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THE MAMMALS OF RIDING MOUNTAIN NATIONAL PARK, MANITOBA, CANADA

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

Riding Mountain National Park lies in southwestern Manitoba on the northern margin of the Great Plains. It is a forest area in sharp contrast with the flat agricultural land to the south. The transition is abrupt in leaving the plains and entering upon a wilderness environment of woods, hills, lakes, and streams.

Comparatively early in the settlement of Manitoba, Riding Mountain was set aside as a forest reserve and in 1929 the larger part of the plateau became a national park. The objects were to preserve permanently the aboriginal forest and wildlife and to provide a playground for human relaxation and enjoyment.

For many years one of the principal aims of the administration has been to gather as much data as possible on the higher vertebrates of Canada's national parks. In some parks limited mammalogical investigations had been made from time to time, both before and after their establishment, and some information was available. For the newer parks like Riding Mountain, little wildlife knowledge had been accumulated, except with regard to a few big game species. Additional data on the smaller mammals were especially desirable.

In 1939, the Department directed the writer to undertake a faunal survey of Riding Mountain Park. Investigations were begun in the autumn of 1940, and work was resumed at intervals during the spring, summer, and autumn months in the years 1941, 1942, 1945, and 1946. Previous to this the writer had made incidental observations on the mammals and birds of the area during short periods in the summers of 1936, 1938, and 1940. The mammal data collected during these periods have been assembled in the present report.

Acknowledgments

Grateful acknowledgment is made to O.E. Heaslip, Superintendent of Riding Mountain National Park, for generous co-operation during the various investigations, and in subsequent correspondence. Helpful in the field work at various times were Wardens Binkley, Allen, Carter, Hand, McKinnon, Hyska, and Tully. Special services rendered by Warden D.B. Binkley in the Elphinstone District were particularly useful. Of much value in the work were the earlier observations of H.U. Green, the general results of which were published in his paper, "Mammals of Riding Mountain National Park, Manitoba." This and other articles of his on the mammals of the area, dealing chiefly with the otter, beaver, and wapiti, are listed under "Literature Cited" with the recent reports of A.W.F. Banfield and D.G. Colls, concerning their investigations of large mammals in the park.

It is also a pleasure to acknowledge in the invaluable assistance received from Dr. R.M. Anderson, former Chief of the Biological Division, National Museum of Canada, Ottawa, who determined the subspecies of all small mammals collected in the park.

Physical Geography and Climate

Riding Mountain National Park occupies the greater part of a plateau bearing the same name. The southeastern corner of the park is 102 miles north of the International Boundary, and the western end approximately 16 miles from the Saskatchewan boundary. From park headquarters, at Wasagaming, Winnipeg lies 140 airline miles to the southeast.

Riding Mountain is one of the larger national parks in Canada. Its main axis lies east and west with a length of 67 miles, and the total area is 1,148 square miles, of which about 37 square miles are water areas. To follow the boundary in one complete circuit, would involve a journey of about 220 miles.

There is a sharply defined escarpment along the east and north sides. The rise from the plain at Norgate to the top of the plateau is about 950 feet, and from Dauphin, 1,000 feet. The average elevation is about 2,000 feet above sea-level, and the greatest elevation, in the eastern part of the park, about 2,100 feet above sea-level.

The plateau slopes gently to the west, merging almost imperceptibly into the Great Plains. The slope to the south is also gradual, and no clearly defined escarpment exists, but the country is very hilly for some distance south of the park and there are hundreds of potholes, sloughs, and small lakes.

Large areas on Riding Mountain are nearly flat, or very gently undulating. Others are markedly rolling, or, particularly in the northeast, distinctly rugged with many hills and ridges. On the perimeter of the mountain, the slopes have been deeply trenched by stream and atmospheric erosion to form many valleys up to hundreds of feet in depth. The largest of these are on the east and north.

On the whole, lakes are not conspicuously numerous. There are very few in the eastern third of the area, the largest being Whirlpool Lake. In this area there are few or no typical western sloughs. The southern section of the western two-thirds of the plateau contains most of the lakes, the larger being Clear, Whitewater, Audy, Shoal, Gunn,

and Tillson, and a few others which are unnamed. In the northeastern part of the plateau are two attractive bodies of water, Moon and Edwards Lakes. Clear and Moon Lakes are more frequented by tourists than any other lakes in the park.

There are wide differences in the character of the lakes in various districts. A few have sandy, or stony beaches; others are bordered by mud flats, or encircled by aquatic vegetation; some are true muskeg lakes completely surrounded by bog trees and shrub associations; and some closely resemble prairie lakes and sloughs. Bodies of water with a sandy and stony littoral and those of muskeg character are commonest in the eastern part of the park, and prairie sloughs in the western part.

Many small streams, none large enough to be navigable, have their sources on Riding Mountain. The chief of these on the south slope, and draining most of the larger lakes, are Birdtail Creek and Minnedosa, Whirlpool, and Rolling Rivers. On the east are Turtle and Ochre Rivers; and on the north, Edwards Creek, Vermilion and Wilson Rivers, and tributaries of Valley River. Drainage westward is almost negligible. On the high plateau the drainage is immature and there are only a few small, sluggish streams. From Clear Lake east there are a number of excellent springs.

Riding Mountain is an erosion plateau of Mesozoic sedimentaries, chiefly of the Foxhill and Pierre formations. A very close geological relationship exists between Riding, Duck, and Porcupine Mountains. All three are pre-glacial in origin and many of the natural features owe their existence directly to the Ice Age. Among these are hundreds of bogs, potholes, lakes, sand and gravel ridges, and immense deposits of boulder clay.

In approximately the northern two-thirds of the park the surface deposits consist of unmodified glacial till, or boulder clay. The soil is chiefly fine sandy loam, or clay loam, the clay sub-soil in most places being relatively free from stones, although in a few places there is an abundance of glacial erratics. These conditions also occur in a strip three miles wide southwards on the west side of Lake Audy to about the confluence of Wasamin Creek and Minnedosa River. On the east side of Lake Audy is a small glacial outwash plain composed of fine sandy loam (Fig. 2).

Most of the southern part of the park has a morainic type of topography, formed by marginal deposits from the ancient ice-sheets. The soil is largely fine sandy to clay loam; the surface for the most part is characterized by irregular hills and undrained depressions. On the eastern escarpment, and for many miles towards lake Manitoba, are numerous raised beaches, or shore deposits of the prehistoric glacial Lake Agassiz.

Spring commences in this region during middle or late April and summer six to eight weeks later. These seasons are somewhat tardier than on the Great Plains to the south. Average length of the growing season (from average date of seeding to average date of first frost) is between 130 and 140 days. Summer may be said to last from about the middle of June until the end of August, the warmest month being July, which has occasional periods of extreme heat when the temperature may reach 90° F. During some seasons exceptionally fine, warm - even hot - weather, continues for a week or so into September. One of the charming periods of the year is from mid-September until early October; at this time the foliage is autumn-tinted, mosquitoes have disappeared, and the weather is thoroughly enjoyable for

outdoor pursuits. Winter weather ordinarily arrives in early November, with the freezing up of lakes and streams and the first light fall of snow.

Snowfall is not excessive, although during some winters a considerable quantity accumulates in the forest by spring. The mean yearly precipitation is approximately 17 inches which is intermediate between areas lying to the north and south of the park.

Faunal Life Zone

The greater part of the park lies within the Canadian Life Zone. On the forestry map of Canada (1930) most of Riding Mountain is shown within the "Northwestern Coniferous Forest Belt" which is comparable to that zone. The western end of the park together with some of the southern part belongs to the Aspen Grove, or Parklands Belt, equivalent to the Zoological Transition Life Zone.

The lower parts of the escarpments merging into the adjacent plains are of similar character.

The northern slope and parts of the eastern slope together with wide areas on the plateau, are pure Canadian Zone. This condition extends south to the north shore of Clear Lake, and even farther southeast of that lake. Westwards, it extends to about the longitude of Whitewater Lake and it occurs in patches farther west, particularly on the northern slope.

In the central part of the park there are many prairies basically campestrian in nature and therefore of Transition Zone character. Other extensive areas may be regarded as mixed Transition-Canadian because of the composite nature of the fauna and flora. Areas in the west of the

park are unquestionably referable to the Transition Zone as is the greater part of the country south of Clear Lake. Even there a few white spruce are locally mixed with the poplar, but these alter the zonal quality only to an insignificant degree. In some southern boundary areas there is little or no difference in the general biological composition from the aspen grove farmlands of the Transition Zone, elements of which penetrate the park for a considerable distance. Small mammals of the park which are indicative or definitely representative, of the Transition Life Zone include the following: long-tailed prairie weasel; Richardson's, striped, and Franklin's ground squirrels; Baird's white-footed mouse; Loring's red-backed vole; badger; Richardson's pocket gopher; Maximilian's grasshopper mouse; prairie jumping mouse; and little upland vole. Because of their habitat requirements, most of these animals have a relatively restricted range within the park.

Among the park mammals typical of the Canadian Life Zone are Richardson's water shrew; black bear; red fox; Bonaparte's weasel; Hudson Bay mink; Canada otter; Canadian beaver; varying hare; moose; and northern white-tailed and Rocky Mountain mule deer. Some characteristic species and subspecies are rather local in distribution, but most of them are usually present in favourable habitats throughout the park.

Notes on the Flora

Riding Mountain belongs to that vegetational division known to foresters as the Boreal or Mixedwood Belt. In a more generalized classification it would be included in the Northwestern Coniferous Forest Belt, as on the Dominion Forestry Map of 1930 (See also Halliday, 1937). The soil over the greater part of the park is unsuitable for agriculture, but well

suited for the growth of trees. The characteristic forest of this belt is a mixture of white spruce (Picea glauca) and aspen poplar (Populus tremuloides). Good pure stands of aspen and balsam poplar (P. balsamifera) are also common.

The densest forest occurs in the eastern part of the park, where coniferous trees are often predominant. Fine examples of white spruce, with diameters of 25 to 30 inches and apparent height of 90 to 100 feet, were seen. Some excellent stands of aspen also exist in this district; individual trees may have a base diameter of 15 inches or more and a height up to about 60 feet. The balsam poplar is most abundant along lakes and streams and, in general, on low ground, where it is frequently the commonest tree.

Over a considerable part of the eastern district balsam fir (Abies balsamea) is found locally in varying abundance. It was noticed west to Clear Lake and commonly occurs around many of the more northern lakes. Many balsam fir with diameters of 12 to 14 inches were noticed, although the majority are smaller. In this eastern area there are also rather extensive stands of Banksian pine (Pinus Banksiana) on light or sandy soil. White birch (Betula papyrifera) seems to be scarce or absent west of Clear Lake, but is locally common at that point, and to the east and north. In some valleys of the eastern and northern escarpments it is abundant.

Black spruce (Picea mariana) is widely distributed on low ground and especially on areas of poor drainage. On the better sites it reaches an average diameter of 8 to 10 inches, and a height of 50 to 60 feet, but for the most part it is an inhabitant of wet depressions and muskegs where it exists in stunted form. Another characteristic tree of the boggy lowlands

is the tamarack (Larix laricina) which grows in close association with black spruce, willows (Salix), and alders (Alnus). Other typical species are the dwarf birches (Betula glandulosa and glandulifera), Labrador tea (Ledum groenlandicum), dwarf cranberry (Vaccinium Oxycoccos) and the muskeg mosses (Sphagnum magellanicum and fuscum). Some bog areas are clothed only with the familiar combination of Labrador tea and sphagnum mosses.

The remaining tree species of Riding Mountain are the bur oak (Quercus macrocarpa), white elm (Ulmus americana), green ash (Fraxinus pennsylvanica), mountain ash (Sorbus americana) and the mountain maple (Acer specatum). Most of these are confined to various parts of the escarpment, but the mountain ash is not uncommon locally in the eastern part of the plateau.

The better upland woods abound in various species of shrubs. Occasionally such growth is very dense. This is commonly the case with willows and alders fringing the shores of lakes and streams. The mountain alder (Alnus incana) forms thickets on higher ground, as does also the hazelnut (Corylus americana). Other indigenous shrubs of the woodlands include chokecherry (Prunus virginiana), pincherry (P. pennsylvanica), black haw, or nannyberry (Viburnum Lentago), red-osier dogwood (Cornus stolonifera), Canadian buffalo-berry (Shepherdia canadensis), red raspberry (Rubus strigosus), wild black currant (Ribes americanum), northern gooseberry (R. oxyacanthoides), highbush cranberry (Viburnum opulus), and wild rose, (Rosa aciculatis). Those characteristic of the open grasslands are snowberry (Symphoricarpus albus), silverberry (Elaeagnus argentea) and shrubby cinquefoil (Dasiphora fruticosa).

Along the south shore of Clear Lake bearberry (Arctostaphylos Uva-ursi) was noted on sandy soil, here and there in association with prostrate juniper (Juniperus horizontalis). On the sandy ground of pine woods, the Canada blueberry (Vaccinium canadense) occasionally covers rather extensive tracts. Most of the trailing mat type of vegetation also grows on sandy soil. A large number of herbaceous flowering plants are found in the woods, and on the prairies and meadows.

Annotated List of Mammals

This list includes 53 species and subspecies. It is believed to be a nearly complete presentation of the park's mammalian fauna. In time, a few more forms may be added, particularly of the order Chiroptera. Little is known regarding the bats of this territory; unrecorded but to be looked for, are Trouessart's mouse-eared bat (Myotis keenii septentrionalis), silver-haired bat (Lasionycteris noctivagans), eastern red bat (Lasiurus borealis borealis), and hoary bat (Lasiurus cinereus).

Trinomial names have been used throughout. The larger mammals were not collected, but their subspecific identity has been well established in the past. Specimens of the smaller forms were taken especially for identification. With few exceptions, the sequence of species and nomenclature follow Dr. R.M. Anderson's "Catalogue of Canadian Recent Mammals", 1946.

1. STAR-NOSED MOLE. Condylura cristata cristata (Linnaeus).

This animal was not observed by the writer, nor were signs of it seen anywhere in the park. However, its occurrence has been established. Warden P.J. Brodie stated that it inhabited moist, loamy areas east of

Wasagaming. Examples, together with their characteristic mounds, had been seen in the vicinity of the warden's cabin at Whirlpool River and signs were noted elsewhere in neighbouring tracts. Green (1932) records cristata from the southern part of the park (without mentioning any definite locality) where he collected three specimens. Apparently this area represents the northwestern extremity of its geographic range.

2. COMMON CINEREOUS SHREW. Sorex cinereus cinereus Kerr.

Generally speaking, this small insectivore is well distributed on Riding Mountain, occupying nearly all types of habitant in the Canadian Life Zone. In some localities, however, it apparently was very scarce or absent; in no collecting area did it appear to be very common. Its abundance is cyclic and may vary considerably from one period to another. Only six were secured in 2,500 trap-nights at various times from 1940 to 1946; average measurements are: L. 92.3, T. 38.0, H.F. 12.1 mm.; W.3.3. grams.

3. AMERICAN SADDLE-BACKED SHREW. Sorex arcticus arcticus Kerr.

Distribution of this shrew in the park is general, but very localized, owing to its choice of habitat. Most specimens were trapped in boggy, Labrador tea-sphagnum muskegs and spruce-tamarack bogs, but some inhabit semi-swampy depressions grown to spruce and poplar. The species seemed to be scarce even in the most favourable areas. All trapping operations produced but five examples with average measurements L. 115.4; T.40.4, H.F. 14.6 mm.; W. 7.9 grams.

4. PRAIRIE DUSKY SHREW. Sorex obscurus soperi Anderson and Rand.

The type specimen of this new form was taken by the writer 2½ miles northwest of Lake Audy on September 21, 1940 (N.M.C. No. 18249).

A full account is given by Anderson and Rand, (1945). Three specimens were collected in the above locality, the first dusky shrews to be recorded in Manitoba. On July 17, 1942, another example was taken at Swanson Creek, south of Whirlpool Lake. Average measurements of the four specimens are: L. 108, T.44.5 H.F. 12.3 mm., those of the largest being L. 117, T.45, H.F. 12.5 mm.; W. 6.7 grams. The normal habitat of this shrew on Riding Mountain consists of moist lowlands near streams and lakes with a cover of alders, willows, and scattered poplar and spruce.

5. AMERICAN WATER SHREW. Sorex palustris palustris Richardson.

Green (1932) remarked that palustris was "abundant about streams and certain lakes and sloughs north of the height of land. None has been noted in the southern portion of the park". Except in one instance, noted below, the writer found it generally scarce, or locally absent from 1940 to 1946, despite persistent trapping in many likely areas. The first specimen from the southern watershed (N.M.C. No. 15512), was collected by Richard Sutton July 29, 1938, along a brook at Clear Lake a little west of Wasagaming. Others were taken by the writer on the south slope of the plateau at Swanson Creek and Whitewater Lake, and on the north slope at Kennice Creek. During the early half of October, 1946, they were found more numerous at Whitewater Lake than in any locality previously worked; during that period six were trapped. The average size of these and other specimens taken on the mountain was L. 155.3, T. 68.7, H.F. 19.2 mm.; W. 13.7 grams.

6. NORTHERN PIGMY SHREW. Microsorex hoyi intervectus Jackson.

This smallest of mammals was listed by Green (1932) under M.h. hoyi. The race has now been determined as above. The first specimen so identified was taken by R. Sutton at Clear Lake on October 24, 1939 (N.M.C. No. 16937). Only one was secured in the park by the writer; it was

trapped on June 6, 1941, under shrubbery of dry upland near Swanson Creek (pregnant female; L. 85, T.26, H.F. 10.3 mm.; W. 3.2 grams). Considering the total number of trap-nights (2,500), there can be little question of the scarcity of this animal on Riding Mountain.

7. MANITOBA SHORT-TAILED SHREW. Blarina brevicauda manitobensis Anderson.

Green (1932) regarded this shrew as scarce on Riding Mountain and peculiar to the east and north slopes. However, R. Sutton took three specimens at Clear Lake for the National Museum of Canada in early October, 1939, which, so far, are the only ones found on the southern drainage. It is undoubtedly thinly and very locally distributed on the higher ground of the plateau. The only specimen secured by the author was taken at Edwards Lake on October 28, 1940 (female; L. 119, T. 25, H.F. 16 mm.; W. 19.4 grams).

8. COMMON MOUSE-EARED BAT. Myotis lucifugus lucifugus (LeConte).

This species was said by Green (1932) to be quite common in the park, where he captured a female and one juvenile in a hollow tree. It was not observed by the writer.

9. BIG BROWN BAT. Eptesicus fuscus fuscus (Beauvois).

Apparently the only record available for Riding Mountain is that by Green (1932) of which he says, "Several observed in flight. They are not plentiful".

10. UPPER MISSISSIPPI VALLEY RACCOON. Procyon lotor hirtus Nelson and Goldman.

No positive evidence was secured that this species now inhabits Riding Mountain. Inferentially it did so in the past, since Green (1932) refers to it as having become extinct in the area "during the past two decades".

11. AMERICAN BLACK BEAR. Euarctos americanus americanus Pallas.

Apparently this species is rather scarce in most localities, but may be fairly common in others. Few were actually observed, but fresh tracks were noted on many occasions. In their game summaries for the year previous to November 1, 1940, the wardens listed a total of only about 24 bears actually seen. The park superintendent estimated a total population of between 100 and 200 or an average of about one for each eight square miles. Most were observed in the coniferous forest area east of Clear Lake. In 1941, moderate numbers were found in the Vermilion River - Kennice Creek district. On May 31 of that year, an adult that had just killed an elk calf only a few days old was seen near Kennice Creek. In early October, 1946, the species was fairly common in the Whitewater and Gunn Lakes district. At that time Patrolman Tully reported it to be common in western sections of the park.

12. NORTHERN PLAINS RED FOX. Vulpes fulva regalis Merriam.

No foxes were seen by the writer during any of the investigations, nor does it appear that the wardens observed very many during the same years. Green (1932) stated that a few had been observed in semi-open country near the western boundary, and that the red fox was not plentiful; in fact it might be considered comparatively rare. There is some indication that they were more numerous west of Whitewater Lake, than east of it, and that peak numbers, of whatever order, were reached in 1944. In 1946 it was said that a gradual decline in population had been noted during the two previous years.

13. NORTHEASTERN COYOTE. Canis latrans thamnos Jackson.

Formerly the subspecies inhabiting Riding Mountain was believed to be C. l. latrans Say, but more recently it has been determined to be the

darker race of more eastern and northern distribution shown above (Young and Jackson, 1951, pp. 266-271). No doubt there are a fair number of intergrades in the western part of the park and neighbouring districts.

Coyotes are common and widely distributed in the park and, although they vary locally in abundance, are by no means restricted to any particular districts. It seems clear that the largest populations are usually found in the main elk range west of Shoal Lake and in most parts of the country west of Whitewater and Gunn Lakes, where, in 1940, Warden Hyska stated that they were very common.

Green (1932) remarked: "In the spring of the year they (coyotes) are responsible for the destruction of many wapiti calves". However Colls (1952) described instances of the indifference of elk to coyotes and found no indication that they were detrimental to other animals in the park.

14. SASKATCHEWAN TIMBER WOLF. Canis lupus knightii (Anderson).

Green (1932) does not list this species in his account of the park mammals. It is certain that it was very scarce at that time, but there are are a number of recent records of its occurrence on Riding Mountain. It is quite possible that it was exterminated many years ago, but has since been reinstated by individuals moving southeast from Duck Mountain. Warden Binkley reported that one was shot in the park during 1937 and that another was seen near Lake Audy in 1938. Warden Hyska stated that solitary examples were seen on two occasions in the Gunn Lake area during 1939.

During the years of the investigation, the park wardens and patrolmen consistently reported the species in increasing numbers. This was

coincident with increasing wolf populations over a large region in Alaska and northern Canada. During the winter of 1945-46 a pack of about a dozen was noted in the locality of Gunn Lake, and Patrolman Tully saw five in the country between Gunn and Whitewater Lakes during the summer of 1945. In November, 1946, Tully shot a black female wolf in the western part of the park.

Colls (1952) estimated that there were about 25 wolves in the park at the end of the winter of 1951, and believed that they did not constitute a menace to other wildlife in the numbers existing at that time. By March, 1952, their status appeared to be little changed from 1951.

15. HUDSON BAY MARTEN. Martes americana abieticola (Preble).

At one time this species occurred in fair numbers over at least the eastern and northern watersheds of Riding Mountain in the heavy coniferous forest. According to Green (1932), it was exterminated there between 1910 and 1920. This roughly agrees with a statement by Warden Allen that several decades ago he heard of marten being trapped at Rowland Lake, near the southeastern extremity of the plateau. Questionnaires completed by wardens in 1940 show conclusively that none of these animals were known to occur on Riding Mountain at that time.

16. FISHER. Martes pennanti pennanti (Erxleben).

Writing in 1932, Green remarked that this species was plentiful "some years ago" along the eastern escarpment, but that it was decimated by intensive trapping along the park boundaries, and few remained. It has been rare ever since. Only a few widely-separated examples have been reported by the park wardens, some of whom have observed no sign of the species for several years.

17. RICHARDSON'S ERMINE. Mustela erminea richardsoni Bonaparte.

These weasels are well represented on Riding Mountain where, in the various districts, the wardens rated them as fairly common to abundant. Evidently they are most numerous in central and western areas of the park. They were observed by the writer on several occasions and a specimen was collected near each of Fawn, Edwards, and Whitewater Lakes. Average measurements of these are: L. 320, T. 91.7, H.F. 43 mm. The sub-adult male taken at Whitewater Lake on October 8, 1946, (L. 302 mm.), weighed 129.1 grams. A specimen taken October 28 is all white except for a narrow streak of summer pelage over the face, back, and upper side of the tail. Richardsoni is doubtless the most abundant carnivore in the park.

18. LEAST WEASEL. Mustela rixosa rixosa (Bangs).

This diminutive species is rare in the park. It was not found by the writer, nor does Green list it in his 1932 paper. Nevertheless its presence was to be expected, since the park is surrounded by country in which it is known to occur. Since 1932 it has been reported by two of the park staff. In 1937, Warden Hand (Edwards Lake District) had one in captivity and so tamed that it would eat from his fingers; others were seen in the same district. Warden Tully stated that a few inhabited the country between Clear and Whitewater Lakes and that he had a close view of one travelling along Heron Creek in the autumn of 1939.

19. PRAIRIE LONG-TAILED WEASEL. Mustela frenata longicauda Bonaparte.

Longicauda is not listed by Green and the writer failed to secure any specimens. However, most of the wardens know the species and state that it occasionally ranges into the southern part of the park. Warden Tully said that a few resort to the south-central area between Clear and Audy Lakes.

A specimen in the Wasagaming museum is labelled taken at Clear Lake. Another collected by Green is given the indefinite locality of "Dauphin - Clear Lake Road, R.M. Park". It would appear that the park population is small and scattered and is virtually confined to prairie tracts in southern sections.

20. HUDSON BAY MINK. Mustela vison lacustris (Preble).

Signs of mink (Fig. 8) were noted at so many points during the investigations that a good population was evident. Their abundance varies greatly from one part of the park to another. Specific points of occurrence mentioned by wardens include many creeks and lakes lying in almost all sections of the park. In the east and north they apparently occur in only moderate numbers, but they are more abundant in south-central and western areas.

The species was said to be notably common at Heron, Jackfish, and Birdtail Creeks and Audy, Whitewater, Gunn, Tillson, and Moose Lakes. Wardens Binkley and Tully reported that mink are fairly common to abundant in most streams and lakes in the western part of the park, but are reduced in numbers near the park boundaries by poachers. In the autumn of 1946 the writer found the species very common at Whitewater Lake and neighbouring creeks.

21. EASTERN CANADA OTTER. Lutra canadensis canadensis (Schreber).

Nothing was seen of this species during the investigations. This was expected since it is now very rare on Riding Mountain. In the summary game reports for the year ended October 31, 1940, none of the wardens listed the otter. From all that can be gathered, it appears that the species is now entirely absent from most of the park and that an occasional occurrence

in the northern area, although not unknown, is unusual. It was practically exterminated there long before the park was established. Green (1932) says that previous to 1930 the otter had not been reported on Riding Mountain for many years, but that during the winter of 1930-31 tracks of the animal were seen in the Whirlpool district. In July, 1931, he saw three adults swimming in a beaver pond at the headwaters of Vermilion River. After destroying several broods of wild ducklings they passed on downstream. A more detailed account of the species on Riding Mountain was published by Green during the same year (1932a.).

22. NORTHERN PLAINS SKUNK. Mephitis mephitis hudsonica (Richardson).

Skunks are fairly common on the plateau, but are distributed irregularly according to environment. They are scarcest in the heavy coniferous forests of the east, and most numerous in prairie-poplar parklands in south-central and western parts of the park, where many signs and several adults were seen. The skunk occasionally becomes a nuisance by taking up quarters under a building.

23. AMERICAN BADGER. Taxidea taxus taxus (Schreber).

The writer could obtain no direct evidence of occurrence of badgers in the park. However, occasional examples have been known to wander into the country west of Buck and Whitewater Lakes. Warden McKinnon records the species as occurring there on rare occasions. In the Lake Audy - Whitewater area, Warden Binkley had no definite record of occurrence within the park boundaries, but knew that there were badgers in the settled area. Green (1932) remarked that the badger was occasionally observed in the open areas of the southwest corner of the park.

24. CANADA LYNX. Lynx canadensis canadensis (Kerr).

The lynx was not listed by Green, nor did the writer find it in the park. Probably it was exterminated about 1920, or at least was thought to be extinct in the park. However, full protection for many years has had the effect of slightly increasing their numbers and should operate with greater effect as time goes on. Scattered individuals are said to roam again in the Riding Mountain wilderness. It was thought by some that all those seen in the park recently were migrants from Duck Mountain. Five individuals were reported to have travelled southward from the latter region in the winter of 1939-40 and to have crossed near Gilbert Plains to the north slope of Riding Mountain and almost certainly they entered the park. In the early 1940's, wardens in the western half of the park occasionally listed lynx, referring to them as "rare" or "casual at long intervals".

25. WHITE-TAILED JACK RABBIT. Lepus townsendii campanius Hollister.

This hare was not listed by Green (1932), nor was it seen by the writer anywhere in the park. There is some evidence that a few inhabit grasslands in southern park areas. Several records were established in the late 1930's and early 1940's. Warden Allan saw one along the main trail west of Lake Audy. Warden Binkley stated that a few inhabited the prairie east of Lake Audy. Warden Tully saw them in the same locality, and mentioned that a few were to be found at Moulton Meadows southwest of Lake Audy. It is also clear from a report by Warden Hyska that a few occur on the prairies at the western end of the park north of Rossburn and Birdtail.

26. AMERICAN VARYING HARE. Lepus americanus americanus Erxleben.

The varying hare is usually well distributed on Riding Mountain and becomes abundant during the cyclic peaks. Green (1932) records it as

nowhere plentiful during the three years from 1930 to 1932. In 1940 it was apparent that it was very scarce. A definite increase was under way by 1941. By 1942 it was found common to abundant in many eastern and central areas and was reported plentiful in the west. By the autumn of 1946 the species was again scarce, and even signs of it were rarely seen.

27. CANADA WOODCHUCK. Marmota monax canadensis (Erxleben).

These animals are widely dispersed in the park and were common in extensive areas during the investigations. Reports by the park wardens also indicated that the species was common to very common in nearly all parts of the plateau except in the densest stands of timber. The latest pre-hibernation record obtained by the writer was for one at Kennice Creek on October 1, 1941.

28. RICHARDSON'S GROUND SQUIRREL. Citellus richardsonii richardsonii (Sabine).

The "flicker-tail" has penetrated deeply into the park in some areas, but is absent in others. Since it inhabits campestrian situations, it is normally found in the park only where there are prairies. Hence, most of the population is confined to south-central and western areas. It is moderately common east of Lake Audy, northward around the headwaters of Vermilion River, and westward beyond Whitewater and Gunn Lakes. Distinct colonies exist in some localities, as they do on the plains to the south.

29. NORTHERN THIRTEEN-STRIPED GROUND SQUIRREL. Citellus tridecemlineatus hoodii (Sabine).

Most of the remarks made under C.r. richardsonii apply equally well here. The present species is locally common on many of the same grasslands, but, in addition, inhabits glades in the forest farther east, where it was seen near Clear Lake, Swanson Creek, and Whirlpool River. Average

date of hibernation is not known, but in 1940 the animals were scarce north of Lake Audy in mid-September where they had been common earlier in the year, and the last was recorded on September 21. Measurements of seven park specimens average L.279.3, T.91.0, H.F.39.6 mm. (maxima, 292, 103, 40 mm.). A female collected at Swanson Creek on June 3, 1941, contained seven embryos 35 mm. in length.

30. FRANKLIN'S GROUND SQUIRREL. Citellus franklinii (Sabine).

This species of ground squirrel does not appear to be as commonly dispersed as the two referred to above. Only a few were noted during the various investigations in the park, but some investigations were carried on in autumn when most of the animals already may have been hibernating. It is known that franklinii occurs locally in the southern part of the park from the eastern boundary to well beyond Whitewater Lake, and probably to the western boundary. Ordinarily, the species is most often noted in the area between Clear and Audy Lakes. Like C.t. hoodii it resorts to habitats in both Transition and Canadian Life Zones.

31. GRAY EASTERN CHIPMUNK. Tamias striatus griseus Mearns.

Park records of this species are based entirely upon specimens taken by Green (1934). One of these was collected August 9, 1933, on the eastern escarpment above Norgate, and another was taken on September 17, 1933, along the north shore of Clear Lake. Up to the present, griseus has not been seen in the park north or west of Clear Lake although Green (1937) collected specimens at Dauphin, about 40 miles north of Clear Lake.

32. NORTHERN INTERIOR CHIPMUNK. Eutamias minimus borealis (Allen).

These sprightly little quadrupeds have an almost universal distribution in suitable habitats on Riding Mountain. They inhabit the coniferous forests of the Canadian Zone as well as the dense poplar woods and

parklands of the Transition Zone. Despite this adaptability, they vary noticeably in abundance in different environments. They appeared to be most abundant in the central area of the park. The latest date recorded was for one collected at Edwards Lake on October 31, 1940. A series of seven specimens averaged: L.211.0, T.97.8, H.F. 32.2 mm. (maxima, 221, 103, 33.5 mm.); W.50.3 grams.

33. HUDSON BAY RED SQUIRREL. Tamiasciurus hudsonicus hudsonicus (Erxleben).

Red squirrels inhabit all suitable environment throughout the park. Population density varies from one locality to another. In the early 1940's they were exceptionally common in spruce-poplar tracts of the Lake Audy-Whitewater Creek district and northwards in the Vermilion River and Edwards Creek areas. In 1941, they were equally plentiful in the heavy spruce forest eastward from Moon and Clear Lakes (Fig. 5), much more so than in tracts of poplar and Banksian pine. In 1946, at Whitewater Lake, and west, the species was less in evidence, but still fairly common in good stands of evergreens. To some degree it may be subject to periodic cycles of abundance. Average size of eight park specimens was: L.315.9, T.126.7, H.F. 49.0 mm. (maxima, 327, 131, 51 mm.); W. 204.6 grams.

34. HUDSON BAY FLYING SQUIRREL. Glaucomys sabrinus sabrinus (Shaw).

Very little is known about flying squirrels in the area under review. The writer saw only one individual momentarily and no specimens were obtained although much trapping was done. Green (1932) says that the animals were reported more or less common on the eastern slopes of Riding Mountain. Contrary to the inference, it is not confined to that area. Nearly all wardens reported the species in their respective districts, but regarded it as either fairly scarce, or rare. It may be more numerous than

suspected, as is often the case with these secretive and nocturnal creatures. There is an example in the Wasagaming museum brought in by Warden Allen from a point east of Clear Lake.

It is assumed that sabrinus is the race inhabiting at least the high, Canadian Zone part of the plateau. Some possibility exists that the paler G.s. canescens also occurs in the open, deciduous woods in the southeastern extremity of the park and along the lower part of the eastern escarpment. The type locality of the latter subspecies is Portage la Prairie, about 65 miles to the southeast.

35. RICHARDSON'S POCKET GOPHER. Thomomys talpoides talpoides Richardson.

These animals are common locally and fairly well distributed in the southern and central areas of the park. Occurrence is most frequent in prairie-parklands habitats. Workings were seen from the eastern escarpment and the Whirlpool River area west beyond Whitewater Lake. Indications of greatest abundance were noted from the Lake Audy locality northwards to tributaries of Vermilion River and at Edwards Lake. In some small areas the animals are abundant. On the plateau they occupy many different types of country - prairie lands, grassy slopes, meadows, semi-open poplar woods, and moist, brushy lowlands. On one occasion their earth mounds were observed deep within heavy poplar-spruce woods. Average measurements of seven specimens taken at Swanson Creek and in the Lake Audy-Vermilion River area are: L.227.1, T. 65.8, H.F. 31.4 mm. (maxima, 274, 72, 32 mm.); w. 153.9 grams. This race intergrades with T.t. rufescens to the south and east.

36. CANADA BEAVER. Castor canadensis canadensis Kuhl.

In earlier times the beaver was widely and commonly distributed on Riding Mountain. Most of the population was trapped out before the park

was established. Green (1932, 1936) made extended studies of the species on Riding Mountain and stated then that the total population did not exceed 70. A number of pairs were subsequently introduced and these readily adjusted themselves and multiplied. Evidently the greater part of the present population is in the south-central area between Clear and Whitewater Lakes and northward to the various tributaries of Vermilion River. They appeared to be thriving particularly in the area including Lake Audy, Jackfish, Whitewater, and Heron Creeks, and the upper part of Minnedosa River within the park (Fig. 3).

37. MAXMILIAN'S GRASSHOPPER MOUSE. Onychomys leucogaster leucogaster (Wied).

Apparently Green is the only person to have found this species on Riding Mountain. He remarked (1932), "Several of these rodents were captured about the open stretches along the southern boundary of the park. Apparently they are not numerous."

38. BAIRD'S WHITE-FOOTED MOUSE. Peromyscus maniculatus bairdii (Hoy and Kennicott).

Ordinarily, this ubiquitous species is common or abundant over its normal range. It is widely represented in the park in various types of environment from prairie tracts to mixedwood forest. In 1932 Green recorded it very plentiful in localities suitable to its needs and six years later R. Sutton rated it abundant in the Clear Lake area. From 1940 to 1946 the writer found the species extraordinarily scarce in a large number of park localities. Only 14 were taken in 2,500 trap-nights. In good years it is not uncommon to capture more.from 100 traps in a single night.

Green in his list of park mammals includes both this race and P.m. borealis, remarking that the latter form is "found in the forested areas

about the north escarpment of the mountain and bairdii about the semi-open terrain of the southern boundary". This is what might be expected, but all specimens taken by Sutton and the writer from the southern part of the park to the north slope were identified by Dr. Anderson as bairdii. Average measurements of eight specimens collected on Riding Mountain are: L.149.1, T.63.4, H.F.19.5 mm. (maxima 155, 69, 20 mm.); W.18.2 grams.

39. MANITOBA LEMMING MOUSE. Synaptomys borealis smithii Anderson and Rand.

Proof of the occurrence of this species within the park is provided by two specimens trapped by R. Sutton near the south shore of Clear Lake west of Wasagaming. They were taken on July 30 and October 18, 1938, for the National Museum of Canada. Extensive trapping was carried out by the writer in many bog areas in an effort to secure Synaptomys, but with negative results. It is evident that the species is very rare on Riding Mountain.

40. PRAIRIE PHENACOMYS. Phenacomys ungava soperi Anderson.

On June 5, 1941, one of these animals was taken by the author at Swanson Creek, about 10 miles east of Park Headquarters at Wasagaming, Clear Lake (Fig. 4). This constitutes the first record for the genus on Riding Mountain, or elsewhere in southern Manitoba; the specimen (N.M.C. No. 17131) represents a new subspecies (Anderson, 1942). Measurements of the specimen were: L.135, T.33, H.F. 17 mm. It was a female that contained seven embryos averaging 8 mm. in length. The environment is of typical Canadian Zone aspect, characterized by poplar, spruce, and Banksian pine and scattered muskegs.

About 3½ miles west of the Swanson Creek locality another example was secured on July 16, 1942, (female; L.135, T.30, H.F. 17.5 mm.; W.21.4 grams). The nature of the habitat was similar to that described for

the Swanson Creek specimen. In view of the extensive trapping operations and small results, it is evident that the prairie phenacomys is rare in the park, as it apparently is elsewhere in its range.

41. PLAINS RED-BACKED MOUSE. Clethrionomys gapperi loringi (Bailey).

This is one of the most common small rodents on Riding Mountain, ranging throughout the entire area from prairie-parklands to heavy coniferous forests. Some individual difference of coloration is apparent in a good series of specimens. Normally the species is common to abundant. In 1940 and 1941 it was scarce except for occasional "pockets" of moderate abundance. Trapping results in 1942 indicated that a large increase had taken place and by 1946 it had become the most abundant small mammal in the park.

As in other parts of its range, it resorts to practically all available niches, including the swampy margins of lakes and streams and typical muskeg tracts with or without shrub and tree growth. Thirteen specimens were preserved in the park; these average: L. 126.4, T. 34.3 H.F. 17.8 mm. (maxima, 145, 44, 19.5 mm.); W. 24.1 grams.

42. DRUMMOND'S MEADOW MOUSE. Microtus pennsylvanicus drummondii (Aud. and Bach.).

Meadow mice of this form are found almost everywhere on Riding Mountain. At certain times they are abundant in their especially preferred habitats, including meadows, brushy semi-bog areas, and grass and sedge lowlands along lakes and streams. Occasional examples were taken in forest on high ground. Their numbers vary at different periods. R. Sutton found the species common at Clear Lake in 1939, but there were very few in most collecting areas during 1940 and 1941. Recovery, more marked in some tracts than in others, was evident in 1942. In the autumn of 1946 the species was

common locally to fairly abundant in the better habitats around Whitewater Lake. Possibly the numerical peak was reached during the breeding season of 1945. The average measurements of 11 park specimens are: L. 149.0, T. 41.2, H.F. 18.7 mm. (maxima, 168, 48, 20.3 mm.); W. 42.9 grams.

43. LITTLE UPLAND MOUSE. Pedomys minor (Merriam).

Green (1932) lists this species with the remark that it "is fairly numerous in favoured localities". He was the only investigator who found it in the park. He mentioned no definite localities, but the most likely places of occurrence are the prairies in the south-central part of the park and grasslands near the western extremity.

44. HUDSON BAY MUSKRAT. Ondatra zibethica alba (Sabine).

Over much of the park, muskrats cannot be regarded as common. Large areas have no suitable habitat, particularly in the east and north. Conditions are better and muskrats are more numerous in south-central and western districts, and in some places the animals are plentiful, living both in bank dens and in typical lodges. An adult female was collected at Whitewater Lake on October 8, 1946, with measurements L. 570, T. 243, H.F. 73 mm.; W. 2.75 lbs.

45. HOUSE RAT. Rattus norvegicus (Erxleben).

These exotic mammals have become very common in parts of southern Manitoba, but, as yet, relatively few have invaded Riding Mountain. The writer did not find any in the park, but was informed that some had been seen. Green (1932) remarked that it was common about occupied millsite buildings. A specimen taken by him at Kennice Creek is in the mammal collection at the Wasagaming museum.

46. HOUSE MOUSE. Mus musculus domesticus Rutty.

Having spread throughout the settled lands surrounding the park,

numbers of these animals have now taken up quarters in various buildings on Riding Mountain. The latest information indicates that they are not yet very annoying. Occasional examples were taken in traps set for native mammals. In the Wasagaming museum are four specimens collected by Green. These were taken on the northern escarpment south of Dauphin, and at Kennice Creek, a few miles north of Lake Audy.

47. PRAIRIE JUMPING MOUSE. Zapus hudsonius campestris Preble.

Jumping mice are relatively scarce in the park, but cannot be described as rare. Occasional specimens can be secured in favourable localities during the summer and early autumn before hibernation begins. Examples have been taken at Swanson Creek and Clear Lake, in the Kennice-Edwards Creeks district, and along the headwaters of Vermilion River directly north of Lake Audy. Possibly they are more numerous in the prairie-parklands areas west of Whitewater and Gunn Lakes where investigations were conducted too late in the season to find them. Green and Sutton secured specimens in the central part of the park. The two examples (both males) taken by the writer at Swanson Creek and Vermilion River, respectively, measure L. 230, T. 145, H.F. 30.5 mm.; and L. 217, T. 135, H.F. 32 mm. In both cases the animals were trapped on boggy stream margins grown to grass and willows.

48. EASTERN CANADA PORCUPINE. Erethizon dorsatum dorsatum (Linnaeus).

This creature is rare; in fact, a number of years ago its existence in the park was a matter of lively controversy. Some observers asserted that it never had inhabited the plateau, while others maintained that it was originally present and still persisted in very small numbers. In 1932 Green did not list it. A few do occur, but its rarity is shown by the fact that five out of seven park wardens had never seen one in the park.

Warden McKinnon informed the writer that he had observed one in the western part of the park in 1935. Warden Binkley stated that an adult was killed by a German prisoner in November, 1944, near the P.O.W. camp then located on the north shore of Whitewater Lake. The species was not seen by the writer.

49. MANITOBA ELK. Cervus canadensis manitobensis Millais.

The elk is the most abundant big game animal in the park, which contains one of the largest populations of elk in Canada. They were distributed over most of the park but were usually found in largest numbers in the centre of the plateau north from the Lake Audy prairies, and in various districts about Ochre River northwest of Whirlpool Lake (Figs. 1, 6, and 7). There was a gradual diminution in numbers west and northwest of Whitewater Lake. There were few in the heavy timber on the eastern end of the plateau. They favour woods that are predominately deciduous and interspersed with open hills, ridges, and prairies.

Green (1933) gives a detailed account of this species on Riding Mountain. Investigations of elk were carried out for the Canadian Wildlife Service by Banfield in 1947 (Banfield, 1949), and by Colls and Banfield in 1950, 1951, and 1952 (Colls, 1952). The reports suggest that the population reached a peak in 1947, declined sharply, and was more or less stationary at about the level of 4,700 during the three years preceding March, 1952.

50. ROCKY MOUNTAIN MULE DEER. Odocoileus hemionus hemionus (Rafinesque).

For the most part, this species is rather scarce on Riding Mountain, but it occurs in all districts, the density of the population varying a good deal according to environment. During the investigations, it appeared to be scarcest in the southeast part of the park and in the extreme north, west of Edwards Creek. It was also uncommon in most of the country west of

Whitewater Lake. Evidently it was most plentiful in a belt of country northward from Clear Lake. Even where most plentiful, it was far outnumbered by white-tailed deer, and the wardens estimated that there were five to twenty white-tails for each mule deer, depending upon location. However, it was estimated that several hundred hemionus inhabited the park.

51. NORTHERN PLAINS WHITE-TAILED DEER. Odocoileus virginianus dacotensis Goldman and Kellog.

This is the common deer on Riding Mountain, where it far outnumbers the mule deer. It was found distributed throughout the entire area, except in small unsuitable tracts. Its numerical status varied considerably from one district to another, with generally greatest abundance across the southern half of the park. A conservative estimate of the population at the time of the investigations was between 2,000 and 3,000 head, most of these being west of the longitude of Lake Audy. Colls (1952) concluded that there were somewhat less in 1950, regarding the Chief Warden's estimate for that year of 2,000, including both mule deer and white-tails, as too high. He reported apparent increases in 1951 and 1952.

52. EASTERN MOOSE. Alces americana americana (Clinton).

In some sections of Riding Mountain moose are common, to abundant. Elsewhere they occur in only moderate numbers, or are scarce or absent. Local and general distribution is largely determined by suitability of habitat, and concentration of tourists during the summer months. Based on an analysis of wardens' reports it appeared that the bulk of the moose population was roughly concentrated in the central area of the park, with gradually diminishing numbers to the east and west. At various times the writer saw many individuals and fresh signs in the Whirlpool River, Moon and Edwards Lakes areas; from Lake Audy and Jackfish Creek northwards over

the Vermilion River drainage; and west to Whitewater Lake and the vicinity of Gunn Lake. Beyond the latter points moose were said to be consistently scarcer. Low numbers were also reported for the whole eastern extremity of the plateau. To some extent natural increase around the margins of the park has been nullified by poaching.

Moose were much more numerous than mule deer, but less so than white-tails or elk. Colls (1952) quotes the Chief Warden's estimate of 1,500. On aerial transects he saw more moose than deer and nearly twice as many moose were seen on the transects in 1952 as in either 1950 or 1951.

53. PLAINS BISON. Bison bison bison (Linnaeus).

These animals are a part of the park fauna, but do not occur in a thoroughly wild state. They are confined to a large, heavily fenced enclosure of open prairies and woodlands east of Lake Audy and along Jackfish Creek (Fig. 2). They are an important attraction to visitors during the summer months.

It is questionable whether bison ever existed in a wild state in the central and eastern parts of the park, but almost certainly they once inhabited the prairies in the western part.

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Fig. 1. Poplar woodland and prairie country northeast of Lake Audy, September 20, 1940.

Fig. 2. Plains bison grazing on prairie east of Lake Audy where shrubby cinquefoil prevalent. September 17, 1940.

Fig. 3. Beaver lodge and pond, Whitewater Creek. June 1, 1941.

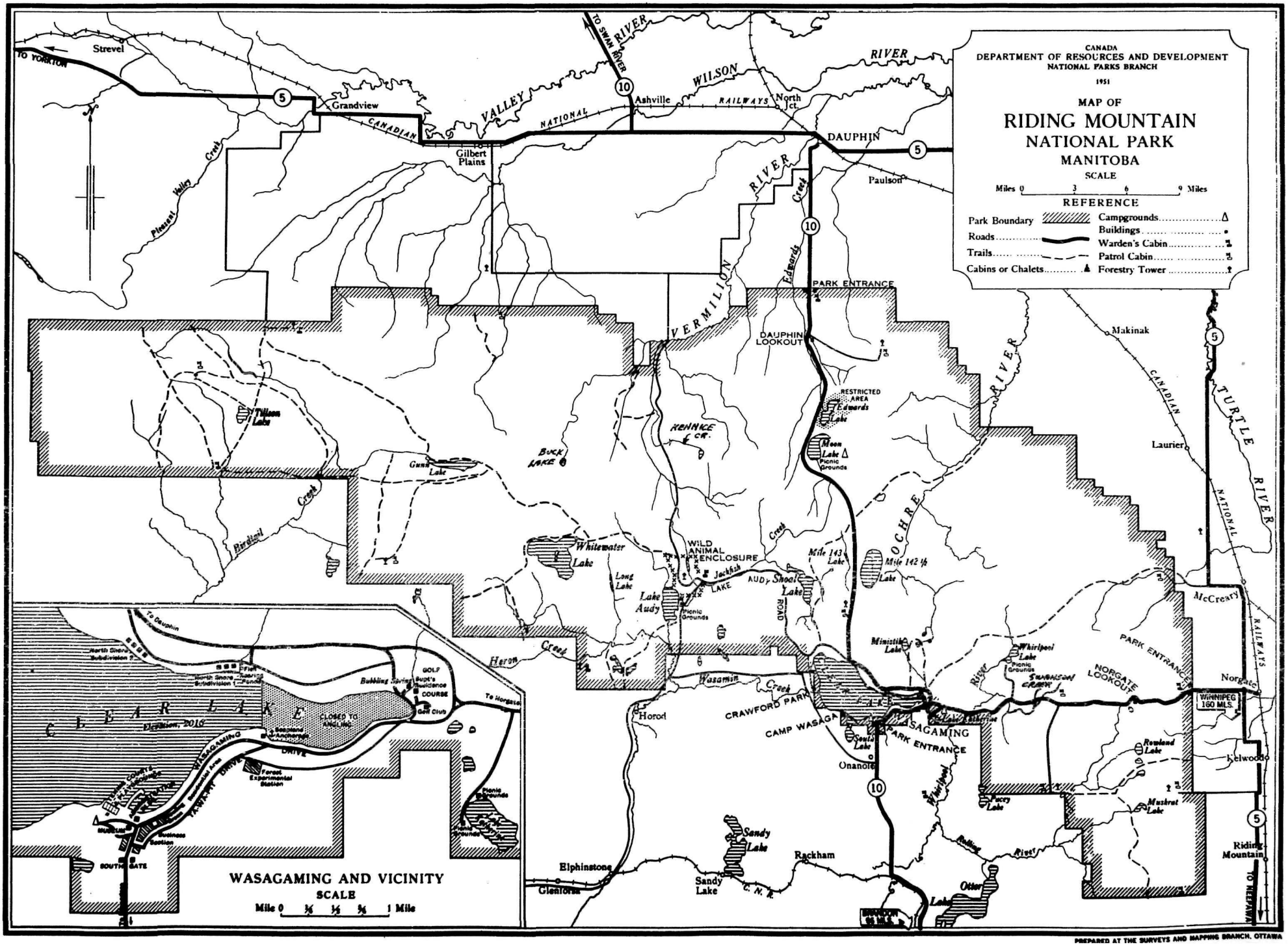
Fig. 4. Type locality of prairie phenacomys in Canadian Life Zone environment at Swanson Creek. June 5, 1941.

Fig. 5. Midden heap of spruce cone scales made by Hudson Bay red squirrel two miles southeast of Whirlpool Lake. June 6, 1941.

Fig. 6. Game trail used chiefly by elk and deer, in valley of Kennice Creek. October 2, 1941.

Fig. 7. Cow elk on prairie in typical Transition Life Zone habitat near Jackfish Creek. October 4, 1941.

Fig. 8. Whitewater Creek near outlet into Whitewater Lake. Mink trail shown on left bank. October 8, 1946.



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