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I Title

Recd. Mar. 27, 1950.

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BIOLOGICAL INVESTIGATIONS IN NORTHERN ALBERTA AND THE NORTHWEST AND YUKON TERRITORIES OF CANADA, 1949

By

J. Dewey Soper
Dominion Wildlife Officer for
Alberta and the Territories.

Federal Wildlife Division,
Department of Resources and Development,
Edmonton, Alberta.
February, 1950

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C O N T E N T S Page

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LETTER OF TRANSMITTAL

307 Alberta Jasper Building,
Edmonton, Alberta, Canada,
February 25, 1950.

Dr. Harrison F. Lewis,
Chief, Wildlife Division,
Department of Resources and Development,
Ottawa, Canada.

Dear Sir:

The undersigned takes much pleasure in having completed the attached report on wildlife matters in northern Alberta, District of MacKenzie and Yukon Territory. Most of the investigations were conducted in the MacKenzie District from Fort Smith along Slave and MacKenzie Rivers to Aklavik and the Arctic coast. The time involved in these inquiries extended from late June to early August, 1949.

In the original plans it was the desire of this office to place the report in your hands by about mid-January, but various circumstances rendered this development impossible. Consequently, it will be somewhat later in reaching you than anticipated. It is deemed more desireable and expedient to utilize available data, to the full, than to curtail reporting in any degree, whatsoever, for the sake of merely achieving and earlier date for delivery.

Owing to the volume of information acquired in the field, especially in connection with the wildfowl population and potential bird sanctuaries, the report is rather extensive. It is furnished with two maps of the region concerned, together with twenty-six photographic illustrations.

Yours faithfully,

J. Dewey Soper

J. Dewey Soper,
Dominion Wildlife Officer for
Alberta and the Territories.

JDS:dsk

LIST OF ILLUSTRATIONS

10. The Ramparts, MacKenzie River, southwest of Fort Good Hope, looking down-stream to the northeast. Photographed between 9.00 and 10.00 p.m. July 12, 1949.

11. A portion of Richardson Mountains as seen from Husky Channel, MacKenzie River Delta district, looking west. July 18, 1949. Treeless conditions exist on the mountains comparable to that of true Arctic tundra.

12. The Dominion Government vessel, M.B. Caribou docked at Aklavik, MacKenzie Delta, N.W.T. In this boat the author and Warden Frank McCall made the journey from Fort Smith to Aklavik and the Arctic coast at Richards Island. July 22, 1949.

13. The aircraft Beaver docked at Aklavik for re-fueling between flights. In this 'plane the author and other government officials carried out extensive investigations in Arctic and sub-Arctic territory. July 22, 1949.

14. Groups and scattered individuals of Whistling Swan along the shore of Kendall Island, MacKenzie Bay. True Arctic conditions obtain on the islands and along the coasts of this region. July 24, 1949.

15. Landscape on Kendall Island, MacKenzie Bay, overlooking lowlands to the east and south-east. Richards Island in the far distance. July 24, 1949.

16. A compact flock of moulting Lesser Snow geese at sea a short distance south-southwest of Kendall Island. Beaufort Sea, N.W.T. July 24, 1949.

17. Large flock of moulting Lesser Snow Geese which put out to sea, from the low-lying coast near Kendall Island, N.W.T. upon approach of the aircraft. July 24, 1949.

18. Another flock of moulting Lesser Snow Geese in the Ellice-Kendall Islands sector of MacKenzie Bay, N.W.T. July 24, 1949.

19. View of the flat lowlands on Ellice Island, MacKenzie Bay, near the southwest coastline looking northeast. Typical Arctic tundra of the treeless delta lowlands. July 24,1949.

20. Portion of Dominion Government reindeer herd during the annual roundup at Kidluit Bay, Richards Island. Several thousands of the animals are present during this yearly operation. July 25, 1949.

21. Small group of adult and sub-adult reindeer on the Arctic tundra flanking Kidluit Bay, Richards Island, N.W.T. High interior of the island visible to the west. July 26, 1949.

22. Group of yound reindeer on the tundra of Richards Island in the neighborhood of Kidluit Bay. At this time antlers were in the velvet and the last remnants of the old winter pelage was being shed. July 26, 1949.

23. Adult female reindeer running across the open tundra of Richardson Island near the sea coast at Kidluit Bay. Note old winter coat over dorsal area and new summer pelage below. July 26, 1949.

24. The Dominion Government's main Reindeer Depot located at East Channel of the MacKenzie Delta; Latitude approximately 68° 42' N. Caribou Hills in the background as seen from the dock looking east-southeast. July 27, 1949.

25. A typical view of the MacKenzie Delta as seen from about 800 feet; few trees, vast areas of open swamp and muskeg, with more water than land. View a few miles southwest of Reindeer Depot, en route to Aklavik, looking westward. July 27, 1949.

26. Territory in the vicinity of McCrea River, a few miles west of McCrea Lake, and approximately 90 miles northeast of Yellowknife, Great Slave Lake. Illustrates character of Hudsonian Life Zone with small scattered tree growth and open, mossy terrain. August 1, 1949

M A P S

1. The Northwest Territories, Dept. of Mines and Resources, Ottawa.

2. Port Brabant, Sheets 107 S.W. and 107 S.E. National Topographic series, Dept. of Mines and Resources, Ottawa.

BIOLOGICAL INVESTIGATIONS IN NORTHERN ALBERTA AND THE NORTHWEST AND YUKON TERRITORIES OF CANADA, 1949

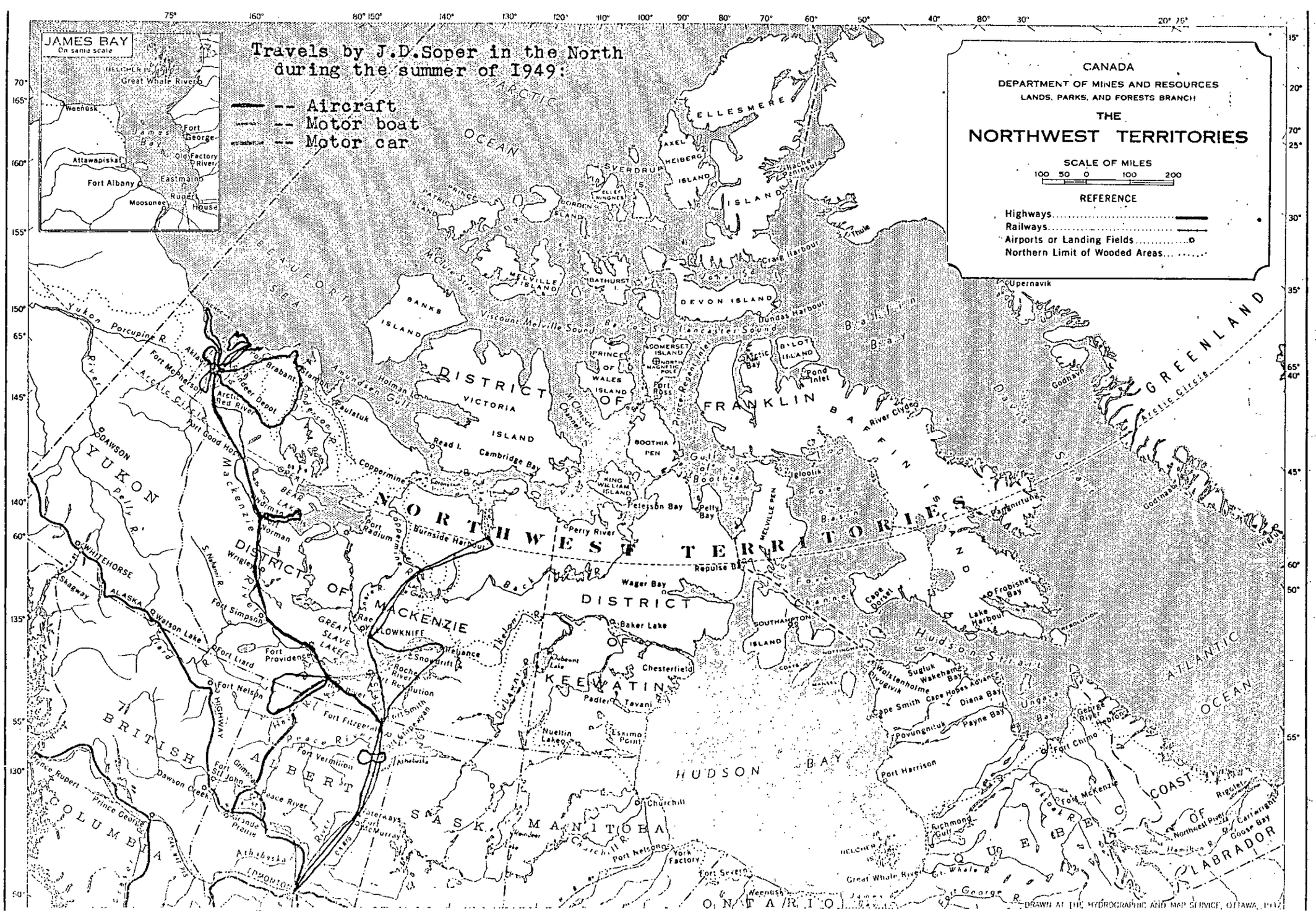
I N T R O D U C T I O N

As early as the autumn of 1948 preliminary plans were laid for the writer to conduct various biological investigations in the Northwest Territories during the following summer. Practically full details had been worked out for these inquiries by March, 1949.

Among the highlights of the planned investigations were certain research problems in connection with Whooping Cranes; combined regional reconnaissance and intensive local studies of waterfowl in the MacKenzie River basin and parts of the Arctic coast and the possible discovery of suitable areas for bird sanctuaries in the same territory. Also of outstanding importance was the examination of prevailing conditions in relation to wildlife in general and the attendent problems embracing various phases of conservation and application of the Northwest Game Ordinance and the Migratory Birds Convention Act.

In addition to these major points of inquiry, many lesser topics provided food for thought and were deserving of study and clarification as opportunity offered. The work engendered by these projected inquiries (some of which were distinctly of a pioneer character) was in due course carried out with varying degrees of success during the months of June and July, and early August, 1949.

The earliest phase of the investigations embraced a search for nesting Whooping Cranes. Operations were based on apparently sound reports of occurence in various parts of the country. The initial search took place in June, operating chiefly by motor car from Edmonton via Grimshaw to Hay River, Great Slave Lake. On the basis of earlier reports, inquiries were conducted, en route, in the Grande Prairie region and at Steen River, northern Alberta. On June 20th, approximately 560 miles were flown in a pontoon-equipped Fairchilds west and south of Hay River, N.W.T. While these investigations were separate and distinct from the succeeding expedition in the MacKenzie River region, it is considered desirable to consolidate the information by presenting the results in the present report. The procedure is supported by the fact that the bulk of operations took place in the District of MacKenzie, with a lesser amount in Northern Alberta.


Travels by J.D.Soper in the North during the summer of 1949:
-- Aircraft
-- Motor boat
-- Motor car
JAMES BAY
On same scale
CANADA
DEPARTMENT OF MINES AND RESOURCES
LANDS, PARKS, AND FORESTS BRANCH
THE
NORTHWEST TERRITORIES
SCALE OF MILES
100 50 0 100 200
REFERENCE
Highways
Railways
Airports or Landing Fields
Northern Limit of Wooded Areas
NORTHWEST TERRITORIES
DISTRICT OF MACKENZIE
DISTRICT OF KEEWATIN
FRANKLIN
YUKON
BRITISH COLUMBIA
ALBERTA
SASK.
MANITOBA
ONTARIO
QUEBEC
LABRADOR
GREENLAND
ARCTIC OCEAN
HUDSON BAY
ATLANTIC OCEAN
BEAUFORT SEA
DRAWN AT THE HYDROGRAPHIC AND MAP SERVICE, OTTAWA, 1951

A description of this investigation is consequently furnished in the following chapter.

With further inquiries en route, a return was made with the motor car to Edmonton on June 25th. On July 2nd, departure was made from Edmonton via Canadian Pacific Airways for Fort Smith, N.W.T., arriving in the late afternoon. Remainder of the day was employed in advancing plans and preparations for work farther north.

Early the following morning the voyage was commenced downstream. Means of transportation provided was the Department's cabin motor boat Caribou which had been overhauled earlier in the season and was now assigned to the Aklavik district. In this connection, Warden Frank McCall, of the latter point, travelled to Fort Smith in order to take charge of the boat and navigate it to the Aklavik headquarters.

In consequence of this fortunate arrangement, the writer enjoyed a good means of conveyance while conducting inquiries down the Slave and MacKenzie Rivers. A prevailing stage of relatively high water was of marked benefit in taking the M.B. Caribou on the long downstream voyage to the MacKenzie Delta. This was successfully accomplished without particular incident.

Progress northward was relatively rapid on a vigorous downstream current. Distances covered per day varied greatly, depending upon prevailing circumstances, thus fluctuating between about 75 and 200 miles in 24 hours. Much time was necessarily consumed along the way by routine observations and interviews; also occasional delays were caused by high winds and rough water. On the whole, however, conditions were favourable with warm, dry weather, excellent visibility and daylight that prevailed throughout the 24 hours. River and lake itinerary with dates for principal points of contact, was as follows:

Date	Locality	Approx. Mileage
July 3	Departure from Fort Smith, N.W.T.	
" 4	Arrival Fort Resolution, G.S. Lake	229
" 5	" Hay River, " "	75
" 7	" Fort Providence, MacKenzie R	165
" 8	" Fort Simpson, "	130
" 9	" Fort Wrigley, "	150
" 10	" Fort Norman, "	156
" 11	" Hume River, "	153
" 12	" Tutsieta, River, "	112
" 13	" Arctic Red R, "	115
" 14	" Aklavik, Mackenzie Delta	76
	Approximate Total.....1361	

This voyage was followed by investigations in the MacKenzie Delta on July 16 via M.B. Caribou from Aklavik to the Reindeer Depot. On the same date observations were extended by aircraft from the latter point northward to Kittagazuit and Port Brabant west to Kidluit Bay, Richards Island, and return to Aklavik. On the 18th inquiries were conducted in the M.B. Caribou southward in MacKenzie Delta territory to Fort McPherson and beyond (Peel River), making return to Aklavik on July 21st. On the 23rd a waterfowl transect was run by aircraft from the latter point to Fort McPherson and return, followed by a reconnaissance flight into Richardson Mountains; return flight was made via the Arctic coast and southward along Moose and West Channels.

The next week was a very active one in carrying out investigations by boat and aircraft over extensive areas of the delta and adjacent territory. Special observations were made by air over Richards Island and other islands in MacKenzie Bay. A flight was also run along the Yukon coast to Herschel Island and back to Aklavik. Further inquiries were conducted by aircraft via the Reindeer Depot and Eskimo Lakes to Liverpool Bay, Stanton, delta of Anderson River and up that stream to the height of land, followed by a westerly course over Campsell Lake to Reindeer Depot and Aklavik.

Local observations were also carried out at, and in the general vicinity of Kidluit Bay, Richards Island, coincident with the annual reindeer round-up at that point. Leaving Aklavik in the aircraft Beaver on July 28, a start was made for Fort Smith. Many business calls were carried out en route including a side-trip to Fort Franklin, Great Bear Lake. Travelling via Wrigley, Fort Simpson and Hay River, Fort Smith was reached on the evening of July 29th.

Late in the month and early in August, further investigations were conducted by air in the Beaver. A course was taken to the northeast from Fort Smith via Snowdrift River to Fort Reliance, thence to Yellowknife and northward to Burnside Harbour, Bathurst Inlet. Return to Fort Smith was accomplished by way of Contwayto Lake, Yellowknife, Fort Resolution and Slave River. On August 2nd a return flight was made to Edmonton. Travelled distances involved in the Northwest Territories investigations of June, July and early August from Edmonton north and return, are as follows: Motor car - 1,946; Motor boat - 1,723; Aircraft - 5,753; Total - 9,422 miles.

WHOOPING CRANE INVESTIGATIONS

With the passage of time, Whooping Cranes (Grus americanus (Linnaeus)) have become increasingly rarer and more difficult to locate on their breeding grounds. Now they are to be regarded as a vanishing species, with a rarity represented by only 36 known individuals still existing in North America. Owing to this regrettable circumstance, everything possible is being done to protect them and prevent ultimate extinction.

Among the various measures adopted, much publicity has been carried out in connection with protection, conservation, and the soliciting of information. Numerous reports have been received. On investigation, many of these were found to have been based upon careless observation and misidentification, while others are apparently sound and accurate. In any event, observations of these birds are necessarily very limited in number and far apart at the present time.

The few remaining individuals are widely scattered over an immense territory. Distribution is chiefly confined to the mid-western States and the Prairie Provinces of Canada. Whooping Cranes no longer breed in the settled plains and prairie region, but fly farther north to nest. For several years a consistent effort has been made to discover unmolested, nesting pairs of these birds, but, so far, this long search in the northern latitudes has been fruitless.

Among the comparatively few reports regarded as authentic, was one from Mr. E. L. Mattice with respect to the occurrence of a pair of Whooping Cranes observed at Steen River, Northern Alberta, during the summer of 1948. Since this occurrence is somewhat related to the investigation carried out in 1949, a portion of my report on the inquiry of 1948 is presented in this place. It was forwarded from Winnipeg, Manitoba to the Dominion Wildlife Service, Ottawa under date of August 25, 1948:

"....an investigation was conducted in relation to the reported occurrence of Whooping Cranes at Steen River, Alberta. The original information was supplied by Mr. E. L. Mattice, Engineer and Construction Service, Department of Mines and Resources, Ottawa. At that time Mr. Mattice was carrying out his official duties along the Yellowknife highway, particularly in the general vicinity of Steen River, where his headquarters camp was located most of the summer.

"Steen River is a tributary of Hay River. It enters the latter stream from the southwest in about Latitude 59° 38' N.... The Yellowknife Highway crosses Steen River a mile or so from the mouth, on the west side of Hay River, and approximately 28 miles south of the Alberta-Northwest Territories boundary.

"On the morning of July 25, 1948, I left Winnipeg by

motor car and reached Steen River (by the same means of transportation) on the afternoon of July 31st. The remainder of the day was spent in discussing Whooping Cranes with Mr. Mattice and in going over the country with him where he had seen the cranes earlier in the season. He informed me that a pair had been observed repeatedly along Steen River and in the vicinity, from June 1st until July 7th. Unfortunately the birds had disappeared after the latter date; consequently, nothing had been seen of them for three weeks prior to my arrival at Steen River.

"In view of this situation I was helpless to locate the cranes in question, or to obtain any further information in regard to them. Ground was covered in the vicinity of Steen River and Hay River on July 31st and August 1st without detecting the slightest evidence of their presence. Any extended and methodical search would involve an unknown amount of time and difficulty and would likely prove impractical. Distances are vast and much of the forest almost impenetrable. For the most part, where the terrain is not heavily forested, it is characterized by the presence of extensive swamps and muskegs. Very large muskegs are said to be especially prevalent in this latitude to the east of Hay River. Large areas also occur to the west. All of this country is more or less difficult of access during the summer.

"This territory, of course, is entirely embraced by the Canadian Life Zone. The dominant growth is characteristically black and white spruce, Banksian pine, aspen and balsam poplar, birch and tamarack. Pine occurs on the sandy ridges, while black spruce and tamarack occupies low swampy ground and typical muskeg areas. Various shrub species grow in abundance and in many tracts form almost impenetrable thickets.

"Judging from Mr. Mattice's description of the birds under review, there would seem to be no question, whatever, that he actually had Whooping Cranes under observation at various times from June 1st to July 7th. He obtained no direct evidence of breeding. In conjunction with the latitude, the time of year, and the fact that these two birds were evidently mated, it would seem that they were on, or near, their nesting ground. On the other hand, so far as I can recall, they were invariably seen together and this would scarcely have been the case had one of them been incubating. Moreover, no juveniles were noted. A puzzling feature arises from the circumstances that while the cranes were observed repeatedly at and near Steen River for five weeks, they suddenly disappeared. This would cause no surprise later in the year, but at the height of summer their sudden withdrawal from the area is peculiar, unexpected and mysterious.

"Mr. Mattice is of the opinion that Indians are not an outstanding menace to the Whooping Cranes in this part of Northern Alberta. During the summer these people are seen in the bush, if at all, only at wide intervals. Substantially, they may be said to spend the summer along the shores of the larger lakes where mosquitos and flies are less menacing and greater bodily comforts can be enjoyed.

"Nevertheless, it might be a good idea to contact the northern Indians more closely in regard to the protection of the rare Whooping Crane. Perhaps it would be feasible to print warning notices in Indian syllabic's and have them erected at posts and other meeting places throughout the north by Royal Canadian Mounted Police and Hudson's Bay Company officials. A picture of the bird would also help. Such a message would go directly to all Indian inhabitants of the north country; it might prove to be a very valuable feature in restraining any tendencies they might have to kill these vanishing birds....."

".....It is quite possible that the pair of Whooping Cranes that frequented the vicinity of lower Steen River earlier in the season may return to that area next summer. If investigations were resumed at that time, success might attend the venture, especially if the inquiries were pursued during the month of June."

Later in the season we received an apparently good lead with respect to the summer occurrence of Whooping Cranes in the District of MacKenzie, southwest of Fort Providence. The report stemmed from the Royal Canadian Mounted Police at Fort Vermilion, Alberta. This was based on information supplied by Warren Paul, a trapper from the general area within the Northwest Territories where the Whooping Cranes were evidently observed. Paul was interviewed in this regard at Upper Hay River Post where he came to renew his N.W.T. trapping permit and secure supplies.

The chief occasion on which Paul noted the large white birds, assumed to be Whooping Cranes, was in May, 1946. They were flying in and out of a large muskeg with numerous shallow ponds, springs and small creeks. He gave the location of this muskeg as about 50 miles west of Tathlina Lake, in the N.W.T., and about the same distance northwest of Bistcho Lake, Alberta. It will be noted when consulting map sheet No. 85 S.W., National Topographical Series, that a conspicuously large muskeg is situated in approximately the location given by Warren Paul. Its western margin varies from approximately four to twelve miles from the eastern boundary of British Columbia.

In his report on this matter in late July, 1948, Cpl. A.R. Foster, R.C.M.P., remarks, in part, as follows:

".....In February, 1947, Warren Paul made a trip into this same muskeg; he found it a floating muskeg with open leads running through it and too dangerous for travel across it. He also noted springs running into this muskeg from high ground; later, crossing these springs he found them unfrozen, the snow giving away when he attempted to cross. He further

stated that there was a water plant growing in this muskeg that he had never seen before; it grew under the water somewhat like a water lily, but has small fruit on it like "small green tomatoes".

".....He explained that the country was different than any he had seen previously, that the muskeg in question was about 16 miles long and about two miles wide, lying very low and bordered by high ground east and west. The muskeg, itself, was floating and quite deep with several islands within it, these being quite heavily wooded with birch trees. He also remarked that it was the only place where he had seen bulrushes or cattails growing and believed that it was because of the warm water that these plants existed there...."

"Questioned further on the actual number of white cranes he evidently observed in May, 1946, Paul stated he estimated about 20 in each of three flocks noted but added, it could have been the same flock going back and forth; he did not pay much attention to them at the time and they were a considerable distance from him; besides, he added, he was mostly interested in game."

The circumstantial evidence in connection with the apparent, correct identification of these large white birds was such as to give rise to serious consideration of the case. The Service finally decided to make a full inquiry; the writer was assigned to investigate that matter in June, 1949. On the way north by motor car from Edmonton to Hay River, Great Slave Lake, a halt was made at Steen River to check on the possible presence of the pair of Whooping Cranes that was seen there the previous summer. While an extensive area was covered near the confluence of Steen and Hay Rivers, nothing was seen of the cranes. The journey was resumed to the settlement of Hay River.

Local investigations were carried out at this point until an airplane became available for the Whooping Crane investigations to the westward. For this purpose a Fairchilds aircraft of Territories Air Services Ltd., arrived from Fort Smith on the forenoon of June 20th, piloted by "Mush" Sharrun. Shortly after, the trip was commenced on the search for Grus americana. In addition to the pilot and writer, the flight was made with a mechanic, and Warden Harry Camsell of Hay River. This increased the possibilities of acute observation, simultaneously, on both sides of the aircraft.

It is to be mentioned at this juncture that a preliminary report on the above flight was submitted to the Service on June 27, 1949. This constitutes a basis for the statements that follow, but the present report is naturally fuller and more detailed.

On the appointed day the weather was fine with excellent visibility and the aircraft operations were conducted on schedule without particular incident. The course taken was southwest of Hay River to the southeast angle of Tathlina Lake and then along the south shore of that body of water. The main Kakisa River was rather closely followed to the forks, after which the southern branch of the stream was more or less skirted to the westward where it has its origin in the "great" muskeg.

The north branch of the Kakisa also rises in the latter area. It closely parallels the south branch, where the two streams flow through the lowlands in a northerly direction. A glance at the map will reveal how these two streams and their tributaries fairly interlace the whole, vast muskeg area west and southwest of Tathlina Lake. This was clearly the great muskeg referred to by Warren Paul and where, ostensibly, Whooping Cranes resorted. General characteristics were readily discerned from the air. It is one of the largest continuous open bog areas that the writer has ever observed.

A particularly close watch was maintained for Whooping Cranes immediately following departure from Hay River. However, the objective was to make as many observations as possible on other forms of wildlife as well. Most of the flight was carried out at about 600 feet. At that altitude large white birds are readily discernible; this is especially true in open country where they become very conspicuous, as, for example, Snow Geese and Whistling Swans on the Arctic tundra. Where desirable, or especially pointed observation demanded it, the aircraft was flown at a great variety of lower altitudes.

Waterfowl proved to be surprisingly scarce. Multitudes of small lakes and ponds were closely scrutinized which seemed to be utterly devoid of birdlife. In passing over the southern limits of Tathlina Lake a few loons and mergansers were noted, but no sporting ducks of any kind. A curious atmosphere of relative lifelessness pervaded the entire territory so far as visible birdlife was concerned. An occasional gull came to view where nothing else appeared to exist. There was no sign of the main object of our search.

The "great" muskeg was entered from the east at about Latitude 60° 30' N. From there a course was flown southwards looping back and forth across the muskeg from east to west and reverse. This provided excellent coverage in combination with a 600 to 800 foot altitude and four men constantly on the alert for Whooping Cranes. Any and all white, or light coloured features were accorded critical examination with the binoculars, or with the naked eye at the lesser heights. Close to the ground the use of glasses is unsatisfactory owing to the high speed of the aircraft.

At times the plane was dropped to 100 feet, or less, above the lowlands. This was felt necessary in order to closely examine some white feature at close range to be absolutely certain of identity. Occasionally, a fairly bulky white object appeared that might have been a crane crouched low on its nest, but throughout the search no Whooping Crane was detected. On each occasion the white object that momentarily created some hope and excitement proved to be merely a white rock protruding above the scanty vegetation. In this manner the muskeg area was brought under close observation without result.

At this juncture gas began to run low in the tanks and it was necessary to re-fuel from emergency drums. For this purpose a lake was required for landing. A course was taken for a relatively small body of water lying in Latitude 60° 17' N and Longtitude 119° 5' W., or approximately 34 miles west - southwest of Tathlina Lake. Surroundings are chiefly of the muskeg type. A wooded island occurs in the southern half. The area has no name, so it is proposed here to call it "Muskeg" Lake for convenient reference. In Figure 1 the aircraft is shown moored to this island while refueling. The lake is clear and cold with predominantly swampy circumference, but sand, gravel and boulders occur along the shores of the island. The lake lies at an altitude of about 1000 feet a.s.l. and is drained by a small muskeg-flanked tributary of the southeast branch of Kakisa River.

It is probable that our party contained the first naturalist to visit "Muskeg" Lake. For the short time available to study conditions, the area proved interesting; more opportunity would have been acceptable. Concerning ducks and geese, however, it must be admitted that "Muskeg" Lake was practically worthless. No examples of this class were noted with the exception of widely-scattered Mergansers. A few loons were also present.

A pair of Bald Eagles was encountered along the west shore flying toward the southeast. It is possible that the birds had a nest in one of the large spruces existing on the island. Except for birdlife around the latter, "Muskeg" Lake was relatively barren, and devoid of interest from a zoological viewpoint.

The real highlight of the locality lay in the solitary island referred to above. Upon approaching the long sand and gravel spit at the south end (Fig 1), interest was promptly alerted in the presence of numerous Common Terns, Short-billed and Herring Gulls. The terns were nesting on the open spit among sticks, gravel and small boulders (Fig 2); in some of the nests the young were just hatching at this time. Farther along the stony beach, near overhanging shrubbery, the Short-billed Gulls had their nests and eggs (Fig 3); in several of the nests the young were then hatching in coincidence with the Common Terns. While the two latter species were comparitively numerous breeders at this point, the Herring Gull was uncommon; two nests with eggs were discovered along the shore (partly under over-

hanging shrubs among small boulders), one containing three and the other four eggs.

Upon quitting "Muskeg" Lake a course was flown over additional muskeg country in a south-southeast direction for Bistcho Lake. Whooping Cranes, of course, continued to be the prime objective. At one point the route lay over a spur of Cameron Hills. Conditions were very similar around Bistcho Lake (1812 feet a.s.l.), as in intervening territory; however, while muskegs were common they were not as extensive as west and north of Cameron Hills and somewhat higher terrain became more common.

Nevertheless, wildlife conditions appeared to be similar to those prevailing farther north. Waterfowl continued scarce or absent, not only in muskeg ponds and small lakes, but little evidence of ducks was seen at Bistcho Lake. No Canada Geese was detected, nor any Sandhill or Whooping Cranes. The same comments apply to the territory flown over from Bistcho Lake to and along Steen River to Hay River and return to Hay River Settlement at Great Slave Lake.

It may be stressed here that very close scrutiny of the country was maintained throughout the flight of nearly 600 miles. Special attention was devoted to the area widely surrounding the confluence of Steen and Hay Rivers where Whooping Cranes were reported by Mr. E. L. Mattice during the same part of the season a year earlier. However, nothing was seen of the species on this later occasion. Naturally this was a marked disappointment to the field personnel, as well as to Ottawa officials of the Dominion Wildlife Service.

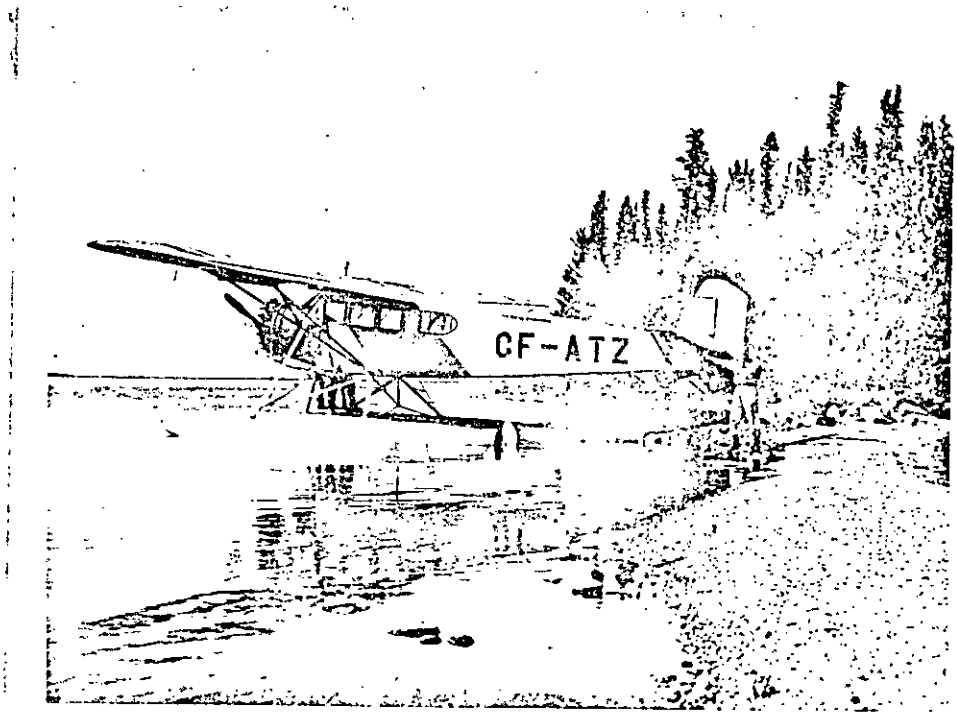
As a further commentary regarding the region flown over at this time, the following extract is taken from the field notebook of June 20, 1949; it provides a short and simple resume, as it were, of regional properties founded on observation and impressions of the moment.

".....The flight is now nearly concluded. In foregoing notes many facts have been written down during hours of air cruising. On the whole, this is a poor looking country. Almost everywhere and throughout are vast areas of muskeg and impoverished lowland with sparse stands of stunted spruces. Some aspen poplar growth on occasional, higher terrain. This is true of more attractive ground in the Cameron Hills.

"Throughout the territory birdlife is apparently very scarce. No sporting ducks, nor Canada Geese were observed anywhere. Therefore, very disappointing as to waterfowl. Only a few mergansers and loons were noted during the flight. Lakes and ponds are plentiful - mostly muskeg type, shallow and lifeless as to avifauna. Relatively few scattered gulls and terns. Failed to sight a single example of big game in nearly six hours flying. Noted about 20 beaver lodges on the trip, 14 of which are in the N.W.T. and the remainder in northern Alberta. In some areas muskrats are said to be plentiful."

Thus came to a close the unsuccessful search for nesting Whooping Cranes in northern Alberta. These activities immediately succeeded similar investigations in the Grande Prairie region, actuated by earlier reports as to occurence and probable nesting. In this search the writer was assisted by Mr. Bernhard Hamm. These and succeeding investigations in that territory were equally fruitless; no example of the species could be found.

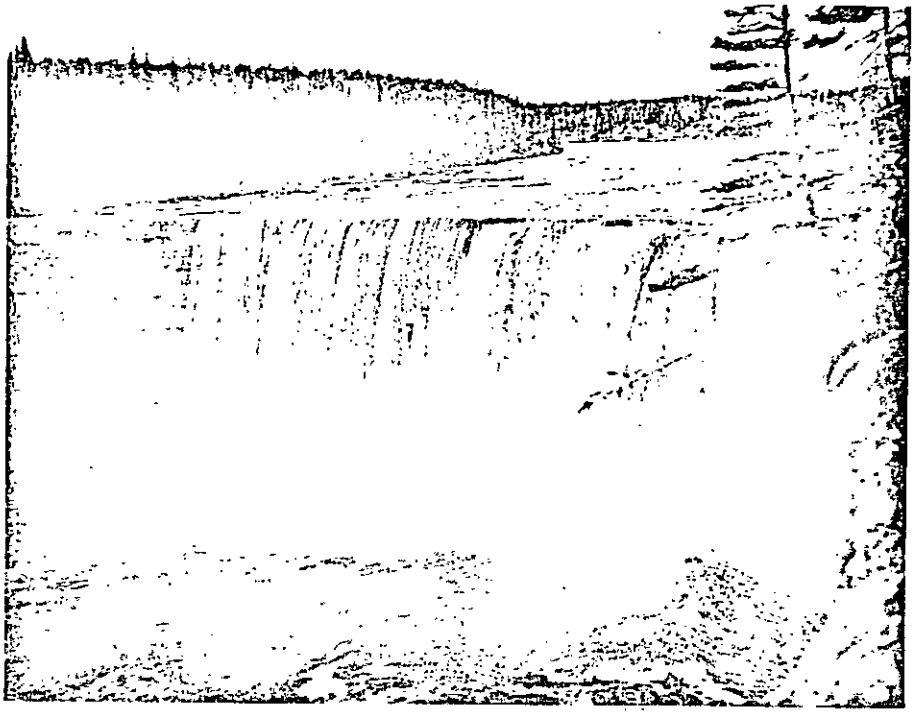
In the weeks that followed during the wildlife inquiries in the MacKenzie River region, etc., constant attention was accorded the possibility of sighting Whooping Cranes on their nesting grounds. Enquiries were made throughout the country. Of the numerous people consulted, none knew anything about the species at the present time. Old-timers knew the bird many years ago. Thousands of miles were travelled by boat and aircraft (the majority on waterfowl transect observations), but not a single Whooping Crane was sighted throughout the entire season's operations.



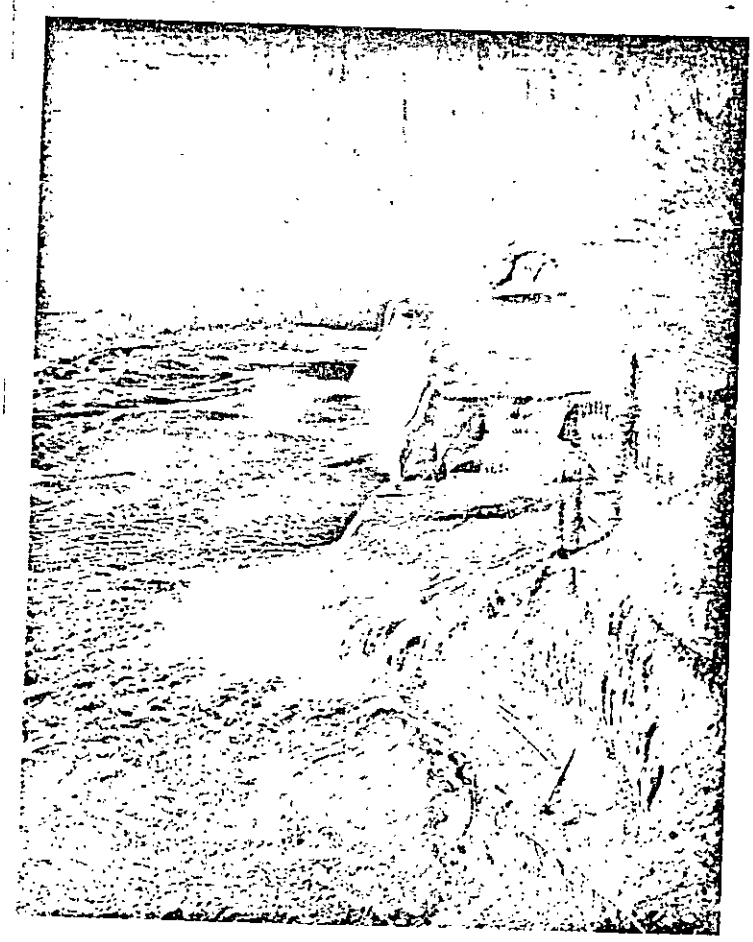
1. Fairchilds aircraft (and author) at the island on "Muskeg" Lake, N.W.T. during wildlife investigations on June 20, 1949. Sandspit in foreground accommodated numbers of nesting Common Terns and Short-billed Gulls.

2. Nest and eggs of Common Tern at "Muskeg" Lake, 37 miles southwest of Tathlina Lake, N.W.T.; nests were located on long sand and gravel spit of the solitary island. June 20, 1949.

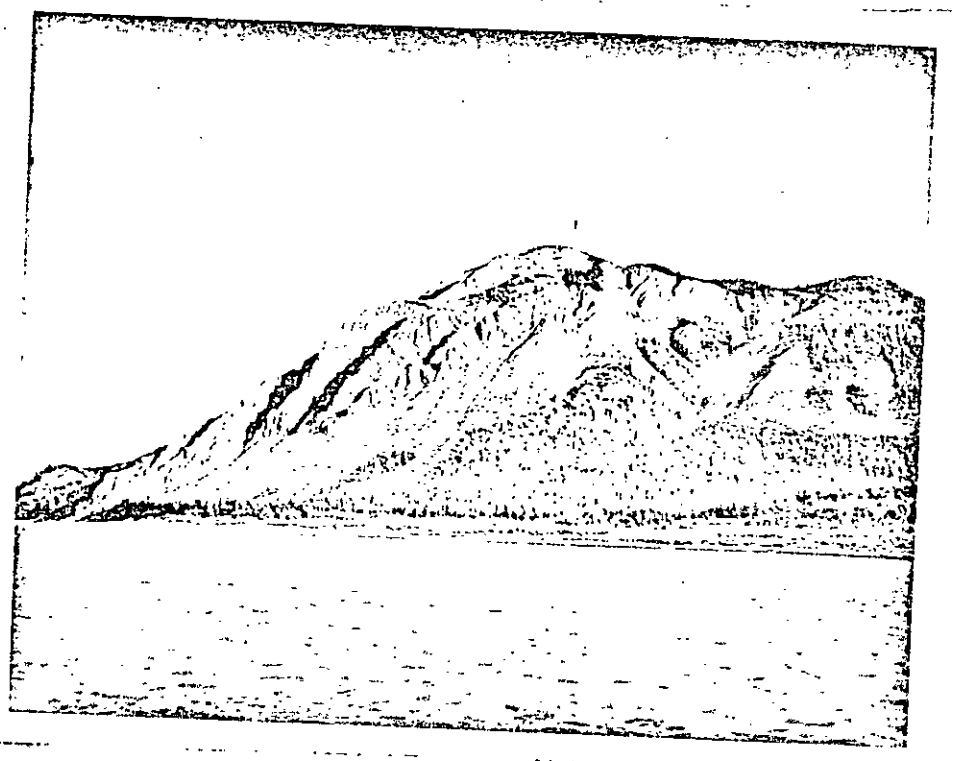
3. Nest and eggs of the Short-billed Gull along the shoreline of an island in "Muskeg" Lake, N.W.T. (Lat. 60° 17' N; Long. 119° 05' W). June 20, 1949. Young beginning to hatch on this date, as were also the associated Common Terns.



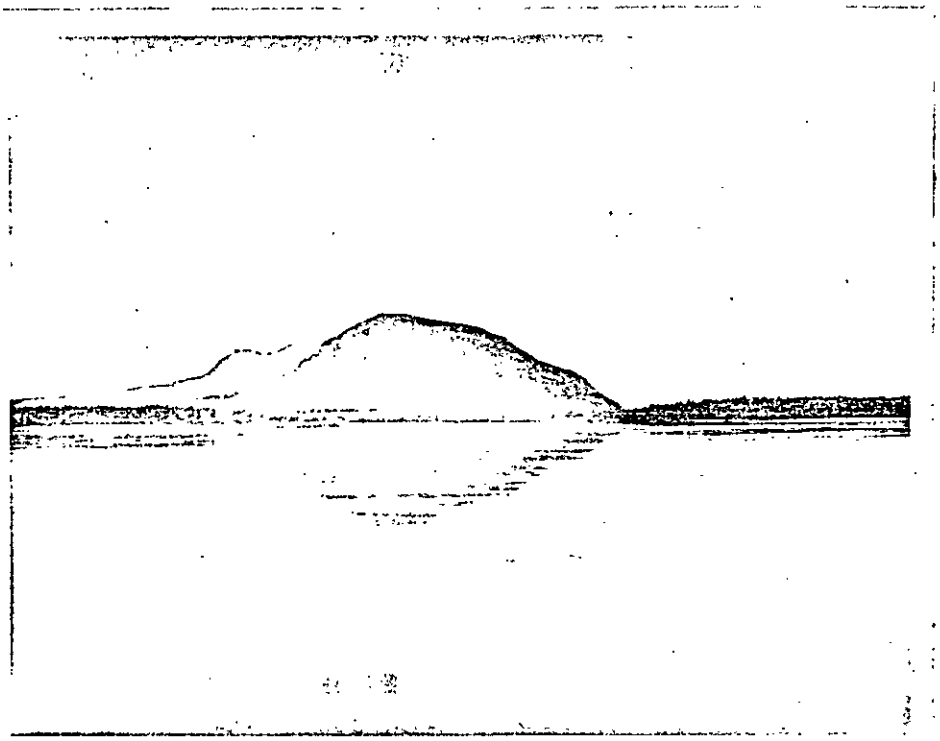
4. Alexander Falls, Hay River, N.W.T., viewed from the west bank looking soutward. June 21, 1949.



5. Louis Falls, Hay River, N. W. T., viewed from west rim of the canyon looking east-southeast. June 21, 1949.



6. A section of Nahanni Mountains, above Camsell Bend, flanking the west side of Mackenzie River, N.W.T. looking west-southwest. Very rugged topography in this sector. July 9, 1949.



7. Relatively distant view of Camsell Mountains as seen from the vicinity of Camsell Bend, Mackenzie River, looking westward. July 9, 1949.

8. Mackenzie River and terrain along the east shore, in the neighborhood of Fort Norman, looking upstream. July 10, 1949. In some sections the land is high and rugged with steep banks along the river and tributaries.

THE REGIONAL WATERFOWL POPULATION

During the inquiries under review the first advanced opportunity to observe wildfowl in the Northwest Territories occurred on July 3rd. At four o'clock that morning the party left Fort Smith in the M.B. Caribou, on the descent of lower Slave River, bound for Aklavik and the delta of the MacKenzie River at the Arctic coast.

LOWER SLAVE RIVER

It may be stated, at once, that only a very moderate duck population resides in the ponds and small lakes of the Slave River lowlands. On the present occasion no opportunity offered to investigate these in detail. However, this territory had been personally examined at various times in the past; results were always the same— relatively few game ducks inhabited the available breeding grounds.

During the summer of 1945 the overall population was found very low. The average per square mile was not obtained that season, but in the light of present knowledge it is very doubtful if sporting ducks in these lowlands averaged more than three birds to the square mile. The 1945 season was dry and water-levels were low; in fact, many ponds and lakes were completely dry. The duck aggregate had entirely vanished from some localities. In a report of that season I remarked: "In total, the amount of deterioration in the waterfowl situation of this region is very considerable, indeed; improvishment of the breeding population and consequent reproduction, will continue on a downward trend until improved rainfall and runoff are forthcoming."

Fortunately, in the ensueing years a small betterment took place. This was more pronounced in some areas than others. In the summer of 1948 Robert Smith, (U.S. Fish and Wildlife Service) reported from his transect data an average of 4.3 ducks per square mile in the "Slave River Parklands." In the season of 1949 the aerial investigations were repeated and the result was 6.8 individuals to the square mile. Accordingly, a small upward trend in regional numbers had apparently taken place since the previous year. Even the latter figure, however, is extremely low and goes to demonstrate the inferiority of this particular boreal territory as a game duck producer.

Despite the 1949 increase noted above, ducks of all kinds were found scarce throughout lower Slave River. Species recorded in order of abundance were Mallard, Lesser Scaup, Buffle-head, American Golden-eye, Green-winged Teal, Pintail, Baldpate and Ring-necked Duck. So comparatively few were seen, indeed, that the birds inhabiting the larger streams bear little or no significant relationship to the whole.

Data for various parts of lower Slave River show that the duck aggregate of the stream from Fort Smith to Fort Resolution varies only slightly from an average of about 1.5 to 2.1 individuals per lineal mile. These figures do not apply to Slave River Delta, nor to some of the bays in the district abo Fort Resolution. In a few of these there were some attractive gatherings. A number of Canada Geese and Sandhill Cranes also inhabited a few of the more sequestered bays and channels.

SLAVE RIVER DELTA

The limited observations in this area during the past summer apparently serves to indicate that ducks were somewhat more numerous than in 1945. That was the last previous year during which the writer was able to make observations in this locality. The impression was possibly correct in view of small increases recorded by Smith in the "Slave River Parklands" during 1949 as compared with 1948. Nevertheless, the general run of ducks noted in the delta is decidedly modest in character. As compared with many other delta areas, the breeding aggregate in the present area is relatively small. Far greater numbers are present during the spring and autumn migrations. This applies also with respect to the presence of geese during at least a portion of those periods.

Later in July the character of Slave River Delta was discussed with Mr. Cecil Law, then working for the Federal Wildlife Division. He had had the advantage of conducting a special investigation in the delta that extended over a period of several weeks. It followed that much detailed information was obtained. Doubtless all of this is now available in a separate report. However, in passing, a very brief summary of waterfowl conditions in the Slave River Delta will be presented as obtained from Mr. Law during a conversation at Fort Smith:

It is asserted that a fair breeding population of sporting ducks and other wildfowl resorts to the delta. The total per acre, or square mile, however, is relatively paltry as compared with really high-class breeding areas. The Common Mallard is the predominant duck. It is followed in numerical status by the Buffle-head. Indigenous species of lesser prominence were Baldpate, Lesser Scaup, American Golden-eye, Pintail, Shoveller, Green-winged Teal, Ring-necked Duck and Canvas-back.

All, or most of these species breed locally along the channels and around the shallow lakes of the lowland, or on somewhat higher terrain in the immediate vicinity. In July, Mr. Law noted broods of young of various species, including those of the Canvas-back. These varied from a few hours, or days, old to those that were conspicuously well-developed and feathered. Young of Horned and Eared Grebes were also encountered.

No evidence was gathered that Canada Geese nest in this precise area, but they unquestionably do so within the district. At times, non-breeders are encountered in the delta lowlands, proper, but more frequently along the outer shorelines facing on Great Slave Lake. The local aggregate is vastly expanded when breeding birds and their off-springs from higher latitudes converge upon the delta during the fall migration. At that season the delta and adjacent lands become the primary wildfowl hunting area for the whole Fort Resolution district. While considerable numbers of birds are taken, the total is undoubtedly small as compared with the aggregate kill in the Peace-Athabasca Delta.

TALTSON RIVER DELTA

Information was obtained at Fort Resolution to the effect that the Taltson River Delta and vicinity is an attractive area for ducks and geese during the spring and fall migrations. Large numbers are said to frequent the locality at these periods. On the other hand it is stated to be a relatively poor breeding area. The writer has never seen that locality, so can form no independent opinion with respect to its qualifications in this regard.

GREAT SLAVE LAKE

For the most part, waterfowl are scarce on Great Slave Lake. This is true at least during the height of summer. Very few were recorded on the run from Fort Resolution via Hay River to the outlet of the lake at Big Island. In this respect the following extract from the writer's report of 1945 is a good brief description of the potentialities:

"..So few ducks were seen on Great Slave Lake between Fort Resolution and Hay River (July 8-9, 1945) as to be scarcely worthy of mention. In a few localities Herring and Ring-billed Gulls were plentiful, together with a few Bonaparte's Gulls. However, in the Hay River locality two fairly large flocks of ducks were seen in flight, travelling from southeast to northwest. They were beyond the range of positive identification, but were apparently mostly Mallards with a sprinkling of Baldpates. Hay River was ascended by canoe for a few miles above the mouth, during which a few of the latter species were encountered, together with an occasional American Golden-eye and Buffle-head".

While observing in the latter locality, in 1949, almost precisely the same conditions were noted. A minor difference was that a few Green-winged Teal were added to the bird list for the Hay River - Great Slave Lake locality. The majority of ducks noted in this area resort to the slack-water of the river that obtains for some considerable distance upstream above the mouth. Beyond that, waterfowl are even scarcer

On the open expanse of the lake between Hay River and the outlet, ducks were far from common. In fact, very few game species of any kind were met with and these were chiefly Mallards. The commonest kinds were White-winged Scoters and American Mergansers. Other species of wildfowl met with in moderate numbers were Common Loons, Herring, Ring-billed and Short-billed Gulls and Common Terns.

MACKENZIE RIVER

As soon as one quits the wide, open expanse of the lake and enters MacKenzie River, wildfowl immediately become more numerous. the birds are definitely attracted by the channels among the islands and the more sequestered waters existing in bays and lake-like expansions. During the voyage in this section from Lobstick Island westward via Brabant, Sinclair and Grassy Islands, waterfowl of one kind or another were constantly in sight.

In some particular tracts of this island maze the birds were plentiful. Of the sporting ducks, only Mallards, Baldpates and Ring-necked Ducks were recorded with any marked frequency. However, a fair number of American Golden-eyes and occasional Green-winged Teals were encountered. The dominant duck in this instance proved to be the American Merganser; many occurred in small groups or flocks. Next in abundance were Surf and White-winged Scoters which added much to the sense of "aliveness" imparted by this island-channel environment. Augmenting the general interest, were many Common Loons, Herring, Ring-billed and Short-billed Gulls, Common Terns and other species.

"Beaver Lake", the marked expansion of the Mackenzie River immediately west of Big Island, is shallow and normally contains an attractive waterfowl population. The species involved are substantially the same as mentioned above and in similar order of abundance. It was noted, however, that it is not relatively as rich in birdlife as the small-island area south of Big Island. As a matter of some interest it may be mentioned that the first Pacific Loons of the voyage were observed in"Beaver Lake".

The Big Island - Mills Lake section of the Mackenzie River enjoys a reputation as one of the locally better areas in the Northwest Territories for the nesting of ducks and a lesser number of Canada Geese. As personally observed, some parts would appear to deserve the reputed distinction, while other areas do not. Certainly "Beaver Lake" was disappointing in its wildfowl population and, without hesitation it can be stated also, that far fewer examples occurred on Mills Lake than anticipated. Not only were species in inferior numbers, but individuals were far from abundant. Practically the only ducks seen in this section were Mallards, plus a few American Golden-eyes and American Mergansers. The remainder of the true waterfowl population was substantially composed of Common and Pacific Loons.

Information has been received repeatedly to the effect that the above district is a relatively superior breeding locale for many species of ducks and for Canada Geese. During the passage through the area nothing whatever was seen of the latter birds. Many are said to nest along the north shore of the section under review. A special investigation of this tract would undoubtedly yield much useful information.

Of one fact we may be certain; far larger numbers of wildfowl resort to this area during the two periods of migration. In the autumn, especially, it has been asserted that tens of thousands of ducks, geese and swans frequent the channels about Big Island and west to Mills Lake. They are said to occur in large rafts, darkening the waters, sometimes tarrying for weeks.

Below Mills Lake surprisingly few ducks were noted anywhere along the Mackenzie via Fort Simpson and Wrigley to Fort Norman. Among the sporting ducks, the species most frequently seen was the Mallard. Only widely spaced examples of Baldpate, Pintail, Golden-eye and Lesser Scaup were encountered. Particularly in some areas, the non-sporting diving ducks were more numerous, comrising Surf and White-winged Scoters and an infrequent American Merganser. Of these, the Surf Scoter was the commonest, occurring in pairs and occasional small flocks. At times, however, hours would pass without noting a single duck, or loon, of any kind.

Apparently Canada Geese were entirely absent. In any event not a single example was detected. At this period the birds are evidently very secretive and retiring when accompanied by juveniles and avoid the open river. At the time it was considered rather curious, however, that at least occasional non-breeding groups were not seen frequenting points and sand-bars along the stream.

According to local residents the wildfowl situation is quite different along the Mackenzie during the spring and fall migrations. At these times it is stated that large numbers of ducks, geese and swans pass through the region. They patronize many small lakes adjacent to the Mackenzie river and, in some areas, are to be found on and along the river itself. Of the Anserinae, Lesser Swan and Canada Geese are the most plentiful; in fact, some observers report that the former species composes about 75 to 80 percent of all the geese during migration. In addition, Whistling Swans fly through the Mackenzie Basin in thousands, as do also Lesser Sandhill Cranes

With respect to ducks and geese, practically identical conditions exist along the MacKenzie from Fort Norman to Aklavik as already described for the section from below Mills Lake to the former point. So far as could be ascertained, no prime breeding area of any outstanding importance exists along, or in the vicinity of the river from

Mills Lake to Mackenzie Delta - a distance of over 700 airline miles.

It is true, however, that scattered nesting of ducks and geese takes place along the river and in numerous small lakes nearby. Nevertheless, from such information as is available the general, average density of the regional waterfowl population appears to be very low. It will probably be found, in time, that the bush country flanking Mackenzie River does not support a summer duck population in excess of four or five ducks per square mile. Many areas are certain to have a lesser density, but, on the other hand, superior numbers may well prevail in some other localities.

Data gathered along about 600 miles of Mackenzie River denotes that the July duck population of the stream averaged approximately 0.28 ducks per lineal mile. In long stretches of the river no ducks were encountered. Again, occasional small flocks here and there served to boost the mean result. As indicated by the above figure, the duck aggregate on and along Mackenzie River averages about six times less than that existing on lower Slave River - and even the latter stream possesses a low summer density.

Various residents of the region stated that relatively few Canada Geese nest along the river north of Fort Simpson, although a certain amount of reproduction takes place practically throughout the entire basin. However, it was said definitely that these birds do not bring forth young around the many small lakes of the Fort Good Hope - Thunder River district, but go farther northward to nest. Such would include areas of the Anderson River drainage, Eskimo Lakes, Mackenzie Delta, Richards Island and evidently northern Yukon.

It would seem apparent from the evidence obtained that more Canada Geese nest in the sub-Arctic and on the Arctic tundra than in the stunted-tree, brush and shrub environment of the Hudsonian Life Zone. The full truth of the situation can be gained only by much more extensive and detailed waterfowl inquiries in the two zones implicated. The quickest and most reliable results will unquestionably be obtained by the use of aircraft.

While the territory referred to above is not goose country, ducks of several species are said to be fairly plentiful on the numerous small lakes. The species reported include Mallard, Pintail, Baldpate, Green-Winged Teal, American Golden-eye and White-winged and Surf Scaters. According to report, the two latter species of non-game ducks are predominant, with the White-winged Scater the more numerous.

MACKENZIE RIVER DELTA

AND VICINITY

From the standpoint of game ducks and other waterfowl, the Mackenzie Delta is a particularly important territory with an overall area of between 5,000 and 6,000 square miles. While the average density of its nesting population is not great by ordinary standards, it is unquestionably the best and most extensive area of its kind in the Northwest Territories.

With Aklavik as headquarters, the writer engaged in numerous trips in and around the delta area. Some of these journeys were by boat and others by aircraft. Time was too limited for a thorough investigation. Nevertheless, considerable information was secured. Doubtless this can be augmented by further data from special investigations of the Wildlife Division located at the delta.

In the present instance most of the results were obtained by the transect method, both by boat and aircraft. Operations by boat, however, were not considered satisfactory; results were indifferent and of no particular significance, as the aggregate is not great, at best, and the majority of the ducks resort to the multitude of small ponds and lakes rather than to the navigable channels.

Aerial transect results are presented below. Unless otherwise stated, there was but a single observer and the results obtained are based upon a sample ground strip averaging one-eighth of a mile wide. Tally from one side of aircraft only. Several of the flights were made for purposes other than a waterfowl survey; consequently, the latter became a by-product only and altitudes flown were frequently in excess of an ideal height for critical observation.

TRANSECT NO. 1

From Reindeer Depot via Parsons Lake and Port Brabant (TUK TUK) to Kidluit Bay, Richards Island, N.W.T. July 17, 1949; 80 lineal miles; Altitude;- 500-1000 feet; 10 square miles.

Species	Count	Percent	Average Sq.Mile
Whistling Swan	24	40.7	2.4
Baldpate	4	6.8	.4
Scaup Duck sp.	6	10.1	.6
Old-squaw	10	16.9	1.0
King Eider	7	11.9	.7
White-winged Scater	8	13.6	.8
Unidentified ducks	28	--	--
TOTAL	87	100.0	--

Average number of waterfowl per square mile - 8.7

This area is characterized by a great wealth of small lakes, mostly shallow. Except for a few stunted spruces near the Reindeer Depot and an occasional depression for a short distance north, territory is open tundra beyond the limits of trees. Most of it is gently undulating with a cover of moss, grass and other lowly vegetation. At this date much of the tundra carpet was turning pale green. Low willows occur in fair abundance. All the lakes were now free of ice. Whistling Swans ranked as the commonest large waterbirds on this section of the tundra. More ducks were seen in the Kugmallit Bay area than elsewhere on this particular trip - chiefly scoters and eiders.

TRANSECT NO. 2

From Fort McPherson to Aklavik -
July 23, 1949; 56 lineal miles;
Altitude;- 100-200 feet; 7.0 square miles.

Species	Count	Percent	Average Sq.Mile
Mallard	4	4.8	.6
Baldpate	8	9.5	1.1
Pintail	6	7.1	.9
Scaup Duck sp.	13	15.5	1.9
American Golden-eye	4	4.8	.6
Buffle-head	2	2.4	.3
Old-Squaw Duck	2	2.4	.3
White-winged Scoter	30	35.7	4.3
Surf Scoter	15	17.8	2.1
Unidentified ducks	29	--	---
TOTAL	113	100.0	---
Average number of ducks per square mile — 15.6			

Portion of transect was made at low altitude above Peel River. Remainder of flight was carried our directly to Aklavik over lowlands studded with an abundance of small lakes and ponds, and cut by numerous channels. All of the area lies within the wooded portion of the Mackenzie Delta. On the whole, waterfowl were scarce. Small flocks, groups and scattered individuals observed at comparatively wide intervals. Very few surface-feeding wildfowl; the vast majority composed of diving ducks. No swans, geese, nor Lesser Sandhill Cranes detected anywhere in this area.

TRANSECT NO 3.

From Aklavik west into Richardson Mountains to prominant stream valley (136° 10' W), north to Moose Channel and return along West Channel to Aklavik.
July 23, 1949 — 120 lineal miles.
Altitude - 500-1000 feet. — 15 square miles.

Species	Count	Percent	Average Sq.Mile
Mallard	4	10.0	.2
Baldpate	2	5.0	.1
Pintail	10	25.0	.7
Scaup Duck sp.	8	20.0	.4
White-winged Scoter	16	40.0	1.1
Unidentified ducks	20	--	---
TOTAL	60	100.0	

Average number of ducks per square mile - 4.0

After leaving the delta lowlands immediately west of Aklavik, flight entered true Arctic territory. In this section Richardson Mountains are treeless, with similar vegetative cover to tundra farther north, (above tree-line) at lower altitudes (Fig. 11). No waterfowl of any kind were noted in the ponds and tarns of the mountains. Only on the return flight along Moose and West Channels were ducks encountered. Even there, however, the birds were relatively scarce, locally not exceeding 10 and 12 individuals per square mile. As may be observed, however, average of entire transect was only four ducks per square mile. Although a small segment of the transect was near the coastal flats (observed from 1,000 feet altitude) nothing was seen of any species of geese.

TRANSECT NO. 4

From Aklavik directly northeast to Reindeer Depot, East Channel. Co-observer - W. Sloan
Sample strip - 440 yds.
July 24, 1949 — 40 lineal miles
Altitude - 500 feet — 10 square miles.

Species	Count	Percent	Average Sq.mile
Whistling Swan	4	4.7	.4
Mallard	11	12.9	1.1
Baldpate	18	21.2	1.8
Pintail	6	7.1	.6
Scaup Duck sp.	20	23.5	2.0
American Golden-eye	2	2.4	.2
White-winged Scoter	20	23.5	2.0
Surf Scoter	4	4.7	.4
Unidentified ducks	71	--	---
TOTAL	156	100.0	---
Average number of waterfowl per square mile - 15.4			

The present transect was run over a typical portion of the Mackenzie Delta lying south of the tree-limit. Small lakes and ponds are so numerous as to constitute more water area than land. Although this transect yielded one of the higher results obtained in the Mackenzie River region, wildfowl density, nevertheless, was conspicuously low. Evidently the breeding population is only about one-half as great as that of Athabasca Delta and approximately one-quarter that of the Lakes Claire - Mamawi marshes, Wood Buffalo Park. As on other traverses of the delta, no geese were detected.

TRANSECT NO. 5

From Reindeer Depot, East Channel, north via Kittigazuit to Kidluit Bay, Richards Island.
July 24, 1949 — 60 lineal miles
Altitude - 500 feet — 7.5 square miles

Species	Count	Percent	Average Sq. mile
Whistling Swan	13	23.6	1.7
Mallard	2	3.6	.3
Baldpate	3	5.5	.4
Pintail	10	18.2	1.3
Shoveller	1	1.8	.0+
Scaup Duck sp.	8	14.5	1.0
Old-squaw Duck	12	21.8	1.6
White-winged Scoter	6	11.0	.8
Unidentified ducks	16	--	---
TOTAL	71	100.0	
Average number of waterfowl per square mile - 9.5			

The route of this transect was very similar to that followed in Transect No. 1, being over the same type of country but a few miles further west toward East Channel, Mackenzie Delta. It will be noted that the mean square mile population is markedly low and that the results of Transect 1 and 5 are in rather close agreement — that is, a discrepancy of only 0.8 individuals per square mile, the latter transect having the high figure. As during operations on Transect No.1, no evidence as to the presence of geese, or cranes, was obtained on the present traverse of the territory under review.

TRANSECT NO. 6

From Kidluit Bay, Richards Island, northwest via Hansen Harbour, to cape south of Pullen Island, and southwest via Hooper and Pelley Islands to and including Garry Island, MacKenzie Bay. Co-observer- Mr. Ward Stevens. Sample strip - 440 yards.
July 24, 1949. 66 lineal miles
Altitude:- 100 - 500 feet. 16.5 square miles

Species	Count	Percent	Average Sq.Mile
Whistling Swan	7	14.9	.4
Old-Squaw Duck	30	63.8	1.8
King Eider	10	21.3	.6
Unidentified Ducks	13	--	---
TOTAL	60	100.0	---
Average number of waterfowl per square mile - 3.6			

At the time of running Transect 6, at least, a surprising scarcity of wildfowl obtained all along the northern coast of Richards Island and, so far as could be ascertained, on and around most of the off-lying islands as well. Much of the traversed territory was practically destitute of waterfowl. In other sections there was a mere sprinkling of ducks. As the table indicates, no geese of any kind were observed from Kidluit Bay to Garry Island. This observational result came as a sharp surprise since the writer had previously been under the impression that large numbers of geese frequented the low-lying outer capes of northern Richards Island and the islands in Mackenzie Bay.

When operating on this transect, pack ice was first met with along the north end of Hooper Island. Most of this was broken up into small floes and rather widely scattered and open, but in some tracts, the field ice was packed solid. Vivid "ice-blink" to the north denoted the fairly close proximity to the main polar pack in that direction.

Field notes on the individual islands are substantially as follows:

Hooper Island: Some areas rather low and rolling but other sections rise abruptly from the sea and in the interior attain to heights of a little over 100 feet. True Arctic tundra with short vegetation. In making a close coverage of this island no waterfowl of any kind were detected either on the land or in the adjacent waters which were free of pack-ice.

Pelly Island: Much of the terrain is low and gently rolling, both along the coast and in some areas of the interior— elsewhere rounded ridges rise to perhaps 50 to 60 feet. The presence of swampy flats, with pools, is a leading characteristic. There were apparently no brant or goose colonies of any kind, but, unlike Hooper Island, Pelly at least attracted a few birds both to the land, and waters in vicinity. Three Sandhill Cranes frequented a swampy flat near the coast and all of the seven Whistling Swans recorded on Transect 6 occurred as a group on the east coast. Nearly all of the King Eider and Old-Squaw Ducks tallied on the transect were seen in the neighborhood of Pelly Island.

Garry Island: This island is relatively low-lying over much of its area, but rounded hills and ridges rise in places to about 200 feet above the sea. Occasional small ponds. Like Hooper and Pelly Islands, the surface is more or less sparsely covered with lowly vegetation composed of mosses, Arctic grasses, sedges, etc. At this date most of the surface had assumed a delicate green tint. No waterfowl of any kind was detected during the flight over this island, either on the land or in off-shore areas. In this respect it was as destitute of wildfowl as Hooper Island.

TRANSECT NO. 7

From the southest extremity of Garry Island northeast to Kendall Island, thence southwest to and over Ellice Island and northeast to Kidluit Bay, Richards Island.
Co-observer— Ward Stevens. Sample Strip -440 yds.
July 24, 1949 116 lineal miles.
Altitude— 100-500 feet 29 square miles.

Species	Count	Percent	Average Sq.Mile
Whistling Swan	148	18.0	5.1
Canada Goose	2	.2	.0+
Black Brant	154	18.7	5.3
White-fronted Goose	4	.5	.1
Lesser Snow Goose	450	54.6	15.5
American Pintail	6	.7	.2
Old Squaw Duck	30	3.6	1.0
King Eider	22	2.6	.7
Red-breasted Merganser	9	1.1	.3
Unidentified Ducks	41	--	---
TOTAL	866	100.0	---
Average number of wildfowl per square mile— 29.9			

As evident in the preceding transect data, waterfowl were notably scarce over the northern part of Richards Island and the three outer islands to the west. However, immediately upon leaving Garry Island on Transect No. 7, wildfowl numbers showed a marked increase (Fig 14). This was not so pronounced on Kendall Island and the unnamed islands between it and Garry island, but the population increase began to be very noticeable on the coastal flats to the south and southwest.

Practically all of the land in this quarter south to Ellice and Langley Islands (and beyond) and east to Richards Island is very low and flat. In fact, it is little above high tide level. The terrain is sprinkled with shallow ponds and channels, with wide expanses of a swampy nature bearing a relatively thin covering of moss, grasses, sedges, etc. Dwarf willows occur in some locations. True Arctic conditions prevail. However, the terrain is markedly flatter and more swampy than that occurring on the upland tundra well above sea-level. The nature of the wet, flat tundra lowlands on Kendall and Ellice Islands, and adjacent lands, is fairly well shown in Figures 15 and 16.

The average square mile population of 29.9 wildfowl on Transect 7 was second to the highest figure obtained in the Mackenzie Delta area and adjacent country. Nevertheless, one is left with the impression of a rather scanty wildfowl population over the major portion of the territory. In the present instance the average figure was greatly augmented by the local occurrence of many groups and larger flocks of swans and geese. These chiefly frequented the coastal flats southwar from Garry and Kendall Islands. Lesser Snow Geese were greatly in the majority. These were followed in order of abundance by Black Brant and Whistling Swan. Many groups were obviously in the moult and flightless. Relatively few ducks and geese were noted very far inland from the sea.

In this particular sector Canada and White-fronted Geese were notably low in numbers. Pacific Loons were tolerably common, as were Arctic Terns, but few gulls were met with. The Lesser Sandhill Crane was noted at Pelly Island and again at times, from Kendall Island southwards over the open delta flats to Ellice Island. Very occasional examples were seen on the overland run between the latter point and Kidluit Bay, to the northeast. In all, 35 of the birds were recorded on Transect 7, or an average density of 1.2 individutals to the square mile. Some particular areas appear to be favoured, while over vast reaches of territory on the other hand, the birds seem to be completely lacking.

It is to be remarked in this connection that the summer population, as referred to above, is said to be greatly increased by an influx of ducks and geese during the time of spring and fall migrations. Where these additional thousands of birds come from is not clear, but possibly they accrue from neighboring parts of the coast in the process of funnelling through the delta for the flight in the Mackenzie River Basin. A heavy breeding population of geese resorts to the west coast of Banks Island. However, it seems scarcely likely that the latter birds would journey so much out of their way to the west in order to migrate along Mackenzie River; their route south is much more likely to be by way of Anderson River.

TRANSECT NO. 8

From Aklavik northeast via the Reindeer Depot and Kittigazuit to Kidluit Bay, Richards Island.
July 25, 1949 — 100 lineal miles
Altitude:—100-600 feet — 12.5 square. "

Species	Count	Percent	Average Sq.Mile
Whistling Swan	12	15.2	1.04
Mallard	6	7.6	.52
Baldpate	10	12.7	.80
Pintail	4	5.1	.32
Scaup Duck sp.	26	32.9	2.08
White-winged Scoter	21	26.5	1.68
Unidentified ducks	118	--	--
Total	197	100.0	--

Average number of wildfowl per square mile — 15.7

For all practical purposes this transect may be regarded as a combination re-run of Transects 4 and 5, although the actual route may have varied by a few miles in some places. Character of environment, however, is essentiall identical. Combined data for the latter transects renders an average result of 12.4 waterfowl per square mile. The present transect yields the figure of 15.7 , while the average of all three transects, for the same territory, is 13.5. The latter figure is a relatively close approximation to the mean results of all eight transects run in the Mackenzie Delta district; that is, 12.8 ducks, geese and swans to the square mile. This is a much lowere figure than obtained by Smith and Lawrence (1949) for the delta, as a whole, but is practically the same as that recorded by them (with respect to ducks per square mile) on the adjacent coastal tundra.

ARCTIC COAST AND ADJACENT TUNDRA

In this category little wildfowl research was accomplished. Owing to the general character of duties, in conjunction with the time element, observations could be carried out along or near the Arctic coast only in the area covered by Transects 9, 10 and 12. In some respects, data for Transects 6 and 7 could have been approximately placed under the present heading; however, the country there is largely of a transition nature and closely associated with delta conditions.

It is considered that the tabulated data is insufficient to present a fully reliable mean for the waterfowl density per square mile. More extensive data was secured in this area by Robert H. Smith and C.H. Lawrence, U.S. Fish and Wildlife Service, who specialised in the work by aircraft from June 11 to July 31, 1949, and travelled approximately 11,000 miles. Reference will be made to their findings in a latter place. Personally secured data will first be presented on succeeding pages.

The two following transects were covered in a single flight on July 27th, but for convenience in the field the data was tallied on two separate sheets. The flight was broken for a time at Stanton where some local observations were conducted.

TRANSECT NO. 9

From the Reindeer Depot (East Channel) northeast via Eskimo Lake and Liverpool Bay to Ranger Cabin, Nicholson Peninsula.
July 27, 1949 — 152 lineal miles
Altitude: 100-500 feet — 19 square miles.

Species	Count	Percent	Average Sq.Mile
Whistling Swan	27	8.7	1.42
Canada Goose	4	1.3	.21
Black Brant	22	7.1	1.16
American Pintail	8	2.6	.42
Scaup Ducks sp	42	13.6	2.21
Old-Squaw Ducks	27	8.7	1.42
White-winged Scater	100	32.4	5.26
Surf Scater	59	19.1	3.10
Red-breasted Merganser	20	6.5	1.05
Unidentified ducks	1367	--	--
TOTAL	1676	100.0	--
Average number waterfowl per square mile— 88.2			

A characteristic of the above flight (as over the upland tundra between Reindeer Depot and Port Brabant) was the presence of Whistling Swans inhabiting the small lakes of the interior. The birds were strictly distributed in pairs— never more than a couple on any given lake. Here they had doubtless nested and in some instances were now tending their cygnets. No groups, or larger flocks of moulting, non-breeding individuals were observed, as was the case in the Kendall Island territory a few days earlier.

As demonstrated in the preceding table, ducks were abundant in this area, Such was not the case in the genuine upland waters, but was very marked at Eskimo Lakes and Liverpool Bay. The high sample average of 88.2 individuals per square mile is attributable to the latter situation; it cannot be regarded as typical of the territory, as a whole, where the average is not likely to exceed 25 to 30 birds per square mile. Large numbers of ducks in Eskimo Lakes occurred in rafts; they actively dived, but were apparently flightless. The bulk of them went unidentified, but it appeared certain that the ~~most~~ majority was comprised of diving species, including eiders, old-squaws, scoters and scaups.

It may be mentioned in this place that all the tundra lakes of the district were completely free of ice at the time of investigations. The same conditions prevailed in Eskimo Lakes. On the other hand, Liverpool Bay contained a considerable quantity of pack ice. The bulk of this was drifted along the east shore, while the western portion of the bay was open and completely free. A few detached floes were also noted northeast of Wood Bay.

TRANSECT NO. 10

From Ranger Cabin, Nicholson Peninsula, via Stanton and Anderson Delta up Anderson River drainage to the junction of Wolverine and Cornwath Rivers.
July 27, 1949. 128 lineal miles
Altitude-100-2000 feet 16 square miles

Species	Count	Percent	Average Sq.Mile
Whistling Swan	98	2.6	6.12
Canada Goose	12	.3	.75
Black Brant	3,300	88.9	206.25
White-fronted Goose	8	.2	.50
Lesser Swan Goose	250	6.8	15.62
Old Squaw	20	.6	1.25
King Eider	18	.5	1.12
Red-breasted Merganser	4	.1	.25
Unidentified ducks	136	--	---
TOTAL	3846	100.0	---
Average number of wildfowl per square mile— 240.3			

In connection with this transect it is to be explained at once that the sample waterfowl density thus secured is far removed from average conditions. That is, the great majority of swans, geese and ducks were encountered within a relatively small geographical area in the Anderson River Delta. Over the remainder of the transect from the delta to the forks of the Wolverine and Cornwath Rivers (approx. 104 lin. miles) the mean density of wildfowl dropped from the sample delta result of about 936 birds per square mile, to less than one individual per square mile.

In fact, apart from a few widely scattered swans, lakes of the upland tundra and thinly wooded area neighboring Anderson River appeared to be practically distitute of waterfowl. However, some diving ducks and loons were recorded. To some degree the low tally secured on this leg of the transect may be chargeable to poorer visibility at the relatively high altitude flown. Swans, on the other hand, were easily detected (especially with binoculars) at a height of even 2000 feet. Pairs of swans were more or less regularly seen on small lakes (near Anderson River) from the delta south to about 69° N, and thereafter, to the southwest only at very wide intervals.

People residing at Stanton declared that the 1949 wildfowl population at Anderson River Delta was noticeably smaller than in the seasons of either 1947 or 1948. According to available data, this contention does not appear to hold

true for at least 1948. During the latter season Robert Smith made a count of geese at Anderson River Delta with a total of 1,900, whereas our estimate in the same area for 1949 (geese only) amounted to 3,570, and that of Smith, 2,152. This notable increase, however, may have been merely the result of a temporary influx of birds from neighboring areas following the nesting season.

The 98 swans counted in the area were represented chiefly by several groups in Anderson Delta. These birds were ostensibly non-breeders and appeared to be in the moult and flightless. The other swans occurred in pairs at small lakes to the south.

TRANSECT NO. 11

From forks of Wolverine and Cornwath Rivers southwest to Tenlen Lake and northwest via Campbell Lake to Reindeer Depot.
July 27, 1949 176 lineal miles
Altitude: 1000-2000 feet 22 square miles

Species	Count	Percent	Average Sq.Mile
Whistling Swan ?	17	7.3	.77
Canada Goose	6	2.6	.27
Lesser Swan Goose	47	20.3	2.14
Unidentified ducks	162	69.8	7.36
TOTAL	232	100.0	--
Average number of waterfowl per square mile— 10.5			

On this flight the altitude was excessive for reliable determination of duck species and, consequently, was not attempted. A point of interest was the occurrence of occasional pairs of swans in the region as far south as Tenlen Lake. Others were noted northwestward to Campbell Lake and beyond. As this is well south of the tree-limit, the question arises as to whether or not these birds were all Whistling Swans, or composed wholly, or in part, of Trumpeters. As yet we have no evidence of the latter species being so far north in modern times; but it seems equally strange to comtemplate the presence of Whistling Swans well south of the Arctic tundra and within the wooded Hudsonian Life Zone. This point can be settled only by careful research on the ground.

It is of some interest to note that not a single Lesser Sandhill Crane was observed on the flight east of the Mackenzie Delta, as represented by Transects 10 and 11. Results recorded on this flight are in close agreement with those obtained by Smith in what he refers to as "Transition Zone", between the Anderson and Mackenzie Rivers— that is, 8.9 per square mile for ducks only; in the same category the writer's figure is 7.6

TRANSECT NO. 12

From Aklavik via West Channel and Arctic coast of Yukon Territory to Herschel Island.
July 27, 1949 — 144 lineal miles
Altitude: 200-1000 feet. — 18 square miles

Species	Count	Percent	Average Sq.Mile
Whistling Swan	14	9.8	.77
Lesser Snow Goose	16	11.2	.89
Common Mallard	28	19.6	1.55
American Pintail	6	4.2	.33
Scaup Ducks	32	22.4	1.78
White-winged Scater	7	4.9	.39
King Eider	40	27.9	2.22
Unidentified ducks	26	--	--
TOTAL	169	100.0	--
Average number waterfowl per square mile — 9.4			

Density of the waterfowl population is low in this sector. According to observations on the evening of July 27th, the aggregate is much lower per square mile along the Yukon coast than in the Mackenzie Delta. The swans were scattered chiefly in pairs at small lakes of the coastal tundra west of the delta lowlands. The few Lesser Snow Geese occurred as a single group in the vicinity of Shingle Point — evidently moulting non-breeders. Three Sandhill Cranes were noted on the trip between the delta and Shingle Point. No goose colonies were detected. Nothing was seen of Canada and White-fronted Geese, or Black Brant, on this part of the coast, nor was it ascertained with certainty that any nesting colonies occurred. It is interesting to note that in this part of the region Smith (1949) obtained an average of only 7.2 ducks per square mile. This is in very close agreement with the duck count, only, in the table above, which comes to 7.7.

At this juncture it is interesting to note the following remarks by Anderson (1937) with respect to waterfowl in the Mackenzie Delta - Arctic coast territory. These statements apply to existing conditions in that region some 15 or 20 years ago. In some fundamental aspects they continue to be of similar character today, but, on the other hand, evidently some species are less abundant at the present time.

".....While several species of freshwater ducks breed as far north as the Mackenzie delta, the Pintail is the only one of these that is at all common along the Arctic coast, although it almost never alights on salt water. The only duck really common everywhere in the Arctic is the Old-squaw which also breeds in the interior south to the timber-line. Geese are not numerous enough to be important in most parts of the Western Arctic, although scattered pairs of Canada Geese nest

here and there. The Mackenzie delta has a considerable breeding population of Canada Geese, and Lesser Snow Geese breed east of the delta on Banks Island and farther east. The White-fronted Goose is of general distribution, but does not seem to be common anywhere along the coast. Whistling Swans are fairly common east of the Mackenzie, particularly in the Langton Bay region. Black Brant breed abundantly here and there near the coast east of the Mackenzie and in the Cape Bathurst area, but are rare east of there, and none is found from Coronation gulf to the Eastern Arctic coast."

In their 1948 report on the waterfowl of this region Smith and Allen has the following information on goose colonies; in addition to the foregoing data this information is of marked interest and value:

"In addition to the aerial transects, total waterfowl counts were made of local areas that did not lend themselves to the transect method. This was particularly true where colonial nesting species were found. The following tabulation concerns primarily snow geese and Black Brant, although other geese were included where they were concentrated but no necessarily nesting."

In the summer of 1949 observations were repeated in indentical areas by Smith and Lawrence; results for both years are given in the tables below:

Mackenzie River Delta (Fringe of outer islands):

Species	1948	1949
Lesser Snow Geese	6,600	2,706
Black Brant	300	236
White-fronted Geese	--	144

Cape Dalhousie

Species	1948	1949
Black Brant	550	257

Kugaluk and Smoky River Deltas

Species	1948	1949
Canada Geese	261	543
White-fronted Geese	566	484
Black Brant	327	332
Lesser Snow Geese	20	---
Unidentified Geese	670	

Anderson River Delta

Species	1948	1949
Black Brant	1,200	1,694
Lesser Snow Geese	700	237
White-fronted Geese	--	197
Canada Geese	--	24

TABULAR SUMMARIES

It would seem desirable and expedient at this juncture to provide certain tables summarizing the general 1949 status of wildfowl in the region under review. Needless to remark, full accurracy is not attainable, but the data presented should be a fairly close approximation to the actual conditions existing at the time of observations.

TABLE A

This indicates approximate, numerical status of duck species in the Mackenzie Delta - Arctic Coast Region, July, 1949, in order of relative abundance. The numerous

unidentified ducks tabulated elsewhere are necessarily ommitted in the present table. Data based upon a 182.5 square mile sample by aircraft.

Species	Number	Percent
White-winged Scoter	208	23.9
Scaup Ducks sp.	155	18.0
Old Squaw	131	15.1
King Eider	97	11.2
Surf Scoter	78	8.9
American Pintail	56	6.5
Common Mallard	55	6.4
Baldpate	45	5.2
Red-breasted Merganser	33	3.8
American Golden-eye	6	.7
Buffle-head	2	.2
Shoveller	1	.1
TOTAL	867	100.0

TABLE B

Table denoting relative abundance of various species of geese and swans recorded under the same conditions as described in relation to the preceding table.

Species	Number	Percent
Black Brant	3,476	74.9
Lesser Snow Goose	763	16.4
Whistling Swan	364	7.9
Canada Goose	24	.5
White-fronted Goose	12	.3-
TOTAL	4,639	100.0

TABLE C

Data demonstrating the approximate, relative abundance of all identified and unidentified ducks and geese tabulated during the aerial transect investigations of July, 1949, in the Mackenzie Delta and neighboring areas.

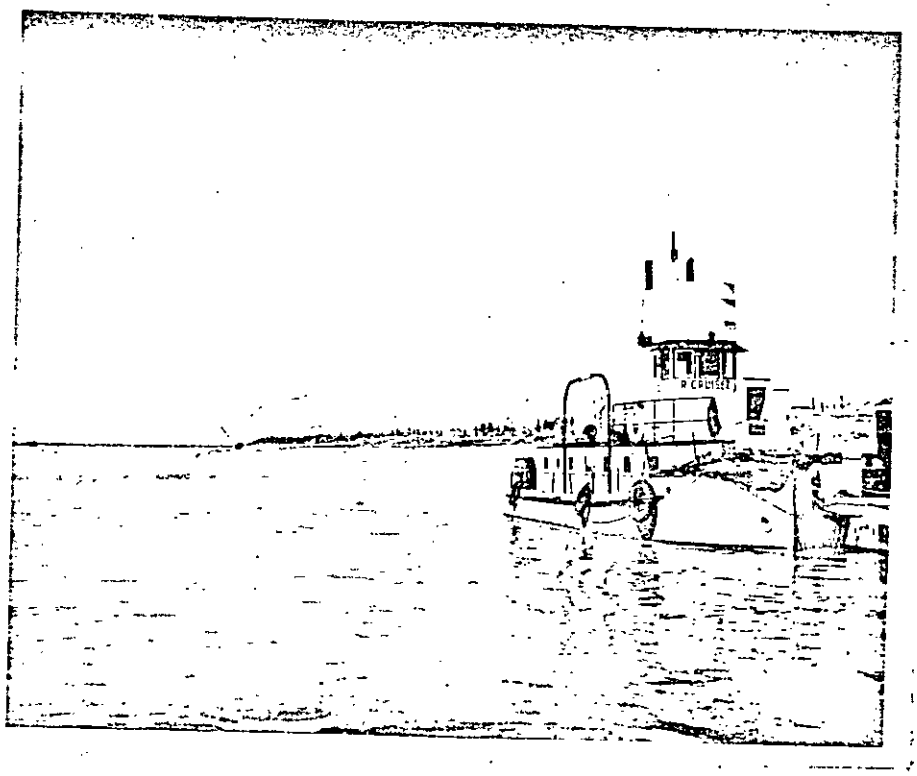
Waterfowl types	Numbers	Percent	Grand Aver. Sq. Mile
Total ducks	2,894	38.41	15.9
Total geese and swans	4,639	61.59	25.4

TABLE D

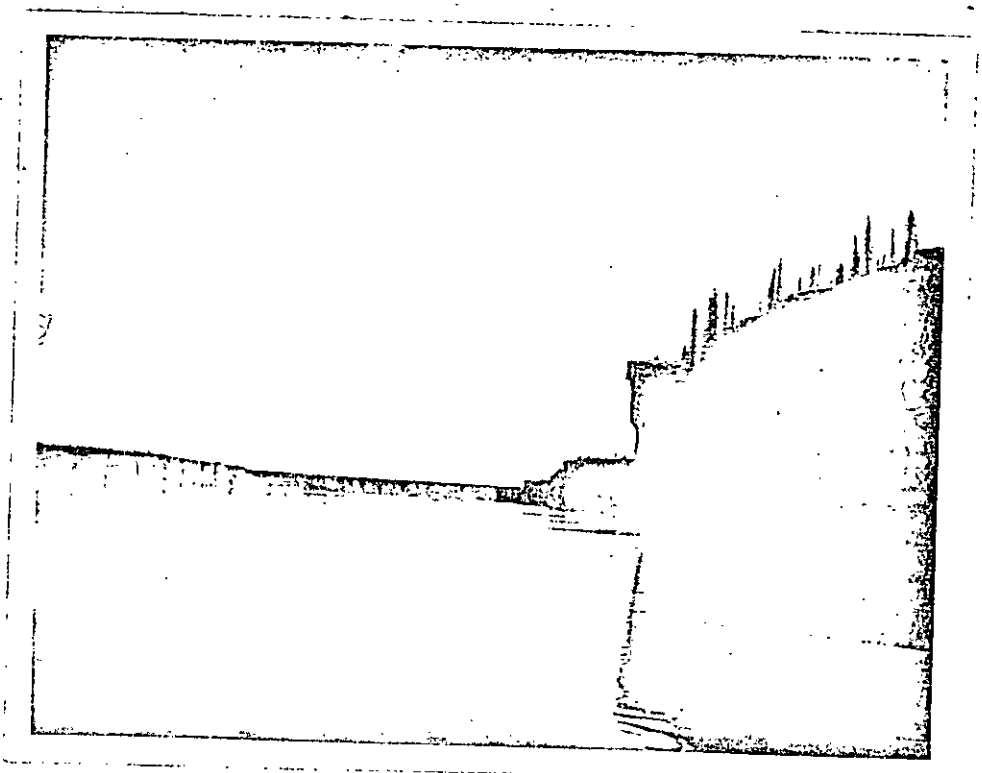
Summary with respect to average distributional density of ducks, geese and swans in the Lower Mackenzie-Arctic Coast region, July, 1949.

LOCATION	Square Mile Sample	Aver.Pop Per Sq. Mile
Transect No. 1. Mackenzie Delta	10.0	8.7
" " 2. " " and vicinity	7.0	15.6
" " 3. " " Richard Mtns	15.0	4.0
" " 4. " "	10.0	15.4
" " 5. " " Richards Is.	7.5	9.5
" " 6. Coast & Islands to W & SW	16.5	3.6
" " 7. " " " " " "	29.0	29.9
" " 8. Mackenzie Delta & North	12.5	15.7
" " 9. To Nicholson Peninsula	19.0	88.2
" " 10. South to Wolverine River	16.0	240.3
" " 11. S.W. & N.W. to Reindeer Dep.	22.0	10.5
" " 12. Aklavik to Herschel Island	18.0	9.4
TOTAL	182.5	---
Grand average - 41.3 individuals per square mile.		

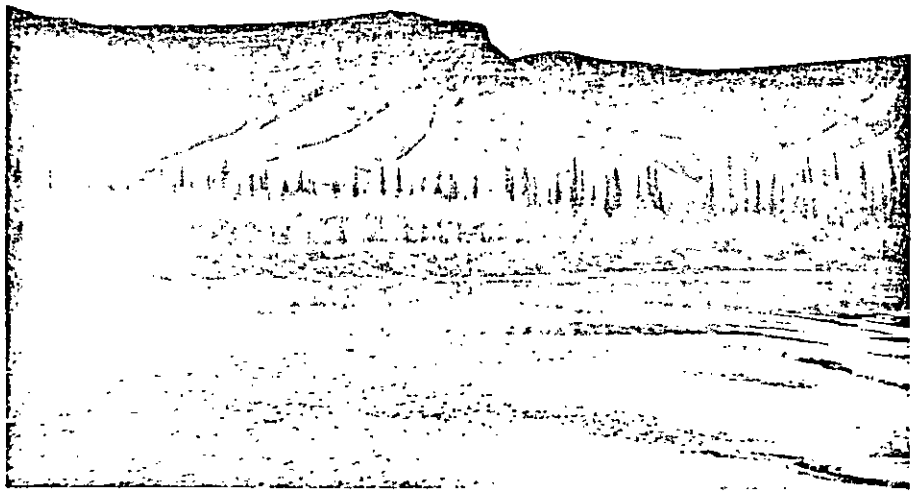
It may be pointed out in this connection that an "unnaturally" high average obtains for Transect 10 because of the inclusion of the large population of geese at the Anderson River Delta. Such inclusion imparts a "fictitiously" high average of 240.3 birds to the square mile, whereas, without the local goose colony referred to, the average for the transect would be only 0.38, or less than one example to the square mile. With the omission of the goose aggregate at the Anderson River Delta, the grand average on all transects in the region would be 17.5 individuals per square mile instead of the 41.3 as given at the foot of the last table. Average density results obtained in 1949 by Smith and Lawrence in the same region (exclusive of colonies) came to 19.8 ducks per square mile; based on a much larger sample, this figure is doubtless more reliable.



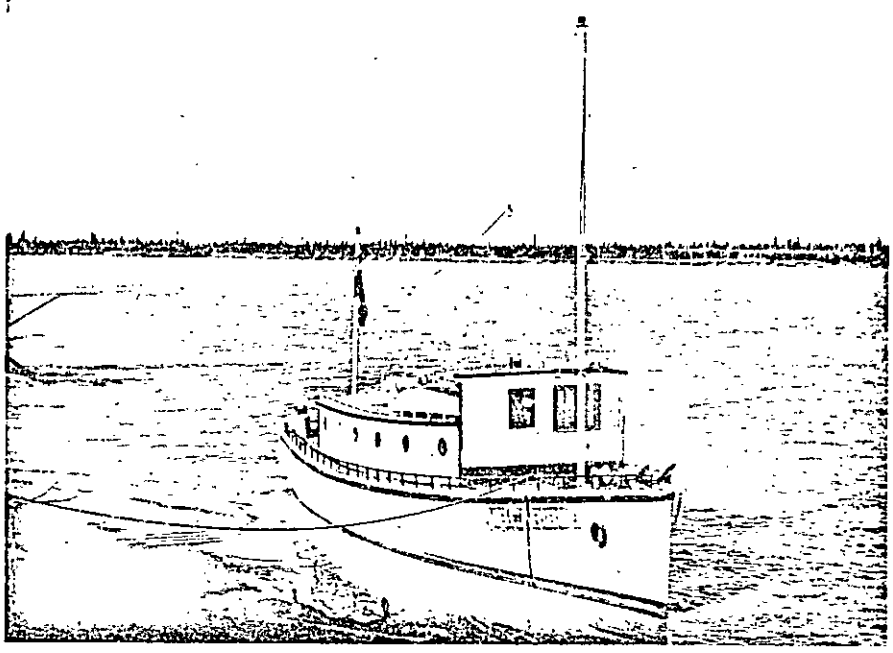
9. Short-billed Gulls flying about the Radium Cruiser at Norman Wells, Mackenzie River. July 11, 1949. Many scores of these birds resorted to the water-front at this and other points along Mackenzie River.



10. The Ramparts, Mackenzie River, southwest of Fort Good Hope, looking down-stream to the northeast. Photographed between 9.00 and 10.00 p.m. July 12, 1949.



11. A portion of Richardson Mountains as seen from Husky Channel, Mackenzie River Delta district, looking west. July 18, 1949. Treeless conditions exist on the mountains comparable to that of true Arctic tundra.



12. The Dominion Government vessel, M.B. Caribou docked at Aklavik, Mackenzie Delta, N.W.T. In this boat the author and Warden Frank McCall made the journey from Fort Smith to Aklavik and the Arctic coast at Richards Island. July 22, 1949.

MISCELLANEOUS AREAS

BANKS ISLAND

This territory was not personally visited, therefore, no first-hand data is available with respect to its wildfowl resources. However, some information was secured and it seems desirable to record it in this place. It derived from J. E. Sidgewick, Hudsons Bay Company, now in charge of the post at Fort McPherson.

Lesser Snow Geese are said to nest by tens of thousands along the low west coast of Banks Island. In places, large areas of the semi-swampy coastal plain are covered with the birds and at a distance appear as acres of clean, white snow. An equal density is not reached all along the west coast, but only in favoured tracts from one locality to another. Their summer nesting haunts depend upon the presence of suitable habitat, embracing ideal lowlands clothed with sedges and grasses and liberally sprinkled with ponds and streams.

It is said that in some areas the geese nest to a depth of about 15 or 20 miles inland from the coast. Evidently this would be in semi-swampy localities well supplied with shallow tundra pools and a lush growth of sedges and other food plants. In addition to Lesser Snow Geese, the territory is reported to also attract smaller numbers of Canada and White-fronted Geese, Black Brant and Whistling Swans. If this information is substantially correct, the coastal tundra of western Banks Island harbours one of the largest goose nesting populations in the western Arctic.

So far as the writer is aware, no qualified naturalist, as yet, has made a detailed study of the wildfowl and other birdlife in this part of the Arctic. Accordingly, it would appear that an outstanding opportunity presents itself to the Service to make a scientific investigation of the notable waterfowl aggregate along the west coast of Banks Island. It would appear to be a splendid opportunity for a summer expedition (of a couple of months) that would ostensibly pay large dividends in the way of new avifaunal information.

VICTORIA ISLAND

With reference to this island, Mr. J.E. Sidgewick stated that, according to his personal knowledge and information, no locality on Victoria Island supports such and abundance of waterfowl as does the west coast of Banks Island. Also, the total character of the bird populations are substantially different. Whereas the latter island is

particularly notable for its large numbers of Snow Geese, Victoria Island is said to have very few. Over large areas i would appear that Lesser Snow Geese are completely lacking, but small nesting groups may occur in some restricted areas.

On the other hand, it is reported that Victoria Island supports large numbers of Black Brant and King Eiders. Also, there is said to be a small representation of breeding White-fronted Geese. These birds are widely scattered along the coast in suitable nesting areas. From the above remarks it will be observed that seemingly the overall character of the summer resident birdlife on the two neighboring islands is notably different. The writer has also gained the impression that, of the two areas, Banks Island attracts the heavier-per-square-mile waterfowl density of the two and is also superior to most of the Arctic mainland coast, east and west.

ARCTIC MAINLAND COASTAL REGION

For all practical purposes, the writer is more or less familiar with that portion of the western Arctic coast, only, that lies between Herschel Island and the mouth of Anderson River. On the actual outer coastline the waterfowl population cannot be regarded as particularly large. In fact, over much of the coastal area ducks and geese occur in only very moderate numbers. Over a long distance perhaps the overall density does not exceed 10 birds per square mile. In some notably favourable areas, however, geese, swans and ducks are much more abundant and reach a local density many times greater than the latter figure.

Wildfowl colonies along the coast are not as numerous as the writer originally anticipated. Of the coastal territory covered, anything of a genuinely colonial character was met with but twice. One occurrence was on the lowland coast adjacent to, and south of, Kendall Island; the other colony was situated in the delta of Anderson River. No other colonies were detected, but at least a few occur elsewhere in country not covered by personal observation.

For example, Smith and Allen, (in 1948) located two additional ones - one at Cape Dalhousie with 550 Black Brant and the other at the delta of Kugaluk and Smoky Rivers containing several species of geese and numbering 1,844 individuals (1,359 in July 1949). This colony is located in a deep inlet at the head of Liverpool bay, south of Campbell Island. It is patently one of the bigger and better aggregations of geese to be found in that region. Many small groups occur here and there along the coast that can scarcely

be dignified with the name of colonies. Occasionally, Whistling Swans are found in these "bird cities" in some numbers. Evidently they are only non-breeders that spend the summer in such companionable surroundings while also undergoing the moult. The nesting pairs are scattered over a wide territory of coastal and upland tundra in association with small lakes. In this region, Snow Geese and Black Brant develop the more spectacular nesting colonies. Such is especially true of the Snow Geese with their conspicuous white plumage; they can be discerned from afar off, particularly from aircraft.

It is understood that nesting geese, perhaps of colonial status, patronize the country about the mouth of Horton River. However, it was stated, positively, that the breeding total is small in comparison with that occurring in the Anderson River Delta. According to information received, it is certain that long reaches of coastline to the east carry a poor waterfowl population, including Coronation Gulf, where goose colonies are apparently non-existent. This is naturally the case where the coast is high and rugged and suitable lowland habitat is totally wanting. So far as could be ascertained in the Mackenzie Delta region and at Bathurst Inlet, it would appear that no important colonies of game ducks, or geese, exist along the whole length of coast from Cape Parry to Perry River. In the latter district the celebrated breeding ground of Ross's Goose is located, together with other species of wildfowl.

FORT SMITH - FORT RELIANCE

On July 31st a flight was made from Fort Smith via Siltaza Lake to Fort Reliance. For some distance northeast from the former point the terrain is low and flat with abundance of muskegs and small ponds. Remainder of the country to Fort Reliance consists of rugged Precambrian rock formation with large numbers of small and medium-sized lakes. These are notably clear and for the most part devoid of aquatic vegetation. Occasional beds of pondweed and water-lilies occur. Waterfowl appear to be extremely scarce, especially eastward beyond the limit of the Slave River low-lands. Only a very few game ducks were seen, together with widely scattered examples of White-winged Scoters, Common Loons and a few unidentified gulls.

FORT RELIANCE - YELLOWKNIFE

The whole of the terrain in this sector is composed of Precambrian, base-complex rocks (as far south) and very rugged, with stunted forest, and a wealth of small and larger lakes. The eastern part of Great Slave Lake is particularly bold with mainland sections and numerous islands rising more or less abruptly in places to several hundred feet. The waterfowl population of this district is so poor and

insignificant as to scarcely call for any comment beyond making the statement. No game ducks were positively identified. A few Common Loons and gulls were sighted. No gull-nesting colonies were observed on any of the numerous islands brought under observation. On a low reef almost due north of the mouth of Snowdrift River a small gathering of 20 gulls was seen — the only conspicuous group of waterbirds noted between Reliance and Yellowknife.

YELLOWKNIFE - BATHURST INLET

This entire territory is composed of Precambrian bed-rock — part of the Canadian Shield. The topography is that of a vast undulating plain of moderate ruggedness, studded with countless ponds and lakes and threaded by numerous streams. Over most of the region the bed-rock is exposed, but in some areas a relatively light mantle of glacial drift obtains here and there in the form of eskers and other sand and gravel deposits. From Yellowknife northeast to the vicinity of Jolly Lake the country possesses an increasingly scanty covering of spruce, birch, willow, etc. beyond that to the north the region is open, treeless tundra.

The flight was made on August 1st. At that time numerous snowbanks still persisted on northern slopes between Contwoyto Lake and the Arctic coast. Even at this late date many of the lakes harboured ice in mid-sections, with an open shore lead.

Throughout the flight a close watch was maintained in connection with the occurrence and general distribution of waterfowl. As a broad statement of fact it may be said that the poverty of the wildfowl population is a striking characteristic over the whole area traversed from Yellowknife to the coast. While most of the journey was made at a moderate altitude, no game ducks of any kind were positively identified. Rarely, scattered birds were noted which were recorded as loons and mergansers. Scores of miles were flown at a time without sighting a single example of wildfowl. On the line flown, no example existed as to the occurrence of geese swans or Sandhill Cranes.

Much more interesting results were obtained with respect to Barren Ground Caribou and Muskoxen, but notes on these are reserved for another place in the report.

SUMMARY

Waterfowl investigations were conducted in the Northwest Territories from the latter half of June until early August, 1949. Most of the inquiries were made in July, from Fort Smith down Slave and Mackenzie Rivers to the Arctic coast.

The more important wildfowl research was carried out in Mackenzie Delta and adjacent upland tundra areas, west along t Yukon coast to Herschel Island and east to the delta of Anderson River. Early in August, air observations were executed from Fort Smith to Fort Reliance and via Yellowknife and Conwoyto Lake to Bathurst Inlet and return. Total travel involved— 9,422 miles.

The waterfowl population in the Slave River lowlands is of very modest character, the average density approximately only 4.3 individuals per square mile. On lower Slave River the number of ducks per lineal mile varied from about 1.5 to 2.1. This is a mid-summer figure; relative abundance is greatly increased during spring and fall migrations. The nesting population of Slave River Delta is rather mediocre and therefore does not compare favourably with such territory as the Athabasca Delta and the area embracing Mamawi and Claire Lakes.

Great Slave Lake was found notably poor in game ducks, the Mallard being the commonest member. The most plentiful ducks were White-winged Scoters and American Mergansers. Characteristic birdlife comprises Common Loons, various species of gulls and terns. Some parts of the lake are more nearly destitute of birdlife than others.

Waterfowl are ordinarily plentiful in Mackenzie River from the outlet at Big Island through the maze of small islands and channels to an beyond "Beaver Lake" to the river expansion known as Mills Lake. Both surface-feeding and divin ducks are represented. Numbers of Canada Geese are reported, in particular, to breed along this section of the river. From Mills Lake downstream to Arctic Red River surprisingly few wildfowl were noted. Data gathered along 600 miles of tha Mackenzie denotes that the July duck population of the stream averages about 0.28 ducks per lineal mile. Scarcity is very pronounced. Some small lakes of the adjoining country are sai to harbour a fairly good aggregate of ducks, together with scattered pairs of Canada Geese.

The Mackenzie Delta is an important wildfowl territory of some 5,000 to 6,000 square miles. While the average density of its nesting population is not great by ordinary standards, it is unquestionably the best and most extensive area of its kind in the Northwest Territories. A total of 182.5 square miles were sampled by the aircraft transect method. Various parts of the delta, the associated islands and adjacent lowland tundra were studied and the density of the wildfowl population computed. The figures varied in different parts from a low of 3.6 to a high of 240.3 ducks, geese and swans to the square mile.

The grand average of all transects run in the delta and along the Arctic coast came to 41.3 individuals per square mile. This means was reached by including the large goose colony at Anderson River Delta. If this colony is omitted from the otherwise total transect data, the average becomes 17.5 individuals per square mile.

Large colonies of nesting wildfowl are far from common and occur only at wide intervals. Most are associated with the Arctic coast on islands and mainland and usually exist on swampy flats close to salt water. The more important colonies known in the region are located at present as follows Anderson River Delta; Kugaluk and Smoky Rivers Delta; Cape Dalhousie; and the low coastal territory in the general vicinity of Kendall Island.

Mid-summer wildfowl population along the Yukon coast from Mackenzie Delta to Herschel Island was found scanty and thinly distributed. The average number of wildfowl per square mile was only 9.4 from Aklavik to Herschel. Evidently no nesting colonies of any kind occur along this section of the coast.

According to report, a large population of geese spend the summer and nest along the west coast of Banks Island Lesser Snow Geese predominate, ostensibly occurring in tens of thousands. Density varies with favourable or unfavourable nature of the local environment. In some tracts the birds are said to occur in very large numbers and to occupy the terrain, in places, up to a distance of 15 or 20 miles from the sea. Other species represented in smaller numbers are Canada and White-fronted Geese, Black Brant and Whistling Swan.

Victoria Island differs from Banks Island very substantially in the general character of its wildfowl resources. In the first place, it is said that relatively few Lesser Snow Geese resort to the island. On the other hand, large numbers of Black Brant and King Eiders are reported to nest in suitable areas along the coast. Based on what information is available, it would appear that, area for area, Banks Island supports much the heavier waterfowl aggregate of the two insular areas under review.

Observations were carried out by aircraft from Fort Smith via Fort Reliance, Yellowknife and Contwoyto Lake to Bathurst Inlet, Coronation Gulf. Over the whole of this route game ducks were practically non-existent. In fact, waterfowl of any kind were widely scattered and relatively rare. The few representatives noted were evidently composed entirely of loons, Old-squaws and Mergansers. The overall square mile density is too insignificant to call for any further remark on the subject, except to remark that Smith (1949) in this same type of country (referred to as "Precambrain Barrens") recorded only 0.14 ducks to the square mile

NOTES ON WILDFOWL MIGRATION

Bird migration is a subject of perennial interest and fascination. For administrative and other purposes it should be well understood. Through a continuing lack of knowledge on some aspects of the subject, the movements of some of our wildfowl are not thoroughly known. As studies continue this will be corrected eventually.

It has been realized for a long period of time, however, that large numbers of our ducks, geese and swans fly the Mackenzie-Slave-Athabasca rivers route during the spring and autumn migrations. Nevertheless, the whole pattern of the flights was not well comprehended; for much of it, indeed, we had no information whatever. For a long time it has been obvious that a strong flight took place along (or roughly in the vicinity of) Athabasca and Slave Rivers via Athabasca Delta.

Tens of thousands of ducks and geese pour into the latter area to feed and rest. Large numbers still patronize the delta, as well as Mamawi and Claire Lakes, but now numbers are not nearly as great as during the early days of the fur trade. The Athabasca Delta and the latter lakes have long been celebrated for their large wildfowl concentrations during migration. The area is outstanding in attracting the remnant of the Ross's Goose population during the migration between its Perry River nesting ground and the wintering area in California. Movements and concentrations continue much as they did long ago. However, they are on a distinctly smaller scale as various wildfowl become markedly reduced in numbers, or face an even more serious degree of depletion.

A distinct, local flyway exists along the Riviere de Rochers and Slave Rivers. Large numbers of ducks and geese follow this route between Athabasca and Slave River Deltas. While many flocks pass directly over the streams, in question, the migration is not necessarily and literally in close association with the waterways, but is frequently well to one side. In the case of Ross's Goose, its flights are northeast and southwest, respectively, in departing from and returning to the Peace-Athabasca Delta in connection with the Perry River nesting area.

During the spring and autumn migrations, important aggregates of waterfowl resort to Slave River Delta. The same is said to occur in the mouth of Taltson River, but on a much smaller scale. Presumably the bulk of these wildfowl, in the spring migration, derives from the Peace-Athabasca Delta. After resting and feeding, the vast majority pass on, leaving only a relatively small percentage behind that nests in the local marshes and grassy lowlands.

Evidently a large number of these migrants from Slave and Taltson River Deltas fan out over the country to the north and northeast. Many of the Lesser Snow Geese perhaps go directly to nesting localities in the mid-Mackenzie District coastal area and on to Victoria Island. It is not unlikely that some of the White-fronted Geese noted in the Athabasca Delta territory follow this route to nest in the same district as Ross's Geese near Perry River.

Another distinct waterfowl flyway occurs west of Peace River and Caribou Mountain. Many times it has been reported, for example, that tens of thousands of ducks, geese and swans migrate by way of the Hay Lakes in extreme northwestern Alberta. Doubtless this is part of the stream of migrants that appears at Kimawan and Winagami Lakes, and other lakes in the Crane Prairie - Peace River region. At Manning I was told in 1949 that despite this heavy duck and goose flight that passes over the two lakes mentioned above, relatively few of these birds are noted in the Manning locality. According to local accounts, however, Manning and North Star are manifestly on a mainline flight of Lesser Sandhill Cranes. It would appear that the Hay Lakes are particularly noted for the large numbers of Lesser Snow Geese that appear there during migration. In addition are numerous Canada and White-fronted Geese and masses of ducks.

These circumstances are clearly related to condition farther north. For example, it has long been known that an especially fine, migrational movement of waterfowl takes place along the upper Mackenzie between Mills Lake and Big Island. The tale has often been heard that birds of many kinds habitually reach an aggregate of many thousands of individuals Seemingly several species of geese are particularly notable. Nothing like it is known between the latter locality and Slave River Delta. In fact, one gains the impression that a stronge migrational wave visits the Big Island - Mills Lake sector than anywhere in and around the Slave-Taltson River Deltas. In any event it appears obvious that the multitudes of birds observed in the former area are identical with those of the noted flights of geese and ducks seen at Hay Lakes and farther south.

The detailed nature of the migration north of the Big Island - Mills Lake territory is admittedly far from clear. However, when local information is pieced together there is no question as to its composite nature. At one time we visualized the main northbound flight as via the Mackenzie and immediate vicinity.

Some details gathered in 1949 throws a measure of doubt on this conclusion. According to a few informants, the main spring flight of geese, in particular, is not by way of the Mackenzie but directly northwards from the Mills Lake district. Especially does this apply to Lesser Snow and Canada Geese. This does not attempt to discount the fact, however, that a pronounced flight of these birds takes place along Mackenzie River, as well, and especially in its lower reaches from about Fort Good Hope and Arctic Red River on down to the Mackenzie Delta.

It is maintained by Mr. J. E. Sidgewick and others (from available observational facts) that a major wildfowl flight drives northward from the Mills Lake district and does not attempt to follow the Mackenzie. This flight, it is said, is quite marked at Blackwater Lake and other nearby bodies of water to the east. It keeps chiefly to the east of Norman Range and Franklin Mountains and passes over an area around the west end of Great Bear Lake.

Here there is evidently a split in the stream of migration. One leg of the flight is now supposed to angle off to the northwest through Good Hope and Arctic Red River districts, thence into the delta and tundra lands to the northward. Another division evidently heads for Eskimo Lakes and Liverpool Bay, while a third travels to and along Anderson River to the delta of that stream and adjacent coastal areas, such as Franklin Bay and Cape Parry. Since the flight of Less Snow Geese is known to be of a major character down Anderson River, it is held by some observers that thousands of these geese set off from Cape Bathurst and Parry for the west coast of Banks Island.

Some observers are of the opinion that perhaps many member of the heavy flight along Eskimo Lakes continue their journey (after food and rest) via Cape Dalhousie and Bathurst to the west coast of Banks Island. As mentioned earlier in the report, thousands of Lesser Snow and other geese nest in the latter region.

The following extract from the field notebook (for July 13th) is based upon information secured at Norman wells, Fort Good Hope and Arctic Red River;

"...Spring migration of ducks, geese and swans is reported quite substantial at times along Mackenzie River and in nearby lakes of the river drainage. It would appear that the majority of these observed, especially from Good Hope northward, may well derive from the marked flyway that obtains from Mills Lake northwest past the west end of Great Bear Lake and east of Franklin Mountains. For the most part, the birds venture north early. They follow closely on the heels of the downstream drifting of ice as the river breaks up, and upon the opening of the smaller lakes. Often the birds crowd into small lakes where the ice has melted before the Mackenzie is free. With open water in the river, however, large numbers resort to it and also rest on banks, spits, bars and islands. Owing to the above tendency on the part of waterfowl, the spring migration is often prolonged; this is especially true with a long-delayed spring, when the ice is late in going out and the birds, in a sense are "dammed up" behind the lingering winter ice. As the ice melts in situ, or moves north down the river, the wildfowl gradually follow closely behind.

"The autumn migration is asserted to be much shorter in duration. The birds usually linger on, or near, their breeding grounds until relatively late. At a given time, a sudden cold snap in the Far North will set a powerful migration in action and the birds may well make a fast trip south. Under such conditions ducks and geese are said to fly high and to be also much more wary and restless. As one informant expressed it, 'On fall migration, ducks and geese usually pass over with much less loitering than in spring and for this reason offer comparatively little opportunity for successful hunting.'"

The Snow and Canada Geese observed migrating past Arctic Red River (and smaller numbers along Peel River) are ostensibly bound for nesting and summer moulting grounds along the Northwestern perimeter of MacKenzie Bay sector and to some extent, also, Richards Island. Numbers may also move in to inhabit parts of the Yukon coast during the summer.

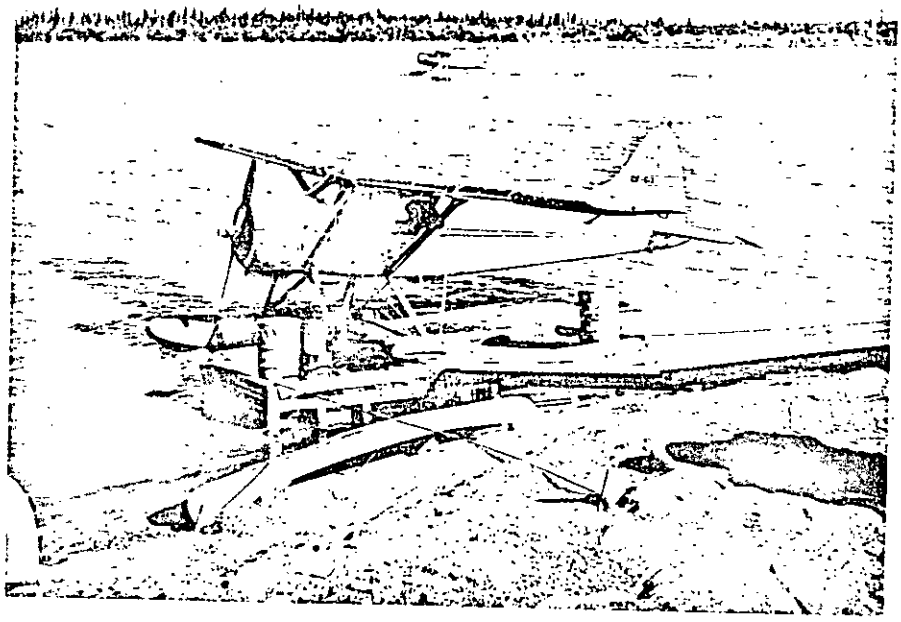
In connection with Canada Geese, it is interesting to note the following statement from Porsild (1943): "The fall migration passes over the Delta September 10-15. In migration practically all birds pass over the western part of the Delta and but few flocks are seen on the East Branch." And with respect to Black Brant: "In both spring and fall migration the Brant appears to follow the coast of the Arctic Ocean from east to west and back."

It has long been known, of course, that waterfowl migration into the western Arctic is not all from the south. The following interesting statements derive from Dr. R. M. Anderson (1937):

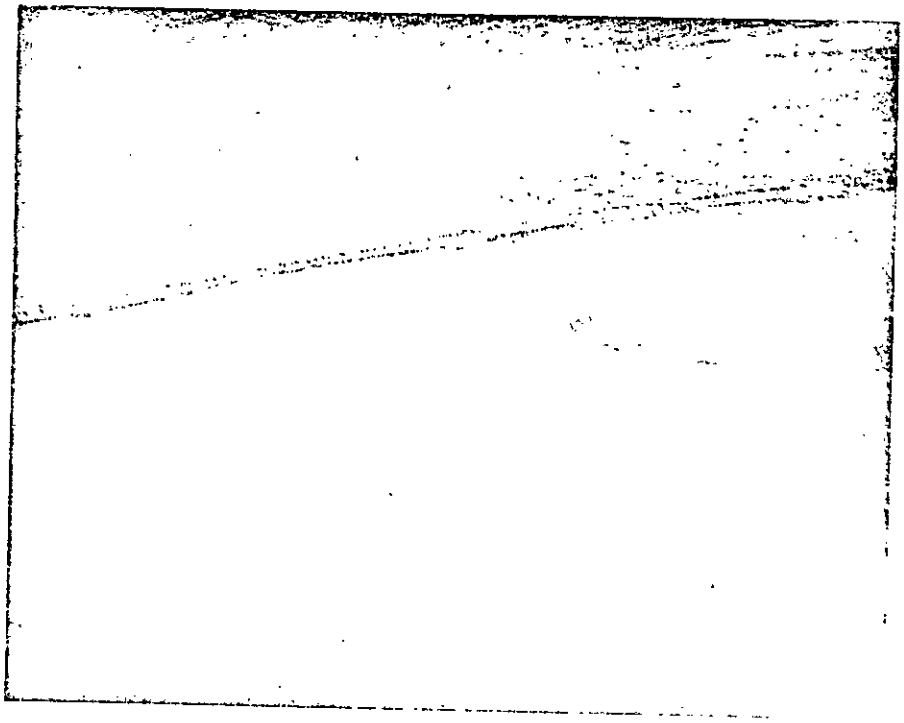
"The Mackenzie delta is rich in summer bird life. There seems to be a slight migration to the westward in spring from the Mackenzie along the north coast of Yukon Territory. Numbers of geese and ducks appear to come over the low divide from the Yukon and Porcupine rivers and spread eastward along the coast. A considerable amount of the Upper Mackenzie River migration does not come to the mouth of the river at all, but crosses from the Mackenzie to Anderson River and thence into Liverpool bay. Large numbers of Lesser Snow Geese come into Liverpool Bay from the south as well as from the west, cross over Cape Bathurst and go directly to Banks Island, although numbers remain to breed on the mainland."

As Anderson further points out, a high percentage of the bird migration on the Arctic coast, proper, is virtually east and west instead of north and south as is commonly the case. He remarks (1937, p. 118) that, "The sea-ducks, gulls, jaegars and many of the shorebirds come from Bering sea and the Pacific, some of them around the far northwest corner of Alaska, reaching the eastern limits of their range as far east as Banks Island, Melville Island, and Coronation Gulf.

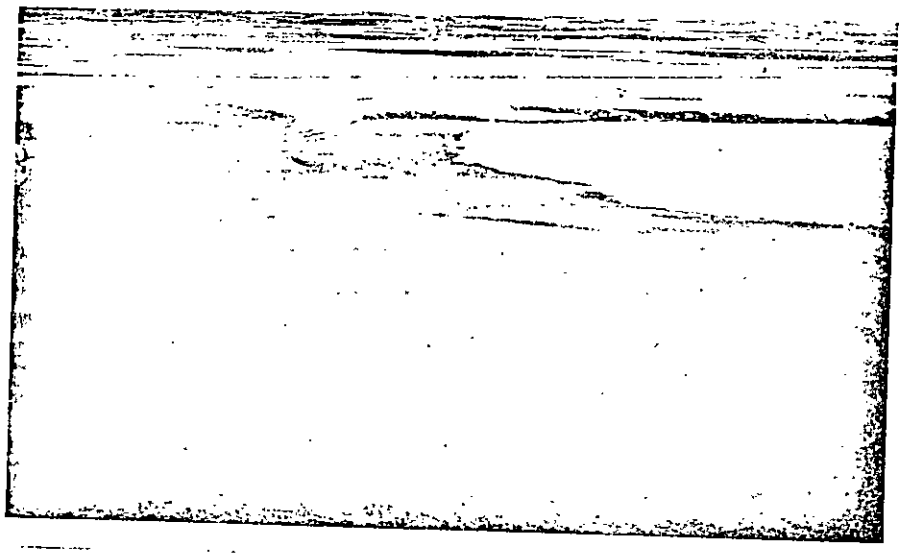
East of Franklin Bay the country is generally comparatively sterile or rocky, and the shores of Amundsen Gulf, Dolphin and Union Strait, and a large part of Coronation Gulf show a surprising scarcity of birds, both in numbers and in species. Comparatively few birds come north by way of Coppermine River, but some birds come to Victoria Island along the coast from the west."



13. The aircraft Beaver docked at Aklavik for re-fueling between flights. In this 'plane the author and other government officials carried out extensive investigations in Arctic and sub-Arctic territory. July 22, 1949.



14. Groups and scattered individuals of Whistling Swan along the shore of Kendall Island, Mackenzie Bay. True Arctic conditions obtain on the island and along the coasts of this region. July 24, 1949.



15. Landscape on Kendall Island, Mackenzie Bay, overlooking lowlands to the east and southeast. Richards Island in the far distance. July 24, 1949.

LIST OF THE LARGER WATERBIRDS

The following list is presented for obvious reasons. It provides more detailed information on the various wildfowl species than is to be found in preceding sections of the report. Also, it is a convenient vehicle for much additional data not practical to record elsewhere. There is also the advantage of having all specific information consolidated under appropriate headings for ready reference. This is especially desirable in connection with species of economic value.

With respect to the following (as well as preceding) results, it is quite likely that full and adequate information was obtained with respect to the 1949 wildfowl situation. All important transect data on this score was obtained by aircraft operations. This modern method has great and indisputable advantages.

On the other hand, certain detailed data can be acquired only by research on the ground. During the inquiries very little time and opportunity was available to study waterfowl by the latter means. Consequently, certain quantitative data could well be of only roughly approximate accuracy. Moreover, certain species may have been overlooked by air that might have been detected by ground observations. The air method, however, is invaluable for covering large areas for broad results in a manner that ground study could not hope to accomplish.

1. COMMON LOON. Gavia immer (Brunnich).

This species is generally distributed in the region under review from northern Alberta to the Arctic coast and off-lying islands. On the various aircraft transects it was observed in numerous lakes of the territory, including Great Slave Lake. Several were seen in Mackenzie River between Big Island and Fort Simpson; another was positively identified a short distance upstream from Arctic Red River. Occasional individuals were noted in the Mackenzie Delta from Peel Channel northeast to the Reindeer Depot. Many loons were observed from aircraft on tundra lakes whose identity was not ascertained.

2. YELLOW-BILLED LOON. Gavia adamsi (Gray).

Few of these birds were personally identified. However, the species is well known to occupy a large section of the western Arctic, inculding Mackenzie River Delta and tundra lakes east and west. It is said not to nest in the delta proper. Examples have been seen in summer as far south as Great Slave Lake. It is said to nest rather commonly about the Eskimo Lakes and other relatively shallow bodies of water on the rolling tundra east of Mackenzie River. Reported common at Bathurst Inlet (Clarke, 1944). There is some possibility that adamsi also inhabit Banks and Victoria Islands.

3. PACIFIC LOON. Gavia a. pacifica (Lawrence).

On the descent of Slave and Mackenzie Rivers this species was first met with in the latter stream between Big Island and Mills Lake. However, it is known to breed about Great Slave Lake and even farther south. Examples were observed daily along Mackenzie River, in the delta and Peel River, and at numerous other points to the northward. According to personal records, pacifica is the commonest of the loons along the lower Mackenzie and in adjacent territory. It is also a familiar inhabitant of the Canadian Arctic islands.

4. RED-THROATED LOON. Gavia stellata (Pontoppidan)

This diver is highly charcteristic of the small lakes and ponds of the treeless tundra along the Arctic coast and on the islands to the north. It does not confine itself to the open tundra, however, but nests as far south as Great Slave Lake. On the whole, it may be the most numerous member of the genus in this region, especially with reference to the higher latitudes. Certainly the species is not so frequently seen farther south (as about Great Slave Lake and upper Mackenzie River) where immer and pacifica are clearly more numerous.

5. RED-NECKED GREBE. Colymbus grisegena Boddaert.

The Red-necked Grebe is widely distributed in northern Canada and nests in suitable habitats throughout the Slave-Mackenzie River drainage basin northwards to the delta of the latter stream. In the delta, proper, it substantially confines itself to the low, alluvial area south of the tree-limit. Along the northern fringe of its summer range, the species is occasionally met with in an Arctic tundra environment. In some Hudsonian Life Zone areas the birds are common, locally almost rivalling their status in the heavily forested region to the south.

6. HORNED GREBE. Colymbus auritus Linnaeus.

This diver was not personally recorded, with certainty, after leaving the Fort Resolution locality. However, it is known to nest with fair frequency in suitable areas north to the wooded portion of Mackenzie Delta and occasionally beyond. Porsild (1943) states that the bird is common in the former territory, but they are rarer in the delta north of the tree-limit. On one occasion he saw a pair in a lake on the southern end of Richards Island.

7. EARED GREBE. Colymbus nigricollis (Brehm).

Extreme northern Alberta and adjoining territory in the District of Mackenzie constitute the absolute limit of range of nigricollis in this region. Preble (1908) refers to a specimen taken by Kennicott at Fort Resolution. Not personally recorded anywhere in the Northwest Territories.

8. WHITE PELICAN. Pelecanus erythrorhynchos Gmelin.

In this region the only known nesting colony of White Pelicans exists on an island at Pelican Rapids, Slave River, Alberta, between Fitzgerald and Fort Smith. Occasional individuals have been seen farther north, as at Great Slave Lake; also, on the Mackenzie as far downstream as Fort Good Hope (Clarke, 1944).

9. WHISTLING SWAN. Cygnus columbianus (Ord.)

Large numbers migrate to and from the Arctic breeding grounds through the Mackenzie River Basin and the drainages of Slave and Athabasca Rivers. In the summer of 1949 the first examples were seen during a flight from Reindeer Depot via Tuktuk to Kidluit Bay, Richards Island. The birds were relatively common on the upland tundra. They occurred as nesting pairs — invariably no more than a single pair to a given area, and were found well distributed at small and medium sized lakes.

On a flight over northern Richards Island the specie was not seen and the same was true in relation to Hooper, Pelly and Garry Islands. However, a total of 155 individuals was met with in the vicinity of Kendall Island and over lowlands to the south (Fig 14). Most of these birds were in groups, or larger flocks; evidently they were moulting, non-breeders. A few were seen about small lakes (chiefly as pairs along the Yukon coast between Mackenzie Delta and Shingle Point.

While running an aerial transect from Reindeer Depot via Eskimo Lakes to Nicholson Peninsula, a total of 27 swans was recorded. As on the tundra a little farther west, practically all of these examples occurred as pairs at separate lakes. Here they had doubtless nested and in some cases were now tending their young. In this particular territory no moulting flocks were seen. At Anderson River Delta, however, the latter feature was well marked where scores of individuals were noted in more or less close association with geese.

In tundra tracts south of the Anderson Delta a few mated swans were again observed scattered over the country at separate lakes. Pairs of swans were also seen at small lakes in wooded and semi-wooded country to the south and west. During the Arctic investigations a total of 364 swans were recorded in a sample area of 182.5 square miles. Ratio of occurrence in relation to geese and brant came to 7.9 per cent of the total.

10. TRUMPETER SWAN. Cygnus buccinator Richardson.

A question is raised in the mind of the writer as to the identity of the swans seen in the more or less sparsely wooded country northeast of Arctic Red River. In

flying south from the mouth of Anderson River, it was taken for granted that all scattered pairs at lakes on the treeless tundra were Whistling Swans. South of the local tree-limit in about Latitude 68° 45' N. pairs of swans continued to inhabit the lakes. Thus they were recorded at intervals to the forks of the Anderson, up Wolverine and Cornwath Rivers, in the Tenlen Lake district, and northwest to and beyond Campbell Lake.

It is the identity of these birds that is uncertain; perhaps they are referable to buccinator. In any event, this wooded environment is not normal nesting range for the Arctic-breeding Whistling Swan. A total of 21 swans was seen in wooded or semi-wooded territory from near the forks of Anderson River via Tenlen Lake to and somewhat beyond Campbell Lake. (See information under Transects Nos. 10 and 11). Most pairs were very widely scattered, but several were noted in and around the latter body of water.

The identity of these birds can be determined only by study on the ground. At this juncture the writer tentatively regards them as Trumpeters until such a time, at least, as it can be shown that Whistling Swans nest in a wooded or semi-wooded environment.

With reference to buccinator, Clarke (1944) rather significantly remarks: "Mr. Jas. Hall of Good Hope, formerly of Fort Franklin, reported a small colony of swans at Willow Lake, between Norman and Good Hope. These birds are far from the breeding grounds of the Whistling Swan and should be trumpeter swans. On July 17, 1942, I saw a pair of swans from the air on a muskeg lake west of Arctic Red River. This is also well south of the Whistling Swan breeding ground.

11. CANADA GOOSE. Branta canadensis (Linnaeus)

Breeds more or less consistently throughout the region under review north to the Arctic coast. A relatively common summer resident in northern Wood Buffalo Park and in the vicinity of "Beaver" and Mills Lakes below the Great Slave Lake outlet. Evidently of sparing distribution in some areas of the Mackenzie River Basin and more numerous in other localities. It is known to breed along the Yukon coast; in the Mackenzie Delta and islands to the north; in the Eskimo Lakes-Liverpool Bay territory; along Anderson River, and other localities to the east.

Surprisingly few were actually seen during the July investigations. These were recorded in the Kendall Island district, and on the flight from Reindeer Depot over the Eskimo Lakes to Anderson River Delta. Apparently larger numbers are to be found in the goose colony at the delta of Kugaluk River. A few more were also noted in the Tenlen-Campbell Lakes territory.

In relation to swans and other geese, the present species occupies a numerically low position, those observed representing only 0.5 per cent of the total, recorded population.

12. BLACK BRANT. Branta bernicla (Lawrence).

The Black Brant is a substantially common Arctic-nesting species, but while abundant in some areas, it is totally absent in extensive territory elsewhere. It is virtually restricted during the nesting season to tundra along the outer Arctic coast including the polar islands. The species is locally common on tundra islands in the northern part of the Mackenzie Delta; in the Eskimo Lakes - Liverpool Bay sector; at Cape Dalhousie; delta of Kugaluk and Smoky Rivers; delta of Anderson River; and also reported on islands to the northeast, and in Franklin Bay. Large numbers are said to nest on Banks and Victoria Islands and also Melville Island.

In the summer of 1949 it was found much more abundant than any other species of goose, or swan, in the coastal territory between Mackenzie Bay and Wood Bay. Its numerical status was 74.9 per cent of the goose-swan aggregate. Of late years the species is said to have decreased in numbers.

13. WHITE-FRONTED GOOSE. Anser albifrons (Scopolo).

These birds commonly migrate down Mackenzie River to their nesting grounds along the Arctic coast east and west of Mackenzie Delta. Actual nesting distribution and relative abundance within the regular summer range is markedly spotty and irregular. It was personally seen nowhere in the delta, proper, nor along the Yukon coast. A few were met with in the Kendall-Richards Island sector and, again, only small numbers in the Anderson River Delta.

It is reported to nest moderately in the Eskimo Lakes - Liverpool Bay district, evidently being most numerous in the area about the mouth of Kugaluk River. On the basis of personal records this species is the scarcest of the geese in the coastal region referred to; in relation to all geese and swans tabulated, its ratio of abundance was less than 0.3 per cent.

14. LESSER SNOW GOOSE. Chen hyperborea (Pallas).

This species is the second most numerous goose of the region, being exceeded in numbers only by the Black Brant which is apparently more than four times as abundant. In relation to total geese and swans recorded, the present species had a standing of 16.4 per cent. While overall distribution is very extensive, there are large local areas in the Arctic where the birds are not found.

They were personally recorded in numbers, only in the Kendall-Ellice Islands territory (Figs 16-18) and at the delta of Anderson River. A few were seen, also, in the vicinity of Shingle Point, Yukon coast, and Eskimo Lakes district. Numbers occur with other species of geese in the Kugaluk River Delta at the extreme head of Liverpool Bay. These geese are reported to nest in great abundance along the west coast of Banks Island and to a much lesser degree on Victoria Island.

While at Fort Franklin the writer was informed by natives that snow geese nested to some extent in the Deerpass Bay - Smith Arm territory of Great Bear Lake. The exact locality was not ascertained. It was said that the country inhabited by the geese is chiefly open tundra, but that a few stunted trees occur in the neighborhood. There is no means of knowing how reliable this statement may be ; it appears questionable owing to the fact that the disignated area is many miles south of the local tree-limit and we normally associate nesting snow geese with unmodified, coastal tundra. However, the statement is recorded for what it may be worth.

15. COMMON MALLARD. Anas platyrhynchos Linnaeus.

The Mallard enjoys a very wide geographical range. In addition to being a dominant game duck in many parts of the South, it is distributed through the region all the way to the Arctic coast. In the upper latitudes, however, it yields position to various diving ducks that become much more abundant in tundra lakes and along the Arctic sea-coast. It was found nowhere actually plentiful in the Mackenzie Delta, or on upland and coastal tundra east or west.

In numerical status it was recorded as seventh on the list of ducks with a ratio of 6.4 per cent, based on a sample coverage of 182.5 square miles. Mallards are more common in the wooded part of the delta and forested region to the south.

16. BALDPATE. Mareca americana (Gmelin).

This is a fairly common duck in the wooded part of the region and in some areas rivals the numerical status of the preceding species. It also occurs rather commonly in the wooded portion of Mackenzie Delta, with frequency and general distribution very similar to that of the Mallard. Few were noted in the delta north of the limit of trees. On most transects run over upland and Arctic coast tundra it was not recorded at all.

According to transect figures based on identified birds, the Baldpate ranks next to the Mallard (or eighth on the list of ducks as to relative abundance) with a ratio of 5.2 per cent. This expresses the grand average. Relative abundance with any species may, and often does, vary markedly from one locality to another.

17. AMERICAN PINTAIL. Anas a. tzitzihoa (Vieillot).

The overall average of recordings on the far northern transects placed the Pintail slightly above the Mallard in abundance with a ratio of 6.5 per cent. The species occurs throughout the region, not only in wooded territory, but commonly into the Arctic Zone as well.

While numbers were seen on the majority of transects, the birds appeared to be distinctly more numerous in the wooded part of the Mackenzie Delta than in unqualified Arctic environment to the northward. Nevertheless, many examples exist in the latter territory along the Yukon coast and east as far as observations were conducted. Numerous members of the species are said to inhabit Eskimo Lakes, Liverpool Bay, and areas northward to Cape Dalhousie.

18. GREEN-WINGED TEAL. Anas carolinense (Gmelin).

In northern Alberta and southern part of the Mackenzie District these little ducks were observed sparingly almost everyday. They were found moderately common in some restricted areas. Only occasional exampled were noted at very wide intervals along Mackenzie River, evidently becoming increasingly scarcer as latitude increased. A few were seen along Husky and Peel Channels.

It was not positively identified on a single one of the transects by aircraft and, therefore, is not listed in any of the tables. In all liklihood the species is extremely rare in the Far North except in the wooded part of Mackenzie Delta; even there, however, it apparently occurs in very limited numbers.

19. BLUE-WINGED TEAL. Anas discors (Linnaeus)

A few of these teal occur in the southern part of the region investigated in the summer of 1949. They are very scarce, however, in extreme northern Alberta and the southern part of the Northwest Territories. There are a few records extant for Great Slave Lake and a portion of the Mackenzie below the outlet. It was not personally noted anywhere in the Mackenzie District in 1949.

20. SHOVELLER. Spatula clypeata (Linnaeus)

This is a common species in the southern parts of its range, but becomes increasingly scarcer through the Mackenzie District to the wooded part of the Mackenzie Delta. After entering the N.W.T. in 1949, it was not personally detected anywhere until a few examples were seen in Husky and Peel Channels on July 19 and 21. On the 24th a solitary example was noted while flying from Aklavik to Reindeer Depot, East Channel. Of the duck total, clypeata apparently represents only about 0.1 per cent — an insignificant part of the total regional population.

21. Ring-NECKED DUCK. Aythya collaris (Donovan).

Moderate numbers of these birds occur in northern Alberta (W.B. Park) and north into the southern part of Mackenzie District. But in approaching the latter territory the species gradually diminishes in numbers and finally becomes rare, or completely absent. In 1949 a few in total were recorded in the Hay River district and along Mackenzie River between Big Island and Mills Lake. It was not seen farther north. Preble (1908) in dealing with collaris remarked: "This duck has not been observed north of Fort Simpson, and is rather rare up to that latitude."

22. CANVAS-BACK. Aythya valisineria (Wilson).

This is a comparatively rare, or scarce species in the Slave-Mackenzie drainage. In that ragion during the summer of 1949, it was positively, personally observed only in the small island-channel maze of the Mackenzie between Great Slave Lake outlet and Beaver Lake. Another was tentatively recorded near Mills Lake. Occasional examples have been seen as far north as Mackenzie Delta and Anderson River.

23. GREATER SCAUP DUCK. Aythya marila (Linnaeus).

Marila is generally distributed through the region under review, occurring in summer from Lake Athabasca to the Arctic coast. Principal breeding ground evidently occurs in Alaska. Greater Scaups were occasionally identified, in 1949, from Great Slave Lake to the Mackenzie Delta. During aircraft operations it was usually impossible to differentiate between this species and affinis and therefore no definite ratio of occurrence was secured.

However, a few were noted in the wood section of the delta (Peel and East Channels) and others, tentatively as marila along Moose Channel and Yukon coast to the west. It is apparently not as common in the delta territory as the Lesser Scaup. In regard to marila in this area Porsild (1943) remarks: "A somewhat infrequent summer resident, and no doubt breeding wherever found."

24. LESSER SCAUP DUCK. Aythya affinis (Eyton).

The Lesser Scaup occurs commonly in suitable environment throughout the region north to the tree-limit and in some instances even somewhat farther. In the Mackenzie Delta, for example, affinis has been recorded both south and north of the limit of trees. In some areas it is apparently fairly common.

In relation to air transects, positive identity could not be established, so the respective status of the two scaups was not worked out. Evidently the present species is at least somewhat more numerous than marila since Porsild (1943) refers t it as "A fairly common summer resident, probably breeding wherever found."

Relative abundance of the two scaup species combined is high on the list with an 18.0 per cent ratio of occurrence — exceeded only by the White-winged Scoter.

25. AMERICAN GOLDEN-EYE. Bucephala c. americana. Bonaparte.

A very common species along the Athabasca, Peace and Slave Rivers and other streams in northern Alberta. Fair frequency of occurence is also marked in various parts of southern Mackenzie District. It is much less numerous to the north but, nevertheless, is distributed in some numbers along the Mackenzie to the delta. It was noted on various channels of the latter area, within the wooded portion, both while travelling by boat and aircraft. Nowhere was it positively detected north of the tree-limit, although it is understood that a few are seen in the latter area.

According to transect figures for the delta-coastal territory, americana is third from the bottom of the list in relative abundance with a mean occurrence of only 0.7 per cent.

26. BUFFLE-HEAD. Bucephala albeola (Linnaeus).

Remarks on distribution under the preceding species apply almost equally well to the Buffle-head. The latter, however, is consistently less common throughout the region. Very few were personally noted in the summer of 1949. Only two were positively identified and recorded on transects run in the delta territory and vicinity. Both were observed along Peel Channel while travelling from Fort McPherson to Aklavik. Ratio of relative abundance is 0.2 per cent. Based on aerial transect data, only the Shoveller ranks scarcer, that is, occurring at the bottom of the list. Porsild (1943) does not mention the Buffle-Head.

27. OLD SQUAW. Clangula hyemalis (Linnaeus).

These birds commonly migrate along the Athabasca-Slave-Mackenzie River system in flying to and from their breeding grounds along the Arctic coast. Owing to the time of season, none was encountered while travelling from Fort Smith to Aklavik. The first were recorded while running Transect No. 1 from the latter point to Kidluit Bay, Richards Island. Relatively few are noted in the delta proper, during the summer, although abundant during the spring.

The birds are of ~~the~~ truly Arctic character and nest on upland and coastal tundra flanking the polar sea. Largest numbers were personally recorded westward from Kidluit Bay over Richarded Island, and lands to the west and southwest. They were also relatively abundant in the Eskimo Lakes - Liverpool Bay territory and in Wood Bay. With the exception of the scaup aggregate and White-winged Scoters, the Old-Squaw is apparently the commonest duck of the region with a percentage ratio of 15.1 in relation to the total duck population.

28. PACIFIC EIDER. Somateria m. v-nigra Gray.

During the aircraft operations of July, 1949, this species was not positively listed in the transect sheets. Owing to rapidity of travel and frequent difficulty in connection with visibility and adequate, detailed observations from suitable altitudes, many questions of identity are left unanswered. It is now the writer's conviction that many Pacific Eiders were seen in the distance along the Yukon coast, in Kugmallit Bay, and at Eskimo Lakes and Liverpool Bay. Males were conspicuously light coloured over the back when in flight, but females of this and the King Eider are similar.

With reference to this region and v-nigra, Porsild (1943) says: "A summer resident of the islands off the Mackenzie Delta and of the coast to the eastward. Large moulting flocks were seen at Cape Dalhousie and in Liverpool Bay, August, 1927.. Anderson (1937) states that this species breeds locally in large colonies on sandy islands off Capes Brown and Dalhousie; Horton River sandspit; islands in Franklin Bay; and in Dolphin and Union Strait.

29. KING EIDER. Somateria spectablis (Linnaeus).

A few of these birds migrate through the Mackenzie Basin, but the small volume is out of all proportion to the extensive summer population inhabiting the Arctic coast and islands to the north. The main stream of migration is evidently east and west along the coast between Bering Sea and the Canadian Arctic coast. The birds are tolerably common in some sectors and apparently absent in others.

They were first met with in Kugmallit Bay on July 17. Later, small flocks were seen around Pelley and Kendall Islands and along neighboring shores. Many were noted along the Yukon coast between Mackenzie Delta and Herschel Island. Large numbers of unidentified ducks noted in Eskimo Lakes and Liverpool Bay may have been individuals of this species.

Many examples of spectabalis were seen in Wood Bay and the delta of Anderson River. The species is said to be common in Franklin Bay, about Cape Parry, and in suitable environment along the coasts of Victoria and Banks Islands. Of the ducks positively identified on the 1949 transects, the King Eider assumes fourth place in relative abundance with a ratio of approximately 11.2 per cent. If all unidentified ducks could have been determined, no doubt the acquired percentages would be of a somewhat different order.

30. WHITE-WINGED SCOTER. Melanitta fusca (Bonaparte).

These birds, locally known as "Black Ducks", are commonly distributed throughout the region under review. They are relatively plentiful in Athabasca and Great Slave Lakes and occur in moderate numbers at various points along Mackenzie

River to the delta.

In the latter territory and especially the wooded section, the transect data indicates that the species is the commonest of the ducks, with a relative abundance of 23.9 per cent. The diving ducks, as a class, are vastly in the majority over the greater part of the Mackenzie Delta, and the neighboring Arctic coast and tundra to the east and west.

With reference to this scoter, Porsild (1943) remarks that it is "A common summer resident in the wooded part of the Delta, occurring perhaps less commonly north of the tree-limit.. The species was noted on most transects, but was definitely more numerous in the delta (both wooded and treeless sections) than elsewhere. Nevertheless, numbers occur in lakes of the open tundra, both upland and coastal. Dozens were observed in Eskimo Lakes and it was the writer's impression that a few were present in Liverpool Bay, but they were not positively identifie

Preble (1908) writes that "MacFarlane found the white-winged scoter breeding throughout the Anderson River regio both in the wooded country and on the "Barrens'". A few were personally noted along the Yukon coast between the delta and Shingle Point. Other notably white-winged ducks seen farther west (from a much higher altitude) were very likely male Pacific Eiders rather than the present species.

31. SURF SCOTER. Melanitta perspicillata (Linnaeus).

In this region the Surf Scoter has a wide range similar to that of the White-winged Scoter; that is, it is locally common from Great Slave Lake north in some localities to the Arctic coast. The birds were found fairly numerous on Mackenzie River between Big Island and Mills Lake. From there downstream the birds were less plentiful. Over long reaches of the river the species were not seen, then occasional small flock were met with all the way to the delta below Arctic Red River.

In the latter area many of the birds were recorded, both south and north of the tree-limit, but much more frequently in the former environment, Numbers were noted in East, Moose, Husky and Peel Channels and Peel River. Relatively few were positively identified, as such, on the treeless tundra, but scattered examples were noted between Reindeer Depot and Kittigazuit; between the former point and Port Brabant; and also in the Eskimo Lakes.

Porsild (1943) found this species a common summer resident in the delta and decidedly scarcer north of the tree-limit than the preceding species. Preble (1908) notes that MacFarlane found it breeding at Fort Anderson; on the lower Anderson River; and at Franklin Bay.

Based on the 1949 transect figures for the upper latitudes of the region, this species is approximately but one-third as numerous at the White-winged Scoter, with an overall average ratio of 8.9 per cent. The latter species was tabulated as 23.9 per cent.

32. AMERICAN MERGANSER. Mergus m. americanus Cassin.

This is a decidedly uncommon breeder in northern Alberta and the southern portion of Mackenzie District. It was only rarely observed. One was noted at Hay River, in June, and a few others were seen on the flight from the latter point west to Tathlina and "Muskeg" Lakes, south to Bistcho Lake and east along Steen River. In July, several examples were observed between Hay River and Big Island and along the Mackenzie River to a point between Mills Lake and Fort Simpson. Nowhere was the species detected farther north.

33, RED-BREASTED MERGANSER. Mergus serrator. Linnaeus.

This so-called "Fish-Duck" ranges over a very wide territory, breeding throughout the region north to the Arctic coast and adjacent islands. The species was noted on many occasions in GreatSlave Lake and along Mackenzie River to the delta. In the latter area it appeared to be somewhat more common than along the main river, occurring in both wooded and treeless sections. Many were recorded along the arctic coast and in lakes of upland and coastal tundra westward from Kugmallit Bay and from East Channel northeast to Liverpool and Woods Bays.

Perhaps there is very little of the mainland Arctic coast, and vicinity, from Alaska eastwards but is inhabited by this species. With reference to Macknezie Delta district, Porsild (1943) states that serrator is a very common summer resident south, as well as north of the tree-limit, and that it breeds wherever found. MacFarlane (Preble 1908) found the species breeding along Anderson River and on the tundra to the east. It is also relatively common, to abundant, in much of the region to the south and southeast, including the vicinity of Great Bear, Aylmer, Clinton Colden and Great Slave Lakes.

Based upon the transect figures of 1949, the Red-breasted Merganser stands ninth on the list of ducks in relative abundance with a ratio of 3.8 per cent. Thus, this is an overall long-term average in various types of country. In some localities serrator appears to be much more numerous than the latter figure denotes. It is said to inhabit Banks and Victoria Islands in moderate numbers.

34. WHOOPING CRANE$. Grus americana (Linnaeus).

As set forth in a previous chapter, nothing was seen of this rare bird during the summer investigations of 1949. It is evidently now all but extinct in far northern latitudes. While and odd report of occurrence is received, as likely as not it is unreliable, having been based upon careless observation and misidentification. It formerly ranged into the Northwest Territories in some numbers, a few having travelled as far north as Anderson River and Mackenzie Delta area. However, it appeared to be more common around the western half of Great Slave Lake and along upper Mackenzie River between the lake and Fort Simpson. Even by the early part of the

century it had become very rare throughout the region as shown by Preble (1908). The last local record seems to have been a pair shot by an Indian at the mouth of Hay River about 22 years ago (Information from Warden Harry Camsell).

35. LESSER SANDHILL CRANE. Grus canadensis (Linnaeus).

This species is distributed in varying degrees of abundance over the greater part of the region. It is known to occur from Wood Buffalo Park and other northern Alberta localities north to the Arctic coast. Over considerable territory the birds appear to be very scarce, or absent, whereas in some other districts they are common.

In the Mackenzie Delta, proper, it was not personally recorded, but 35 were observed on the flight to and about Kendall Island and adjacent lands. Several were noted between the delta and Shingle Point, Yukon coast, and others were observed in the territory between East Channel and Anderson River. Porsild (1943) states it is "A somewhat rare summer resident, breeding only in the most inaccessible parts of the Barrens north and east of the Delta; according to the Eskimos it was formerly more common."

36. AMERICAN COOT. Fulica americana Gmelin.

In the region dealt with here, the Coot is only infrequently observed. A few were met with in Wood Buffalo Park; along the lower Slave River area, to the delta; and in the Hay River district. It was not seen, personally, any farther north. However, there are records of occurrence along upper Mackenzie River from Big Island (Great Slave Lake) outlet to Fort Simpson. Evidently, numbers inhabiting the Northwest Territories is insignificant.

POTENTIAL BIRD SANCTUARY AREAS

One of the items of paramount concern in the 1949 inquiries was that of locating potentially new bird sanctuary areas in the District of Mackenzie. Much was already known of the native birdlife and its distribution. We also had some knowledge as to the disposition of important nesting colonies, but much more was necessary.

Above all, an initial and somewhat specialized investigation was needed to secure a proper concept of sanctuary possibilities; also, to judge the feasibility of establishing such protective areas when found. A great expanse of territory was involved. Of little or no concern in this instance were the small passerine, or the upland game birds. Serious interest at this time was reserved primarily for waterfowl and other marsh-birds, in general, including Anatidae, Laridae, Gavidae, and Grøidae.

The location of several potential sites was already known. They required further study and clarification. Observations over large areas by boat and aircraft disclosed the fact that immense tracts have no bird sanctuary possibilities whatever— particularly of the type in mind. Certain restricted areas are somewhat favourable, but lack size and the all-round ecological essentials of sufficient scope to make their reservation as bird sanctuaries worthwhile. A few localities to be described below have excellent qualifications.

Deltoid alluvial tracts normally have distinct assets in relation to ducks and other waterbirds, nesting and feeding environment, etc. Unfortunately, relatively few such areas exist in the Northwest Territories. The two most notable are the deltas of Mackenzie and Slave Rivers, respectively. Special attention was devoted to the Mackenzie River Basin; observations were carried out by boat and aircraft, thus attaining to two complete coverages for the whole length of the river. No potential sanctuary area deserving of even faint recommendation could be detected anywhere in the valley from above Fort Simpson all the way to the commencement of the Mackenzie River Delta below Arctic Red River.

In other words, there is a distinct shortage of good game duck environment. For the most part, rivers have not produced marsh-deltoid habitat at their mouths, or at least areas of sufficient scope and effectiveness to be of any importance from a sanctuary viewpoint. Consequently instead of often being more or less concentrated in such tracts (as frequently occurs farther south), waterbirds are widely disseminated in a multitude of small ponds and lakes, many of which have narrow marshy fringes. In such territory, consolidation of bird resources is at a minimum, as are also related high-class environmental conditions. So, frequently the latter are normally lacking, together with the possibility of setting aside practical sanctuaries of genuine merit.

While the latter conditions broadly apply in the greater part of the Mackenzie Basin, they are even more pronounced over vast reaches of mountain and pre-Cambrian bedrock territory on either hand. In fact, far from having rich bird sanctuary potentials, huge tracts of the "Canadian Shield" — while possessing a wealth of lakes — are utterly poverty stricken with respect to waterfowl of all, or nearly all species. It is to be noted, therefore, that by far, the greater part of the country holds no possibilities, what-so-ever, in connection with the establishment of adequate and otherwise feasible sanctuaries for many classes of avifauna, economically important, or otherwise.

Certain tracts having sanctuary possibilities are individually dealt with below. Some of these have had a reasonable degree of study. Others again, owing to circumstances, are worthy of more detailed attention and should receive this by a competent biologist before final decisions are made. Especially is this the case with respect to localities covered only by aircraft inspection and thus lacking any detailed survey on the ground.

In a few instances certain tracts are listed that were not personally seen, but on which a little authentic information is available. Some aspects of the situation are intriguing and conceivably would call for more detailed study. The 1949 inquires were essentially in the nature of a reconnaissance survey to discover the possibilities of a vast territory and to sift the worthless from existing resources of merit and value. This, at least, would lay a foundation for future progress.

I. Pelican Island, Slave River, Alberta

(Nat. Topographic Sheet 74 N. W.)

No serious attention was given to the White Pelican breeding colony in Slave River during the 1949 investigations. It is considered disirable at this juncture, however, to draw attention to its continued existence ever since the river voyage of Alexander Mackenzie in 1789. The species has nested there ~~ever~~ since time immemorial. Whether or not it is accorded protection under the Migratory Birds Convention Act, it seems to me that a protective attitude should be taken with respect to this particular colony.

In the future, if the safety of these birds is jeopardized by chance, a decision might well be made to create a sanctuary of the island on which they nest. This island is in the midst of Pelican Rapids, Slave River, Alberta, 10 miles southeast of Fort Smith, N.W.T. It is believed that this proposition merits thoughtful consideration. Many of the northern residents are seriously interested in the birds and derive much pleasure from watching them feeding below the rapids at Fort Smith. Moreover, these birds are unique to the extent

that they constitute, so far as known, the northern-most nesting colony of the species in North America.

II. Slave River Delta, N.W.T.

(Nat. Topographical Sheet 85 S.E.)

As a potential bird sanctuary, this area has distinct possibilities. Its location, as the title denotes, is at the mouth of lower Slave River, south shore of Great Slave Lake, and approximately two miles northeast of the village of Fort Resolution. From Nagle Bay, (southwest extremity) to its practical northeast limits near Jean River, the overall width at the lake may be referred to as approximately 14 miles. Since the average extent of marsh, grassland and channels back from the lake is roughly four miles, the delta may be said to have an area of about 56 square miles.

As in all alluvial areas of this sort, the land is flat and low-lying, extensively marshy and intersected by numerous streams and channels. It is clothed to considerable extent by willows, poplars and a few spruce. Much of the tract consists of open grassland. Small ponds and lakes, within the limits of the delta, are relatively not nearly as numerous as in either the Athabasca, or Mackenzie Deltas. Extensive silt flats and sandbars characterize the outer fringe of the delta in the lake. These constitute first class loafing areas for ducks and geese during spring and fall migrations.

This is the largest typical delta of which we have any knowledge lying between the Peace-Athabasca Delta and the mouth of Mackenzie River. The waterfowl breeding population, nevertheless, is only moderate in size. While numerous species resort to it during the breeding season, the overall aggregate is clearly much smaller per square mile than in either of the two areas referred to above. Notwithstanding, it is an interesting tract, in a land of few such examples, with a fair degree of summer production. More detailed information will be found in the chapter, "The Regional Waterfowl Population".

The waterbird aggregate is vastly augmented during spring and autumn migrations. Not only is there a notable increase in the number of game ducks, but thousands of geese also must visit the area to feed and rest. These are composed of Canada, Lesser Snow, and White-fronted Geese. It is understood that Whistling Swans and Lesser Sandhill Cranes sometimes resort to the area in at least limited numbers. During the autumn migration the birds evidently funnel into the delta from a wide area to the northward, some of them, ostensibly, coming from the mainland Arctic coast and perhaps Victoria Island.

If a sanctuary were ever to be set aside in this part of the Northwest Territories, the Slave River Delta is the logical area. It is superior to any other deltoid tract about Great Slave Lake; in fact, it is a rather rare condition in the region. While it is understood that the Taltson has an elementary production of this type, many other streams such as Snowdrift, Lockhart, Buffalo, Little Buffalo, and Hay Rivers, and numerous other streams, lack any such deltoid-marsh development. Consequently, for wildfowl sanctuary purposes the Slave River Delta is unique in a large territory, offering the only conspicuous possibilities along these lines.

As a sanctuary, the area might be regarded as really of less value for the protection of the summer breeding population than for the much larger aggregate of geese and ducks found within its confines during the autumn. In the latter season considerable gunning takes place. Opportunity for the birds to properly feed and rest at this time is greatly curtailed. Since illegal spring and summer shooting is now practically abolished (and especially in the delta with such close proximity to law enforcement officers at Fort Resolution) the cardinal value of a bird sanctuary at this point would be to permit wildfowl feeding and resting in the autumn without molestation of any kind.

Such a move would undoubtedly tend to reduce the total kill of ducks and geese in the district. Assurance was received, however, that, as yet, the latter is not markedly extensive. If settlement greatly expands there in future years, the slaughter of wildfowl could readily become much more pronounced and perhaps even serious. Particularly with the development of a sanctuary such conditions would at the Slave Delta become both desirable and justified.

At the present time the kill of waterfowl in that area is not excessive. There are comparitively few white, local sportsmen, the natives are not heavy gunners, and the area (so far from commonplace civilization) has not yet suffered to any measureable extent from the inroads of sportsmen from the "outside".

It may be pointed out that the local residents are not in favour of setting the delta aside as a bird sanctuary. This is only natural. There are relatively few hunters, as yet, and the kill is moderate. The local residents have few pleasures and those that enjoy wildfowling in the fall are not willing to relinquish the sport. Also, the fresh meat is of no small importance in the far northern community.

If the delta were closed to hunting wildfowl the local people would practically loose their duck and goose shooting. Other suitable tracts are at a considerable distance.

Perhaps it may be concluded that the time is not yet ripe for the creation of a bird sanctuary in the Slave River Delta. However, the above information is now available and the matter can be kept in mind. Should the kill tend to become excessive through increase of population from mining and other activities, I would then heartily recommend that the entire delta, or the major portion of it, be set aside as a bird sanctuary under the M.B.C. Act and Regulations.

III. Taltson River Delta, N.W.T.

(Nat. Topographic Sheet 855 S.E.)

Taltson River flows into Great Slave Lake, from the south, in about Longitude 112° 45' W. It is 36 miles east-northeast of Fort Resolution. Several channels exist at the mouth as the river approaches and flows into Taltson and Gaudet Bays, respectively, Numerous islands characterize the river's mouth and vicinity. This is especially true of Taltson Bay.

Schedules were of such a nature that this area was never personally observed. While working in other parts of the North it was several times heard referred to as a fairly good waterfowl resort. Without an adequate routine investigation it is impossible to give any proper account of its real qualifications. If any true delta conditions exist in the way of low, alluvial lands, ponds, marshes, etc., they are evidently confined to a restricted tract.

It is reported that a moderate number of game ducks nest about the mouth of Taltson River. Some ostensibly utilize grassy lowlands, while others resort to neighboring islands. It is also understood that a few Canada Geese nest, or otherwise spend the summer in the general vicinity. As in the case of Slave River Delta, relatively few ducks are to be found away from the mouth of the river, except perhaps for numbers that spend the summer farther upstream.

An informant at Fort Resolution stated that the tract under review was much less notable for waterfowl in the summer than during the spring and autumn migrations. At those periods (particularly in the fall) it is said that ducks and geese resort to the area in considerable numbers. The general character of the bird population is evidently much the same as that obtaining at Slave River Delta; that is, comprising many species of game ducks, together with Canada, Snow and White-fronted Geese and occasional Whistling Swans. According to report, it would appear that scattered examples of Ross's Goose find their way into the Taltson River area; however, the main flight between Athabasca River Delta and Perry River is fully 150 miles farther east.

It has been suggested that the area around the mouth of the Taltson would provide good sanctuary possibilities of moderate capacity. Perhaps about 20 square miles would appropriately lead themselves to a sanctuary scheme of this kind if and when such a closed area in the district is deemed advisable. It is personally felt that, as yet, no real urgency for a bird sanctuary exists in this locality; particularly is this true if a sanctuary were established in the comparatively nearby Slave River Delta.

As in the latter area, protective measures afforded by setting up a sanctuary at the mouth of the Taltson would be aimed more at the goose and duck concentrations during migration periods than for the benefit of the modest summer breeding population. Naturally, however, all phases of the situation would profit, thereby, especially the relief from gun pressure in the autumn. The general aspects of the matter are very much the same as those mentioned in connection with the Slave Delta. This would undoubtedly include local opposition.

The present purpose is particularly to place the Taltson area on record in relation to possible future requirements. Before any serious action is taken it would be highly advisable to make a comprehensive waterfowl survey of the area; this would conceivably not only embrace the summer population, but also representative periods, spring and autumn, to ascertain volume and general character of the duck and goose concentrations.

For future administration purposes, aside from any sanctuary proposals, an intimate avifaunal knowledge of the area is desirable. The Slave River Delta is in need of a similar detailed investigation. Both areas could be conveniently worked from a common headquarters and the result incorporated in a single report.

IV. Egg Island, Great Slave Lake

(Nat. Topographic Sheet 85 S.E.)

The presence and character of this island were drawn to my attention during a visit to Fort Resolution. Unfortunately, no appropriate opportunity arose with respect to its investigation. However, the island is extremely small (represented as perhaps two or three acres) and it is consequently doubtful if it is of sufficient size and importance to interest the Department.

Egg Island lies well out in Great Slave Lake due west of Nagel Channel, Slave River Delta, and 12.5 miles northwest of Fort Resolution. It is reported as rocky in character, of moderate elevation, and situated in relatively deep water. During the breeding season it is said to be literally covered with nesting gulls. The residing species (one or more) was not ascertained, but there is a high probability that the population comprises either California, or Herring Gulls, or both. Short-billed Gulls are also common summer residents of the region.

In relation to potential bird sanctuaries, it is deemed expedient to list this teeming islet on principle. If it is considered too small for practical sanctuary purposes, at least no harm will have been done by recording it in this place. However, the day may come with a greatly expanded human population in this region, when such concentrated bird colonies, regardless of size, will receive the beneficial protection afforded by sanctuary legislation.

NOTE.---Before commencing investigations in the territory under review it was the expressed desire of the Wildlife Division that islands in Great Slave Lake supporting bird colonies should, if possible, be discovered and reported upon. Such would embrace sanctuary possibilities. Vague rumours were heard from the natives to the effect that at least Gull colonies occurred on islands in the eastern part of Great Slave Lake. Myriads of tracts exist in that district ranging from large islands down to islets, or mere reefs. It was to be admitted that the probabilities seemed excellent for the occurrence of bird colonies under these conditions.

It should be recorded that I did considerable flying over the eastern portion of the lake without detecting any colonies whatsoever. One flight was made over a multitude of islands from Fort Reliance westward to the north end of Et-theu Island, thence to Yellowknife. Another flight covered swarms o islands between the latter point, Gras Cap and the south shore at Jean River. Most attentive scrutiny was maintained at all times during these passages over the lake, but no bird colonies could be seen. In fact, birdlife of all kinds appeared to be very scarce.

The experience referred to, however, does not prove non-existence of colonies. On the contrary, there may be many. Despite the considerable coverage at a good observational altitude, hundreds of islands were not brought under close, or any scutiny. The Indians insist that bird colonies are present and this would appear to be significant. In this connection it is self-evident that more exploration is necessary.

In connection with Herring Gulls, Preble (1908, p.265 mentions a gull colony in Great Slave Lake near Loon Island north of Fort Resolution. This is not identifiable on the latest topographic sheet, but probably refers to an island in the Iles Basses group due south of Gras Cap. He remarks: - "On July 13, while detained by wind on Loon Island, 50 miles north of Fort Resolution, I visited a breeding colony on a small island a quarter of a mile to the westward. The island was merely a rock about 50 yards in diameter and only 3 or 4 feet out of water and was bare except for small patches of grass growing in the crevices. Upon it were nesting about 100 pairs of Herring and California Gulls, the latter outnumbering the Herring gulls two to one...."

It is possible that the latter colony is one to which Fort Resolution Indians refer (aside from local Egg Island), but I was under the distinct impression that the alleged gull colonies were farther to the east. Consequently, it is my conviction that new colonies may be discovered eventually in the welter of islands northward from Taltson River and farther east. Certain evidence also suggests that a colony of gulls nests on Hardisty Island, near the west shore, 56 miles north of Point Presquile.

V. Big Island-Mills Lake Section of Mackenzie River, N.W.T.

(Nat. Topographic Sheet 85 S.W.)

For many years I have heard the above-mentioned section of the Mackenzie River referred to in glowing terms as unusually well furnished with many different kinds of waterfowl. That is, it is well above average for the Great Slave Lake region. Complimentary references were made to this locality by different residents of the country. These statements have induced me to list this portion of the upper Mackenzie River under the present caption of potential bird sanctuary areas.

A description of personal observations and impressions in this area is presented in a former chapter, "The Regional Waterfowl Population". Consequently, those details need not be repeated in this place.

As a very brief resumé, however, it may be stated that the summer population of waterfowl is not impressive by more southern standards. However, it is stimulating as compared with most of the regional waters and, particularly, with the open expanses of adjacent Great Slave Lake, conspicuous for its poverty of wildfowl. Not only are ducks much more numerous in the Big Island-Beaver Lake-Mills Lake sector, but other birdlife appears to be broadly more plentiful. Canada Geese are also reported to nest locally in fair numbers. And on the whole, it is an ornithologically attractive section of the country.

Notwithstanding these summer qualifications, it would appear that the major wildlife merit of the territory under review centres around the flood of ducks and geese which pours into it during the spring and autumn migrations. That is why some persons believe that the area should be set aside as a bird sanctuary. Action of this kind would undoubtedly conserve wildfowl.

Gunning is a pronounced activity in this section during the fall, open season. However, as compared with numerous other tracts farther south, the kill is by no means excessive — in fact, moderate. So far, the larger percentage

of wildfowlers are of local origin, with few outsiders. Such a situation could readily change as Hay River settlement expands, together with mining activities in the Pine Point locality, and the possible development of a railroad to the south shore of Great Slave Lake.

The "Northward March of Empire" is to be kept steadil in mind. Needless to say, as civilization gradually encroaches wildlife is subjected to greater pressure and danger. Increasingly more restrictive measures is the only solution.

One of these measures in the North could be the creation of a bird sanctuary along the Mackenzie from the lake outlet at Big Island to the outlet of Mills Lake. In all probability it would be more desireable to set aside two areas and exclude the length of river between "Beaver" Lake and Mills Lake which embraces Fort Providence and Indian villages immediately to the westward.

Thus, a sanctuary area might be created at the Great Slave Lake outlet incorporating the whole of Big Island, and neighboring waters together with "Beaver" Lake (the river expansion below) to approximately longtitude 117° 30' W). This tract, in itself, would provide a highly appropriate protective one for wildfowl. Thousands of geese migrate into that area and also into Mills Lake. The latter could likewise be set aside, if thought advisable, possibly bounded east and west by the Sixth Meridian and Longtitude 118° 30' W., respectively. Perhaps, at most, the one closed area in this locality would be sufficient.

It is to be repeated that any proposals in connection with a sanctuary, or sanctuaries, in the above territory are not based upon the great merit of the country from the viewpoint of summer waterfowl production, although there are favourable points. But the chief consideration is fo the protection of multitudes of geese and other waterfowl that stop to rest and feed in this district during migration. The Big Island-Mills Lake section lies within a chief regional flyway between Hay Lakes and the Arctic tundra and coast.

Considering all angles of the situation, it appears to me that the time is not yet entirely ripe for taking action in relation to the above suggestions. However, there are potentialities and the time may well come when it will be necessary to use them. In any event the above information is now available for reference.

At the present stage of settlement in the Mackenzie District, relatively little wildfowl shooting takes place. As compared with the South, the birds shot are almost neglegible. People of the Territory in some respects, are more deserving of wildfowl hunting that sportsmen living in civilization. Securing fresh meast in the North is a much more serious proposition. Pure sport is generally a secondary consideration. It is said that if the area mentioned above

were set aside for bird sanctuary purposes, the local people from east of Hay River Settlement to Fort Simpson would substantially loose their wildfowl gunning in the autumn. Other goods, or fair, tracts are too far away to be a practical substitute, and, in any event, few local residents can afford the time or money to go hunting in distant localitie

Warden Harry Camsell (Hay River), and others informed me that any move to create a bird sanctuary, or sanctuaries, in the proposed territory would meet with vigorous resistence from the majority of the male residents. The chief opposition, of course, would derive from Hay River with its rapidly expanding population. However, N.W.T. residents from many points along Great Slave Lake (ostensibly including Yellowknife), and west, resort to the above-mentioned areas during the open season. Geese apparently constitute the chief kill, but many game ducks are also secured.

The only course to take in an instance of this kind is to place the facts on record; then the Department can use its best judgement in the matter. What may not be feasible, fair and just at one time could readily develop into a very highly necessary action at some future date. This may well be the case in relation to bird sanctuary potentialities in the area referred to above; the same reasoning applies to the Slave River Delta.

NOTE.--- As intimated above, both areas referred to were disucssed with Warden Harry Camsell of Hay River, N.W.T. He is of the opinion that real dissatisfaction would develop at Great Slave Lake if either the Slave River Delta, or the Big Island-Mills Lake section of the Mackenzie were set aside a inviolate bird sanctuaries. Others are of the same opinion.

It should be mentioned that Mr. Camsell made a counter proposal in relation to the upper section of the Mackenzie River previously discussed. He suggests that an alternative would be to set aside all, or most of Buffalo Lake as a bird sanctuary. In his estimation, the area would provide a substantial and worthwhile area for this purpose. He asserts that the south shore is marshy in various localities and attracts an extensive waterfowl population. This consists of both ducks and Canada geese.

Ducks are numerous in the various marshes along the south shore, including bays grown to aquatic vegetation. Mr. Camsell specifically stated that during July he had seen hundreds of moulting adult and immature Canada Geese.

The writer is not personally familiar with the greater part of Buffalo Lake. However, as represented by Warden Camsell, the area appears to have geniune potentialities in connection with the purpose under review. It is not

improbable that the time will come when Buffalo Lake could be seriously considered from a sanctuary standpoint.

At present relatively little wildfowl hunting is done in the area; few whites visit this lake in the shooting season and Indians are not very active on this type of hunting. However, the situation may change drastically within a few years. Particularly is this true if a railroad is built to Great Slave Lake and the human population greatly increases at Hay River Settlement and in connection with mining developments south of Pine Point. Changing conditions of this kind will undoubtedly call for serious study, as time advances, together with the introduction of necessary adjustments.

VI. Kendall-Ellice Islands Sector of the Mackenzie Delta

(Nat. Top. Sheet 107 S.W. & S.E.)
(Attached to Report)

This proposed sanctuary area lies well north of the tree-limit in the Mackenzie River Delta. Accordingly, it respresents an unmodified Artic environment. On the west and north it is bounded by Mackenzie Bay, Beaufort Sea. Mean latitude is approximately 69° 15' N. Aklavik lies about 60 miles to the south.

In regard to boundaries, a tentative suggestion would be to embrace Langley and Ellice Islands and all coastal tundra lands northward to Mackenzie Bay (including Garry and Kendall Islands and neighboring islands between) and east to the channel that trends to the north in close proximity to Longtitude 135° W. Collectively, this block of terrain is susceptible to good, recognizable boundaries in the channel last mentioned on the east; in the channel south of Langley and Ellice Island; and the open polar sea to the west and north. The territory thu described has an area of between 800 and 900 square miles. Tentative boundaries are shown on the attached map at the end of the report.

Practically all of this terrain is flat and elevated only a few feet above sea-level. It is composed wholly, or chiefly, of deltoid silts derived through the ages from Mackenzie River. Most of the land is relatively low and moist, or of a thoroughly swampy character, often sprinkled with a multitude of shallow ponds and small lakes. It is typical, coastal tundra of the low-lying type which is fundamentally attractive to Arctic waterfowl. Much of the surface is mantled with moss, polar grasses and sedges and other vascular plants. Occasional, low ridges, intersect some of the territor and on these the plantlife varies, sometimes to include dwarf willows. The general character of the terrain is very well shwon in Figures 14, 15 and 16.

Under "Transect 7" of the chapter, "The Regional Waterfowl Population", much detailed information is given respecting the wildfowl complex along this part of the Arctic coast. Perusal of that section will render it unnecessary to go into the matter at any great length in this place. Data under "Transect 7" is not confined to the area here proposed for a bird sanctuary, but the majority of the birds listed were seen within it. Few waterfowl were noted after leaving the coastal lowlands between Mackenzie Bay and Ellice Island and flying a northeast course over the higher terrain of Richards Island. All the low tundra country illustrated in Figures 14 to 16, inclusive, lies within the territory proposed for a bird sanctuary.

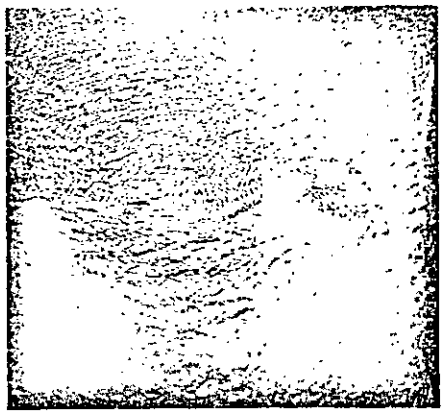
This is apparently one of the best goose areas obtaining anywhere within, or closely adjacent to, the Mackenzie Delta. (Figs. 14, 16, 17 and 18.) Relatively few geese are found during the breeding season in the more typical wooded or semi-wooded delta lands to the south, and these are confined to Canada Geese.

On the Arctic coast, however, is the real summer home of Lesser Snow and White-fronted Geese and Black Brant. Many hundreds, and doubtless thousands of these birds resort to the proposed sanctuary area. Particularly is this true during the autumn migration. Large numbers unquestionably nest. Some evidence also suggests that perhaps equally generous numbers of birds are non-breeders and spend the summer in loafing and moulting in that peaceful and remote environment beside the sea.

In addition to the species mentioned above, there is an attractive showing of Whistling Swan and Lesser Sandhill Crane. Both species are assumed to nest within the prescribed area. A few Canada Geese also occur. The duck aggregate is fairly good, consisting of at least Red-breasted Mergansers, King and Pacific Eiders, Old-Squaw and American Pintail. No markedly large colonies of any waterfowl species was noted in this territory, the population consisting of various-sized groups, flocks, scattered pairs and individuals.

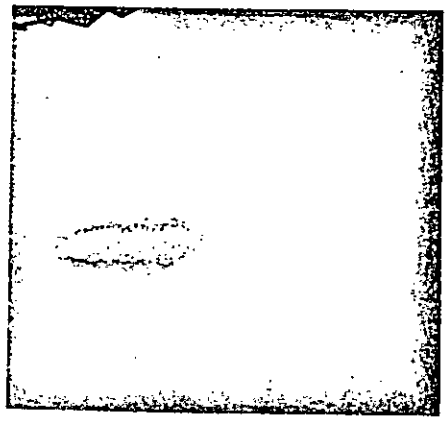
While flying this general territory on a waterfowl survey in 1948, Robert H. Smith tabulated 6,900 geese, comprising 6,600 Lesser Snow Geese and, the remiander, Black Brant. He lists these under the caption, "Mackenzie River Delt (Fringe of outer islands)". A repeat observation in 1949, over precisely the same terrain, gave a total count of 3,086 geese consisting of Lesser Snow Geese, 2,706; White-fronted Geese, 144; and Black Brant, 236;. The precise course of these flights is not known, but very likely embraces some of the proposed sanctuary tract, or lands in the immediate vicinity. In any event, the figures disclose interesting goose conditions in the general district under discussion.

If the Department desired, Hooper and Pelly Islands could be included in the proposed bird sanctuary, thus



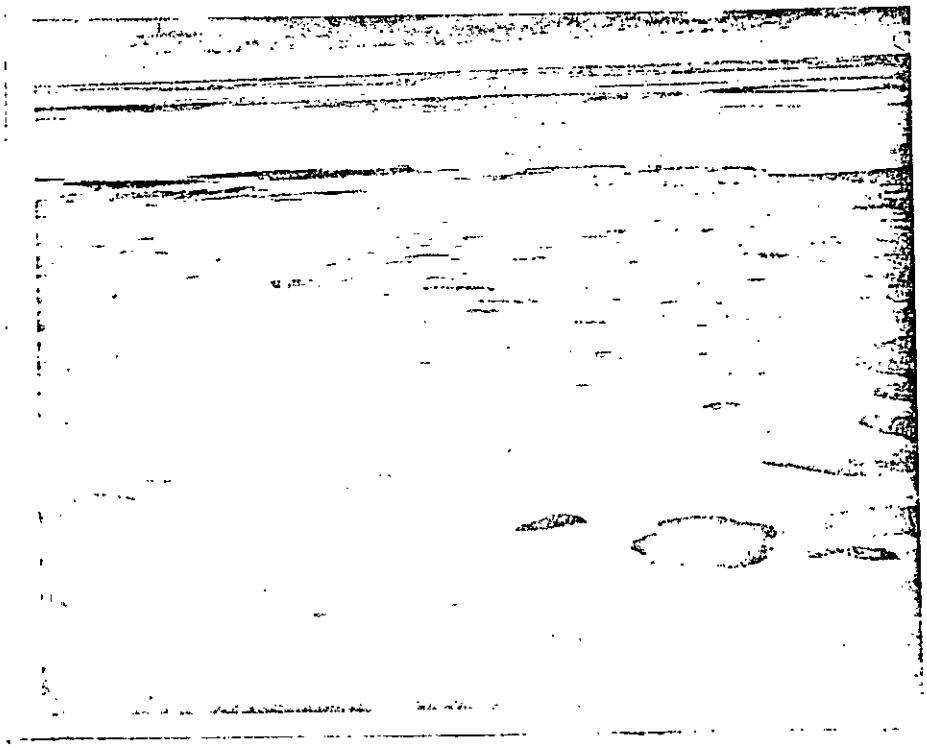
16. A compact flock of moulting Lesser Snow geese at sea a short distance south-south-west of Kendall Island. Beaufort Sea, N.W.T. July 24, 1949.

17. Large flock of moulting Lesser Snow Geese which put out to sea, from the low-lying coast near Kendall Island, N.W.T. upon approach of the aircraft. July 24, 1949.

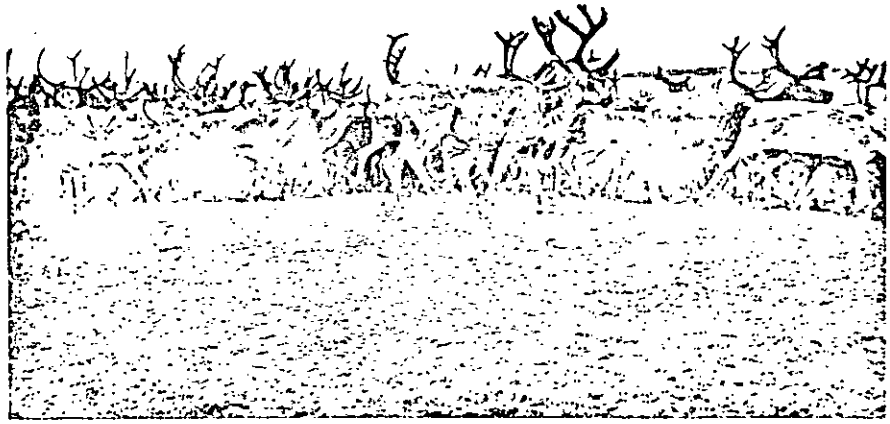


18. Another flock of moulting Lesser Snow Geese in the Ellice-Kendall Islands sector of Mackenzie Bay, N.W.T. July 24, 1949.

Above photos by Ward S[illegible]



19. View of the flat lowlands on Ellice Island, Mackenzie Bay, near the southwest coastline looking northeast. Typical Arctic tundra of the treeless delta lowlands. July 24, 1949.



20. Portion of Dominion Government reindeer herd during the annual roundup at Kidluit Bay, Richards Island. Several thousands of the animals are present during this yearly operation. July 25, 1949.

extending the latter north another 14 miles and increasing the total area by approximately 236 square miles. During the time of our reconnaissance flight it is true that no geese or brant were seen on Hooper and Pelly Islands, but a few Whistling Swans and Lesser Sandhill Cranes frequented the latter area. Geese have been reported as breeding on these islands in the past.

So far as I know, no deterrant of any importance is indicated in relation to establishing a bird sanctuary where proposed. Evidently it would cause no serious inconvenience, or handicap, to the local Eskimos. I understand that the majority spend the summer, in any event, along other parts of the coast and delta where deeper water prevails, including the Kugmallit Bay locality. Insofar as waterfowl of all kinds are concerned, a sanctuary, in true effect, would impose complete protection for only about three and a half months of the year, (Late May to mid-September) because at other times the birds are absent. Presumably no restrictions would be placed upon the Eskimos during the winter months, with respect to santuary lands, when they trap fur-bearing animals for a livelihood. It is understood that no muskrats occur in the treeless, tundra tract proposed for the bird sanctuary and, consequently, there would be no complications in relation to late season shooting and trapping of these animals during the early spring arrival of ducks, geese and other wildfowl.

May I recommend in this place that the Department go into the matter of boundaries, etc., more thoroughly in conjunction with the Aklavik office. The officers there are much more familiar with the area, including, perhaps, certain policies and cicumstances that may be involved. The writer is obliged to take the stand that he is making the above sanctuary proposal purely as a biologist, on the basis of existing ornithological and ecological conditions; and that he is almost completely divorced from any knowledge of local administrative problems, or deterring circumstances, if any exist.

VII. Anderson River Delta

(Nat. Top. Sheets 107 S.W. & S.E.)

The Anderson River Delta is located at Wood Bay, Arctic coast, in Latitude 69° 45' N., Longtitude 129° W. The principle mouth of Mackenzie River lies 120 miles to the westward, while Aklavik is situated about 180 miles to the Southwest. Liverpool Bay, noted for its Arctic wildfowl, is in the neighborhood to the west and north. The little settlement of Stanton is located about three miles east of the mouth of Anderson River.

Climate and environment are unconditionally Arctic. This is readily reflected in the comparatively desolate landscape, the rolling, treeless tundra, temperatures and ice conditions. Much pack-ice was still present in Liverpool and Wood Bays when the locality was investigated on July 27, 1949.

No other area personally investigated in the District of Mackenzie created so much interest and enthusiasm as the locality under review. It was alive with wildfowl. The tract has top-ranking qualifications as a waterfowl resort, together with the potentialities of an excellent bird sanctuary.

The Anderson Delta, proper, is contained within a relatively small area in the southern extremity of Wood Bay. At most, it embraces about 20 square miles, although the area effected by the deposition of silt is much greater. Practicall all the indigenous waterfowl occur on a smaller tract within the 20 square mile delta area mentioned above.

Most of the latter is characterized by numerous channels, islands, mudflats and sandbars, with a high percentage of shallow water occurring where removed from the main current of Anderson River. The islands are low, flat, and of alliwial origin. For the most part they are covered with lowly vegetation, and in general appearance are very similar (on a much smaller scale) to the swampy, coastal tundra existing in the treeless parts of Mackenzie River Delta. The surrounding terrain is much higher and more rugged. Islands and bars are common in the immediate mouth of Anderson River, and for a few miles upstream, but they are practically absent from Wood Bay which is being gradually silted up by the river discharge.

As previously intimated, this is a notable locality for wildfowl. Some data in connection with it is given under "Transect 10" in the chapter, "The Regional Waterfowl Populatio During the flight over the delta on July 27th a waterfowl count was secured for some of the area as high as 936 birds per square mile. This was in well populated tracts and would not begin to average that for the delta as a whole. Actually 3,660 individuals, geese and swans, were recorded on the transect through the delta; these occurred as follows: Black Brant, 3,300; Lesser Snow Goose, 250; Whistling Swan, 90; Canada Goose 12; and White-fronted Goose, 8. Large flocks were in the moult. On the 8th of the month Robert H. Smith (U.S.F.& W. Serv.) got a count of 2,152 geese in the same area. At that time the adult breeders were incubating.

In addition to geese and swans, numerous ducks were noted in the area. These appeared to chiefly comprise Old-Squaw, King Eider and Red-breated Merganser, but a high percentage of the ducks could not be identified owing to air speed and urgent activity on the goose and swan tabulations.

Enough has been said above to disclose the fact that this area is of unusual excellence as a wildfowl resort and offers a first-class sanctuary set-up for the general protection of the birdlife. As noted, parts of the delta fairly teems with waterfowl. Large numbers nest in the area and it is also an important locality for moulting.

It is said that while the summer population is notably attractive, it is actually small as compared with the increased thousands of geese, swans and other wildfowl that resort to the delta during spring and autumn migrations. It is pointed out that the latter condition is particularly conspicuous during the fall. Opportunity for protective measures is therefore outstanding in this locality, not only for breeding and non-breeding birds in the summer, but also for the migrational concentrations. There is a high probability that the great influx of geese (notably Lesser Snow Geese) in the Anderson Delta, during late summer and the autumn, derive from the nesting tundra along the west coast of Banks Island.

This is a factual report on the excellent characteristics of the Anderson Delta and its equally excellent possibilities as a bird sanctuary at some future date. This is now a matter of record. I cannot be certain that the time is actually propitious for establishing a sanctuary immediately or whether decisive action should be deferred until some more pressing juncture in the destiny of North American waterfowl. In any event, the tract has the potentialities sought whenever the Department deems it expedient to carry out such a development.

It is presumed that no sanctuary plans were ever broached that did not raise dissatisfaction and opposition on the part of certain individuals and groups. No doubt the same would happen in the present case. There can be many local reasons for not setting aside a bird sanctuary. Some may be valid. These frequently stem from greed and the fear of loosing out in the kill.

In the present example, for instance, the R.C. Mission at Stanton, and the local Eskimos along this section of the coast would unquestionably be subjected to inconvenience with respect to securing their legal bag-limit of geese if a sanctuary were created. This naturally arises from the fact that it is much simpler to make a good haul in the Anderson Delta, as it stands, than to do so if the area were closed to hunting. In the past the natives and others, on occasion, have had the reprehensible habit (as now regarded) of collecting large quantities of goose eggs in late spring and early summer. These were stored in so-called ice-houses. Such activities were common and routine practise in the locality under review.

With an established sanctuary at this point, plus periodical inspection, the old-illegal habits would be mostly, if not entirely, expunged — conceivably to the chagrin of the local population of the Genus Homo. But this in no way should deter the federal government from creating a sanctuary when the state of the wildfowl requires it. The hall mark in the "march of time", versus wildlife, will inevitably be increasing restrictions placed on the human race to prevent it from exterminating the birds and mammals of the earth.

No mention has been made, as yet, concerning tentative sanctuary limits. Owing to the set of the river, local topography, and the nearby location of Stanton, a very simple proposal for self-evident boundaries is not readily evolved. It cannot be acheived on the basis of natural surface features. A more or less ideal rectangle is shown on the attached map which covers the salient area of the delta inhabited by all, or most of the wildfowl; the enclosed area is about 30 square miles.

However, no matter what decision may be reached, if a sanctuary is created here, the whole of the effective delta should be included and for several miles up the river. Owing to lack of islands in Wood Bay, it would not be necessary to inclose much of the latter in order to embrace the central bulk of the wildfowl population in the real delta area; however, inclusion of some of the bay is desirable as a buffer zone, as would also be the case with lands to the east and west, and a reach of river to the southward. It would be a necessary condition, also, that the settlement of Stanton, and a reasonable margin to the west, be not included in the sanctuary establishment.

VIII. Delta of Kugaluk and Smoky Rivers

(Nat. Top. Sheet 107 S.W. & 107 S.E.)

This area was not personally visited, but its existence and associated bird population should be specifically referred to in this place. It may have decided qualifications in relation to the establishsment of a sanctuary area at some future date. The existence of a notable goose colony at this point was originally brought to attention by Robert H. Smith during waterfowl surveys.

Kugaluk and Smoky Rivers combine at their mouths to form a common delta of several square miles. It is located in Latitude 69° 8' N, close to Longtitude 131° W. — extremity of Liverpool Bay — about 30 miles south of Campbell Island. Port Brabant lies 56 miles to the west-northwest. The delta is situated a few miles south of the northern limit of trees, but for all practical purposes the area may be said to exhibit true Arctic characteristics. The few stunted trees present are said to be substantially confined to places along the stream courses and in depressions beside some of the lakes.

It is understood that the goose colony is centred on the low, adjoining alluvial lands at the mouth of the two rivers. These are open, soggy, mantled with grasses and sedges and locally quite destitute of any tree growth. The locality is essentially 'Arctic tundra'.

When first investigated from an aircraft, in 1948, by Robert Smith, 1,844 geese were recorded in the area. In order of abundance, these were chiefly composed of White-fronted Geese, Black Brant and Canada Geese. Only a very small number of Lesser Snow Geese were present. In 1949, Smith repeated his observations and got a total count of 1,359 birds, comprising Canada Geese, 543; White-fronted Geese, 484; and Balck Brant, 332. On this occasion no Lesser Snow Geese were to be seen.

Under some circumstances such an area would invite immediate and marked consideration with respect to bird sanctuary purposes. The Kugaluk Delta, however, is quite remote, seldom seen by humans, and consequently the birds are unlikely to be seriously molested. Under these conditions it could scarcely be proposed that any urgency exists in connection with creating a bird sanctuary at this point. However, the feature to be stressed is that such a colony exists; that the tract has sanctuary possibilities; that the fact is now permanently recorded for the information of the Wildlife Division; and that time and circumstances may eventually dictate the establishment of a bird sanctuary in the area concerned.

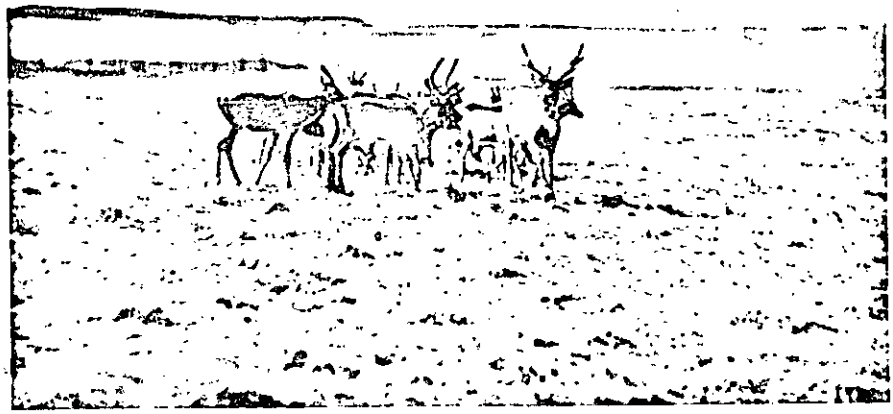
It would be impossible to lay down boundaries for such a sanctuary based upon easily recognizable topographical features. Consequently, reliance must be placed on some other procedure if the area is set aside. Tentative boundaries are suggested on the accompanying map based upon Latitudes 69° 05' and 69° 15' N., and Longitudes 130° 50' and 131° 10'W., respectively. This rectangle encloses an area of approximately 88 square miles. The actual delta tract lies close to a central position with an adequate "buffer zone" in all directions.

In concluding this section of the report it should be mentioned that the foregoing sketches do not necessarily represent limits regarding potential sanctuary possibilities in the District of Mackenzie. Perhaps the subject is well short of exhaustion; but it is a foregone conclusion that before the question can be contemplated with any degree of finality, much more extensive and detailed field research will be required. Large areas have not yet been intimately explored from this angle.

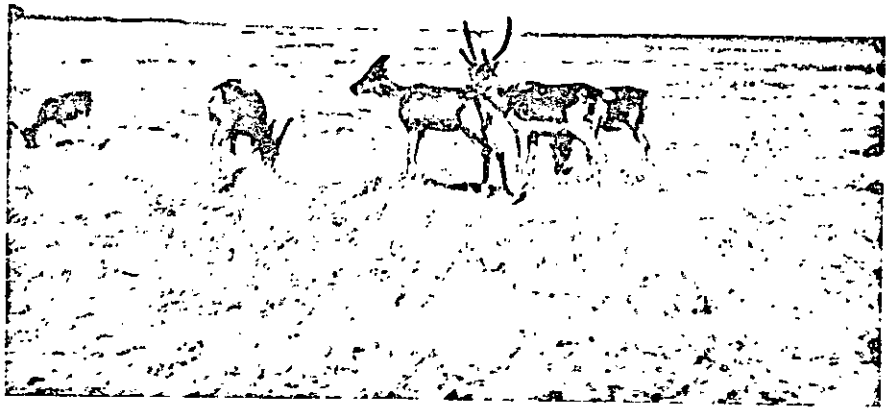
Perhaps it is unlikely that good waterfowl sanctuary possibilities will be found elsewhere than along, or near the coast. Ordinarily such would be the case. An exception to this is the fruitful nesting locality of Ross's Goose (well inland from the sea) in the vicinity of Perry River. Many other geese resort to the same area. Doubtless it has sanctuary possibilities that in the course of time may be

Some little evidence exists as to waterfowl colonies in Franklin Bay; at Cape Parry; and perhaps Darnley Bay. Uncertainties exist as to volume, and whether, or not, geese are solely represented, or if good colonies of eider ducks are also present. In fact, I have no concrete information as to occurrence of large eider duck colonies anywhere along the western coast comparable to those found in the Eastern Canadian Arctic. And yet there must be some fair-sized aggregates at various points in the western Arctic region.

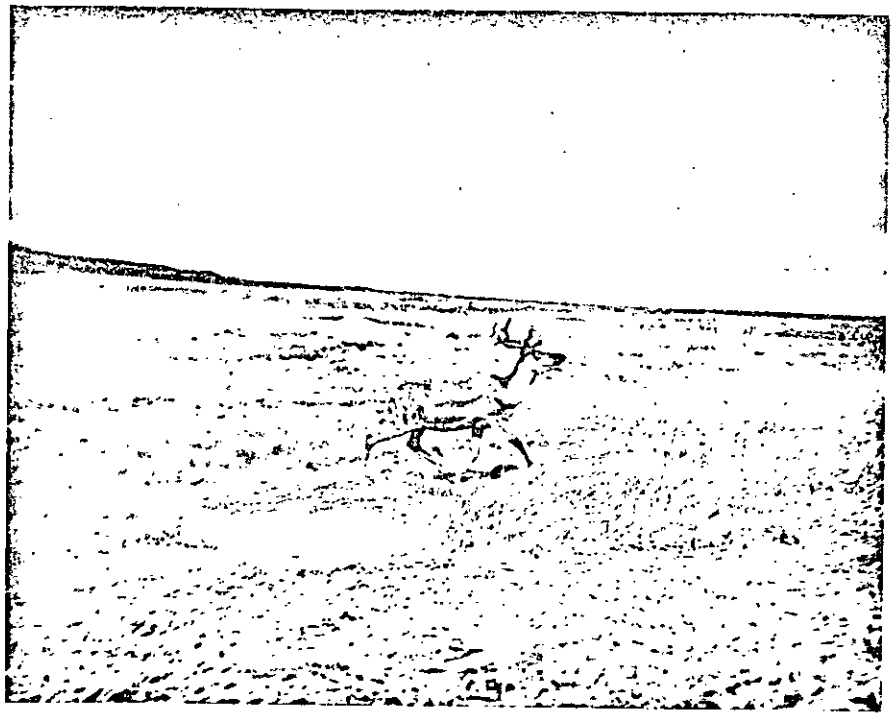
Evidently the mainland coast is practically destitute of any sizable goose or duck assemblies from Darnley Bay to at least Queen Maud Gulf. In that sector it would presently appear that worthwhile bird sanctuary possibilities are totally lacking. Explorations in the future may reveal highly desirable sanctuary areas on Banks and Victoria Islands and perhaps elsewhere.



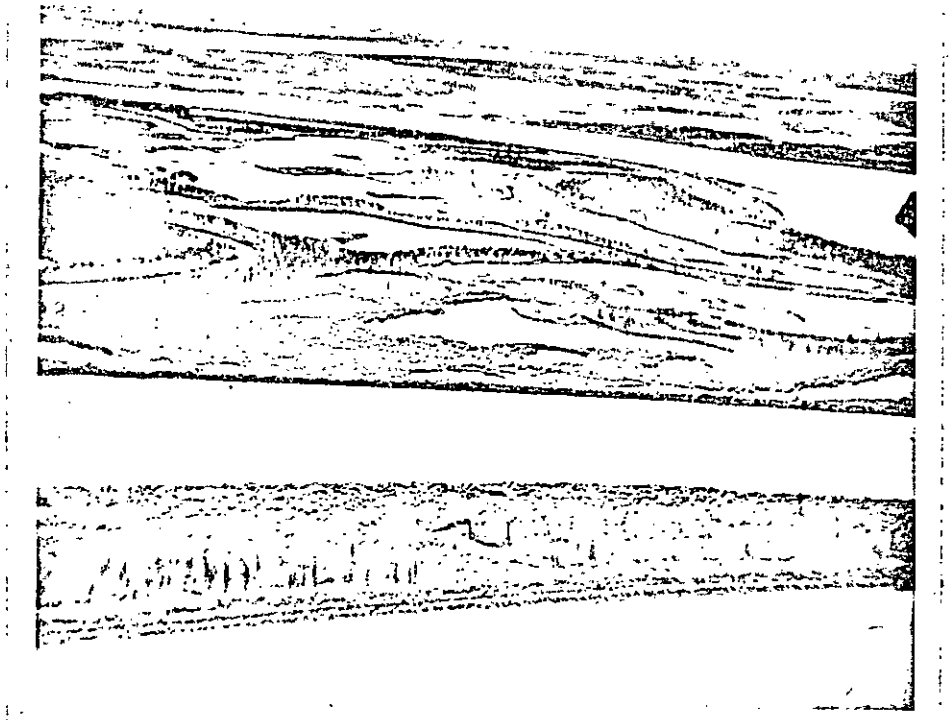
21. Small group of adult and sub-adult reindeer on the Arctic tundra flanking Kidluit Bay, Richards Island, N.W.T. High interior of the island visible to the west. July 26, 1949.



22. Group of young reindeer on the tundra of Richards Island in the neighborhood of Kidluit Bay. At this time antlers were in the velvet and the last remnants of the old winter pelage was being shed. July 26, 1949.



23. Adult female reindeer running across the open tundra of Richardson Island near the sea coast at Kidluit Bay. Note old winter coat over dorsal area and new summer pelage below. July 26, 1949.



24. The Dominion Government's main Reindeer Depot located at East Channel of the Mackenzie Delta; Latitude approximately 68° 42' N. Caribou Hills in the background as seen from the dock looking east-southeast. July 27, 1949.

This photo transposed in relation to No. 25

HUNTING CONDITIONS, MACKENZIE DISTRICT

Hunting conditions, especially in relation to open season dates, vary considerably from one part of the region to another. This is to be expected when the climate and attendant seasonal phenomena undergoes marked variability. How true this is will be noted, for example, as between Fort Smith, on one hand, and the Mackenzie Delta - Arctic coast on the other, with a difference of nearly 10 degrees, or 700 miles in latitude.

It is obvious that in the higher latitudes winter will arrive earlier than hundreds of miles to the south. Similarly, waterfowl will desert far northern regions at a markedly earlier date than in substantially more southern localities. Consequently, it is for this reason that the hunting season on migratory game birds opens earlier in the more northern districts, while the opening date is progressivel later in various zones to the south.

"Ice remains in Athabasca Lake until about the middle of June, in parts of Great Slave Lake until the early part of July and in Great Bear Lake until somewhat later. In the autumn, ice begins to form in the bays and sheltered parts of the great lakes early in October, but on account of storms the main bodies of the lakes remain open for several weeks after. The small inland lakes and muskegs are frozen by the end of October in the southern part of the (Mackenzie) Basin and about a month earlier in the northern part. There is a difference, also, of about a month, between the southern and northern parts of the basin, in the disappearance of the winter snow in the spring and the breaking up of the ice in the streams" (Camsell and Malcolm, 1921).

Despite these seasonal differences the Migratory Bird Convention Act, 1949, presented a uniform open season throughout the Northwest Territories on ducks, geese, ~~and~~ etc., from September 1 to October 15. Some people living in the Aklavik-Mackenzie Delta territory are dissatisfied with this opening date. They maintain that if September 1 is a just opening date at Fort Resolution, Hay River, Fort Smith, etc., it cannot possibly be equally satisfactory for a territory some 700 miles farther north.

This contention is logical enough on careful examination, as the wildfowl migrate from the latter region so much earlier. A percentage of the residents maintain, on this basis, that the autumn opening date for hunting waterfowl in the higher latitudes should be set for about August 20; and that the Arctic and sub-Arctic zone with this opening date shou extend south to Latitude 65 degrees. The next shooting zone to the south would lie between Latitudes 60° and 65°, with September 1 for the opening date as at present. The above suggestion appears sound, on the face of it, and also perfectly

logical in relation to the opening date for northern Alberta and Saskatchewan which is September 10. Thus, if put into effect, a uniform 10-day interval would exist between the proposed three upper zones from northern Alberta to the Arctic region...

The above proposal as passed on to me seems reasonable in the light of prevailing circumstances. In the higher latitudes, for example, only a relatively brief legal season is available when the opening date is September 1st. Thus it is reported that Canada Geese are in migration over the Mackenzie Delta from about September 10 to 15 (Porsild 1943, p.22) and Lesser Snow Geese at approximately the same time. Evidently most of the geese are out of the Arctic Zone shortly after that date.

However, many sporting ducks remain until the latter part of the month. Nevertheless, it is apparent from the evidence secured that relatively few game ducks, or geese, are still available in late September, or in October. It is understood that in some seasons the smaller lakes are all frozen over by the last week of September and ducks and geese are completely out of the country. During some years it appears that no more than two or three weeks of satisfactory hunting opportunities exist when the season opens as late as September 1. These remarks specifically apply to the Arctic and sub-Arctic latitudes.

On the other hand, adopting an opening date as early as August 20 might not be entirely desirable from all angles. One possible objection could well be the immaturity of a considerable percentage of the bag taken of ducks and geese. As to this the writer is not competent to say, in view of the fact that he has not examined waterfowl taken as early as August 20 in the western Arctic. However, there is one thing of which we may be certain. That is the undoubted advantage which would accrue to local residents with respect to obtaining a fair share of the waterfowl resources if the hunting season in the Arctic zone commenced on,or about August 20th. Under present circumstances such a realization is evidently not possible; or at least impossible for the majority Climate, the short season (not the one on paper) and other factors (some of which are variable) are all normally against it. Quite definitely the hunting advantages of the South (with a longer and milder season) far outstrips those more or less briefly enjoyed in the Arctic and sub-Arctic lands.

A similar proposition to that mentioned above was voiced by various individuals at Fort Resolution and Hay River. That is, some of the local element contended that the waterfowl season in that region should open sometime prior to September 1st. It was claimed that the presently-effective, legal open season is too short. While it is long enough in the regulations, it is claimed that freeze-up and the complete disappearance of

wildfowl in this latitude operates in such a manner as not to provide sufficient hunting opportunities. Therefore, the reasoning to have the opening date advanced to, say, August 20, or 25.

In this contention I do not agree, for I seriously believe that, for this latitude, September 1 as opening date for wildfowl shooting is reasonable and adequate. Certainly from a climatic viewpoint the open season seems to me to be fairly adjusted, now, when all factors are taken into consideration. Open water prevails longer and wildfowl stay much later here than in the Arctic and sub-Arctic territory.

Normally, wildfowling activities are possible until sometime in the early half of October, in this respect not differing so very much from conditions usually prevailing in Athabasca Delta. Of course, some seasons are drastically different than others, with the possibilities of freeze-up occurring a full fortnight earlier than usual. It is my well-considered opinion nevertheless, that September 1, as opening date is ideal for the southern portion of the Mackenzie District.

It seems to be the general opinion of R.C.M. Police, government personnel, and traders, that comparatively few wildfowl are shot in the Mackenzie Basin. Unquestionably the take is low per capita and the human population is not at all large by ordinary standards. Then, again, a very considerable number of this moderate aggregate does not hunt, or has very indifferent success.

Evidently the information by Cst. Dagleish, R.C.M.P. Norman Wells, N.W.T., is about average for most of the territory along Mackenzie River from at least Fort Simpson to Arctic Red River. He remarked that a relatively low number of ducks and geese are shot by either whites, or natives. There are comparatively few of the former, and only an occasional Indian possesses a shotgun. He remarked that some attempt was made to secure ducks and geese with a .22 rifle but most of these modest and illegal efforts were ineffectual.

It is generally stated that along the river under average conditions it is difficult, or impossible, to secure any substantial number of waterfowl; that is, the bag limit, or thereabouts. Many persons made practically the same assertion to the effect that the southward migration of ducks and geese in the autumn was rather short-lived and offered comparatively little opportunity for hunting. It was particularly stressed that the fall flight of geese was relatively fast, with few stopovers, or extended delays. (A direct antithesis of the slow-moving, spring migration). Apportunities for duck hunting are somewhat better. This is apparently the situation along most of Mackenzie River. It is stated that few, if any whites, travel to more outstanding shooting areas owing to the high expense involved, or because of business ties.

It is to be noted from the above remarks that average opportunities for wildfowling in most of the Mackenzie Basin is not great. When the short season is added to this, it is more than clear that relatively few waterfowl are killed. Evidently the best hunts are obtained in the Mackenzie Delta; in the Mills Lake - Big Island section of the Mackenzie River; and in the delta of Slave and Taltson Rivers. There are many other minor localities where a few birds are undoubtedly taken, but the latter are apparently the best hunting areas where the bulk of the limited regional kill is secured.

GAME REGULATIONS AND CONSERVATION

Apparently there are few dissatisfactions among the residents of the Northwest Territories in relation to the Migratory Birds Convention Act, and the Northwest Game Ordinance. The few expressions of opinion along these lines seemed of minor character, of little or no real consequence, and usually demonstrated a personal bias. These occasional, individualistic viewpoints were evidently entertained by few people; most patently they were in the minority.

One of the most outstanding exceptions taken to the M.B.C. Act was the one already reported upon in the preceding chapter; that is, the contention that the shooting season on wildfowl in the Arctic and sub-Arctic section of the Northwest and Yukon Territories should open on, or about, August 20 instead of September 1. The latter date now applies universally all over the Northwest and Yukon Territories (M.B.C.A., 1949, p.27) Possibly a compromise of August 25 would rationally meet the situation for all territory north of Latitude 65 degrees.

On the whole there appears to be quite an active appreciation of wildlife values among the white people of the north regardless of their particular vocation. In this respect there is much intelligence and well-formed opinion in connection with wildlife resources and game management. This is not surprising. The greater part of the population, directly or indirectly, still depends upon the wildlife resources of the country for a living. Raw furs and trapping are consequently common topics of conversation, together with discussion of the relative abundance of game mammals and birds. Economic wildlife to these people is what wheat is to the farmers of the Great Plains.

Well informed sources of faunal information were district game wardens, Indian Agents, Hudson's Bay Company officials, and the greater number of Royal Canadian Mounted Police. The assertion particularly applies to the older residents of the country. A man newly assigned to duties in the Territories has a long road of learning and adaptation ahead of him. The majority of officials seemed to possess a keen interest in game animals and problems attached thereto. Their attitude in relation to management and conservation was usually commendable. The majority (especially the well-informe are intelligent and modern in outlook and realize that regulati are highly necessary if the wild stock is to be conserved on a permanent basis.

Many people are concerned with the gradual reduction of moose over extensive areas, although in some restricted districts the animals are said to be still fairly plentiful. The same may be said of the marten. The fisher seems to be doomed to extinction in large areas. Depletion and ultimate survival of the beaver is another common topic of conversation. Wolves constitute a subject of perennial interest and various

viewpoints and convictions are held. While asserted to be overly numerous and destructive of game in given sections, it would appear from some information at hand that diminishment of population has taken place in scattered localities. The species may soon enter upon a general, continental decline in numbers; in this connection there are perhaps cyclic possibilities.

From all that could be gathered, violations of the game regulations do not appear to be a particularly serious problem. A certain amount of such illegal killing undoubtedly takes place from time to time in most localities, the same as among so-called sportsmen and others within the bounds of civilization. Certain individuals are prone to such infraction of the regulations; and seeing that human nature is what it is, we shall doubtless have to contend with this problem for a long time to come. Violations not only involve game birds, but big game and fur-bearing mammals as well. However, as qualifie at the beginning of the paragraph, the illegal kill does not appear to be large; apparently most residents, regardless of colour are responsible, law-abiding individuals.

With further reference to regional game violations, there may be mentioned the case as presented in my memorandum to the Department dated August 9, 1949. Some of my remarks in this connection were: "....Owing to the great extent of territory involved and despite alertness on the part of the limited game warden service and the Royal Canadian Mounted Police, some violations of this nature are certainly to be anticipated. The case had to do with the illegal taking of geese, brant, swans, and ducks by residents of Stanton, Wood Bay, Arctic coas this is in the immediate vicinity of the notable bird colony at the delta of Anderson River. It was also alleged that, in the recent past, hundreds if not thousands of goose eggs were collected and stored in underground "ice houses" for winter consumption.

It was also alleged by Mackenzie Delta residents that the above practise was still operating to some extent among whites and Eskimos alike at various other points along the Arctic coast and on islands to the north. With respect to this I remarked: "Action should be taken and the practise wiped out. These modern times of necessary conservation and game management is a wide departure from the carefree, pioneer days when no game laws were in existence; but some people are still maintaining the latter attitude of mind, long since out-moded, and now justifiably subject to correction...."

In referring to the above case at Stanton as an unusual one with respect to positive evidence in the "ice-houses", and the particulars forwarded to the Department, I terminated the report by saying that "While any action of a concrete nature may be regarded in the above light, it is to be pointed out that actual violations of the M.B.C.A. are not to be placed in that category (the unusual) and that the long-

continued, casual, and indifferent attitude taken with respect to illegal killing of migratory game birds (by certain persons) is something that should be eliminated. Particularly is this true with reference to whites. The latter are, and should be proper examples to the natives. However, the Indians and Eskimos, in turn, suffer far greater hardships, seasonal wants and privation".

On the whole, the natives of the region are law-abiding and do not give undue trouble in connection with game regulations. Some tribes of Indians, however, appear to be of a moody and disputatious nature and go to the authorities with various sorts of complaints and discontent. Much of such grumbling is based upon childish and benighted ideas. It can be fancied that perhaps the most of this will pass, in time, as the natives become more enlightened. It is understood that the Eskimos, as a people, are a happier lot with fewer malcontents, greater self-sufficiency, reasonableness and complacency. They are good hunters with a high degree of energy and efficiency.

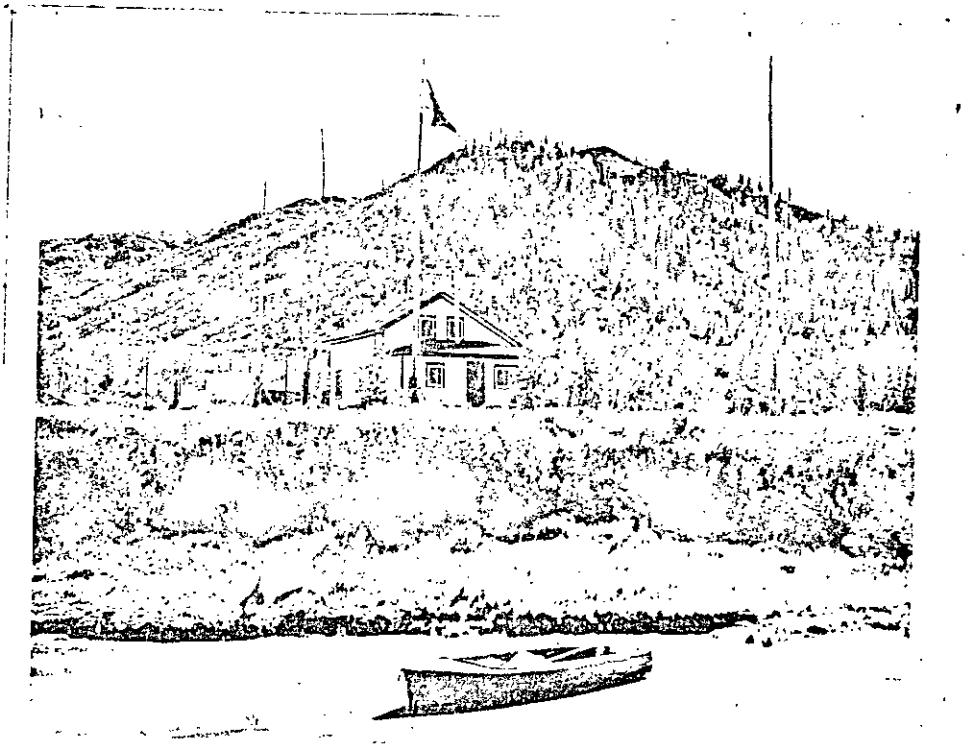
Some infractions of the regulations occasionaly occur among the natives which cannot be regarded as overly serious. Particularly is this true with respect to Indians and Eskimos in very remote areas who have infrequent contact, or dealings with white men. New regulations may appear of which the native may hear nothing for months following . Such illegal acts are committed in good faith and should be so regarded by the game officer. So often the remote natives are at a distinct disadvantage, in comparison with whites, in not being able to read English, or understand the same over the radio. Ordinaril he eventually gets the news by the relatively slow method of "moccasin telegraph".

It is felt in several quarters of the Mackenzie River Basin that copies of the M.B.C. Act and Northwest Game Ordinance are not as thoroughly distributed and made accessible to the people as they should be. It is also said that the same applies to the related game posters giving a quickly comprehended abstract of the basic regulations.

This matter was taken up in a memorandum to the Wildlife Division dated August 11, 1949. which was followed by the comprehensive reply of August 19, 1949. Arrangements as explained in the latter communication appear to be sound and adequate, yet it is maintained by some interested persons that distribution is not entirely satisfactory and that posters, as yet, do not appear in a sufficient number of places to properly enlighten the general public. Ample materials may be sent into the north, in which event it then appears to be indicated that distribution of game law pamphlets, abstracts, etc., is not thorough enough, and the same comment evidently applies to the erection of posters in all available and appropriate sites.

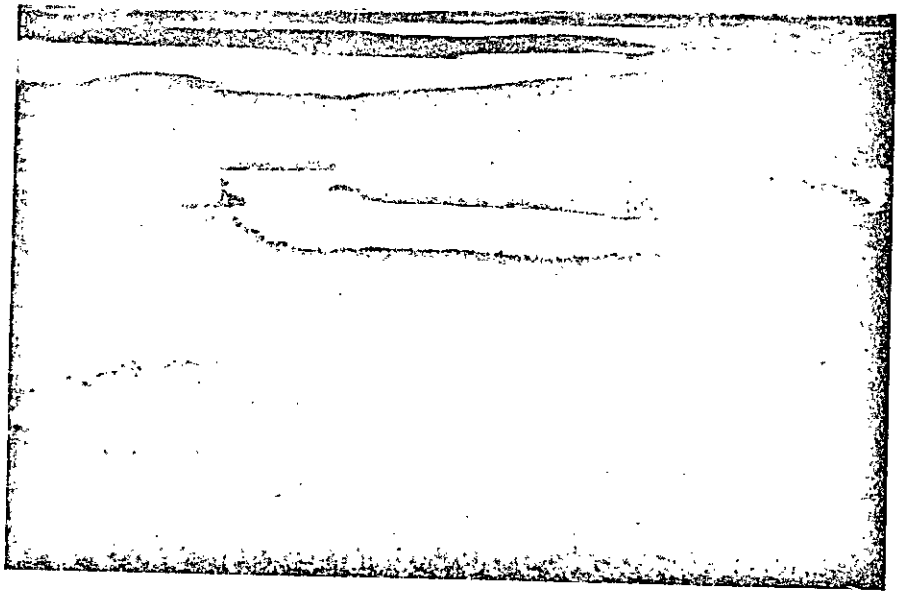
It has been suggested by northern government officials and others that more work should be undertaken in connection with wildlife conservation publicity. This would call for the writing, printing, and distribution of appropriate articles on the subject. A programme of this nature would doubtless do considerable good. Especially is it true at this juncture, as compared with the very small white population of a few years ago, when the present period is witnessing a marked increase in the total number of white people. The expansion is particularly notable at Yellowknife and Hay River.

Published articles on wildlife is only one means of reaching this increasing number of residents whites. Attention was also drawn to the fact that general wildlife publicity could be put on the air from stations at Yellowknife and Aklavik, respectively, By means of the radio no doubt many natives could be reached, also, who understand English, but cannot read it. All in all, a publicity programme of the above suggested kind in the territories would doubtless have considerable merit.



Transposition in relation to No. 24

25. A typical view of the Mackenzie Delta as seen from about 800 feet; few trees, vast areas of open swamp and muskeg, with more water than land. View a few miles southwest of Reindeer Depot, en route to Aklavik, looking westward. July 27, 1949.



26. Territory in the vicinity of McCrea River, a few miles west of McCrea Lake, and approximately 90 miles northeast of Yellowknife, Great Slave Lake. Illustrates character of Hudsonian Life Zone with small scattered tree growth and open mossy terrain. August 1, 1949.

MISCELLANEA

It is felt that a number of short topics should be dealt with here, for the further information of the Wildlife Division, that have not appeared in foregoing pages of the present report. These are briefly presented below:

Immature Waterfowl.--During the lengthy travels in the Northwest and Yukon Territories, surprisingly few young wildfowl were noted anywhere. Some of these negative results were probably what may be referred to as merely fortuitous, but it would not explain the greater proportion of this apparent lack of juveniles. Results would appear to be referable to an inadequate technique; that is, the latter may be perfectly satisfactory in relation to adults, but quite indifferent for the detection and observation of young.

It seems quite evident that extensive use of aircraft on wildfowl investigations emphasizes adults, while minimizing observational opportunities to see and record juveniles. This conclusion is borne out by the far-flung aircraft operations of last summer when a ridiculously small number of young ducks, geese, brant and swans were noted. The vast majority apparentl escape observation by hiding in vegetation, scanty, or otherwise, or the broods may bunch in inactive groups as the aircraft passes over and thus deceive the eye. In fact, so few young of any species were seen that a formal section on reproductive data cannot be supplied that would be of any value.

It was particularly surprising that young of geese, brant and swans were not more frequently detected. Of the scores of pairs of swans seen on transects, cygnets were observed only once. More juveniles of ducks, were noted in Mackenzie Delta than elsewhere, but even so, they were represented by only a few broods; these were utterly insignificant in relation to the total hatch that presumably developed.

The inadequacy of the aircraft method in relation to juvenile wildfowl detection is further borne out by the results secured by Smith and Lawrence on 11,000 miles of flying in the summer of 1949. In this connection, the joint authors make remark as follows:

"When we arrived over the Athabasca Delta on June 12 migration was completed, nesting was apparently well underway, and male mallards and pintails had started to gather. In our flight over the area we observed eight broods of young ducks. On June 15 we rescued six downy pintails from ravens which had already killed two on the main street of Yellowknife, N.W.T. Proceeding north from Yellowknife we saw no more broods of duck during the remainder of the summer.

"Snow geese and black brant were incubating on July 1 on the islands off the Mackenzie Delta; and on July 8 at the

Anderson River Delta. On July 26 an old-squaw was still incubating near the mouth of Perry River." (1949, p.10)

American Moose.— During the course of general investigations I was informed that moose have been depleted to a serious degree in many districts of the North. The animals are apparently very scarce in most localities of the Mackenzie River Basin from Fort Smith as far northward, at least, as Norman Wells. The species is said to be fairly numerous in back districts at Fort Good Hope, and north and west of Arctic Red River. The writer was surprised to hear that moose occurre with fair frequency well north in the Anderson River country, sometimes being seen on the tundra north of the limit of trees. This was substantiated by the fact that two moose heads, in the flesh, were seen frozen in a side-hill "ice-house" at Stanton, on the Arctic coast. A moose was also seen running along the east coast of Liverpool Bay almost due north of Rufus Lake; the point of occurrence was at least 32 miles out on the open tundra beyond the tree limit.

Barren Ground Caribou.— During a flight from Yellowknife northeast to Bathurst Inlet, on August 1, the first deep Barren Ground Caribou trails were noticed near Coppermine River, west end of Lac de Gras. They appeared to have been well travelled. Others were noted in the general vicinity, and just north of this lake. Between Pellatt and Contwoyto Lakes, trails occurred in abundance; these were of multiple type, dozens running closely parallel in a northwest-southeast direction. It was quite evident from the character of these well-worn trails that large numbers of caribou had passed over them; also, that it represented a "trunk highway" on the regional migration.

En route from the latter point to Bathurst Inlet, numerous, additional trails were noted at various places. In approximate Latitude 66° 15'N; a herd of several hundred caribou was observed moving methodically toward the northwest. Along a tributary of Burnside River, about 34 miles south-southeast of Burnside Harbour (Bathurst Inlet) numerous caribou were observed travelling toward the northwest. Well-worn trails were plentiful in this locality and many others were seen a few miles farther north.

We were informed at Burnside Harbour that late in the third week of July many thousands of the animals migrated along the rugged slope above the sea south of, and within view of the post. Their course led to the northwest past the mouth of Burnside River. Multiple trails were very pronounced in this district as seen from the air. On the return flight to Yellow-knife, small, scattered herds of caribou were noted as far south as Contwoyto Lake where a group of 20 individuals was see swimming across the narrows at the east end. No other caribou were noticed farther south.

For a considerable distance, however, well-marked trails were in evidence cutting across the illimitable tundra in many localities. Deeply worn caribou trails were positively identified, locally, as far south as about Garland (Long. 112° 10' W., Lat. 63° 55'N), and it is certain that less conspicuous ones exist far to the south of that point. In travelling from the northward, the first, small spruces were noted about 15 miles northeast of Garland, or roughly in the vicinity of Jolly and Courageous Lakes. Here the local limit of trees is not continuous and well-defined; it is rather represented by small, scattered patches of stunted spruce and birch. About 15 miles southward from Garland, however, most of the terrain is beginning to be clothed almost unbrokenly with small trees and shrubbery (Fig 26).

Barren Ground Muskox.--- On the same flight as described above (between Yellowknife and Bathurst Inlet) little evidence was seen of Muskoxen. A sharp watch was kept for the species in order to secure as much distributional and other data as possible. On August 1, during the return journey, in approximately Latitude 66° 10'N., and Longitude 108° 30'W (near eastern tributary of Burnside River) a small group of three Muskoxen was sighted. These consisted of two adults and a calf of the year. A little later a small herd of ten individuals was noted northeast of the eastern extremity of Contwoyto Lake in about Latitude 65° 33' N., Longitude 109° 35' W. The group was composed of adult bulls, cows and immatures. These were the only examples of the species noted while making two crossings of the tundra to and from the Arctic coast north of Great Slave Lake.

Timber and Barren Ground Wolves.--- Not a single example of either of these predators was sighted during the summer investigations of 1949. It was not anticipated that any would necessarily be observed while flying over timbered areas. Yet, there is always the chance that an occasional individual will be spotted along the shores of lake, or stream, regardless of the type of transportation used.

The most surprising development, however, was the failure to see a single example of wolf while flying over many hundreds of miles of open tundra. In the Arctic region, naturally, visibility is excellent where all vegetation is short and relatively scanty. Judging by the result of our observations, one would come to the conclusion that wolves are now low in numbers on the Arctic tundra. These results, however, are probably not to be taken too literally. The present status of wolves in the Arctic is not known to the writer. The timber wolf is still plentiful in some districts, but said to be declining in others.

Snowshoe Hare.--- Inquiries at various points in the Mackenzie River Basin, and elsewhere, revealed the fact that at least in most localities the Snowshoe Hare was exceedingly low in numbers during the winter of 1947-1948. A perceptible increase was observed during the following winter of 1948-1949, but this up-swing from the low point in the cycle was apparentl not of universal development. In many localities the hare continued notably scarce. This was true not only for the winter months, but also for the summer and autumn of 1949. In short, while a substantial increase in numbers was noted in some districts, the animals continued at a low ebb in other parts of the country.

It is to be clearly seen, therefore, that recovery is not uniform even within the same general region. The opini was generally held, however, that a marked increase in this hare would be observable over a wide area in the fall of 1949 and during the winter of 1949-1950. Some localities would remain more or less depleted until the peak of the cycle is more closely approached. Then there is evidently a population pressure overflow until, during the peak interval, most habitats are overrun; the hare status will then vary, locally, from merely common to a condition of super-abundance.

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Soper, J. Dewey
Biological
investigations in
Northern Alberta and

DATE	ISSUED TO
10/9/76	Mais RKCC
Dec 9/76	Goodman - (yellowknife)
14 Feb 77	Bradley - Slaney
7.2.78	Joanna / Kelsall
Nov 2/78	Quinlan
Dec. 18/79	John Ward
April 11/80	Hal Reynolds
23 Aug 82	Goossen
Mar. 4/87	K Smith
Feb 24/9[illegible]	M Mei[illegible]

Date Due
