

Ecological Notes on Animals of the Churchill Region of Hudson Bay

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ABSTRACT. The distribution and ecology of 26 mammals, 6 birds, and 1 amphibian are described. Northern range extensions are recorded for the pygmy shrew, arctic shrew, muskrat, heather vole, northern bog lemming and wood frog. A southern range extension of the arctic ground squirrel is noted following its being observed for the first time in Manitoba. Observation of a great blue heron at Churchill, far from its usual range in southern Manitoba, is also recorded. The number of species of small mammals on two-hectare quadrats in marsh, prairie, shrub, and savanna along the grassland-coniferous forest transition in southern Manitoba was 1.8 to 3.0 times greater than in beach-meadow, tundra, shrub, and open-forest quadrats along the coniferous forest-tundra transition of northern Manitoba, while the total population was 1.8 to 3.4 times greater.

RÉSUMÉ. *Notes écologiques sur les animaux de la région de Churchill sur la mer d'Hudson.* L'auteur décrit la distribution et l'écologie de 26 mammifères, 6 oiseaux et 1 amphibien. Il enregistre une extension d'aire vers le nord pour la musaraigne pygmée, la musaraigne arctique, le rat musqué, le campagnol roux, le lemming des marais et la grenouille des bois. Il note une extension d'aire vers le sud pour l'écureuil de terre arctique, par suite d'une première observation de cette espèce au Manitoba. Il enregistre aussi l'observation d'un grand héron bleu à Churchill, loin de son aire habituelle dans le sud du Manitoba. Le nombre d'espèces de petits mammifères sur des carrés de deux hectares dans les marécages, la prairie, les broussailles et la savane le long de la transition entre la forêt coniférienne et la prairie dans le sud du Manitoba est de 1.8 à 3.0 fois plus grand que dans des carrés de prairie côtière, de toundra, d'arbustes et de forêt-parc le long de la transition forêt coniférienne-toundra dans le nord du Manitoba, alors que la population est de 1.8 à 3.4 fois plus grande.

РЕЗЮМЕ. *Экологические заметки о животных в районе г. Черчилль на Гудзоновом заливе.* Описано распространение и экология 26 видов млекопитающих, 6 видов птиц и одной амфибии. Зарегистрированы северные границы ареала бурузубки малой, бурузубки полярной, ондатры, лемминговой мыши северной и лягушки лесной американской. Установлена южная граница ареала полярного суслика в Манитобе, где этот вид был обнаружен впервые. Было также отмечено появление цапли голубой большой в районе Черчилля, далеко от ее обычных мест обитания в южной Манитобе. Численность видов мелких млекопитающих на участках наблюдения площадью в два гектара вдоль южной границы хвойного леса в Манитобе в 1,8-3,0 раза больше, чем вдоль северной границы, в то время как общая их популяция на юге в 1,8-3,4 раза больше, чем на севере.

INTRODUCTION

During the period 4-20 July 1973, a field party from the Manitoba Museum of Man and Nature conducted biological studies near a camp on the west coast of Hudson Bay (latitude 59° 09'N), five miles (8 km.) north of Seal River and 35 miles (56 km.) northwest of Churchill, Manitoba, and work continued in the Churchill region from 24 August to 1 September. The areas of activity are in-

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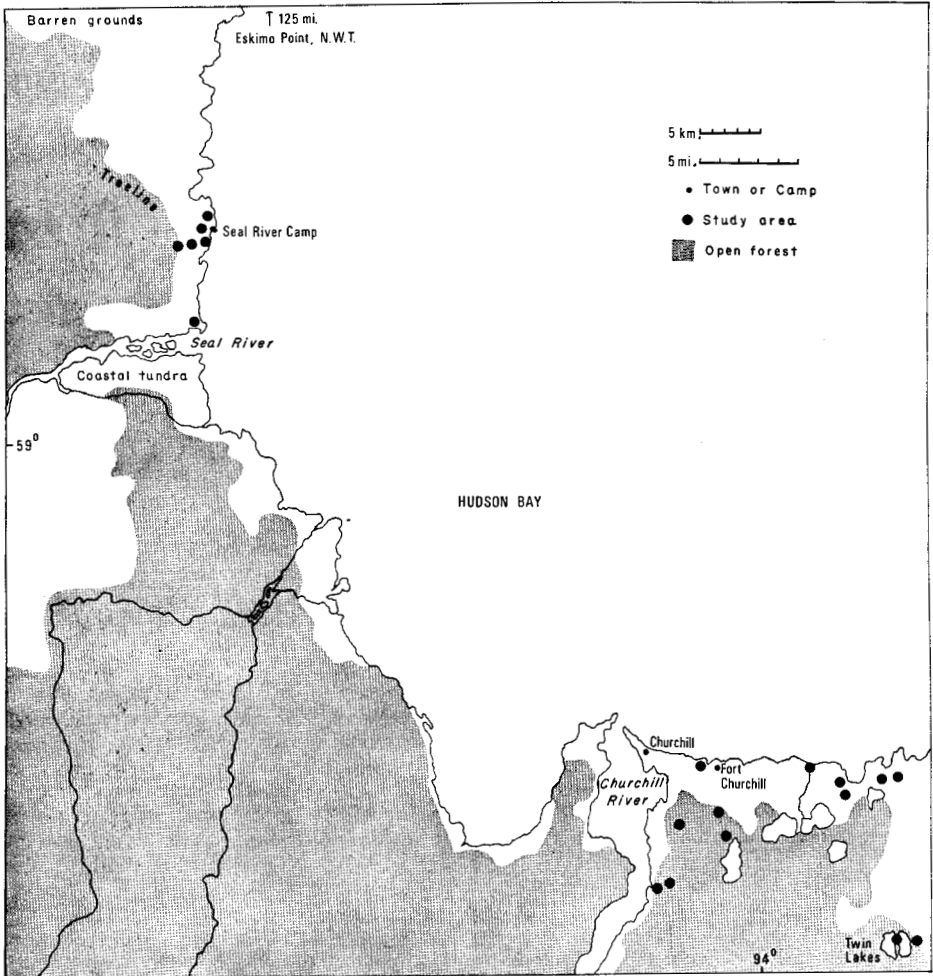


FIG. 1. Map of southwestern Hudson Bay, showing the study areas at Churchill and Seal River.

indicated on Fig. 1. This region lies at the northern edge of the forest-tundra ecotone. Additional studies were undertaken from 31 July to 3 August 1974 during a boat trip along the coast from Churchill to the vicinity of Nunalla, an abandoned Eskimo camp on the barren grounds, 82 miles (132 km.) northwest of Churchill and over 35 miles (56 km.) from the treeline. The barren grounds extend southeastward across northern Manitoba to about the latitude of the Seal River camp, while the stretch of coastal tundra continues in patches considerably farther south, permitting a number of arctic animals to range as far south as Churchill (e.g. collared lemming and arctic hare). In turn, the decline of forest in extreme northeastern Manitoba limits the distribution of forest and forest-edge animals (e.g. red squirrel and meadow jumping mouse). In the following accounts are recorded the distribution and ecology of various mammals, birds, and amphibians found in the forest, tundra, ecotone, and beach communities of western Hudson Bay.

MAJOR PLANT COMMUNITIES AND TOPOGRAPHY

Although topography and vegetation vary considerably at different sites, the following zones and dominant plants are generally present (Ritchie 1956; Scoggan 1959; and personal observations by the author and Dr. Karen Johnson of the Manitoba Museum of Man and Nature):

Beach meadow on sandy beach — *Elymus arenarius*, *Arenaria peploides*.

Tidal flats — *Puccinellia* spp., *Plantago maritima*, *Chrysanthemum arcticum*.

Salt marsh — *Puccinellia* spp., *Matricaria ambigua*.

Coastal and tundra shrub thicket on ridges — *Alnus crispa*, *Salix* spp., *Betula glandulosa*.

Heath and heath-lichen on quartzite outcrops and rocky beach ridges — *Empetrum nigrum*, *Vaccinium vitis-idaea*, *Arctostaphylos uva-ursi*, *Dryas integrifolia*, *Cetraria nivalis*.

Moss-hummock tundra on wet peat flats — *Sphagnum rubellum*, *Andromeda polifolia*, *Oxycoccus microcarpus*.

Sedge-meadow tundra on flooded peat flats — *Eriophorum scheuchzeri*, *Carex* spp., *Scirpus caespitosus*.

Pond and creek margins — *Potentilla palustris*, *Ranunculus* spp., *Carex* spp., *Salix myrtilifolia*, *Betula glandulosa*.

Treeline shrub thicket — *Betula glandulosa*, *Alnus crispa*, *Salix* spp., *Myrica gale*, *Ledum groenlandicum*.

Open spruce-tamarack forest — *Picea glauca*, *Picea mariana*, *Larix laricina*, *Betula glandulosa*, *Cladonia alpestris*.

Closed spruce forest on elevated flats and ridges — *Picea glauca*, *Ledum groenlandicum*, mosses.

In Fig. 2 are illustrated diagrammatically the relationships of the major plant communities, topographical features, and small-mammal communities in the Churchill-Seal River region of Manitoba.

MAMMAL ACCOUNTS

Masked shrew (*Sorex cinereus*).

This species was rather uncommon at Seal River and only 15 specimens were collected. Though a few were present in most habitats, the majority were found in the moist shrub zone near the treeline. In contrast, the masked shrew was the most abundant mammal at Churchill where 136 specimens were taken. The most productive habitats were the sedge-shrub zone near creeks and ponds inside treeline, and in the heath-moss cover of open and closed spruce forest. Only a few shrews were found on the tundra, in the sedge-dwarf shrub border of watercourses. Smith and Foster (1957) reported that only about 17 specimens were known previously from the Churchill region.

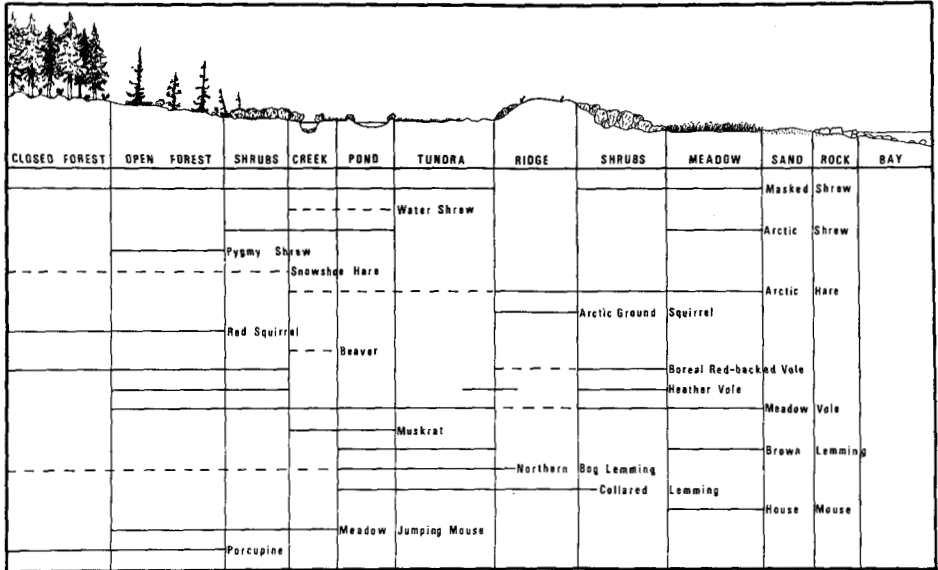


FIG. 2. Diagram illustrating the zonation of small mammals (Insectivora, Lagomorpha, and Rodentia) in relation to vegetation and topography in the Churchill - Seal River region. Solid lines represent data from the present study, broken lines data from Preble (1902) and Smith and Foster (1957)

Arctic shrew (*Sorex arcticus*).

Eighteen individuals were captured at a number of sites near Churchill — a northern range extension of about 200 miles (320 km.) from the Gods (formerly Shamattawa) River, a tributary of the Hayes River, Manitoba (Merriam 1895). Fourteen were collected in the sedge-shrub border of ponds and creeks just inside the treeline of spruce-tamarack forest, three in the sedge-dwarf shrub zone of tundra ponds, and one in the beach meadow of sea lyme-grass and marsh fleabane (*Senecio congestus*). It is interesting to note that the older record from Gods River “was the ‘totem’ of an Indian chief from whom it was stolen, and when he missed it he went on the war path” (Merriam, 1895).

Pygmy shrew (*Microsorex hoyi*).

Two specimens were collected just inside the treeline in an area three miles south of Fort Churchill. The habitat consisted of scattered stands of white spruce and tamarack, numerous lakes and ponds, and raised peat hummocks overgrown with heaths and lichens. Discovery of these specimens extends the range of this rare species 300 miles (480 km.) northward from Robinson Portage (35 miles or 56 km. southwest of Oxford Lake), Manitoba (Preble 1902). Other species taken in association with the pygmy shrews were 64 masked shrews, 2 arctic shrews, 3 red-backed voles, 9 heather voles, 3 meadow voles, 13 meadow jumping mice, and 1 red squirrel.

Arctic hare (*Lepus arcticus*).

Three individuals were collected, and seven others were observed, in shrub tundra near the coast in the vicinity of the Seal River camp. Several hares were first sighted while they were stretched out on the top of boulders, their grey dorsal pelage closely matching the colour of the rocks.

Arctic ground squirrel (*Spermophilus parryii*).

Fourteen specimens were collected at the Seal River camp, on the beach ridge along the coast and on rocky ridges inland for about half a mile. Their mounds and well-worn runways were common features of the landscape. This species was very numerous and over 100 adults were observed. Individuals were often seen sunning themselves on the tops of boulders (see cover picture) and on patches of sand, or feeding within 60 yards (55 m.) of their dens. One was observed running quickly along the intertidal flats to its home at least 120 yards (110 m.) away.

Six out of eight females at Seal River camp showed signs of recent breeding, and these had 6 to 12 placental scars and manifested lactation. Young were first seen above ground on 9 July. Some weighing around 168 grams were actively nibbling vegetation, but in one family the offspring each weighed only about 66 grams and their eyes were still closed. By mid-July, families of up to one dozen young could be seen at almost every den entrance. Fifty per cent of the adults were still moulting, while the others were already in the new pelage.

This species was also common on the rocky ridges at Nunalla where three specimens were collected. At Hubbard Point, 48 miles (77 km.) northwest of Churchill, a colony of several hundred were found inhabiting the sandy beach ridge, and one individual crossed the muddy intertidal flats at low tide over 300 metres from the nearest shore.

These are the first records of arctic ground squirrel having been taken as far south as Manitoba. In 1900, Preble (1902) searched for this species along the coast of Hudson Bay from Churchill to a camp 25 miles (40 km.) south of Eskimo Point (formerly Cape Eskimo), District of Keewatin, N.W.T., about 130 miles (208 km.) north of Churchill. Several specimens were taken at the latter camp, and the Eskimo guide informed Preble that the species did not occur any farther south, though Preble had heard it stated that the animal inhabited the coast south of Fort Churchill. It is difficult to imagine that both Preble and his guide could have missed this conspicuous animal (or its burrows) in the area between the Seal River and their camp in over two weeks of investigation (1-18 August 1900). Did the species expand its range southward after 1900? Several adult Chipewyans, whose parents had previously lived in the Seal River area, informed the present author that the "siksik" had been there for a very long time. Considering these reports and the apparently suitable habitat along the coast south to the Seal River, it may be presumed that the arctic ground squirrel has long been present in this region and was overlooked, possibly during a period of low numbers. Mr. Pearce Burry of Churchill stated that he has seen this animal as far south as the south shore of the Seal River. These records extend the range of the arctic ground squirrel 114 miles (182 km.) south of Preble's locality, and bring the species to within 31 miles (50 km.) of Churchill.

Red squirrel (*Tamiasciurus hudsonicus*).

Preble (1902) and Smith and Foster (1957) noted that red squirrels inhabited the spruce forests just south of Churchill, but only one specimen and a skull from an owl pellet were collected by the latter. During the present study, red squirrels were found at most forested areas visited near Churchill, and nine were collected. In locations where the spruce and tamarack were stunted and widely spaced, the squirrels took refuge underground rather than in trees. This population is the northernmost known along the coast, though others probably occur still farther north, approaching the northern treeline. None was observed at Seal River; however, activities were not extended very far into the open forest there.

Tundra red-backed vole (*Clethrionomys rutilus*).

Only one specimen of this tundra species had been previously collected as far south as Manitoba, on the coast at Nunalla (Breckenridge 1936). During the present study two additional voles were collected at a nearby site, 82 miles (132 km.) northwest of Churchill. Both inhabited a dwarfed (less than one metre high) alder and willow shrub thicket growing along the protected edge of a boulder ridge. This was the best developed shrub thicket in terms of size of the shrubs and extent of area that was seen for several miles. Shrub mats less than one-half metre high produced no tundra red-backed voles nor showed signs of their former occupation — debarked twigs, burrows, and piles of faeces. This species likely occurs throughout the barren grounds of northeastern Manitoba in shrubby growth.

Boreal red-backed vole (*Clethrionomys gapperi*).

This usually abundant species was present in small numbers at both locations. Only 17 specimens were taken at Seal River, in moist and dry shrub communities at the treeline and on the rocky ridges of the tundra. They represent a 35-mile (56-km.) range extension northwestward from Churchill. Though many sites were trapped at Churchill, where Smith and Foster (1957) caught over 500 individuals in 1954-55, only nine were collected in open and closed spruce forest during the present study.

Heather vole (*Phenacomys intermedius*).

Sixty individuals were collected near the Seal River camp, the majority being found on rocky ridges surrounded by wet tundra. Between the boulders were patches of dry heath, lichen, moss, and shrubs. Piles of debarked twigs of mountain alder, dwarf birch, and willow, and small mounds of faeces indicated the presence of these voles. A number of individuals (mostly subadults) were taken in wet sedge-moss tundra within 100 yards (91 m.) of the ridges. The species was found at many sites extending from the coast into the open forest. This locality represents a range extension of 35 miles (56 km.) northwest of Churchill, where Smith and Foster (1957) also found the species abundant. The nearest record to the northwest is one specimen taken at Malaher Lake, Keewatin, well within the treeline (Manning 1948). Extensive trapping at Churchill in the course of the present study produced only nine specimens — in open white spruce-tamarack forest.

Throughout its range in the boreal forest and forest-tundra transition, the heather vole is almost always scarce. It is therefore surprising that it should occur in such abundance on the periphery of the range, where the species reaches its limits of tolerance of certain environmental factors (particularly decreasing size of shrubs and frequency of shrub patches). The Seal River populations are of special interest because they occur outside the northern treeline on the edge of the barren grounds.

Heather voles living in shrub communities and open woods may compete for denning sites and food sources of herbs and bark with red-backed voles, meadow voles, and collared lemmings. The Seal River populations were highest on the rocky ridges in shrubs where the other species were uncommon or absent during the study. However, medium to high numbers of meadow voles, red-backed voles, and collared lemmings during the summers of 1954 and 1955 at Churchill did not prevent a build up of heather voles (Smith and Foster, 1957). In contrast, all four species were scarce there in 1973.

Meadow vole (*Microtus pennsylvanicus*).

These voles were very abundant at Seal River and relatively uncommon at Churchill. A total of 323 were trapped at the Seal River camp with little effort. The beach meadow, dominated by sea lyme-grass, was the most productive habitat where the mice were often seen scurrying along runways. Meadow voles were also found right down to the high-tide mark in the short salt grasses of the coastal flats. Farther inland this species preferred moist sites in sedge-grass-moss tundra and the sedge-shrub borders of ponds, but a few were also taken under shrubs on the drier ridges, and in the open forest. Only 34 meadow voles were captured at Churchill, and these were mostly in grass-sedge or low shrub habitats along creeks and ponds on the tundra and near the beach. Limited trapping at Nunalla produced 25 voles in the sedge growth around ponds and in moist sedge-moss tundra.

Muskrat (*Ondatra zibethicus*).

Smith and Foster (1957) summarized the few reports of muskrats in this region, stating that they inhabited the Churchill River system and occasionally dispersed over the tundra in summer via creeks and ponds. The present author saw none personally, but Mr. Dan Rogers of the University of Guelph observed one at Eskimo Point, and had reliable reports of three others there — representing a northern range extension of 152 miles (243 km.).

Northern bog lemming (*Synaptomys borealis*).

One specimen was collected near the coast at the Seal River camp, in sedge-moss tundra close to shrub-lined ponds and the beach ridge. It is one of the few specimens which has been taken beyond the treeline and its capture extends the range 35 miles (56 km.) northwest from Churchill.

Collared lemming (*Dicrostonyx torquatus*).

This lemming was extremely scarce near Churchill where neither individuals nor fresh sign was seen. Rogers (see above) found only a few there during the summer

of 1973. The species was common near Seal River where 41 specimens were collected in wet and mesic sedge-moss tundra. None was captured on the elevated rock ridges which cross the low tundra; however, old droppings showed that lemmings had been present there previously, possibly during the past winter. Most were captured in the vicinity of moss hummocks. An adult male and female, and six offspring were caught around a single hummock. Other collared lemmings were trapped in very wet sites which became submerged for periods after rain. A single lemming taken at Nunalla was found on the tundra between a dry rocky ridge and sedge ponds. Smith and Foster (1957) collected all their lemmings at Churchill in dry habitats along rocky ridges.

Mr. Frank S. Bailey, Regional Game Officer for the Northwest Territories, reported that lemmings had been abundant on the tundra near Eskimo Point since the early spring of 1973. Rogers and his associates studied lemmings there during the summer and found both collared and brown lemmings (*Lemmus sibiricus*) extremely abundant. Hundreds of each species were captured and many others were observed. Bailey noted that, as the summer progressed, lemmings became abundant at Repulse Bay, then Rankin Inlet and Whale Cove, and lastly Coral Harbour (District of Keewatin, N.W.T.).

House mouse (*Mus musculus*).

Smith and Foster (1957) recorded the first house mouse within the townsite of Churchill in 1952. The species was probably introduced via ships and/or the railway. It is now common around various settlements and grain elevators. Considering the harsh winter conditions of the region, it was rather surprising to capture three feral house mice in the beach community of sea lyme-grass and marsh fleabane, about 4.5 miles (7.2 km.) east of Fort Churchill. Another specimen was taken in a grassy ditch closer to the town.

Meadow jumping mouse (*Zapus hudsonius*).

Preble (1902) recorded two jumping mice from the Churchill area, and Smith and Foster (1957) an additional eight. The exact location where the latter caught five specimens was re-examined in the course of the present study, and 11 more were captured in the sedge-shrub borders of ponds in open spruce-tamarack forest. Three mice were trapped, and another observed, at three other localities just inside the treeline, and one individual was caught along a creek not far from the beach and over three miles (5 km.) from the treeline (a total of 15 specimens). This population occurs at the northern boundary of the species' range.

White whale (*Delphinapterus leucas*).

Over 1000 individuals were observed in this region, the majority of them occurring at the mouths of the Seal and Churchill rivers. They were often seen and heard at high tide while swimming near the pack ice. From a plane they appeared like grains of rice scattered over the dark, shallow waters of the bay. A beached skull and a jaw of another specimen were collected.

Short-tailed weasel (*Mustela erminea*).

Three weasels were trapped in thick grass near the beach at Churchill by Rogers, who kindly donated them to the Manitoba Museum of Man and Nature. The author shot on the tundra an additional specimen, which had darted out on the road to feed on a dead lemming. Short-tailed weasels were very common at the Nunalla camp, and four adults were collected along a boulder ridge overgrown by heath and dwarf shrubs. Three were shot while they were actively hunting during daylight hours, while the fourth was trapped only one metre away from where an arctic ground squirrel was trapped the same evening.

Miscellaneous

Other species seen near the Seal River camp include three polar bears (*Ursus maritimus*), several ringed seals (*Phoca hispida*) and harbour seals (*Phoca vitulina*), and also two barren-ground caribou (*Rangifer tarandus*). Several porcupines (*Erethizon dorsatum*), red foxes (*Vulpes vulpes*), grey wolves (*Canis lupus*), and one lynx (*Lynx lynx*) were observed at Twin Lakes, southeast of Churchill.

On the boat trip along the coast from Churchill to Nunalla 17 polar bears were observed at close range, the majority swimming in the bay. Twenty seals (harbour and ringed) were also seen, many congregating at the rich kelp beds at Hubbard Point, where the Caribou River enters the bay.

MAMMAL QUADRATS

Four five-acre (two-hectare) quadrats, set in beach-meadow, sedge-moss tundra, treeline shrub, and treeline open-forest habitats, were studied in order to determine the kinds and numbers of mammals occurring in each of these major communities of the Churchill-Seal River region. Each quadrat was measured to 142 metres on all four sides, using a steel tape and compass. Small mammals were collected over three nights with 400 museum special traps spaced evenly in rows and set at the nearest spot likely to produce voles and shrews. The larger mammals were recorded



FIG. 3. Marine beach-meadow quadrat located at the Seal River camp. Dominant plants: *Elymus arenarius*, *Senecio congestus*, *Epilobium angustifolium*, and a few patches of mosses. Along the inland border are the shrubs *Salix* spp., *Alnus crispa*, and *Betula glandulosa*. The soil consists of sand, gravel, and peat, with a number of poorly drained sites.

by observation, tracks, droppings, and carcasses. The dominant plants, substrate, and moisture conditions are described in the captions of Figs. 3-6 and the results are shown in Table 1.



FIG. 4. Wet, sedge-moss tundra quadrat located near the Seal River camp. Dominant plants on the peat flats: *Scirpus caespitosus*, *Carex aquatilis*, *Carex vaginata*, *Carex rariflora*, *Sphagnum rubellum*, *Potentilla palustris*, *Triglochin maritima*, *Andromeda polifolia*, *Salix arctica*, *Betula glandulosa*, *Alnus crispa*, and *Myrica gale*. The many ponds flood large areas after rain.

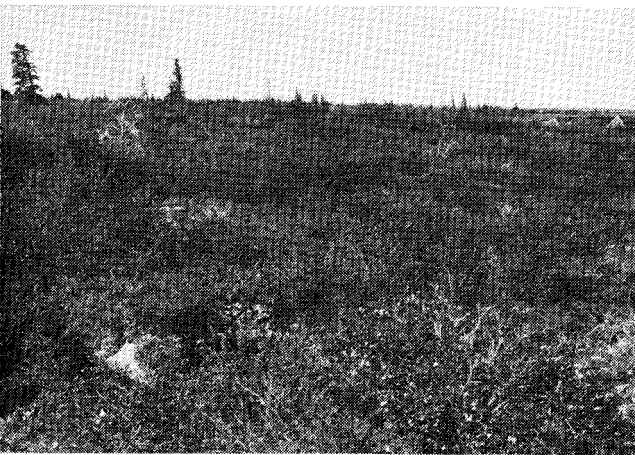


FIG. 5. Treeline-shrub quadrat located near the Seal River camp. Dominant plants: *Betula glandulosa*, *Alnus crispa*, *Salix calcicola*, *Salix brachycarpa*, *Ledum decumbens*, *Ledum groenlandicum*, *Vaccinium uliginosum*, *Myrica gale*, feather mosses, and occasional *Picea glauca*, *Picea mariana*, and *Larix laricina*. These grow over a rough terrain of boulders, between which are deep depressions filled with water.



FIG. 6. Treeline open-forest quadrat located near Fort Churchill. Dominant plants: *Picea glauca*, *Larix laricina*, mosses, *Cladonia alpestris*, *Carex aquatilis*, *Carex rariflora*, *Scirpus caespitosus*, *Vaccinium uliginosum*, *Empetrum nigrum*, *Ledum groenlandicum*, *Betula glandulosa*, *Salix reticulata*, and grasses. Microhabitats range from one-metre-high peat areas to sedge-covered ponds.

TABLE 1. Species and numbers of small mammals present on two-hectare quadrats in northern Manitoba, at the northern edge of the forest-tundra ecotone.

Species	Beach meadow	Tundra	Shrub	Open forest
Masked shrew	1		7	12
Pygmy shrew				1
Arctic hare	2			
Arctic ground squirrel	3 (burrows)			
Boreal red-backed vole			2	
Heather vole		4	8	7
Meadow vole	121	74	12	1
Collared lemming		23		
Meadow jumping mouse				2
Total individuals	127	101	29	23
Total species	4	3	4	5

Large mammals present on the beach-meadow quadrat were: grey wolf, arctic fox (*Alopex lagopus*), red fox, polar bear, and caribou. An adult polar bear was observed here, while the other species were detected by droppings, carcasses, and antlers. These large mammals are not included in Table 1, since they are wide-ranging and, in the course of their activities, would occur in all terrestrial communities. Also, the presence of the field party working on the quadrats would likely deter them from staying in the area. These species no doubt also crossed tundra, shrub, and open-forest quadrats on occasion, and to estimate their abundance would require special techniques and larger quadrats.

The numbers of species and individuals of small mammals found on the quadrats were relatively low, but it is important to take into account the great fluctuations in populations which are characteristic of the North. The masked shrew, red-backed vole, heather vole, meadow vole, and collared lemming may become very abundant in this region, and could no doubt attain levels of over a hundred individuals for each species over a two-hectare quadrat — a conclusion drawn from observations made during the present study and supported by Smith and Foster (1957) and Shelford (1943). Under such circumstances these species would appear in suboptimal and even marginal habitats. Conversely, minimal population levels would result in species withdrawing to highly preferred habitats, and even there, might easily be missed during a census. Also, population size may differ markedly in different regions at the same time of year. For example, the collared lemming was very rare in the Churchill area in 1973; 35 miles (56 km.) farther north at the Seal River camp it was common; while 130 miles (208 km.) still farther north along the coast lemmings were at the peak of their cycle.

The beach-meadow, tundra, shrub, and open-forest quadrats represent the major biotic communities in the transition between the arctic tundra biome and the boreal coniferous forest biome (Shelford 1963). The small-mammal populations found in

TABLE 2. Species and numbers of small mammals present on two-hectare quadrats in southern Manitoba, at the southern edge of the forest-grassland ecotone (Wrigley 1974; and unpublished data).

Species	Marsh	Prairie	Shrub	Savanna
Masked shrew	19	21	23	2
Arctic shrew	10			
Short-tailed shrew	3		1	
Snowshoe hare				1 (sign)
Least chipmunk			2	2
Thirteen-lined ground squirrel		37	27	4
Franklin ground squirrel			3	
Red squirrel				3
Northern pocket gopher		21	12	3
Deer mouse	1	1	2	11
Boreal red-backed vole		3	17	6
Meadow vole	192	46	1	2
Prairie vole		11	2	5
Meadow jumping mouse	6		1	1
Western jumping mouse		1	8	
Porcupine				1
Short-tailed weasel	1			
Total individuals	232	141	99	41
Total species	7	8	12	12

plant communities of similar life-form and stratification from southern Manitoba are shown in Table 2. The marsh at Delta on Lake Manitoba was dominated by white-top grass (*Scholochloa festucacea*), phragmites (*Phragmites communis*), and sedge (*Carex atherodes*); the mixed-grass prairie at Margaret by little bluestem (*Andropogon scoparius*), needlegrass (*Stipa* spp.), and grama grass (*Bouteloua gracilis*); the shrub thicket at Margaret by silverberry (*Eleagnus commutata*) and snowberry (*Symphoricarpos occidentalis*); and the savanna at Carberry by white spruce, bur oak (*Quercus macrocarpa*), and trembling aspen (*Populus tremuloides*).

The southern Manitoba quadrats are located near the geographical centre of North America, and represent communities in the transition of the temperate grassland biome and boreal coniferous forest biome. Many grassland and boreal forest mammals are absent from the northern quadrats, but the masked shrew, red-backed vole, meadow vole, and meadow jumping mouse are important inhabitants of both regions. The numbers of species on the quadrats along the grassland-forest transition are 1.8 to 3.0 times greater than along the forest-tundra transition, while the total populations are 1.8 to 3.4 times greater.

BIRDS

Jehl and Smith (1970) summarized the distribution and breeding habits of 209 species of birds from the Churchill region. Sixty-six species were recorded at the Seal River camp in the present study. Noteworthy, because of their northern occurrence, were a nesting mallard (*Anas platyrhynchos*), a ring-necked duck (*Aythya collaris*), cliff swallow (*Petrochelidon pyrrhonota*), clay-coloured sparrow (*Spizella pallida*), and house sparrow (*Passer domesticus*). A great blue heron (*Ardea herodias*) was observed on two occasions at Churchill, which is considerably farther north than it has been reported previously in Manitoba. Its general range is the southern one-third of the province, with northernmost colonies at Talbot Lake, 54° 07' N, 99° 53' W (Vermeer 1970) and Weaver Lake, 52° 45' N, 96° 34' W (Vermeer and Hatch 1972).

AMPHIBIANS

Six adult wood frogs (*Rana sylvatica*) were collected at several sites between the Seal River camp and the treeline in wet sedge-moss tundra and wet shrub tundra. These records represent an extension of this species' range north from Churchill (Logier and Toner 1961) and east from Wolverine River at 59° 07' (Sutton 1968).

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