STATUS OF LARID BREEDING SITES BETWEEN FRANK CHANNEL AND YELLOWKNIFE BAY, AND OTHER OBSERVATIONS OF LARIDS IN THE NORTH ARM OF GREAT SLAVE LAKE:1988

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ABSTRACT

In June 1988, we surveyed larid breeding sites in the North Arm of Great Slave lake, between Frank Channel and Trout Rock. We had previously surveyed this area in 1986. A total of 935 nests of larids were found at 37 sites, compared to 734 nests at 31 sites in 1986. All species - Caspian Terns, Common Terns, Arctic Terns, Herring Gulls, Ring-billed Gulls and Mew Gulls - were more numerous. The limited scope of our results does not allow us to determine whether local populations are increasing or not. Many breeding sites active in 1986 had been abandoned in 1988, but a larger number of new sites were occupied in 1988. The numerous changes of locations of nesting sites were probably enhanced by a late spring break-up in 1988, compared to 1986.

A section of the southwest coast of the North Arm was also surveyed. No nesting larids were found between Frank Channel and Whitebeach Point, but two small colonies were recorded near Waite Island.

The Frank Channel-Trout Rock area was revisited on 5 August 1988. Nearly 60% of the revisited sites had been vacated by adults and fledgelings. Over 800 larids were loafing at a small offshore islet, including five adult and five young Black Terns. This represents the first evidence of breeding for this species in northern Great Slave Lake.

RÉSUMÉ

Nous avons dénombré les nids de Laridés entre Frank Channel et Trout Rock, dans le bras nord du Grand lac des Esclaves, en juin 1988. Un inventaire semblable fut réalisé en juin 1986. Neuf cent trente-cinq nids furent trouvés sur 37 îles alors qu'en 1986, 734 nids furent dénombrés sur 31 îles. Toutes les espèces - Sterne caspienne, Sterne pierregarin, Sterne arctique, Goéland argenté, Goéland à bec cerclé, et Goéland cendré - étaient plus abondantes. Par contre, nos résultats ne nous permettent pas de déterminer si les populations locales sont en train d'augmenter. On a noté de nombreux changements dans la distribution locale des couples nicheurs. Nous pensons que la débâcle tardive en 1988, en comparaison de celle de 1986, ait provoqué certains de ces changements.

Un nouveau secteur du bras nord fut inventorié mais aucun couple nicheur ne fut observé entre Frank Channel et Whitebeach Point. Deux petites colonies furent trouvées près de l'île Waite.

Nous avons revisité le secteur Frank Channel - Trout Rock le 5 août. Près de 60% des colonies revisitées avaient déjà été abandonnées par les adultes et les oisillons. Plus de 800 goélands et sternes s'étaient rassemblés sur un petit îlot isolé au large. Parmi eux se trouvaient cinq adultes et cinq jeunes Guifettes noires. C'est la première fois que l'on observe des jeunes guifettes dans le nord du Grand lac des Esclaves.

ACKNOWLEDGEMENTS

Bob Bromley, Hans Blokpoel and Chip Weseloh reviewed the manuscript and provided valuable comments and criticisms.

David Kay participated in the survey and helped confirm the identifications of Common Terns and Arctic Terns, as well as those of Lesser Scaup and Greater Scaup.

Susan MacEachran prepared the figures and arranged for printing the report.

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1.0 INTRODUCTION

One of the Canadian Wildlife Service's activities in the Northwest Territories (NWT) consists of assessing wildlife habitat and identifying key migratory bird habitat sites. Recently, particular attention has been given to Great Slave Lake because surprisingly little information is available on the wildlife of this large subarctic lake. Yet it is one of the most intensively used waterbodies (domestic, commercial and industrial activities) in the NWT. Substantial populations of breeding Caspian Terns and other larids have been found in the lake in the last three years. This has resulted in the identification of new key habitat sites (Alexander and McCormick, in prep.). The Caspian Tern is considered "rare" by the Committee on the Status of Endangered Wildlife in Canada (Martin 1978). In NWT, it is known to breed only in the southern Mackenzie District, particularly the Great Slave Lake region, and in James Bay (A.O.U. 1983, Godfrey 1986).

In 1986 and 1987, surveys of larid breeding sites were carried out east and west of Yellowknife Bay along the northeast coast of the North Arm. Over 2,000 pairs of larids have been recorded at 122 breeding sites between Frank Channel, near Rae-Edzo, and Gros Cap, at the entrance of the East Arm (McCormick and Sirois 1988, Sirois et al. 1989; Fig. 1).

In 1988, we resurveyed an area visited in 1986 and surveyed a new area along the southwest coast of the North Arm. We also revisited many nesting sites later in the summer. Our objectives

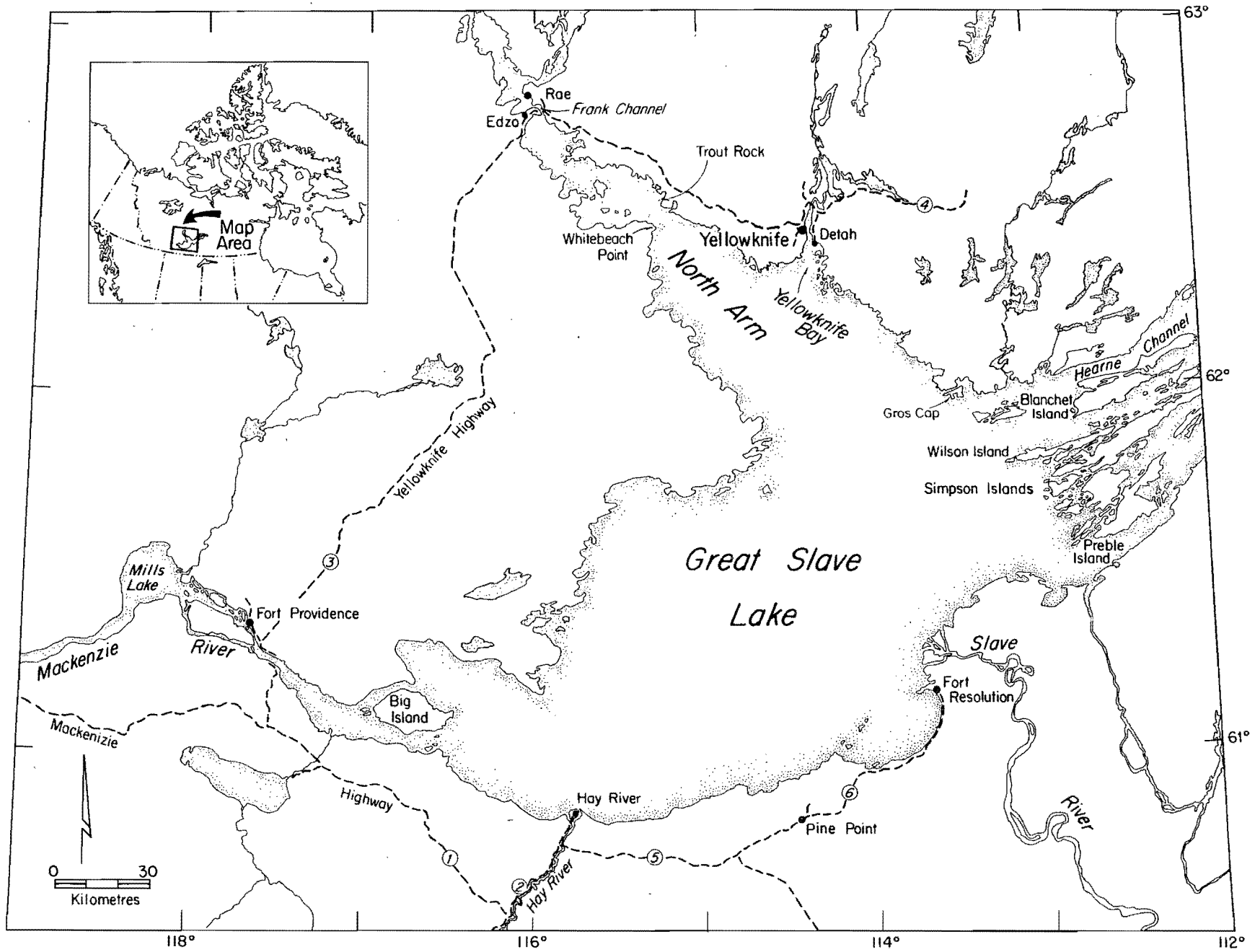

Figure 1. Location of the North Arm of Great Slave lake.

were: 1) to record changes in abundance and distribution of all larids between Frank Channel and Trout Rock; 2) to identify larid breeding sites between Frank Channel and Whitebeach Point, and around Waite Island; 3) to identify patterns of post-nesting distribution of larids between Frank Channel and Trout Rock; and 4) to search for and record the presence of nesting waterfowl at all larid breeding sites that we surveyed.

2.0 STUDY AREA, ICE CONDITIONS AND WATER LEVELS

The North Arm of Great Slave Lake is at the interface of the Precambrian Shield and the Interior Plains. Accordingly, the study area straddles two different terrestrial ecozones. The northeast coast of the North Arm, including Waite Island and the small islands in its immediate vicinity, belongs to the Taiga Shield ecozone (Wiken 1986). The coastline is characterized by numerous bays delimited by sparsely vegetated Precambrian outcrops, up to 60 m high, and by a myriad of rocky islands, many of them no more than a few metres in length (Fig.2). The nearshore islands are generally treed. The exposed outer islets, where most gulls and terns nest, consist of rounded and bare outcrops with little or no vegetation.

The southwest coast of the North Arm belongs to the Taiga Plains ecozone (Wiken 1986). It features nearly level or gently rolling relief covered by glacial moraine, lacustrine deposits, and a relatively thick soil. Thick boreal forest covers the entire coast and the shores of the few but large embayments. Islands are few and flat, and generally treed. As a rule, a thick

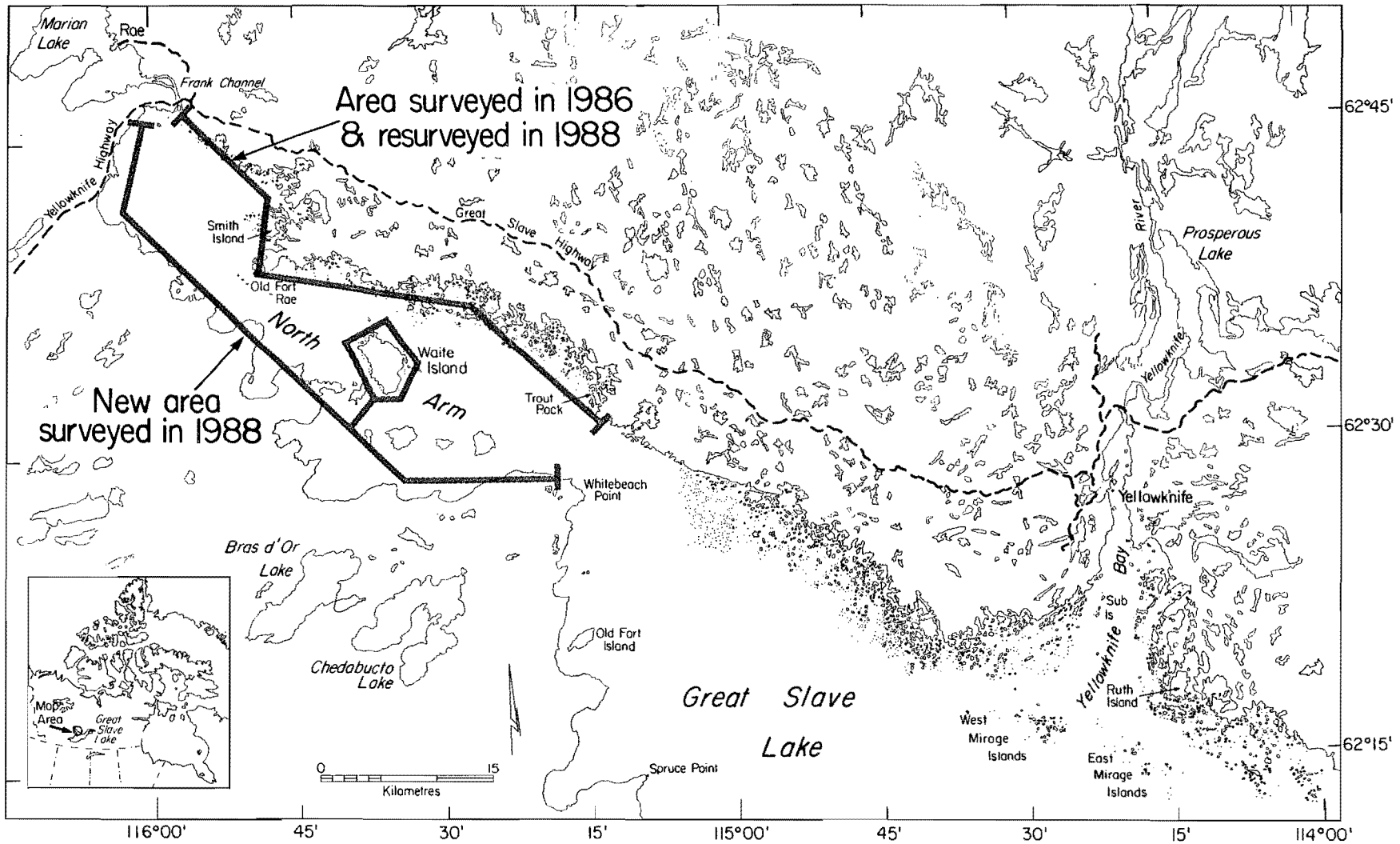

Figure 2. Location of the study area in the North Arm of Great Slave Lake.

band of willows (Salix sp.) and alders (Alnus crispa) covers the immediate shoreline.

Ice-free waterbird habitats, namely wetlands, shallows and sheltered waters are usually available from mid-May to late October in Great Slave Lake. In the spring, drifting ice abounds until mid-June. Compared to 1986, break-up occurred 15 days later in 1988, and relatively little open water was available until late May. A detailed description of the 1988 break-up is given in Sirois and Cameron (1989).

In the last five years, Great Slave Lake's water levels have fluctuated between 156.637 m and 156.750 m above sea level (Water Survey of Canada, unpub. data). Accordingly, water levels have been stable in the recent past and the availability of nesting islands is not believed to have changed. Water levels have been regulated since 1968 by a dam on the Peace River, British Columbia (Cheng and Bennett 1975).

Unlike other parts of the North Arm, the Frank Channel - Trout Rock sector is virtually a wilderness area where boat traffic is almost exclusively restricted to native hunters and fishermen. A few houses are located near Trout Rock but they are usually used only during the winter. Recreational boaters do not favor this part of Great Slave Lake because of its shallow, murky waters, and its numerous, invisible shoals and rocks. Human disturbance to larid colonies is apparently minimal.

3.0 METHODS

Three observers in a motor boat examined the outer islands between Frank Channel and Whitebeach Point, including Waite Island and environs, and between Trout Rock and Frank Channel, 24-26 June 1988. The nearshore islands between Trout Rock and Frank Channel were only given cursory examination because previous surveys have shown that most larids prefer the outer islands. All breeding sites (1 to 31, except 5) identified in 1986 and their surroundings were revisited. Four sites (69, 71, 72, and 73) were also revisited in Yellowknife Bay (Appendix 3). Total ground counts of nests of all larids were made at each breeding site. Data were also collected on clutch size and presence of young. Disturbance to breeding birds was minimized by keeping our visits as short as possible. The locations of the nesting islands were determined from 1:50,000 National Topographic Series maps.

A subsequent visit to the Trout Rock area was made on 3 July, the approximate start of the hatching period of Caspian Terns. The entire area between Frank Channel and Trout Rock was resurveyed, 5 August, to look at the fledging activities of the various species of gulls and terns.

Special attention was given to the identification of Common Terns and Arctic Terns. However, our figures on these species remain estimates. In many cases it was not possible to distinguish their nests.

4.0 RESULTS AND DISCUSSION

The results of our 1986 and 1988 surveys are summarized in Table 1. At least 201 additional nests (+27%) of gulls and terns and 12 new breeding sites were found. However, five sites where larids nested in 1986 were vacant in 1988. As single pairs of Arctic Terns, Mew Gulls and Herring Gulls have been observed frequently in the North Arm, additional nests and sites were likely overlooked in both years.

Whether the increase between 1986 and 1988 was caused by immigration from other parts of Great Slave Lake or other regions, or was the result of growth of the local populations remains undetermined. The lack of historical and banding information preclude any definitive assessment. However, the 1988 spring break-up occurred two weeks later than in 1986 and it is possible that pairs that usually nest in the surrounding lakes of the Precambrian Shield were drawn into the North Arm and its ice-free habitats. The very shallow waters and extensive wetlands of the North Arm were ice-free before many of the Shield's waterbodies in May 1988 (Sirois and Cameron 1989).

As in 1986, over 70% of all sites supported only one or two breeding species. Six sites supported three species, compared to seven in 1986, and one site supported four species both years. In 1988, two sites supported five species (Appendix 2).

The largest drop in numbers of nests occurred at Site 18 where 135 pairs nested in 1986 - the largest colony then - but only one in 1988 (see Ring-billed Gull and Common Tern below). On the

Table 1. Number of nests of larids between Frank Channel and Trout Rock, June 1986 and 1988.

Species	1986	1988
Caspian Tern	55	67
Arctic Tern	46	50
Common Tern	194	433
Common or Arctic tern	162	20
Herring Gull	24	37
Ring-billed Gull	239	309
Mew Gull	14	19
Total	734	935
Number of breeding sites	31	37
Average number of pairs per site	23.7	25.3

other hand, breeding pairs were at least twice as numerous at seven sites - 4, 14, 17, 20, 21, 24, and 29. In 1988, the largest colony (Site 25) comprised 95 pairs - 56 pairs of Caspian Terns, 29 pairs of Ring-billed Gulls and 10 pairs of Herring Gulls. The largest new colony, where there was none in 1986, comprised 67 pairs, 64 of which were Ring-billed Gulls (Site 87; Appendix 2).

No larids nested on the southwest coast of the North Arm, between Frank Channel and Whitebeach Point. As most available islands were completely covered by trees or shrubbery, there seems to be little nesting habitat available. The numerous, flat and bare Precambrian islets which are found a few kilometres away, across the North Arm, are certainly more attractive to nesting larids than these treed islands.

Surprisingly few larids were nesting around Waite Island, which is surrounded by numerous, small and bare Precambrian islets. Only two small colonies of Common Terns (Sites 74 and 75) were located off its south end. Good larid nesting habitat occurs around Waite Island and more larids may nest there in the future.

Four sites (69, 71, 72, 73, Appendix. 2) were also revisited in Yellowknife Bay. Small changes in the number of active nests occurred at these islands.

4.1 Caspian Tern

Twelve more nests of Caspian Terns - a total of 67 - were found between Frank Channel and Trout Rock in 1988 than in 1986. Fifty-six nests were recorded at Site 25, compared to 49 in 1986.

This site is still the largest colony known in the North Arm. Four sites where a single nest occurred in 1986 were vacant in 1988, and seven sites where no nest occurred in 1986 were occupied by one or two nests. Therefore, three more sites, for a total of ten, were occupied in 1988 (Fig.3). Caspian Terns always nested in association with at least one of the other five species of larids, but were most often associated with Common Terns and Ring-billed Gulls, the two most common larids in the study area.

The abandonment of old breeding sites and the occupation of new ones by single breeders was expected as these birds show less site tenacity than terns nesting in large colonies (Bergman 1980). The enlargement of the colony at Site 25 - the largest in the study area - was not surprising as larger colonies have a strong collecting effect on conspecifics (Bergman 1980). In this case, other larid species were also attracted to the colony and it became the largest in the study area in 1988: 95 pairs.

The small increase in active nests does not enable us to determine whether this population is changing. We do not know what percentage of the Great SLave Lake population nest in the study area. The changes recorded appear insignificant if compared to the sharp fluctuations in colony size and the massive desertions that have taken place in other areas (Vaisanen 1973, Bergman 1980). Given the disjunct nature of the Canadian and world populations (Martin 1978, Shugart et al. 1978, Godfrey 1986), the Great Slave population is probably independant from the North American Great Lakes, where population growth has been recently recorded (Ludwig 1979, Blokpoel and Harfenist 1986,

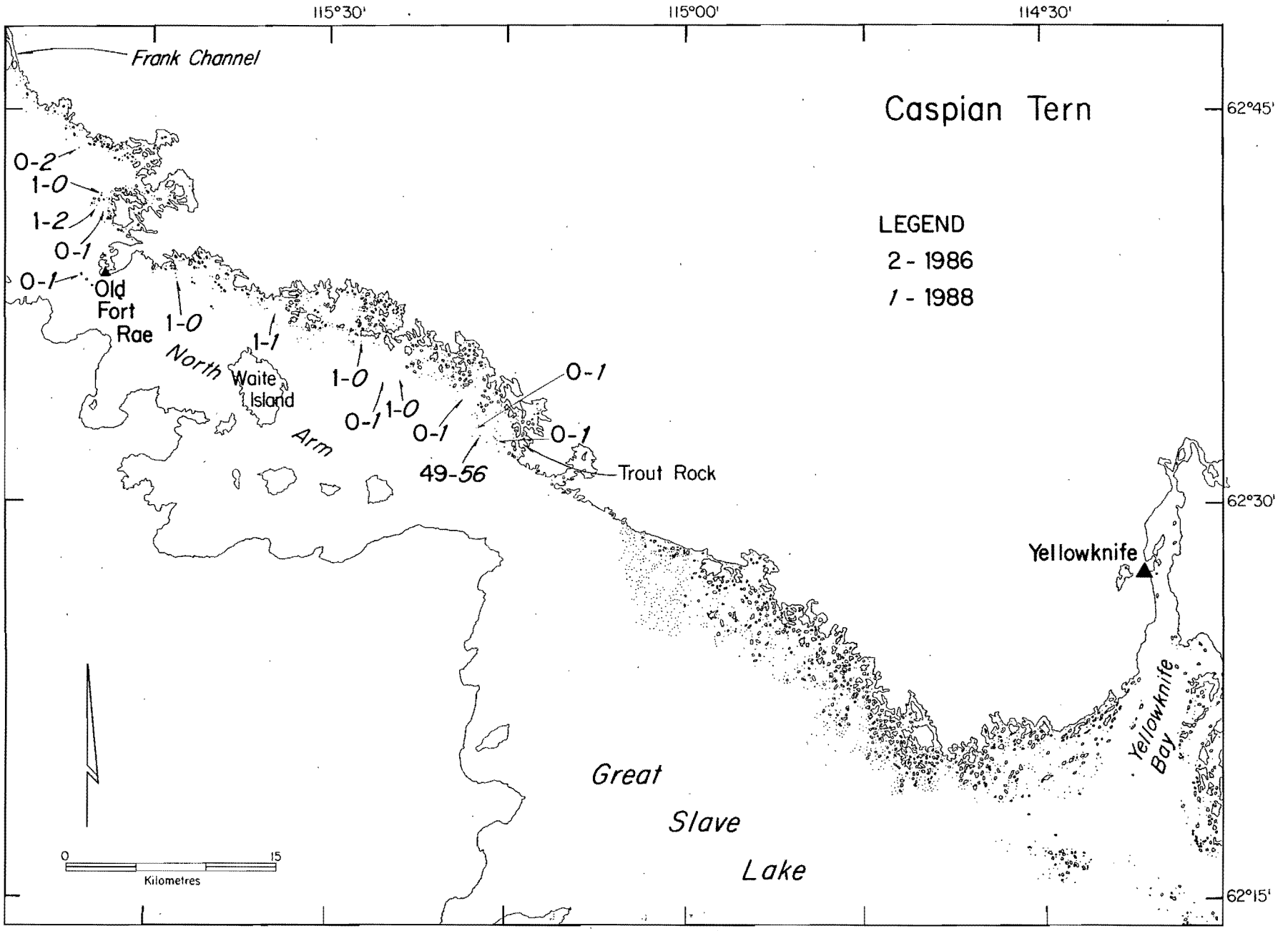

Figure 3. Location of Capsian Tern nests between Frank Channel and Trout Rock, June 1986 and 1988.

Weseloh et al. 1986).

Additional information on the nesting chronology of Caspian Terns was collected. Hatching had not commenced by the time of our visit, 24 June 1986. However we found one hatched young at Site 25 on 26 June 1988. Given the 26-day incubation period of Caspian Terns (Ludwig 1965), this egg was likely laid before 1 June. A subsequent visit to Site 25 (3 July) revealed the presence of 25 hatchlings and 19 pipped eggs. This suggests that many eggs were laid at the end of the first week of June. During our last visit to this island, 5 August, approximately 20 fully grown, but apparently flightless young were present and assembled in a crèche-like formation. The breeding success of this colony cannot be determined from these figures as the colony was not closely monitored. It is not known if some young had already fledged.

4.2 Common and Arctic terns

In 1986, the identification of Common Terns and Arctic Terns proved rather difficult. We felt that both species nested together at many sites between Frank Channel and Trout Rock. We positively identified 60% of the birds flying above the 402 active nests that we found and estimated that 80% were Common Terns. In 1988, with the benefit of experience we identified 96% of the birds flying above 503 active nests and estimated that 90% were Common Terns.

In 1988, 101 more pairs (+25%) of Common/Arctic terns were present at 31 sites, four more sites than in 1986. Seven sites

were vacated and 11 new sites were occupied. The number of nests fluctuated widely at many sites. Sometimes Common Terns nested in 1988 where Arctic Terns did in 1986, or vice-versa. Both species were confirmed to nest together at three sites only. Despite a 25% increase in the total number of nests of Common/Arctic terns a similar number of confirmed nests of Arctic Terns was found both years: 46 in 1986 and 50 in 1988. As more specific information is now available on each species, we will look at them separately. But the low number of positively identified nests in 1986 does not allow comparisons between both years. Accordingly, the figures on the distribution of Common Terns and Arctic Terns depict only the results of the 1988 survey.

4.2.1 Common Tern

An estimated 433 nests of Common Terns were recorded in 1988. The average colony comprised 18 pairs. Common Terns were present at 24 of the 37 (65%) active larid breeding sites in the study area (Fig. 4). It was the most common larid. Common Terns' nests accounted for 46% of all nests recorded. The largest colony comprised 52 nests (Site 21) and the largest new colony, where none existed in 1986, comprised 39 nests. Single breeding pairs were observed at three nesting sites but in two cases they were associated with other larids.

For the first time since we initiated our survey of larids in Great Slave Lake, we recorded one pair of Common Terns nesting alone. This single pair nested where 132 pairs of Ring-billed Gulls and three pairs of Arctic Terns nested in 1986. The

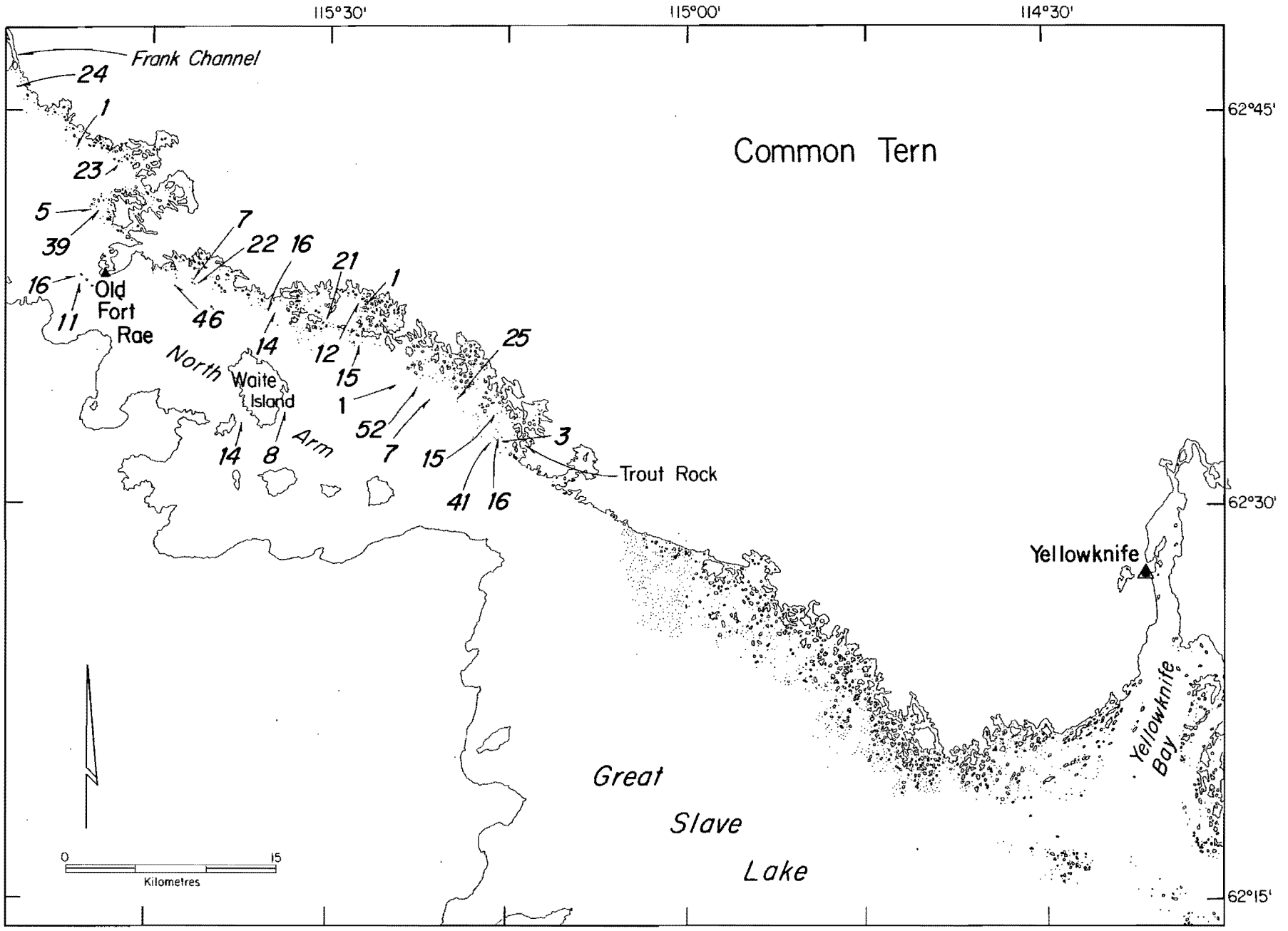

Figure 4. Location of Common Tern nests between Frank Channel and Trout Rock, June 1988.

probable cause of abandonment of this site by Ring-billed Gulls will be treated below. Non-colonial breeding Common Terns appear to be uncommon in other areas as well. They have been recorded at few locations in Lake Ontario in 1976, in Lake Erie in 1977 and in Lake Huron in 1980 (Blokpoel 1977, Blokpoel and McKeating 1978, Weseloh et al. 1986). Bergman (1980) reports that they are relativley uncommon in the Baltic Sea as well.

Even though our data indicate that Common Terns were more numerous between Frank Channel and Trout Rock in 1988 than in 1986, their uncertain status in 1986 precludes a valid assessment of any change in status and of their site tenacity. Also, the comparatively late 1988 break-up may have altered their regional nesting distribution by concentrating them in the North Arm, where open water was available earlier. Common Terns nest commonly in lakes adjacent to the North Arm.

Populations of Common Terns have declined in the last decades either in the Great Lakes region or in Atlantic Canada (Courtney and Blokpoel 1983, Shugart and Scharf 1983, Weseloh et al. 1986, Lock 1989) but lately appear to have stabilized, or even increased, in some areas (Kress et al. 1983, Shugart and Scharf 1983, Blokpoel and Harfenist 1986). Human disturbance, fluctuating water levels, and the demographic explosion of some gull species appear to account for the decline of Common Terns in southern Canada (Blokpoel and Harfenist 1986, Lock 1989). None of these phenomena are known to occur in any significant manner in the study area.

Nesting associates were Ring-billed Gulls at ten sites, Herring Gulls and Caspian Terns at seven sites, Mew Gulls at five sites, and Arctic Terns at three sites (Appendix 2).

4.2.2 Arctic Tern

We recorded an estimated 50 nests of Arctic Terns on our survey. The largest concentration comprised 19 nests (Fig. 5). An average of 6.2 nests were found at eight sites. In 1986, an estimated 46 nests occurred at six sites. Although the estimated number of nests of Arctic Terns remained essentially the same, they were present at six new sites and absent at four sites recorded in 1986, thus displaying little site tenacity. Given the relative stability of their nesting habitat, we cannot explain this low level of tenacity. A late spring break-up should impact less on Arctic Terns than Common Terns, given their ability to nest throughout the Canadian Arctic, where spring break-up occurs even later. However, we know that Arctic Terns are much more abundant in other sectors of Great SLave Lake, where Common Terns are absent (Sirois and Cameron 1989). The Frank Channel - Trout Rock study area appears to provide marginal habitat to Arctic Terns, which is probably reflected by low site tenacity.

Their uncertain status in 1986 precludes assessment of changes, if any, between 1986 and 1988. We do not know the status of their breeding population in Canada as they are widespread in the remote and inacessible parts of northern Canada (Godfrey 1986). The populations of Arctic Terns of eastern Canada and northeastern U.S.A. have apparently declined in the last decades

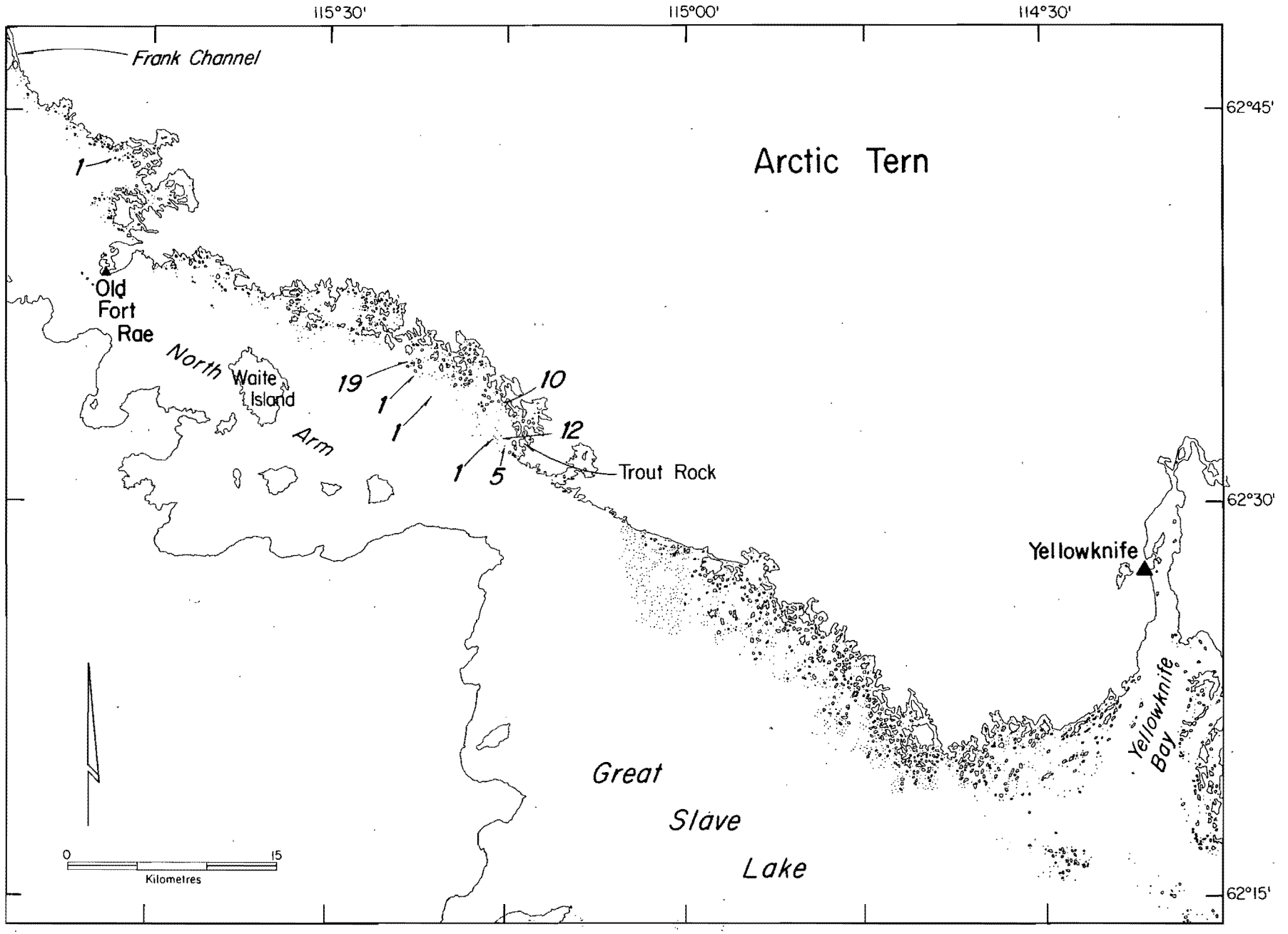

Figure 5. Location of Arctic Tern nests between Frank Channel and Trout Rock, June 1988.

(Kress et al. 1983.).

Nesting associates were Mew Gulls at four sites, Herring Gulls and Common Terns at three sites, Caspian Terns at two sites, and Ring-billed Gulls at one site (Appendix 2).

4.3 Herring Gull

In 1986, we found 24 nests at seven sites (3.4 nests per site) in the study area. In 1988, we found 37 nests at 12 sites; an average of three nests per site. The largest concentration comprised 12 pairs both years. Herring Gulls occupied six new sites but vacated only one between 1986 and 1988 (Fig. 6). This small increase may be the result of shifts in regional distribution caused by the late spring break-up in 1988. Herring Gulls are common in Great Slave Lake and adjacent lakes, especially near Yellowknife where they feed at the municipal dump in great numbers. Their regional population is apparently expanding (McCormick and Sirois 1988).

This holarctic species is well known for its demographic explosion caused by refuse generated from human activities (Kadlec and Drury 1968, Weseloh et al. 1986, Carrera 1987). Given the current growth of the city of Yellowknife, we suspect that the North Arm population will continue to expand.

Single pairs of Herring Gulls nested at only three sites. Nesting associates were Common Terns at seven sites, Caspian Terns at four sites, and Arctic Terns, Mew Gulls and Ring-billed Gulls at three sites (Appendix 2).

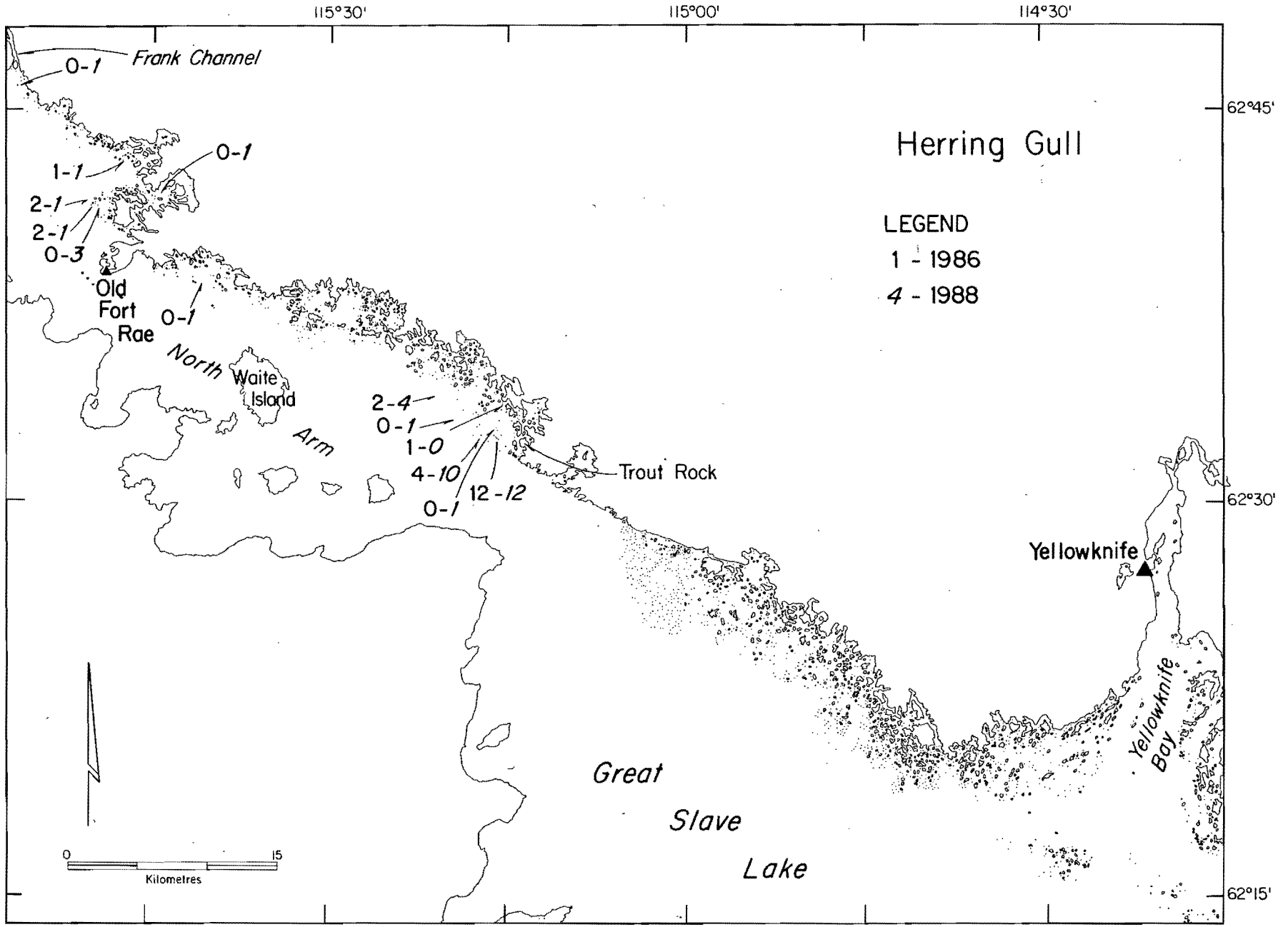

Figure 6. Location of Herring Gull nests between Frank Channel and Trout Rock, June 1986 and 1988.

4.4 Ring-billed Gull

In 1986, we found 239 nests at nine sites (26.5 nests per site) in the study area. In 1988, we found 309 nests at 11 sites, an average of 28 pairs per site. Ring-bills were the second most common larid. Three old nesting sites were vacated but five new sites were occupied in 1988 (Fig. 7). This 29% increase in the number of nests may indicate that the local population is expanding. The impacts of the late 1988 break-up on this species are thought to be minimal as nesting Ring-billed Gulls have never been observed in lakes adjacent to the North Arm.

The largest colony (Site 17) comprised 70 nests in 1988; in 1986, the largest colony (Site 18) comprised 132 nests. The largest new colony in 1988, where there was none in 1986, comprised 64 nests. Both years, as few as three pairs nested together, but they were always associated with other larids. The size of many colonies varied considerably between 1986 and 1988 (Appendix 2).

This Nearctic gull is well known for its current demographic explosion and the expansion of its range in Canada; in some locations it has become a problem. (Vermeer 1970, Mousseau 1984, Blokpoel and Tessier 1986, Weseloh et al. 1986, Montevecchi and Tuck 1987, Lock 1988).

The abandonment of Site 18, where 132 nests were recorded in 1986 and the apparent redistribution of these nests at other breeding sites warrant further comments as this was the largest concentration of larids in the study area. The desertion was

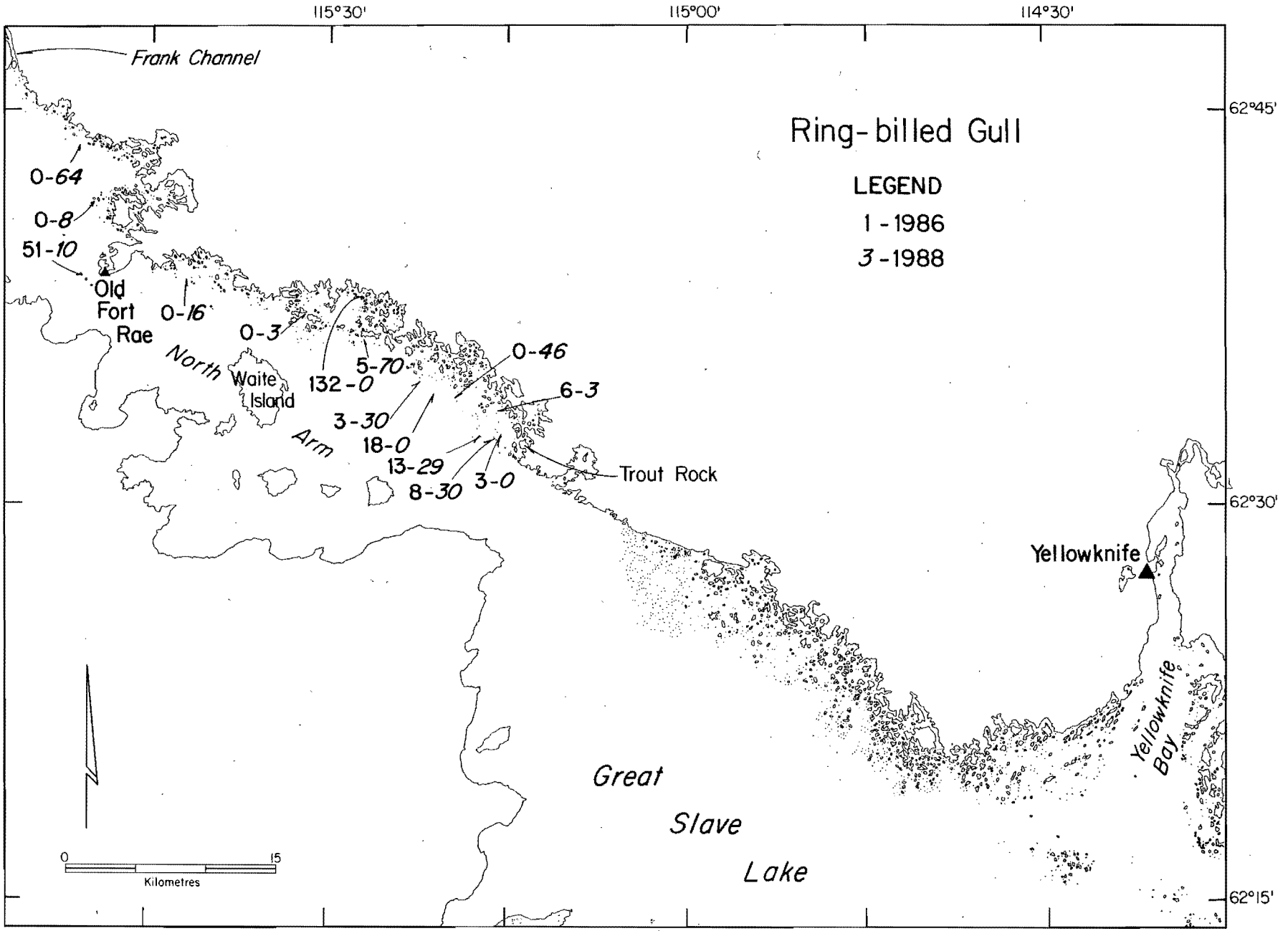

Figure 7. Location of Ring-billed Gull nests between Frank Channel and Trout Rock, June 1986 and 1988.

probably caused by human disturbance. A hunting and fishing camp was within 500 m of the nesting islets in 1988. This camp was not there in June 1986.

4.5 Mew Gull

In 1986, we found 14 nests at eight sites, an average 1.75 nests per site. In 1988, we found 19 nests at ten sites, an average of 1.9 nests per site. Three old sites were vacated and five new sites were colonized in 1988 (Fig. 8). The largest colony comprised six nests in 1986 and four nests in 1988. Both years, Mew Gulls were the least common breeding species in the study area. We suspect that we missed some nesting pairs both years . In other sectors of the North Arm, where particular attention was given to the treed nearshore islands, additional pairs, many of which single, were always found. In this survey, particular attention was given to the offshore islands.

The changes recorded between 1986 and 1988 appear insignificant. Single pairs of Mew Gulls nest commonly in the lakes of the Precambrian Shield adjacent to the North Arm, and many may have been displaced by the late 1988 break-up. This is suggested by observations recorded at Site 69 in Yellowknife Bay. This colony comprised 24 active nests in both 1986 and 1988. It is the largest Mew Gull colony known in Great Slave Lake (J. Sirois, unpub. data). In 1988, 30 additional pairs and their empty nests were scattered among the rocks and islets in the immediate vicinity of the core of the colony. We suspect that these birds were displaced from their usual nesting sites, in the

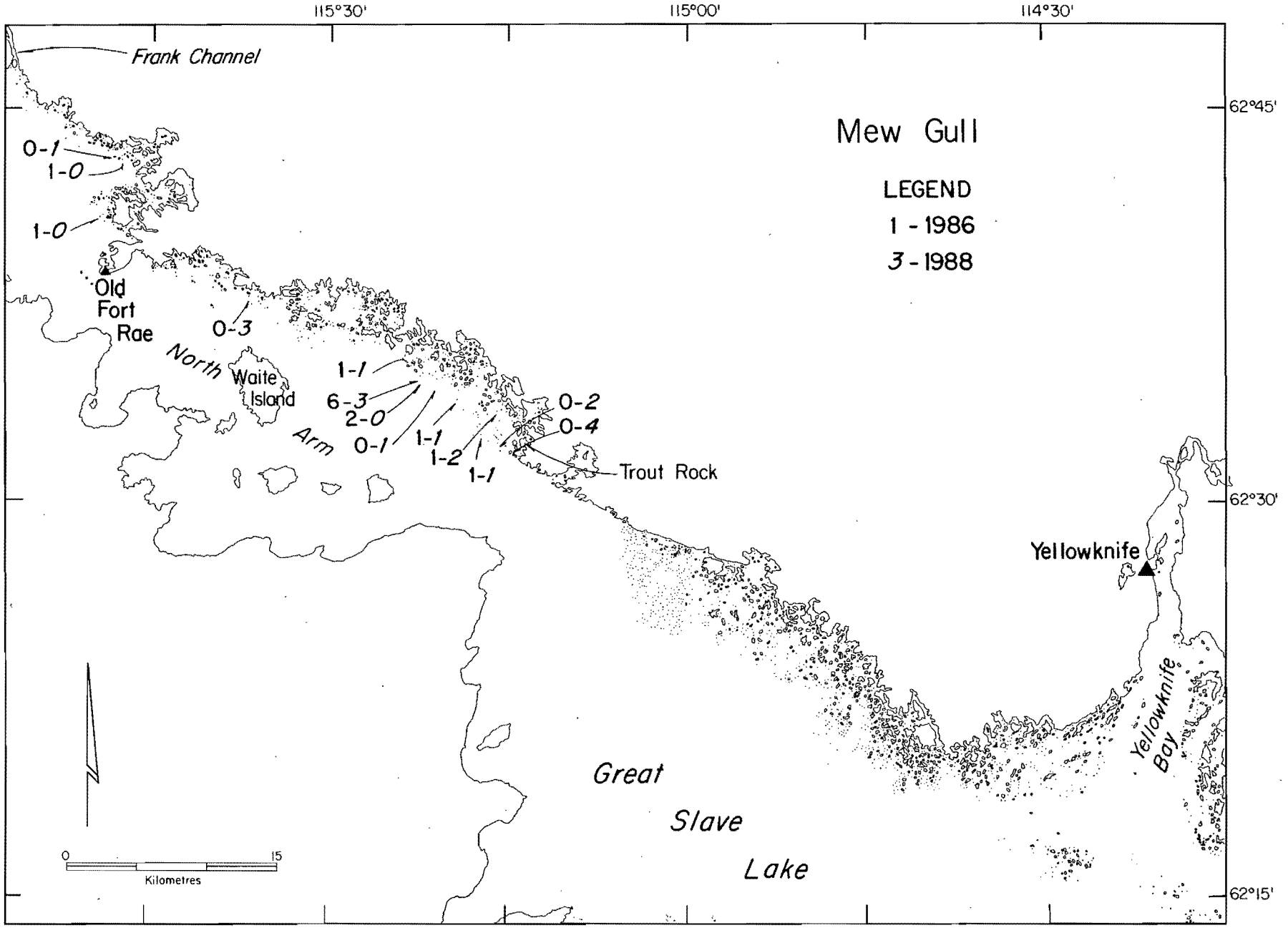

Figure 8. Location of Mew Gull nests between Frank Channel and Trout Rock, June 1986 and 1988.

interior of the Precambrian Shield, by late break-up and the absence of open water. The gulls gathered at Site 69 because open water was available earlier. They were probably also attracted by the presence of a large number of conspecifics. None of these 30 pairs appeared to have produced young.

This species appears well established in and near Great Slave Lake, where pairs nest commonly either in small colonies or alone. Regional population trends are nearly impossible to determine given the presence of numerous non-colonial pairs over large tracts of inaccessible wilderness. The status of the continental population and its current trends are apparently unknown for similar reasons.

Mew Gulls always nested in association with other larid species except in one case (Site 81). Nesting associates were Common Terns at five sites, Arctic Terns at four sites, and Caspian Terns, Herring Gulls and Ring-billed Gulls at two sites.

5.0 ADDITIONAL OBSERVATIONS

5.1 Non-breeding larids

No attempt was made to define the numbers of non-breeding larids at each nesting site. Non-breeding adults were present at many sites as the number of active nests were often less than half the number of birds present. Several individuals, pairs, and even flocks of Herring Gulls, Mew Gulls, Caspian Terns, Common Terns and Arctic Terns were often foraging or loafing at or near nesting sites (Table 2). Whether these birds were late nesters,

Table 2. Observations of non-nesting larids between Frank Channel and Trout Rock, 24-26 June 1988.

Site number	Remarks
1	35 Herring Gulls loafing nearby.
3	1 pair of Mew Gulls nests here and 10 additional adults, apparently territorial but without nests, are also present.
14	1 adult Caspian Tern but no active nest; 1 pair nested here in 1986.
18	3 Caspian Terns, 3 Mew Gulls and 15 Common Terns loafing nearby.
20	2 Caspian Terns, 4 Bonaparte's Gulls and 1 Laughing Gull loafing nearby.
22	20 Mew Gulls nearby.
23	1 pair of Caspian Terns nearby.
25	1 pair of Parasitic Jaegers nearby.
75	10 Mew Gulls nearby.
76	2 Caspian Terns and 5 Arctic Terns nearby.
78	4 Ring-billed Gulls present but no nest.
80	3 Caspian Terns, 5 Mew Gulls and 15 Common Terns loafing nearby.

non-breeders or failed breeders was not determined. All non-breeders of all species had adult plumages. This matter deserves more attention in the future.

Black Terns, California Gulls, Bonaparte's Gulls and Parasitic Jaegers nest in or near Great Slave Lake but none were found nesting between Frank Channel and Trout Rock in either 1986 and 1988.

The unconfirmed sighting of a Laughing Gull on 25 June 1988 was of particular interest. This is apparently a first record for Great Slave Lake (Bromley and Trauger, n.d., R. Bromley, pers. comm.). The adult bird was loafing with four Bonaparte's Gulls and two Caspian Terns. Many of its feathers were damaged, suggesting that it had recently flown over large distances. This species nests principally on the east coast of the United States and has been often reported in lakes Ontario, Erie and Michigan (A.O.U. 1983, Godfrey 1986). Two Laughing Gulls have been recorded as far west as Lake Chaplin in southwestern Saskatchewan (Savile and Savile 1975).

5.2 Post-breeding distribution of larids

Virtually nothing is known about the post-breeding dispersal and distribution of larids in Great Slave Lake. Most species apparently fledge at different times. The levels of synchronicity of breeding activities between and within species are unknown. As the North Arm's colonies are small, scattered and numerous, we suspect that breeding is less synchronized than in areas where colonies are large and few.

Twenty-six of the 37 breeding sites identified in 1988 were revisited on 5 August. Fifteen sites had already been vacated but larids were still present at 11 sites (Table 3). All Herring Gulls, Common Terns, Arctic Terns, and Mew Gulls had apparently fledged and so had most Ring-billed Gulls. Some young Ring-billed Gulls still had down. No young Caspian Terns were seen on the wing. Twenty flightless but fully grown and feathered young were present at Site 25, among approximately 100 adults. Some young had probably fledged already. These preliminary observations reveal many differences in the breeding chronology of each species and hence, many potential differences in their post-breeding distribution.

The largest concentration of post-nesting larids was recorded at Site 78, where one nest of Caspian Terns and one nest of Arctic Terns were found earlier in June. Approximately 800 larids, mostly Common Terns and Arctic Terns, were loafing on this small offshore islet. Adults and juveniles were in equal numbers. This mixed-species flock also included one Caspian Tern, ten Black Terns and approximately 70 Ring-billed Gulls. It constitutes the largest flock of larids we have ever seen in the North Arm. Small flocks and several individuals were also observed foraging in many other locales.

The observation of ten Black Terns among this 800-bird flock is of particular interest as five of these Black Terns were recently-fledged juveniles. This represents the first evidence of successful breeding for this species in northern Great Slave Lake (Bromley and Trauger n.d., Godfrey 1986). We suspect that these

Table 3. Highlights of a larid survey between Frank Channel and Yellowknife, 5 August 1988.

Site Number	Remarks
1	45 adult Common Terns and 20 juveniles all of which had fledged.
4	1 Caspian Tern nearby.
11	2 Caspian Terns nearby.
17	70 adult Ring-billed Gulls and 25 juveniles all of which had fledged; 90 adult Common Terns and 30 juveniles all of which had fledged.
19	80 Common Terns, adults and juveniles all of which had fledged; 1 adult Black Tern forage nearby.
24	80 Common Terns and 25 Ring-billed Gulls, adults and juveniles all of which had fledged.
25	Over 100 adult Caspian Terns and 20 juveniles; none of the young can fly; all appeared fully grown.
69	4 adult Mew Gulls and 7 juveniles, all of which had fledged; 1 Caspian Tern.
78	Over 700 adults and juvenile Common Terns (mostly) and Arctic Terns, 70 adult Ring-billed Gulls, 5 adult and 5 juvenile Black Terns, 1 adult Caspian Tern.
82	35 adult Common Terns and 15 juveniles all of which had fledged.
near 84	20 juvenile Common Terns foraging; some dove and caught fish.
87	50 adult Ring-billed Gulls and 10 chicks which had not fledged but are almost fully grown; some chicks still had down.

terns nested in wetlands or lakes adjacent to the North Arm. Following the fledging of the young, they moved into the North Arm to loaf and roost with other larids prior to fall migration. Because of its vast wetlands and shallows, the North Arm provides good foraging habitat to insectivorous larids. In early August, dragonflies (Odonata) and caddisflies (Trichoptera) are abundant.

Anecdotal reports indicate that most small terns have left northern Great SLave Lake by late August and Caspian Terns, by mid-September. Herring, California, and Ring-billed gulls roost and loaf in Yellowknife Bay and feed at the Yellowknife dump well into October. A Glaucous Gull has been sighted as late as mid-December in Yellowknife (R. Bromley, pers. comm.).

5.3 Waterfowl nesting at larid breeding sites.

Several reports indicate that ducks commonly nest in association with larids (Hilden 1964, Vermeer 1968, Dwernychuk and Boag 1971, Nakashima and Murray 1988). Gulls protect the duck nests from predation but exact a toll when the ducklings leave their nest. Common Terns and Arctic Terns probably offer less protection but are not likely to exact a toll.

In 1986, we found 43 nests of waterfowl at 21 (29%) of the 73 larid breeding sites recorded between Frank Channel and Yellowknife Bay. They included 38 nests of Scaup sp. (we felt that both Lesser Scaup and Greater Scaup were present), three nests of Northern Pintails, one nest of Mallards and one nest of American Wigeons (McCormick and Sirois 1988). In 1987, we found 26 nests of waterfowl at 17 (35%) of the 49 larid breeding sites

recorded between Yellowknife Bay and Gros Cap. They included 21 nests of Greater Scaup, four nests of Northern Pintails and one nest of Red-breasted Mergansers (Sirois et al. 1989).

In 1988, we found 41 nests of waterfowl at 22 (59%) of the 37 larid breeding sites between Frank Channel and Trout Rock (Table 4). They included 26 nests of Lesser Scaup, one nest of Greater Scaup, five nests of Red-breasted Mergansers, four nests of Mallards, two nests of Northern Pintails, two nests of Northern Shovelers and one nest of Green-winged Teals. One brood of Mallards, Northern Pintails and Canada Geeese were also observed. Clearly, the associations between nesting larids and anatids are common in Great Slave Lake and deserve more attention. The current drought on the Prairies and the possible presence of displaced waterfowl in the Great Slave lake region warrant further examination of this phenomenon.

6.0 CONCLUSION

Numerous changes in the distribution and abundance of gulls and terns have taken place in the study area between 1986 and 1988. Nearly 30% more nests of larids were found in 1988 and more breeding sites were occupied. Although these findings are too limited to assess population trends, they provide new insights on the population dynamics of larids of Great Slave Lake. The specific impacts of the late 1988 spring break-up (compared to that of 1986) on larid nesting distribution remain unknown. Late break-up is suspected to have generated shifts in distribution of species like Common Terns, Herring Gulls and Mew Gulls.

Table 4. Clutch or brood sizes of nesting waterfowl at larid breeding sites between Frank Channel and Trout Rock, 24-26 June 1988.

Site Number	Remarks
3	Lesser Scaup - 10; Green-winged Teal - 6
4	Lesser Scaup - 6, 13; Northern Shoveler -9
6	Lesser Scaup - 9, 15
12	Lesser Scaup - 15; Mallard - 8
15	Lesser Scaup - 8
16	Lesser Scaup - 8, 10
20	Greater Scaup - 14; Northern Shoveler - 6
22	Lesser Scaup - 9; Mallard - 6
23	Lesser Scaup - 8; Red-breasted Merganser - 7
25	Lesser Scaup - 10; Northern Pintail - 5
27	Lesser Scaup - 10; Greater Scaup - 6
29	Mallard - 7, 8; Red-breasted Merganser - 6; Lesser Scaup - 9
30	Lesser Scaup - 11; Mallard - 8
31	Lesser Scaup - 9
74	Lesser Scaup - 9
76	Lesser Scaup - 10; Mallard - 8; Canada Goose - 4 chicks
77	Mallard - 4, 5 chicks; Northern Pintail - 6 chicks
79	Lesser Scaup - 15, 13
80	Northern Pintail- 5
83	Lesser Scaup - 9, 6, 10
85	Lesser Scaup - 25
87	Lesser Scaup - 9

Observations of particular interest recorded during this study include: 1) all larid species were more numerous in 1988 than in 1986; 2) the desertion of Site 18 - 132 pairs of Ring-billed Gulls and three pairs of Arctic Terns - which was the largest colony in the study area in 1986; 3) the better determination of the relative abundance of Common Terns and Arctic Terns; 4) the sighting of five juvenile Black Terns, the first evidence of breeding for this species in northern Great Slave Lake; 5) the presence of a vagrant (not confirmed by photograph) Laughing Gull, a first record for Great Slave Lake; 6) the presence of over 800 post-nesting larids loafing on an islet, the largest flock of terns and gulls we have ever observed in the North Arm, and 7) waterfowl nests were found at nearly 60% of the larid breeding sites that we visited.

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Appendix 1. Scientific and English* names of bird species mentioned in this report.

Family	Scientific Name	English Name
Anatidae	Branta canadensis	Canada Goose
	Anas platyrhynchos	Mallard
	Anas acuta	Northern Pintail
	Anas americana	American Wigeon
	Anas clypeata	Northern Shoveler
	Anas crecca	Green-winged Teal
	Aythya marila	Greater Scaup
	Aythya affinis	Lesser Scaup
	Mergus serrator	Red-breasted Merganser
Laridae	Stercorarius parasiticus	Parasitic Jaeger
	Larus argentatus	Herring Gull
	Larus californicus	California Gull
	Larus delawarensis	Ring-billed Gull
	Larus canus	Mew Gull
	Larus atricilla	Laughing Gull
	Larus philadelphia	Bonaparte's Gull
	Larus hyperboreus	Glaucous Gull
	Sterna paradisaea	Arctic Tern
	Sterna hirundo	Common Tern
	Sterna caspia	Caspian Tern
	Chlidonias niger	Black Tern

*American Ornithologists' Union, 1983.

Appendix 2. Number of nests of each species at 48 larid breeding sites in the North Arm of Great Slave Lake, June 1986 and 1988.

Site Number	Location UTM Grid	CATE		ARTE*		COTE*		C/ATE*		HEGU		RBGU		MEGU		TOTAL	
		86	88	86	88	86	88	86	88	86	88	86	88	86	88	86	88
a) Sites between Frank Channel and Trout Rock:																	
1	NV 5422 5975					22	24			0	1					22	25
2	NV 5832 5656					2	0									2	0
3	NV 6120 5480			1	1									0	1	1	2
4	NV 6170 5455			4	0	0	23			1	1			1	0	6	24
5	NV 6370 5570									1	no					1	no
6	NV 6470 5230							25	18	0	1					25	19
7	NV 5965 5205	1	0			4	0									5	0
8	NV 5875 5200									2	1					2	1
9	NV 5920 5155									2	1					2	1
10	NV 6000 5140	1	2	29	0	0	5					0	8			30	15
11	NV 6000 5090							22	0					1	0	23	0
12	NV 5893 4635	0	1			2	11					51	10			53	22
13	NV 4685 4660			1	0											1	0
14	NV 6615 4630	1	0			8	46									9	46
15	NV 7317 4440	1	1			10	14									11	15
16	NV 7745 4375					29	21					0	3			29	24
17	NV 7940 4250	1	0			23	15					5	70			29	85
18	NV 7950 4500			3	0	0	1					132	0			135	1
19	NV 8242 3990	1	0					3	0							4	0
20	NV 8282 4100			8	19									1	1	9	20
21	NV 8425 3990					22	52					3	30	2	0	27	82
22	NV 8377 4010					0	1							6	3	6	4
23	NV 8450 3892			0	1	0	7	48	0	2	4	18	0	0	1	68	13
24	NV 8637 3840	0	1			15	25			0	1	0	46	1	1	16	74
25	NV 8725 3527	49	56					1	0	4	10	13	29			67	95
26	NV 8815 3587	0	1					1	0					1	1	2	2
27	NV 8853 3740					0	15	28	0			6	3	1	2	35	20
28	NV 8945 3820			0	10			7	0	1	0					8	10
29	NV 8877 3535	0	1	0	1	0	41	27	0	12	12	8	30			47	85
30	NV 8920 3575					50	16			0	1	3	0			53	17
31	NV 8990 3535			0	5	7	0									7	5
76	NV 8990 3520							0	2					0	4	0	6
77	NV 8940 3540			0	12	0	3							0	2	0	17
78	NV 8090 4005	0	1	0	1											0	2
79	NV 7905 4525					0	12									0	12
80	NV 7275 4425					0	16									0	16
81	NV 7225 4500													0	3	0	3
82	NV 6735 4650					0	7			0	1					0	8
83	NV 6730 4620					0	22					0	16			0	38
84	NV 5870 4660					0	16									0	16
85	NV 6030 5120	0	1			0	39									0	40
86	NV 5950 5140									0	3					0	3
87	NV 5870 5540	0	2			0	1					0	64			0	67
	total	55	67	46	50	194	433	162	20	24	37	239	309	14	19	734	935

Appendix 2. Continued.

Site Number	Location UTM Grid	CATE 86	CATE 88	ARTE* 86	ARTE* 88	COTE* 86	COTE* 88	C/ATE* 86	C/ATE* 88	HEGU 86	HEGU 88	CAGU 86	CAGU 88	RBGU 86	RBGU 88	MEGU 86	MEGU 88	TOTAL 86	TOTAL 88
b) Sites between Frank Channel and Whitebeach Point, including Waite Island:**																			
74	NV 7130 3660					no	14											no	14
75	NV 7410 3750					no	8											no	8
c) Sites near Yellowknife:																			
69	PV 3145 1440			2	0											24	24	26	24
71	PV 3575 1340	1	1							32	37	44	29					77	67
72	PV 3482 2800			0	1											3	2	3	3
73	PV 3765 3270					33	24											33	24

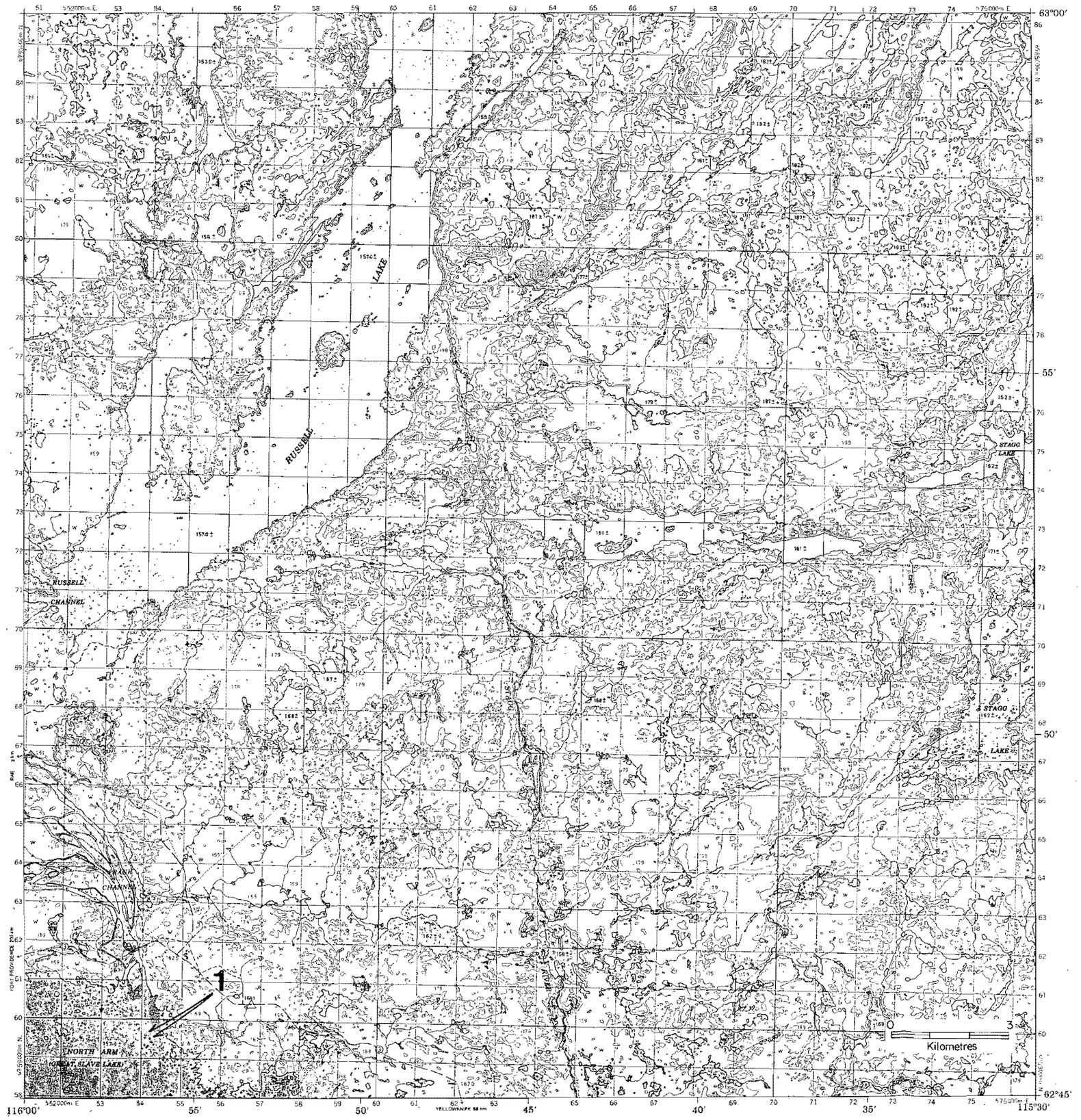
* Estimated number
C/ATE: Common Tern or Arctic Tern.
no: Not visited

Appendix 3. Location of larid breeding sites visited in the North Arm of Great Slave Lake, 1988.

STAGG RIVER

DISTRICT OF MACKENZIE
NORTHWEST TERRITORIES

EDITION 1 85 J/13

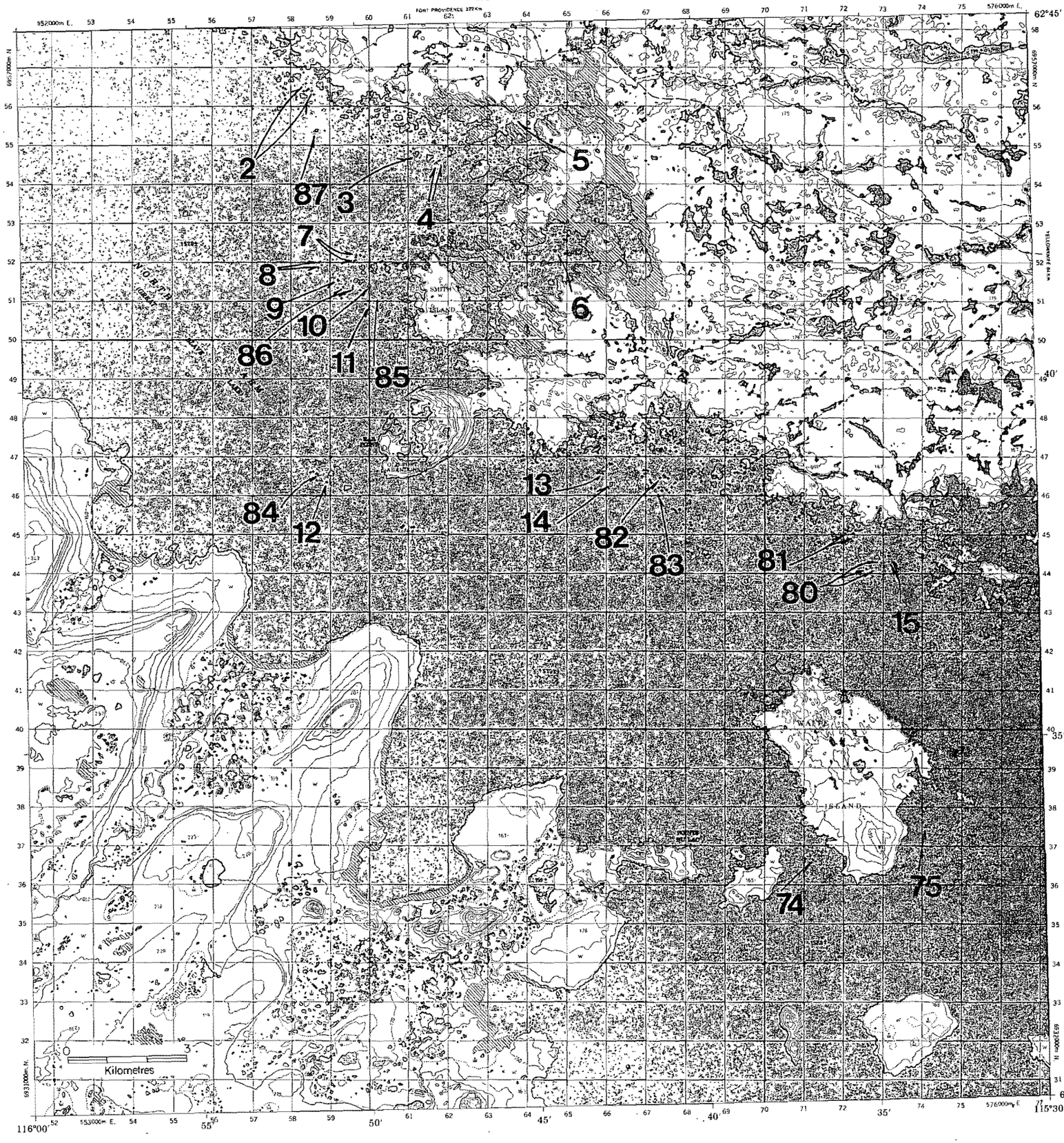


WAITE ISLAND

DISTRICT OF MACKENZIE

NORTHWEST TERRITORIES

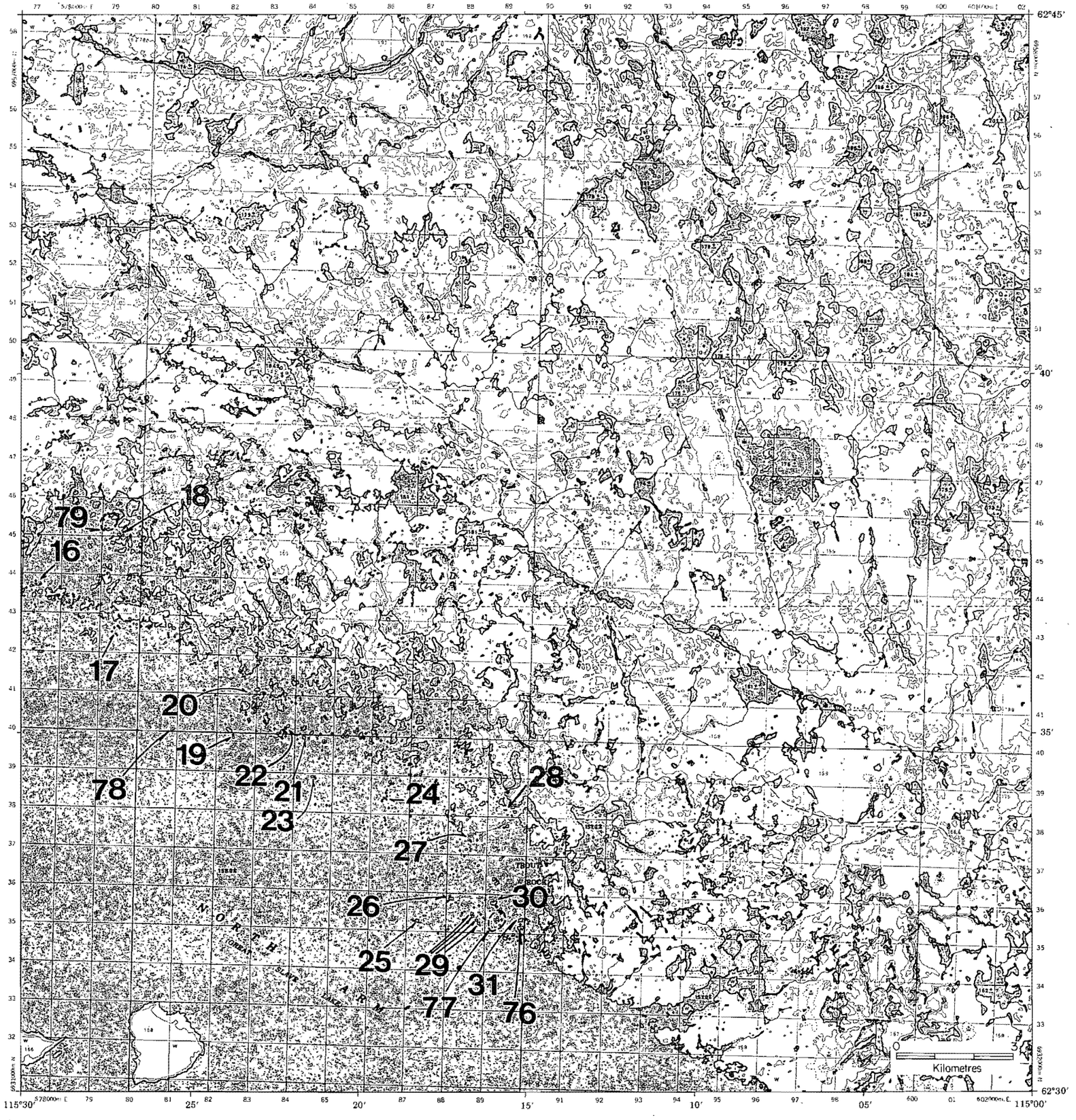
EDITION 1 85 J/12



TROUT ROCK

DISTRICT OF MACKENZIE
NORTHWEST TERRITORIES

EDITION 1 85 J/11

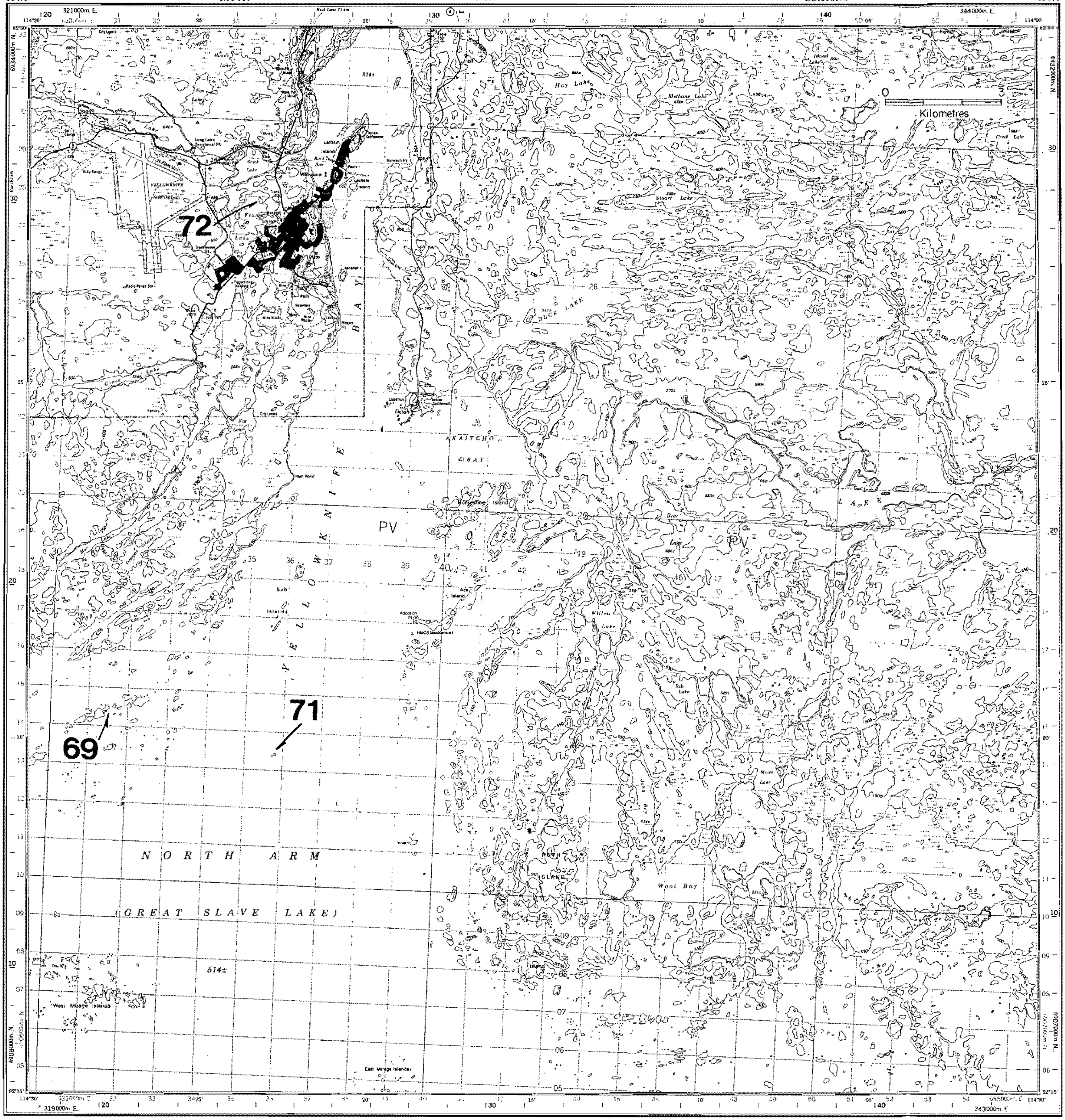


YELLOWKNIFE BAY

DISTRICT OF MACKENZIE

NORTHWEST TERRITORIES

85 J/8 | 1:50 000 | EDITION 3 | 85 J/8



PROSPEROUS LAKE