
**RIDING MOUNTAIN  
NATIONAL PARK**  
MANITOBA

SCALE  
Miles 0 3 6 9 Miles

REFERENCE

- |                   |       |                |         |
|-------------------|-------|----------------|---------|
| Park Boundary     | ..... | Campgrounds    | ..... Δ |
| Roads             | ..... | Buildings      | .....   |
| Trails            | ..... | Warden's Cabin | .....   |
| Cabins or Chalets | ..... | Patrol Cabin   | .....   |
|                   |       | Forestry Tower | .....   |



**Fig. 4. Investigations, January 4 and 6, 1951.**

Bombardier route, January 4

Flight line, January 6





**Fig. 5 - Area long  
Whitewater Lake  
Road showing  
recent pawing  
by elk for food.  
February 8,  
1951.**



**Fig. 6 - Example of  
willow killed  
by over-brows-  
ing during  
extreme winter  
conditions  
in 1946-7.  
February 11,  
1951.**



**Fig. 7 - Example of damage to poplar caused by chawing during extreme winter conditions in 1946-7. February 11, 1951.**



**Fig. 8 - Portion of elk herd seen in Peden Lake area. March 23, 1950.**

