

58 had a total secretariat at peak of eight people, and everyone who took part in that knows what a satisfying experience it was, professionally and personally.

We still, in Canada, have to answer the basic question: *What is the North all about? What good is it?* The answers will not come easily, but they will come in time if we understand how man lived there in the past and can live in the future. If the stress is not laid on the pathological aspects of life north of sixty — a failing of social science in the more southerly areas — then we may be able to use science as a method of understanding and exerting a greater degree of control over the physical and social environment in a way that will benefit all. Already it is not so much that we are developing the North but that the North is developing us.

Social science research in the Canadian North could add new dimensions to our knowledge of the way the world works; or it could lead to massive disasters. In our electronic world, we are moving from the extension of man's muscle to the extension of his mind. What the machines did to men's bodies during the Industrial Revolution, the electronic media might do to men's minds during the Electronic Revolution. And we shall see this trend sooner in the North than elsewhere. Everyone concerned or involved in northern development should be aware of this. And no one should be more aware of this than the social scientist, as he stands on the very frontier of knowledge in a frontier land.

ACKNOWLEDGEMENT

The views expressed herein are my own, and not necessarily those of the Centre or of the Arctic Institute. I would like to acknowledge the very considerable assistance I have received in my work in social science in the north from Dr. George Rogers (University of Alaska — Economics), Dr. Richard Cooley (University of Washington — Geography and Public Affairs), Dr. D. Shimkin (University of Illinois — Anthropology and Geography) and Dr. Trevor Lloyd (McGill University — Geography) among many others.

Jim Lotz

CANADIAN RESEARCH CENTRE FOR ANTHROPOLOGY, OTTAWA.

REFERENCES

- ¹Osler, Jack. 1968. Corridor concept studied. Edmonton: *Edmonton Journal*, September 6.

- ²Cowan, Edward. 1968. Vast plan urged for mid-Canada. New York: *New York Times*, September 15.

- ³Sorensen, Art. 1968. Manitoba Indians sympathy seekers. Edmonton: *Edmonton Journal*, January 20.

- ⁴Rogers, George. 1962. *The future of Alaska: Economic consequences of Statehood*. Baltimore: Johns Hopkins Press, p. 270.

- ⁵Rogers, George. 1967. Eskimo administration in Alaska. *Arctic*, 20: 269-70.

- ⁶Indians challenge treaty. *News of the North* 26 (28), 11 July 1968.

- ⁷Bucksar, Richard. 1967. Operation Camelot. *Canadian Welfare*, 14: 16-21.

- ⁸Smith, J. Russell. 1925. *North America*. New York: Harcourt, Brace and Co. 466 pp.

- ⁹Hoselitz, Bert. 1960. *Sociological aspects of economic growth*. Glencoe: The Free Press. 250 pp.

- ¹⁰Spengler, J. and R. Braibanti (Eds.). 1961. *Traditions, values and socio-economic development*. Durham: Duke University Press, 305 pp.

Overwintering Birds Observed along the Mackenzie-Great Slave Lake Highways

INTRODUCTION

The purpose of this paper is to record the birds observed near Rae, Northwest Territories (62°45'N., 116°5'W.), 12 to 21 December 1965 and at the University of Alberta Biological Station at Heart Lake, Northwest Territories (60°51'N., 116°38'W.), 19 to 28 December 1966. During these periods records were kept of the birds seen at these locations and along the highways connecting these two points (Fig. 1). Also included are observations made by Roy Dyke 6 October to 21 April 1966 at the Biological Station.

Winter distributional records of the avifauna in subarctic regions of northern Canada are incomplete.

DESCRIPTION OF THE AREA

The area in which observations were made falls within the Hay River, Upper Mackenzie and Northwestern Transition sections of the transcontinental Boreal Forest Region.¹ A more general classification places most of the area within the Canadian life zone. To the

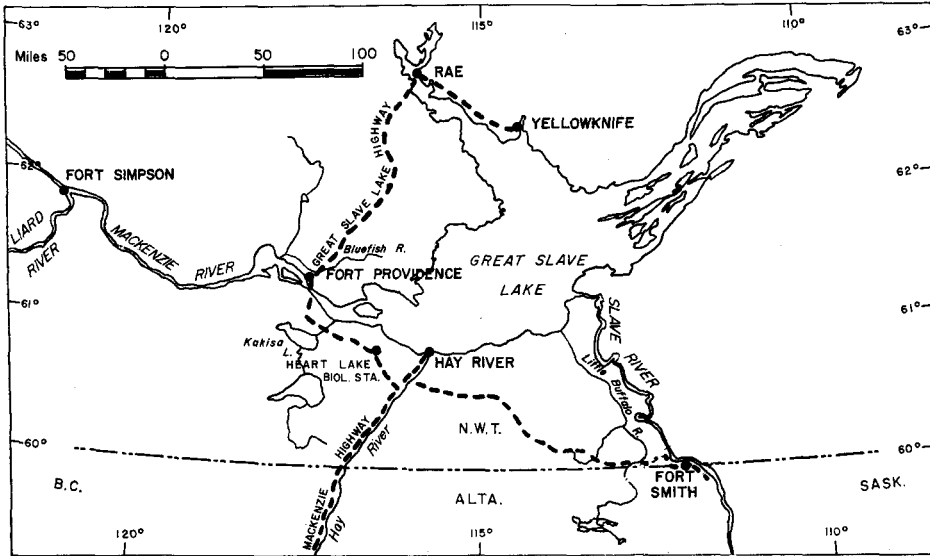


FIG. 1. Location map, Great Slave Lake and Mackenzie highways, Northwest Territories.

north of this zone lies the Hudsonian life zone. The north arm of Great Slave Lake, immediately west of Rae, divides these two zones. The Hudsonian zone is properly classed as open subarctic forest and the Canadian zone as the boreal forest. The change is not abrupt and no sharp phytogeographical dividing lines separate them. With increased latitude the closed forest-moss community gradually changes into open lichen-woodland community, which beyond the tree line merges into tundra.

The most abundant tree species throughout the region is black spruce (*Picea mariana*). Well-drained sites support stands of white spruce (*Picea glauca*), trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*) and white birch (*Betula papyrifera*). Extensive stands of jackpine (*Pinus banksiana*) cover burned-over areas. Tamarack (*Larix laricina*) is common in muskegs.

CLIMATE

The climate in the region is subarctic, characterized by long cold winters, brief warm summers and light precipitation. The winter climatic conditions are predominantly influenced by arctic air masses. Mean monthly temperature is below 0°C. in each of the months from October to April. January generally is the coldest month with a mean temperature around -27°C., followed by December and February with slightly higher averages. A minimum temperature of -56°C. has been recorded for this region.²

Table 1 summarizes long-term climatic data from Yellowknife (60 miles southeast of Rae), Fort Simpson (approximately 120 air miles west of Fort Providence), and Fort Smith (approximately 150 air miles south-east of Heart Lake).

TABLE 1. Long-term climatic data.

	Yellowknife	Fort Simpson	Fort Smith
Mean temperature —			
January (°C.)	-26	-28	-26
December (°C.)	-24	-24	-22
Mean annual precipitation (inches)	8.45	12.7	12.63
Mean annual snowfall (inches)	34.5	56	46.6

PREVIOUS INVESTIGATIONS

Records of winter bird distribution along the Mackenzie-Great Slave Lake highways have not been published previously. The highways were completed in 1960. Most earlier faunal records refer to settlements found along the major water bodies used as transportation routes.

Samuel Hearne was the first white man to explore the general region (1769-72) and to record his faunal observations. Since then various members of the Northwest and Hudson's Bay companies, missionaries and explorers traversed the country; many of the early explorers and traders kept notes on the natural history of the area.

The first fairly detailed written accounts of the avifauna of the Mackenzie-Athabasca regions were by Swainson and Richardson,³ Ross,⁴ MacFarlane,⁵ Mair and MacFarlane,⁶ and Seton.⁷ The most complete description of the fauna is by Preble.⁸

More recent publications on the distribution of the avifauna in the general region were by Fairbairn,⁹ Williams,¹⁰ Soper,¹¹ Clarke,¹² Höhn and Robinson,¹³ Stewart,¹⁴ Höhn,¹⁵ and Godrey.¹⁶ With the exception of Preble⁸ and Soper¹¹ all the publications since 1908 deal with summer bird records. Quantitative studies of summer breeding bird populations were carried out by Stewart¹⁴ along the Little Buffalo River in Wood Buffalo National Park, and by the author in 1967 at the Biological Station and at Rae.¹⁷

ANNOTATED LIST OF SPECIES

Below are listed the birds seen during the latter part of December. Figures in brackets after the date in 1966 list the number of birds seen on that day.

Accipiter gentilis. Goshawk. 1965, 19 Dec., Rae; 1966, 24 Dec. (1), Kakisa River.

It is very probable that after the arrival of willow ptarmigan (*Lagopus lagopus*) from the tundra, larger raptorial birds prey heavily on this species. Seasonal movements of ptarmigan, as well as the status of snowshoe hare (*Lepus americanus*) and spruce grouse (*Canachites canadensis*) probably determine the winter distribution and abundance of goshawks.

Canachites canadensis. Spruce Grouse. 1965, 18, 20 Dec., Rae; 1966, 20 Dec. (2), Fort Providence; 22 (3), 24 (2), 26 (5), 28 (3), at and near Biological Station.

This is the most common resident tetraonid in the area. Snow burrows of this species were found in almost every jackpine stand examined in 1966. Spruce grouse were often seen feeding on jackpine needles which seem to be their main winter food. Two grouse crops that were examined contained jackpine needles exclusively. In both years numerous grouse were killed along the highway, presumably by mammalian predators. The highway furnishes a constant source of gravel for these birds.

Bonasa umbellus. Ruffed Grouse. 1966, 22 Dec. (2).

Two ruffed grouse were seen at Bluefish River near Fort Providence. Soper¹¹ believed that the ruffed grouse undergoes seasonal movements in Wood Buffalo National Park. Preble's notes⁸ suggest a similar conclusion. During continuous winter observations at Fort Simpson he recorded the last ruffed

grouse 5 December, and then again "during the latter part of winter and during spring." *Lagopus lagopus*. Willow Ptarmigan. 1965, 16 Dec., near Fort Providence; 17, 19, 20 Dec., at and near Rae; 1966, 20 Dec. (5), Bluefish River; 23 (10), Fort Providence.

This species is a regular winter visitor in the area.

In 1967 Dyke recorded the first arrival of ptarmigan 2 November, and noted that this species was still common by the middle of March.

Pedioecetes phasianellus. Sharp-tailed Grouse. 1965, 14 Dec., near Kakisa River.

A flock of 5 sharp-tailed grouse was seen feeding on rose hips near Kakisa River at Mile 100 on the Mackenzie Highway.

Bubo virginianus. Great-horned Owl. 1965, 16 Dec., Bluefish River; 1966, 28 Dec., near Biological Station.

Dyke heard this species hooting at Heart Lake 26 February, which would indicate that in the subarctic, as in other areas, this species is an early breeder.

Picoides tridactylus. Northern Three-toed Woodpecker. 1965, 17 Dec., Rae; 1966, 23 Dec. (1), Biological Station.

Both Preble⁸ and Soper¹¹ have recorded this species as a winter resident of the area. *Perisoreus canadensis*. Gray Jay. 1965, 13, 14 Dec., near Biological Station; 15, Fort Providence; 16, 17, 18, 20, 21, at and near Rae; 1966, 20 Dec. (5), 21 (2), near Biological Station; 22 (3), Bluefish River; 23 (2), Fort Providence; 25 (3), 26 (2), 27 (3), 28 (3), at and near Biological Station.

Preble⁸ noted that January and February of 1904 were unusually cold months at Fort Simpson and that the Gray Jays were seldom seen. In 1967 Dyke noted that at Heart Lake this species disappeared in the cold period lasting 10 January to 20 February. However, these birds were again very common in March. This suggests that even this hardy and widely distributed bird may be partially "migratory" during the most severe months of the subarctic winters.

Corvus corax. Raven. 1965, 14 Dec., Fort Providence; 16, 17, 18, 19, 20, Rae; 1966, 19 Dec. (2), Biological Station; 20 (4), Fort Providence; 23 (2), 24 (1), 25 (1), 28 (2), at and near Biological Station.

Ravens were especially numerous around settlements where these birds were feeding on offal and garbage. On several occasions I noticed ravens feeding on road kills along the highway.

Parus hudsonicus. Boreal Chickadees. 1965, 12, 13 Dec., Biological Station; 1966, 19 Dec. (2), 23 (3), 24 (2), 25 (4), 28 (2), at and near Biological Station.

Pinicola enucleator. Pine Grosbeak. 1966, 19 Dec., Fort Providence.

A small flock of about 6 birds was seen feeding in shrubbery along the Mackenzie River.

Acanthis hornemanni. Hoary Redpoll. 1965, 16 Dec., near Fort Providence; 1966, 20 Dec. (2), Biological Station; 22 (10) Bluefish River; 24 (2), 26 (approximately 15), at and near Biological Station.

Often flocks of small birds could be seen darting overhead. On two occasions I identified the birds as belonging to this species when a flock was seen feeding on alder catkins. It is very likely, however, that many of the birds listed above as hoary redpolls were flocks of birds consisting of both hoary and common redpolls.

Loxia leucoptera. White-winged Crossbill. 1965, 21 Dec. (approximately 20), near Rae.

A flock of about 20 birds was seen feeding on cones in a large white spruce tree stand. These birds are rarely seen in winter and probably fluctuate considerably depending on the cone production of coniferous trees.

CONCLUSION

Only a few species of birds remain in the subarctic region around Rae and the Biological Station at Heart Lake during winter. Of the approximately 105 species that breed in the area only 13 species (or about 12 per cent) overwinter.

ACKNOWLEDGEMENTS

Thanks are extended to Dr. D. A. Boag and Dr. D. R. Flook for reading the manuscript critically. I am particularly grateful to Mr. R. Dyke for providing me with additional records of winter distribution at the Biological Station.

Ludwig N. Carbyn
Canadian Wildlife Service
Edmonton, Alberta

REFERENCES

- ¹Rowe, G. S. 1959. Forest regions of Canada. Forestry Branch, *Department of Northern Affairs and National Resources, Bulletin* 123. 71 pp.
- ²Kendrew, W. G. and B. W. Currie. 1955. *The climate of central Canada*. Ottawa: Queen's Printer. 194 pp.
- ³Swainson, W. and J. Richardson. 1831. *Fauna Boreali-Americana Part Second, The Birds*. London: John Murray. 523 pp.
- ⁴Ross, B. R. 1862. On the mammals, birds, etc. of the Mackenzie River District. *National History Revue*, 11: 269-90.
- ⁵MacFarlane, R. 1891. Notes on and list of birds and eggs collected in Arctic America, 1861-1866. *Proceedings United States National Museum*, 14: 413-66.
- ⁶Mair, C. and R. MacFarlane. 1908. *Through the Mackenzie Basin*. 8 volumes. Toronto: William Briggs. 494 pp.
- ⁷Seton, E. T. 1908. Bird records from Great Slave Lake region. *The Auk*, 25: 68-74.
- ⁸Preble, E. A. 1908. A biological investigation of the Athabasca-Mackenzie region. *North American Fauna*, No. 27. Washington: Government Printing Office. 574 pp.
- ⁹Fairbairn, H. W. 1931. Notes on mammals and birds from Great Slave Lake. *Canadian Field-Naturalist*, 45: 158-62.
- ¹⁰Williams, M. Y. 1933. Biological notes covering parts of the Peace, Liard, Mackenzie and Great Bear river basins. *The Canadian Field-Naturalist*, 47: 23-31.
- ¹¹Soper, J. D. 1942. The birds of Wood Buffalo and vicinity, Northern Alberta and District of Mackenzie, N.W.T., Canada. *Transactions Royal Canadian Institute*, 24: 19-97.
- ¹²Clarke, C. H. D. 1944. Notes on the status and distribution of certain mammals and birds in the Mackenzie River and western Arctic area in 1942 and 1943. *Canadian Field Naturalist*, 58: 97-103.
- ¹³Höhn, E. O. and D. L. Robinson. 1951. Some supplementary bird notes from the general area of the Mackenzie Delta and Great Slave Lake. *Canadian Field Naturalist*, 65: 115-18.
- ¹⁴Stewart, R. E. 1955. Contributor to nineteenth breeding bird census. *Audubon Field Notes*, 9: 415-16.
- ¹⁵Höhn, E. O. 1956. Some ornithological records from Wood Buffalo Park and the Mackenzie District, N.W.T. *Canadian Field-Naturalist*, 70: 144.
- ¹⁶Godfrey, W. E. 1965. Range extension of some birds in Western Mackenzie. *Canadian Field-Naturalist*, 79: 34-38.
- ¹⁷Carbyn, L. N. 1967. The abundance and distribution of passerine birds in boreal forest habitats of the western Great Slave Lake region. M. Sc. Thesis unpublished, 81 pp.

Building Code for the North

The Building Code for the North, a special shortened edition of the National Building Code of Canada (1965) prepared for use in