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Flook, D.R.

Aerial census of big game Riding
Mountain Park, November 1959. Edmonton,
1960.

13^l. map (1 fold in packet)

1. Game and game birds - Aerial surveys-
Riding Mountain National Park. 2. Rid-
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AERIAL CENSUS OF BIG GAME

Riding Mountain Park, November, 1959

Introduction

In order to follow fluctuations in the populations of big game, particularly elk, in Riding Mountain National Park, aerial surveys have been carried on since 1950. They were conducted from 1950 to 1958 every winter, with the exception of 1954. Following the February, 1958 survey, it was decided to make the survey at 2 year intervals.

Procedure

The survey was flown November 17, 18 and 19, 1959. As in 1958, a Cessna 170 piloted by Hector Burton of Bethany was chartered from Maple Leaf Aviation, Brandon. W.E. Stevens was left observer in the rear seat of the plane and the writer was right observer in the front seat throughout the survey.

Animals were counted on transects one-quarter mile wide, each observer counting animals seen within a one-eighth strip on his side of the aircraft. The survey was flown at approximately 85 miles per hour, and 400 feet from the ground. Thirty-Six North-South transects were flown this year at two mile intervals. Some elk from the park had spread out onto the adjacent lands. As we were concerned with estimating the entire population, we sampled the entire area which they

were occupying. Therefore, in addition to transects numbered 1 to 33 flown in previous years, one designated as "0" was flown, one mile west of the West park boundary, and two numbered "34" and "35" were flown east of the park. Transect 34 was one mile east of the extreme east boundary, and transect 35 was two miles farther East. This year, all transects were extended on either end until no more sign of elk was seen. In most cases, that did not exceed two miles beyond the boundary as there was not adequate cover for elk beyond that. South of the east end of the park, however, is a large area of wooded land, and there we extended our transects up to a maximum of six miles in the case of transect 27.

Transects 1 to 11 were flown November 17, in conditions of light overcast and a temperature of -4° Farenheit. Transects 12 to 27 were flown November 18, under conditions of a clear sky, a temperature of $+10^{\circ}$ Farenheit, a strong wind, and considerable turbulence. The shadows on that day hampered observing slightly. November 19, transects 28 to 35 were flown under conditions of high overcast, light wind and a temperature of about 0° Farenheit. The snow cover was complete throughout the survey, providing a good background against which to observe the animals.

On November 20, Chief Warden J. Allen, Mr. E. Bossenmaier, Senior Biologist with the Manitoba Game Branch, Dr. Stevens, and I made a trip by snowmobile from Wasagaming to the McCreary Warden Station and return.

Results

The numbers of elk, moose and deer observed on each transect during the current survey, together with population densities for each transect are presented in Appendix 1.

Elk Numbers

Elk population estimates based on the current survey as well as those based on previous years' surveys are shown in Table 1. It will be noted that the total population including those elk which had spread out of the park onto adjacent land at the time of the survey was estimated as 4,840 animals.

Because of variations in densities of elk numbers, between transects, the population estimates of both February, 1958 and November 1959 cannot be accepted as having high precision. The contagious distribution characteristic of elk contributes greatly to the low precision of population estimates based on sample transects. Elks distribution at the time of the current survey was particularly contagious due to the

Table 1. Elk Population Estimates by Area and by year, 1950-1959

Area of Park	Mar.	Feb.	Mar.	Mar.	Mar.	Mar.	Mar.	Feb.	Nov.	Totals
	1950	1951	1952	1953	1955*	1956	1957	1958	1959	
West ½	3040	2740	2015	1375	873	2538	1620	1077	3136	18,414
East ½	1620	1896	2637	1085	259	2755	884	1576	1704	14,416
Entire Park	4660	4636	4652	2460	1132	5293	2504	2653	4840	

Light snow
57-58

59-60

Feb/60

14" 13" 36" 14" 6" 6"

*Believed inaccurate due to poor surveying conditions

Table 2. Moose Population Estimates by Area and by year, 1950-1959

Area of Park	1950	1951	1952	1953	1955	1956	1957	1958	1959
West ½	125	119	149	69	--	--		311	416
East ½	123	138	325	124	--	--		462	576
Entire Park	248	257	474	193	--	--	1100	773	992

influence of snow depth on elk distribution and behavior.

As the elk population was estimated as 2,650 in February 1958, the apparent net increase in the 20 month period was 2,190 elk. Such an increase could take place if the net increase was 35% per season for the two seasons. All information available indicates a preponderance of females in adult elk populations, even where they are not hunted. Under such conditions a net increase of 35% per year would be possible if mortality were low. As winter conditions were not severe in those two winters, mortality probably was low, and a rapid population increase probably took place.

Moose Numbers

Moose population estimates based on the current survey as well as those of previous surveys are presented in Table 2. It will be noted that the 1959 estimate was 992 as compared to 773 in 1958, for an apparent net increase of 219 moose in two seasons or an average net increase of 14% per season.

Deer Numbers

24 Deer were observed on the transects to provide a population estimate of 192 deer. Deer were observed mostly around the periphery of the plateau and their range includes aspen bluffs, scattered through large areas of agricultural land on all sides of Riding Mountain. It is therefore not

possible to state what proportion of the deer sampled on the transects belonged to the park population or whether in actuality the summering park deer population had disbursed at the time of the survey over a larger area than that sampled by the transects. Deer are more difficult to observe from the air than either moose or elk and no doubt many were missed on the transects.

Snow Conditions

Very heavy snowfall occurred on Riding Mountain in October, 1959. As the weather remained cold through the winter, the snow remained deep over the plateau. During the aerial survey it appeared that the snow depth was greatest at the higher levels and on the eastern part of the plateau. However, snow cover was heavy throughout the park. The snow was deep all along the snowmobile route travelled November 20, from Wasagaming to the McCreary warden station. It measured about 22 inches of settled snow at one point which appeared fairly typical. C.R. Stanton of the Department of Agriculture informed me that he recorded an average snow depth of about 40 inches in a snow survey of the headwaters of Bald Hill Creek in mid-March.

Game Distribution

7/4 65% of the elk counted on transects were in the west

half of the park, as compared to 35% in the east half in ^{at the time of} ~~the~~ ^{the current survey.} February, 1958. Moose distribution at the time of the current survey was the opposite to that of elk, 58% being observed in the east half and 42% in the west half.

Most of the higher portions of the plateau where the snow was deepest, were devoid of game sign. At the time of the current survey elk tended to be concentrated near the boundaries of the park, particularly on the south and east sides. 16 elk were counted on transects outside the park, that being 2.6% of the total elk seen on transects. The estimate of the number of elk outside the park during the daytime on the days of the survey is 128 based on the transect counts. It was quite evident from well worn trails that large numbers of elk were travelling back and forth over the park boundaries. That was true particularly on the south and east boundaries, although some egress from the park was noted along the west part of the north boundary. The greatest number of elk straying outside of the park during the day seemed to be in the wooded land south of the east end of the park. The farthest that an elk was seen from the nearest boundary was about 5 miles. That was on transect 27, about one mile north of Otter Lake. During the open season elk were reported shot at greater distances from the park.

The distribution of elk observed outside the park was limited to areas where there was cover of aspen and black poplar. Tracks showed that elk from the park had foraged on cultivated fields, probably at night. However, most signs of elk depredation on hay and stocked and swathed grain were where there was woody cover interspersed among cultivated fields.

On the snowmobile trip from Wasagaming to the McCreary warden station, some elk sign was seen a short distance east of the golf course, but no more was seen until we began to descend the east slope. There, several elk were seen on the oak-covered benches where the oak (Quercus macrocarpa) had been heavily over-browsed.

By the time of the survey, a shift of moose seemed to have taken place, from the higher parts of the plateau towards the periphery where the snow was ^{less} left deep. The shift of moose was not as complete as it was in the case of elk. A few moose were seen on the higher parts of the plateau in very deep snow. On the snowmobile trip a cow and calf moose were encountered in snow about two feet deep on a high part of the plateau.

Three moose were seen outside the park on transects, that being 2.4% of the total moose seen on transects. On

that basis, the number of moose of the park population dispersed beyond the park boundaries at the time of the survey could be estimated as 24.

At the time of the survey, deer were distributed about the periphery of the plateau. That seems to have been normal winter distribution even in seasons of lighter snowfall. However, deer were believed to have vacated the higher ranges more completely this winter than in 1957-58.

Hunter Activity

The open season for elk on land adjacent to the park, began November 17, the day prior to the survey. During the survey, hunters and their tracks were in evidence on lands bordering the park, particularly on the south and west sides. The extent of snowshoe tracks in the wooded area south of the east end of the park was quite noteworthy. Several spots where elk had been butchered were noted south and east of the park.

Peaching

Some evidence of peaching activity was noted in the park. A spot where an animal had been butchered beside a sleigh track was noted inside the park near the south end of transect 18. One elk carcass with the entrails piled

beside it was noted also on transect 18. Remains of a large animal were noted on transect 1, an elk carcass on transect 9, and parts of a moose carcass on transect 10. The last three could have been attributed to natural mortality.

Wolves

A total of eight wolves were observed during the survey, all inside the park. A group of four and a group of two were both near transect 13, with a group of two near transect 28 in the southeastern corner of the park. As all of them were off the transects, the observations do not provide an adequate basis for estimating the wolf population.

Coyotes

Six coyotes were observed during the survey of which two were inside the park, one near transect 18, and one near transect 20. Three were observed south of the park near transects 6, 18 and 27, and one was north of the park near transect 8.

Eagles

Four eagles were seen during the survey. Two were adult bald eagles, one north of the park near transect 6, and one in the park on transect 25. The other two were either

immature bald eagles or golden eagles, both inside the park, one on transect 7, and one on transect 13. Probably the elk entrails had attracted them.

Sex and Age Ratios

Stevens made a special effort to segregate elk and moose into sex and age classes. He succeeded in classifying a fair proportion of the animals seen, and the results are given in Appendix 2. The low calf segment of the elk count seems improbable as a representation of the population. Of all the deer family elk calves are the most difficult to identify among cows. When large cow herds were encountered, Stevens was forced to pass them by for segregation purposes. Perhaps those herds included a larger proportion of calves than did scattered components of the population which were segregated.

It is interesting to note the greater preponderance of females in the sample of adult elk as compared to the sample of adult moose.

Summary

In an aerial big game survey of Riding Mountain Park carried out November 17, 18 and 19, 1959, 36 north-south transects were flown at two mile intervals. Population

estimates based on the sample transects are 4,480 elk and 992 moose as compared to estimates of 2,650 elk and 773 moose estimated on the basis of a similar survey flown in 1958. A very heavy snowfall in October, 1959 had resulted in a great depth of snow on the plateau which remained throughout the winter. The deep snow had caused a shift in elk and, to a lesser extent moose, from the higher parts of the plateau to the lower areas closer to the boundaries. It was estimated that about 2.6% of the elk population was outside the park during the dates of the survey, their distribution being limited to areas where there was woody cover. Well worn trails showed that elk had been crossing back and forth across the park boundaries, probably at night. The egress of elk from the park was greatest along south and east boundaries.

Edmonton, Alberta,

March 24, 1960.

Donald R. Flook

Donald R. Flook,
Wildlife Biologist

APPENDIX 1.

Game Observed on Transects, 1959

Transect Number	Lineal Miles*	Square Miles	Elk	Elk per Sq.mi.	Moose	Moose per sq. mi.	Deer	Deer per sq. mi.
0	9	2.25	0	0	0	0.0	0	0.0
1	9	2.25	3	1.3	0	0.0	5	0.0
2	9	2.25	10	4.4	0	0.0	0	0.0
3	9	2.25	5	2.2	6	2.7	1	0.4
4	9	2.25	7	3.1	1	0.4	0	0.0
5	9	2.25	15	6.7	0	0.0	1	0.4
6	9	2.25	5	2.2	2	0.9	0	0.0
7	9	2.25	14	6.2	10	4.4	2	0.9
8	9	2.25	1	0.4	1	0.4	0	0.0
9	11	2.75	0	0.0	0	0.0	0	0.0
10	17	4.25	39	9.2	7	1.6	1	0.2
11	17	4.25	10	2.3	0	0.0	2	0.5
12	17	4.25	4	0.9	0	0.0	0	0.0
13	19	4.75	11	2.3	2	0.4	1	0.2
14	19	4.75	8	1.7	2	0.4	0	0.0
15	19	4.75	15	3.2	0	0.0	0	0.0
16	22	5.50	34	6.2	7	1.3	0	0.0
17	21.5	5.37	124	23.1	2	0.4	0	0.0
18	20	5.0	49	9.8	5	1.0	3	0.6
19	18	4.5	34	7.5	7	1.5	3	0.7
20	19	4.75	9	1.9	0	0.0	0	0.0
21	21	5.25	44	8.4	6	1.1	0	0.0
22	21	5.25	5	0.9	7	1.3	0	0.0
23	24	6.0	12	2.0	8	1.3	0	0.0
24	25	6.25	3	0.5	5	0.8	1	0.2
25	25	6.25	3	0.5	1	0.2	0	0.0
26	23	5.75	13	2.3	7	1.2	1	0.2
27	20.5	5.12	7	1.4	6	1.2	0	0.0
28	21	5.25	4	0.8	2	0.4	0	0.0
29	20.5	5.12	00	0.0	10	1.9	0	0.0
30	22.5	5.62	26	4.6	12	2.1	0	0.0
31	23	5.75	18	3.1	0	0.0	0	0.0
32	21	5.25	12	2.3	2	0.4	0	0.0
33	17.5	4.37	58	16.5	4	0.2	0	0.0
34	15	3.75	2	0.5	0	0.0	0	0.0
35	10	2.50	1	0.4	2	0.8	0	0.0
Totals	610.5	152.6	605	4.0	124	0.8	24	0.2

* Lineal miles given are length of transect within park for transects 1 to 33.

APPENDIX 2.

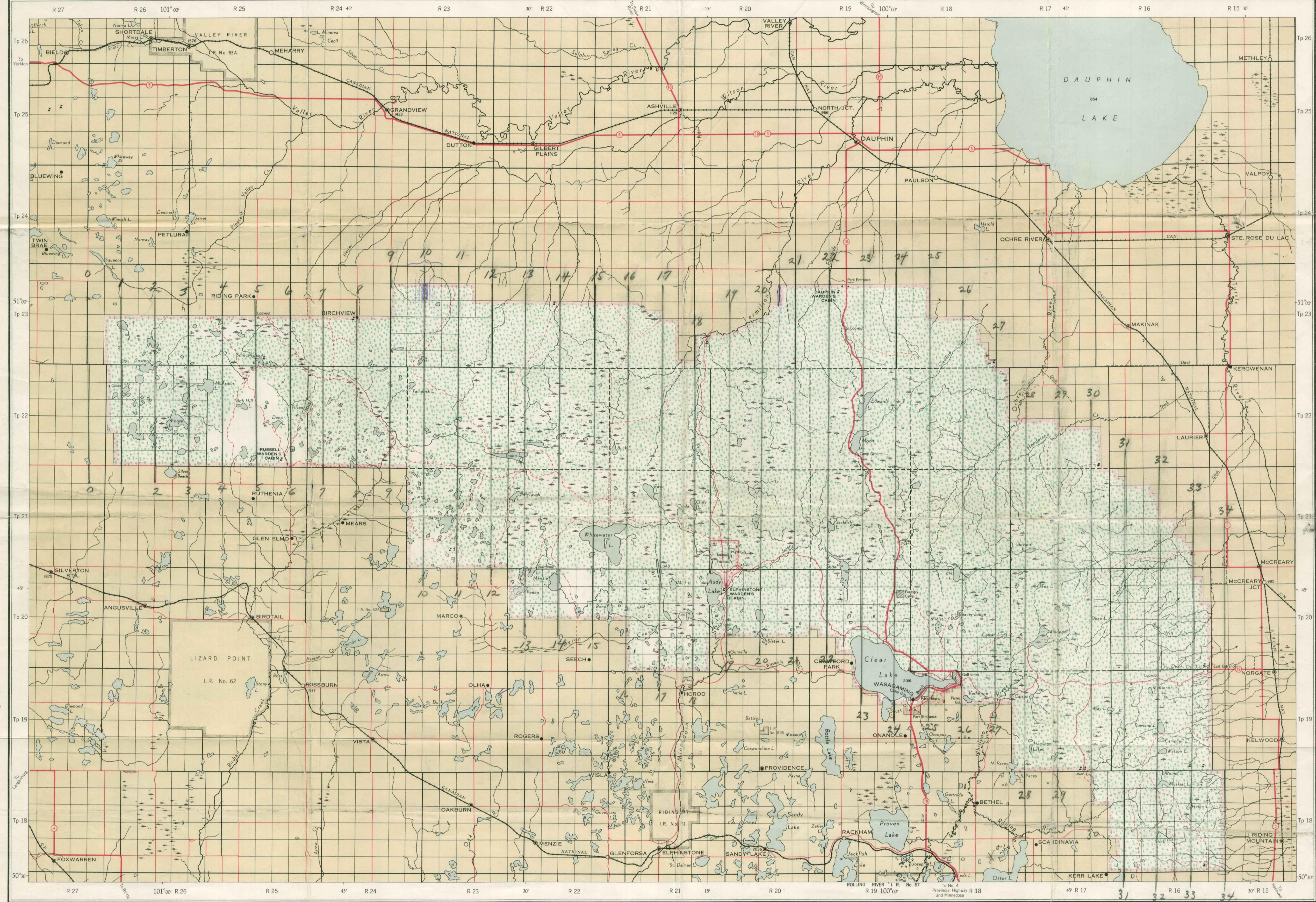
Sex and Age Classes of Elk
Recorded by Stevens

	Elk Segregated on transects	Percent	Elk Segregated off transects	Percent	Total Elk Segre- gated	Percent
Bulls	38	26.6	16	35.5	54	28.7
Cows	92	64.3	24	53.3	116	61.7
Calves	13	9.1	5	11.1	18	9.6

APPENDIX 3.

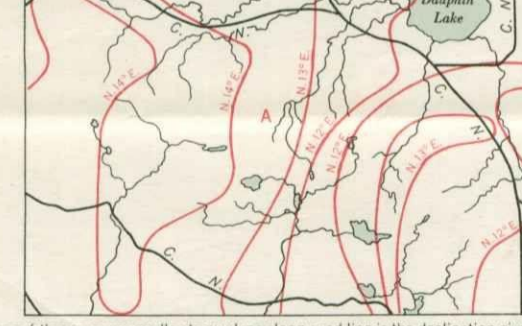
Sex and Age Classes of Moose
Recorded by Stevens

	Moose Segre- gated on Transects	Percent	Moose Segre- gated off Transects	Percent	Total Moose Segre- gated	Percent
Bulls	21	38.8	3	13.6	24	31.6
Cows	26	48.1	18	81.8	44	57.9
Calves	7	13.0	1	4.5	8	11.5



11 1/2 mi E
1/2 Ave 5

THE DECLINATION OF THE COMPASS NEEDLE JANUARY 1931



The declination of the compass needle at any place along a red line is the declination given on that red line. At other places the declination is between those given on the neighbouring red lines, that at the place marked A, because it is halfway between the two red lines marked N. 13° E. and N. 14° E. the declination of the compass needle is N. 13° 30' E. The declination of the compass needle is decreasing 3 1/2 minutes annually.

Compiled, drawn and printed at the office of the Surveyor General, April 1932.
Revised with corrections 1929.
Revised at the Survey and Mapping Branch, Ottawa, 1954.

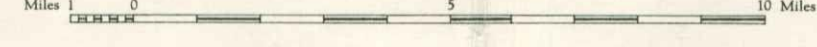
REFERENCE

Railway	—+—+—+—
Main road	—+—+—+—
Other roads	—+—+—+—
Pack trail or path	—+—+—+—
Telephone along road or trail	—+—+—+—
Telephone net along road	—+—+—+—
Boundary - Park	—+—+—+—
Boundary - Indian reserve	—+—+—+—

RIDING MOUNTAIN PARK

MANITOBA

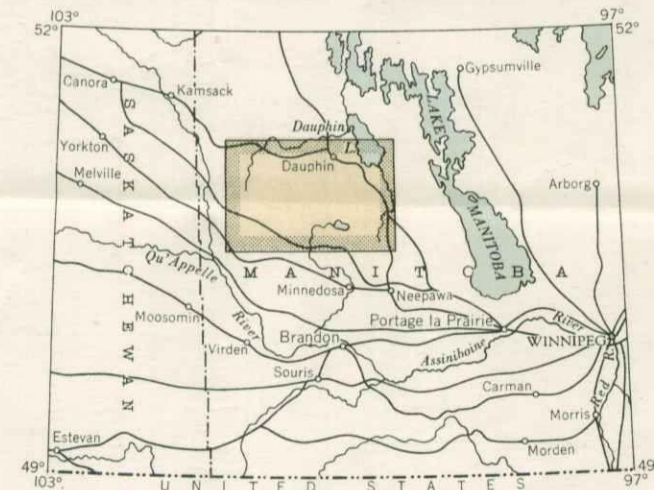
Scale 3 miles to 1 inch or 1:190,080



Codes may be obtained from the Map Distribution Office, Department of Mines and Technical Surveys, Ottawa, at 25 cents per copy.

REFERENCE

Post office	●
Village, railway station and post office	○
Warden's cabin	○
Lookout tower	○
Fire tower	○
Height in feet	1
Woods	HTP
Marsh, bog or open muskeg	HTP



LWS

60-37 Flook, Donald R.
Aerial census of big
game Riding Mountain
Park, November 1959.

TITLE

DATE
LOANED

BORROWER'S NAME

