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Observations of Harlequin Ducks, other waterfowl,  
and Raptors in Labrador, 1987-92.

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This document benefitted from the editorial comments of Eric Hiscock, Manager Ecosystem Science, Environmental Conservation Branch, Atlantic Region. The demands for the data contained in this manuscript prior to publication speak to the value of such data in contributing to sustainable management of our hinterlands.

**ABSTRACT**

During the summers of 1987, 1988, 1989, and 1991, extensive surveys were conducted by helicopter in Labrador in order to expand knowledge on distribution and abundance of Harlequin Ducks (*Histrionicus histrionicus*) and Peregrine Falcons (*Falco peregrinus*). Both species are presently designated as endangered in eastern Canada. Our surveys vastly enhanced the Labrador database for these and many other waterfowl and raptor species.

Harlequin Ducks were observed with 3 to 5 week old broods in late July and early August, and breeding distribution appeared centered from the Makkovik area northward to Ramah Bay ending considerably south of previous speculations. Five pairs and 3 singles of this species were observed on tributaries of the Lower Churchill River in early June 1991, and along the main stem in 1992, the total of 40 individuals including 5 pairs observed increased concern for potential impacts of proposed hydro-electrical developments in that area. It also supported the likelihood of an inland riverine corridor to Ungava Bay and James Bay for migrating Harlequin Ducks. Overall densities of breeding pair equivalents averaged 8.4 per 100 km<sup>2</sup> which is low relative to data on populations of Harlequin Ducks in preferred habitats elsewhere.

Other waterfowl were common and we noted previous undocumented congregations of molting Canada Geese in inland, and especially in estuarine, areas. Large numbers of molting eider ducks and scoters were observed in the Saglek Bay to Ramah area. They were particularly concentrated in the Table Bay area where large breeding and molting assemblages were recorded.

Peregrine Falcons were documented throughout most of coastal Labrador, although distribution was clumped, possibly in relation to availability of important prey species. We documented a number of inland nesting sites noting considerable variation in height of nest placement although, for the most part, they were on cliff faces with a southerly aspect. We suspect numbers actually breeding in our study areas were higher because detection of territorial birds was difficult and aeries often lacked fecal staining and nitrophilous lichens. We documented considerable data on other raptors, especially Golden Eagles (*Anguilla chrysaetos*), extending the known breeding range of this species northward. Gyrfalcon (*Falco rusticolis*) were frequently observed although our surveys were timed too late to detect breeding in this species. Raptor observations were dominated by Rough-

legged Hawks (*Buteo lagopus*) which normally ubiquitous. An exception was 1988 in which year there was a crash in rodent populations.

Our knowledge of this poorly understood hinterland will be enhanced through Canadian Wildlife Service waterfowl population studies under the Black Duck Joint Venture of the North American Waterfowl Management Plan and the Canada-Newfoundland Comprehensive Labrador Cooperation Agreement. A wildlife avoidance monitoring program by the Department of National Defense as part of ongoing mitigation programs to the Low Level Training will contribute additional information.

## RÉSUMÉ

Durant l'été des années 1987, 1988, 1989 et 1991, on a fait au Labrador des recensements étendus par hélicoptère pour en apprendre davantage sur la répartition et l'abondance du canard arlequin (*Histrionicus histrionicus*) et du faucon pèlerin (*Falco peregrinus*). Ces deux espèces figurent actuellement sur la liste des espèces en danger de disparition dans l'Est du Canada. Ces recensements ont beaucoup enrichi nos connaissances, non seulement sur ces deux espèces, mais aussi sur les nombreuses autres que comprennent la sauvagine et l'avifaune prédatrice du Labrador.

On a observé des canards arlequins accompagnés de jeunes de 3 à 5 semaines à la fin de juillet et au début d'août; l'aire de répartition des nicheurs, qui semblait centrée autour de la région de Makkovik, s'étendait jusqu'à la baie Ramah, soit à une latitude beaucoup plus méridionale que ce qu'on avait prévu. Au début de juin 1991, on a signalé 5 couples et 3 sujets solitaires dans les tributaires du cours inférieur du fleuve Churchill et aux abords du bras principal en 1992; comme on a observé en tout 40 individus, dont 5 couples, on redoute davantage les éventuels effets des projets d'aménagement hydro-électrique envisagés pour la région. Ces chiffres permettent également de croire que le canard arlequin migre vraisemblablement par un couloir riverain intérieur débouchant sur la baie d'Ungava et la baie James. La densité globale d'équivalents de couples nicheurs était en

moyenne de 8,4 par 100 km<sup>2</sup>, ce qui est peu par rapport aux valeurs qu'on obtient pour le canard arlequin recensé ailleurs dans son habitat de prédilection.

D'autres espèces de la sauvagine étaient communes; des colonies de bernaches du Canada en mue, jusqu'ici encore jamais signalées, ont été relevées à l'intérieur des terres, plus particulièrement dans les zones estuariennes. On a observé un grand nombre d'eiders et de macreuses en mue entre la baie Saglek et la baie Ramah; ils étaient surtout concentrés dans la région de la baie Table, où l'on a vu de grands groupes de nicher et d'oiseaux en mue.

On a constaté la présence de faucons pèlerins presque partout sur la côte du Labrador, mais avec une distribution en zones de concentration qui est peut-être liée à celle des espèces proies les plus importantes. Un certain nombre de sites de nidification ont été relevés à l'intérieur des terres; la hauteur des emplacements variait considérablement, mais la plupart se trouvaient à flanc de falaise, sur les faces orientées au sud. On pense que le nombre de nicheurs dans la région étudiée est en réalité plus élevé que ne l'indiquent les chiffres, car les oiseaux territoriaux se détectaient difficilement et l'on ne trouvait souvent aucune trace de déjections ni de lichens nitrophiles dans les aires. L'étude a apporté une quantité considérable de données sur d'autres oiseaux de proie et plus particulièrement sur l'aigle royal (*Aquila chrysaetos*), dont l'aire de reproduction s'étend plus au nord qu'on ne le croyait. Quant au faucon gerfaut (*Falco rusticolus*), on l'a fréquemment observé, mais les recensements se faisaient trop tard dans la saison pour qu'on puisse voir des nicheurs. La buse pattue (*Buteo lagopus*), espèce normalement présente partout, dominait l'avifaune prédatrice recensée, sauf en 1988, année où les populations de rongeurs sont radicalement tombées.

Avec les études de l'avifaune aquatique que le Service canadien de la faune réalisera dans le cadre du Projet conjoint sur le canard noir et de l'entente Canada-Terre-Neuve de coopération globale sur le Labrador, nous apprendrons beaucoup sur cette partie méconnue de l'arrière-pays. En outre, le programme de surveillance

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pour l'évitement de la faune que conduit le ministère de la Défense nationale dans le cadre des programmes d'atténuation des effets des vols rasants nous apportera d'autres données.



## INTRODUCTION

Concern for the status of Harlequin Ducks (*Histrionicus histrionicus*) and Peregrine Falcons (*Falco peregrinus*) resulted in cost-shared surveys of breeding distributions in coastal areas and watersheds of Labrador in late July-early August 1987, 1988, and 1989. Further to these surveys has been the original research associated with the Environmental assessment of low-level flying (E.I.S., Department of National Defence, 1989), field work associated with the development of avoidance criteria for low-level flying (Ledrew-Fudge & Associates, Pers. Comm., 1991), and preliminary surveys of tributaries of the lower Churchill River presently being assessed for hydroelectrical development (Goudie 1991, Lidster 1992a). In 1992, aerial surveys of waterfowl breeding in the upper Churchill River watershed were conducted under the Canada-Newfoundland Comprehensive Labrador Cooperation Agreement (Lidster 1992b).

Records of breeding Harlequin Ducks in Labrador were scanty although Austin (1932) considered the area from Hopedale north as the centre of breeding distribution. Historical records indicated that Peregrine Falcons bred at least in the Table Bay to Cape Chidley area of the Labrador coast (Austin 1932, Todd 1965).

Overall, avifaunal surveys of Labrador have been very limited. We recorded all faunal observations, and significantly increased data on distribution and density of various other waterfowl and raptors, especially Canada Geese (*Branta canadensis*) and Golden Eagle (*Aquila chrysaetos*).

## METHODS

Aerial surveys were conducted using a Bell 206L helicopter with 3 observers and the pilot. The front observer also acted as navigator and recorded observations. For Harlequin Ducks, we typically flew river courses at approximately 20 m above ground level, at speeds varying from 90 kph down to a hover. Our review of historical records, especially Austin 1932, suggested that Harlequin Duck broods should be at the mid-developmental stages, i.e., class 1c to 2b or 3 to 5 weeks of age after Gollop and Marshall 1954, during late July-early August of many of the survey periods. At this time, we expected to observe only females and/or broods of Harlequin Ducks as males and non-breeders would be assembled at coastal offshore

molting sites. For late May - early June surveys we anticipated encountering breeding pairs. We recorded all waterfowl observed.

For raptors, we surveyed precipitous cliff faces on offshore islands, coastal and inland areas, especially focusing on those with a southerly to westerly exposure. We attempted to view potential ledges for nest sites by approaching within 30-50m at speeds of 50 kph down to a hover. Often, we combined survey approaches by covering both cliff faces and river courses because many valleys were treated as return routes. We used the presence of orange nitrophilous lichens and white dropping stains as clues to possible raptor activity. Surveys were focused on Peregrine Falcons, however all raptor observations were documented.

We generally flew at low level between rivers and cliff faces, and noted all wildlife observations.

## RESULTS

### I. Nain area to Nachavak Fiord, 1987

#### 1. Waterfowl

On 30 July - 6 August 1987, 81 female-like and 4 broods of Harlequin Ducks were observed along 474 km of rivers that were surveyed (Table 1, Figure 1). The four broods were noted as being in mid-developmental stages. The data suggested extensive non-breeding by female Harlequin Ducks in northern Labrador that year. There appeared to be no clear pattern of river use by Harlequin Ducks, as some seemingly suitable streams were lacking birds while other minor streams supported birds. Observations of singles or small assemblages of 1 to 5 female-like Harlequin Ducks occurred near river estuaries and up to 60 km inland. A few groups of 4 to 5 individuals were associated with smooth meandering estuaries atypical of the expected habitat of breeders along rapids and riffles. Two relatively large groups, of 11 and 13 female-like Harlequin Ducks were located near the mouth of Tasiuyak River and Tikkoatokak rapids, respectively, near Nain (see Figure 1), typical of concentrations of immatures and/or non-breeders noted in other studies (e.g. Bengston 1972) (Table 1).

Considerable numbers of other waterfowl were observed. Over 1,400 molting Canada Geese and some broods were commonly encountered in groups of 30 to 100 individuals at estuaries and protected inlets. We encountered more than 900 Black Ducks (*Anas rubripes*), most noteworthy being molting concentrations in Okak Bay, and assemblages of 70 to 150 individuals on coastal marshes at estuaries in Hebron Fiord and Saglek Fiord. These appeared to be adult male assemblages (see Bowman and Brown 1992). We observed 4 mallards (*A. platyrhynchos*) with Black Duck assemblages (Table 2).

Diving ducks on inland water systems were predominantly Red-breasted Mergansers (*Mergus serrator*), and females were commonly encountered along river courses during coverage for Harlequin Ducks. A few groups of 10 to 50 molting individuals were noted. Goldeneye were not abundant and 2 observations of females with broods were in forested areas, and assumed to be Common Goldeneye (*Bucephala clangula*) (Table 2). Molting concentrations of goldeneye in the Ramah Bay and Rowsell Hr. area were not successfully speciated but our previous experience in this area of Labrador suggested mixed coastal flocks of molting *B. clangula* and *B. islandica* (CWS internal banding reports).

Eider ducks (*Somateria mollissima*) were abundant and especially concentrated in molting assemblages in the area of Ramah Bay to Saglek Fiord. Over 6,000 eiders were recorded, and there were relatively few broods. Over 1200 scoters, apparently in full molt, were mostly *Melanitta perspicillata* and *M. deglandi* and observations were concentrated in Saglek Fiord (Table 2).

Great Black-backed Gulls (*Larus marinus*) and Glaucous Gulls (*L. hyperboreus*) were the most abundant larid species in this area of Labrador, although, overall gull populations were relatively small (Table 2).

## 2. Raptors

Raptor observations were predominated by Rough-legged Hawks (*Buteo lagopus*) with 23 observations of adults and 6 active nest sites. Golden Eagles were relatively common especially in the Kingurutik River area near Nain, where we confirmed 2 active nest sites. Peregrine Falcons were recorded at several new locations. We confirmed breeding at 3 sites, and noted a strongly territorial pair at Uyagaksuyulik Bay (see Lemon and Brazil 1990). Peregrine Falcon chicks ranged in

age from 10 days to 5 weeks. Gyrfalcons (*Falco rusticolus*) were noted but their nesting season would have been completed by this time. The 1 pair and 4 adult Gyrfalcons observed were all grey phase. Merlins (*Falco columbarius*) were fairly common, and we observed ospreys (*Pandion haliaetus*) and Goshawks (*Accipiter gentilis*) in the Nain area. Ravens (*Corvus corax*) were relatively common (Table 3).

## II. Nachvak Fiord to Cape Chidley, 23-28 July 1988

### 1. Waterfowl

No Harlequin Ducks were observed along 277 km of rivers surveyed from Nachvak Fiord north to Cape Chidley. In total, 401 km of rivers were surveyed in 1988, and 17 female-like Harlequin Ducks and 2 broods were observed on rivers entering Hebron Fiord and Okak Bay, the general area where Harlequin Ducks were observed in 1987 (Table 1, Figure 1).

Over 1,100 molting Canada Geese were observed in groups of 10 to 125, especially noteworthy was the relatively large concentration in the Eclipse River area. Black Ducks were relatively scarce north of Saglek Fiord. Female Red-breasted Mergansers were frequently encountered along river courses. Goldeneyes were somewhat more abundant in protected inlets along the northern Labrador coast, and we were able to confirm the presence of molting Barrow's Goldeneye in Razorback Hr. (Table 2).

Over 4,000 Common Eiders were observed although very few broods were noted. The majority of these eiders were located from Saglek Fiord to Kangalaksiorvik Fiord, and were assumed to be molting concentrations (Table 2).

We noted a low incidence of Common Loons, Black Guillemots, Herring Gulls, Glaucous Gulls, and Great Black-backed Gulls.

### 2. Raptors

We noted a complete absence of the Rough-legged Hawk, corresponding to a year of collapsed rodent populations. Five Golden Eagles were observed, and we confirmed the presence of an active nest in Freytag Inlet of Hebron Fiord. Three new active nest sites of Peregrine Falcons were documented as well as an additional

territorial pair. We observed 3 individual Peregrine Falcons not apparently on territory, and we successfully resighted an individual Peregrine Falcon at each of the previously documented sites of Iterunguk Fiord and Nutak. Four dark phase gyrfalcons were recorded. Ravens were relatively common (Table 5).

### III. Southern to central coastal Labrador, 22-30 July 1989

#### 1. Waterfowl

Harlequin Ducks were not observed south of Makkovik region, i.e., Big River. The majority of the 32 female-like Harlequin Ducks and 10 broods were recorded on Big River, Flowers River and Adlatok River in the Hopedale area (Table 1, Figure 1). We noted a small molting concentration of 30 Harlequin Ducks at Tumbledowndick Island, near Porcupine Strand of Groswater Bay where they had been noted during boat-based raptor work in 1982 (J. Brazil, pers. comm.).

The surveyed area supported a sparse population of dabbling ducks and geese. We noted the presence of broods of Black Ducks, Green-winged Teal, and Canada Geese. Very few, and relatively small, concentrations of molting Black Ducks and Geese were recorded. We noted a significant presence of mergansers (mostly *M. serrator* but a few *M. merganser*) on many river systems, and higher densities were noted on rivers where there was a significant presence of Harlequin Ducks (Table 1).

The most outstanding waterfowl observations were Common Eider Ducks with over 10,000 adults and more than 400 broods documented especially in the area from Batteau to Table Bay. An estimated 6,500 molting male eiders were recorded in Table Bay, the general area where ~ 30% of the Labrador eider population is estimated to breed (Lock 1986). Over 3,000 scoters of all 3 species were recorded and apparently in molt (Table 2).

#### 2. Raptors

Rough-legged Hawks were very numerous throughout our survey, coinciding with a year of tremendous small rodent abundance. We observed only a few Bald Eagles, and could not confirm the presence of Golden Eagles in the Table Bay area where they were reported nesting during surveys in 1981 (G. Hansen, C.W.S.

internal report). We noted a very clumped distribution of Peregrine Falcons. Especially noteworthy was the high density in the archipelago area near the mouth of Table Bay (Table 3). There appeared to be a coincidence between the presence of Peregrine Falcons and a significant potential prey base of waterfowl and alcid.

#### IV. Lower Churchill River Tributaries, 3 - 5 June 1991

For some years, the lower Churchill River has been proposed for hydroelectrical development (see E.I.S., lower Churchill Development Corporation, 1980). Recently interest has been reactivated because of negotiations with Hydro Quebec for cost-shared development. Anecdotal information (R. Burry, Minipi Camps) supported the assumed presence of Harlequin Ducks breeding on tributaries of the lower Churchill River, and in 1991, Newfoundland and Labrador Hydro cost-shared surveys of 267 km of the tributaries and 250 km of the main stem of that watershed.

Five pairs and two single adult males and one female-like Harlequin Duck were observed on tributaries of the lower Churchill River, the most productive being Minipi River. One adult male was flushed along the main stem of the lower Churchill River upstream from the confluence with Metchin River (Table 4). On 9 to 10 June 1992, 40 Harlequin Ducks (including 5 pairs) were observed along the main stem of the Churchill River (Lidster 1992a).

#### (V) Department of National Defense, Surveys 1987 - 91.

In Spring 1988 and 23 - 28 July 1991, Ledrew Fudge and Associates, under contract to the Department of National Defence, undertook avifaunal raptor surveys of the low level flying zones, concentrating on the area north of Goose Bay. A marginal amount of coinciding river coverage yielded observations of 21 female-like Harlequin Ducks. Two sites on the Adlatok River watershed had been surveyed in 1989 (Table 4).

## DISCUSSION

### 1. Harlequin Ducks

Many gaps exist in our knowledge of the avifauna of Labrador. Harlequin Ducks were of special interest because of their small population reported for eastern North America (Vickery 1988), and apparent declines (Goudie 1989). The Harlequin Duck is now listed as endangered in eastern North America by the Committee on the Status of Endangered Wildlife in Canada (C.O.S.E.W.I.C., 1990). Prior to our surveys there was only limited knowledge of the distribution of breeding Harlequin Ducks along rivers and streams in Labrador. Austin's (1932) account of this species has remained the most accepted, stating "... *a common summer resident in Labrador from the Hopedale region northward, and a common migrant along the entire coast.*" Our results support the contention that the breeding distribution of the Harlequin Duck is centered in the area from Hamilton Inlet northward although apparently absent along rivers north of Nachvak Fiord corresponding closely to the northern distribution limit of biting Black Flies (Simuliidae) (M. Colbo, M.U.N., pers. comm.). Simuliid larvae are a staple food supply of Harlequin Ducks on the breeding grounds in Iceland (Bengston and Ulfstrand, 1971). The absence of Harlequin Ducks from rivers surveyed in southern Labrador was puzzling as we expected at least a low presence there because of observations of lone females on rivers somewhat north of this area, i.e., Double Brook near Luscombe's Brook, Groswater Bay in July 1985 and English River, Lake Melville (see Figure 1) in July 1983 (R.I. Goudie, pers. obs.). Some low density of breeding Harlequin Ducks may occur in this zone although the dark coloration of the water in these watersheds suggests different water chemistry to those further north where Harlequin Ducks were observed.

Rivers of the Hopedale, Nain, and Hebron Fiord areas were noted for the relative abundance of Harlequin Ducks, and these corresponded with watersheds productive for anadromous Atlantic Salmon (*Salmo salar*) and Arctic Char (*Salvelinus alpinus*) and mergansers. High water clarity was frequently noted on these watersheds. Other authors have documented the importance of salmon roe to Harlequin Ducks during the breeding season (e.g. Dzinball 1982) but breeding of Harlequin Ducks and egg laying of Atlantic Salmon do not coincide.

A high frequency of non-breeding is a feature noted for Harlequin Ducks in Iceland (annual average of 0.56 in Bengston 1972), and our data provided circumstantial evidence for a high rate of non-breeding in females in 1987 when water levels were extremely low. Observations for 1988, and especially 1989, were indicative of

better breeding success. Overall densities of Harlequin Ducks averaged 8.4 female-like Harlequin Ducks per 100 km of river. However, observations were especially confined to the area from Makkovik north to Nachvak Fiord where the density averaged 13.0 female-like Harlequin Ducks per 100 km of river for the 998 km of rivers surveyed in this zone in 1987 - 1989. This density is very low relative to other reported populations of Harlequin Ducks where 1 female or pair per km of river is considered low to average (see Bengston 1972, Dzinbal 1982, Kochel 1977). These surveys have provided further evidence that the population of Harlequin Ducks in eastern North America is small, probably numbering less than 1,000 individuals (see Goudie 1989, Vickery 1988). The absence of the Harlequin Duck along rivers north of Nachvak Fiord reduces the area in Labrador that was speculated to support breeding pairs (e.g. Palmer 1976). Although there was no statistical correlation of the presence of Harlequin Ducks to water quality, we noted that highest densities corresponded to the least turbidity. Harlequin Ducks may select this condition because it facilitates better food detection. Statistical inferences may be presently limited by the reduced numbers of Harlequin Ducks and overall preponderance of suitable habitat without birds. Although a variety of river sizes was occupied, there appeared to be an avoidance of especially large basins and breeding was confined to the upper reaches and tributaries of such systems, e.g., Big River, Adlatok River, Flowers River.

Our observation of broods being tended by more than one female may be the first documentation of "aunting" or possibly creching in this species (see Palmer 1976 for eiders).

Confirmation of breeding pairs of Harlequin Ducks on the lower Churchill River tributaries raises special concern because of proposed development of the lower Churchill River for hydro-electricity. Inundation and loss of rapids and obstructions to migration could further reduce numbers of Harlequin Ducks breeding in eastern North America. Surveys of the 136,000 km<sup>2</sup> area implicated in the proposed James Bay II development in northern Quebec have detected the presence of at least 153 pairs (F. Morneau, G.R.E.B.E. Consultants Ltd., 1993, pers. comm.). This and our scanty knowledge of pre-development habitats in the James Bay I and Upper Churchill River Development suggest hydro-electrical developments have had more dramatic impact on Harlequin Ducks in eastern North America than originally realized (e.g. see Goudie, 1990).



Almost no coastal concentrations of Harlequin Ducks were observed despite our coverage in "likely" archipelagoes. We did observe 30 molting individuals at Tumbledown Dick Island, Groswater Bay. This site and the Gannet Clusters off Cartwright (100 to 150 molters) are the only 2 known molting sites for Harlequin Ducks in eastern North America.

## 2. Other Waterfowl

The importance of northern Labrador to molting waterfowl was obvious during these surveys where hundreds to thousands of flightless Black Ducks, Canada Geese, diving ducks and sea ducks were common observations in coastal estuaries and protected bays. These must represent molting migrants from points farther south. For Black Ducks at least, molt concentrations are virtually all adult males (Bowman and Longcore 1988), and recapture of individuals banded farther south has been common.

The broader bays, fiords and outer coast of Labrador supported thousands of molting sea ducks, especially Common Eiders but Scoters were also commonly observed. The Surf Scoter is the most abundant scoter breeding on the Labrador plateau (Goudie and Whitman 1987) so this may account for the stronger presence of molting males of this species along the coast.

Eiders breed throughout Labrador but peak abundance occurs in the Table Bay area (Lock 1986). The low presence of broods or creches in 1987 and 1988 and the high frequency in 1989 is circumstantial support for the extreme variation in annual productivity in eiders demonstrated in other studies (e.g. Milne 1974). Years of high fledging success probably correspond to years when availability of invertebrate food for ducklings is very high (see Swennen 1989).

## 3. Raptors

Raptors were fairly abundant in Labrador in 1987 and 1989, and may have been correlated with the presence of a potential food base. For example, in 1988 when small rodent populations had crashed, no Rough-legged Hawks were observed whereas they were the most numerous raptor in 1987 and 1989.

We documented breeding and non-breeding Golden Eagles north of Nain to extend their previously known northern range limit (Palmer 1988).

Raptor observations were highlighted by Peregrine Falcons, and we documented 15 territorial pairs from Table Bay to Bowdoin Hr., near Cape Chidley. We recorded a diversity of nest sites, from the high base cliff faces of Iterunguk Fiord to the low vegetated hills of Nutak inlet and inland some 60 km on a broken cliff face overlooking a river delta at Nakvak Lake. Aeries often had a southerly exposure (see Lemon and Brazil 1990). During the late July - early August surveys, most young were judged to average 2 to 3 weeks of age (range 1.5 to 5 weeks). We noted a frequent coincidence of Peregrine Falcon aeries to significant prey bases, e.g., waterfowl and alcid concentrations. Offshore island aeries generally occurred in areas with a significant presence of Black Guillemots. Palmer (1988) noted that unavailability of suitable prey restricts the occurrence of Peregrine Falcons.

It is possible that a significant number of breeding sites of Peregrine Falcons went undetected. We arrived at this conclusion because during our 1988 surveys of 2 sites documented in 1987, at least 3 passes by helicopter were undertaken before territorial birds were seen. In normal surveying circumstances such sites would not have been approached repeatedly. Our documentation of the significant presence of Peregrine Falcon's breeding in Labrador updates earlier publications (C.W.S., 1988: Hinterlands Who's Who Series) which placed Labrador outside of the known recent breeding range. There is no doubt that a core of breeding Peregrine Falcons have remained throughout remote Labrador.

## LITERATURE CITED

- Anderson, T.C. 1985. The Rivers of Labrador. Canadian Special Publication of Fisheries and Aquatic Sciences 81. Fisheries and Oceans, Ottawa.
- Austin, O.L. 1932. Birds of Newfoundland and Labrador. Memoirs of the Nuttall Ornithological Club, Cambridge. 2 pp.
- Bengston, S.-A. 1972. Breeding ecology of the Harlequin Duck (*Histrionicus histrionicus*) (L.) in Iceland.
- Bengston, S.-A., and S. Ulfstrand. 1971. Food resources and breeding frequency of the Harlequin Duck (*Histrionicus histrionicus*) in Iceland. *Oikos* 22: 235-239.
- Bowman, T.D. 1981. Ecology of Male Black Ducks molting in Labrador. M.Sc. Thesis. University of Maine, Orono. 60pp.
- Bowman, T.D. and P.W. Brown. 1992. Site fidelity of male Black Ducks to a molting area in Labrador. *J. Field Ornithol.* 63(1):32-34.
- Bowman, T.D. and J.R. Longcore. 1989. Survival and movements of molting male Black Ducks in Labrador. *J. Wildl. Manag.* 53:1057-1061.
- Dzinbal, K.A. 1982. Ecology of Harlequin Ducks in Prince William Sound. Unpubl. M.S. Thesis. Oregon State University, Portland. 89 pp.
- Canadian Wildlife Service, 1988. Peregrine Falcon. C.W.S. Hinterland Who's Who. Ministry of Supply and Services, Canada. Catalogue No. CW69-4/32-1985E.
- Gollop, J.B. and W.H. Marshall, 1954. A guide for aging duck broods in the field. *Miss. Flyway Tech. Sect. Leaflet*. 14 pp.
- Goudie, R.I. 1989. Historical status of Harlequin Ducks wintering in eastern North America - a reappraisal. *Wilson Bulletin* 10: 112-114.
- Goudie, R.I. 1990. Status report on the Harlequin Duck (eastern population) *Histrionicus histrionicus*. Committee on the Status of Endangered Wildlife In Canada, Ottawa, Ont., K1A 0H3.
- Goudie, R.I. 1991. Harlequin Duck and other waterfowl surveys of the Lower Churchill River watershed, 3-5 June 1991. C.W.S. Internal Report.

- Goudie, R.I. and W.R. Whitman. 1987. Waterfowl populations of Labrador. Canadian Wildlife Service Occasional Paper 60.
- Kochel, C.R. 1977. Some aspects of the behavior and ecology of Harlequin Ducks breeding in Glacier National Park, Montana. Unpublished Manuscript thesis, University of Montana. 169 pp.
- Lemon, D. and J. Brazil. 1990. Preliminary report on breeding Peregrine Falcons (*Falco peregrinus*) in Labrador, 1987 and 1988 survey results. Can. Field-Nat. 104(2):200-202.
- Lock, A.R. 1986. A census of Common Eiders breeding in Labrador and the Maritime Provinces. Pages 30 - 38 in Reed, A. ed. Eider Ducks in Canada. Can. Wildl. Serv. Rep. Ser. No. 47. 177 pp.
- Palmer, R.S. Editor. 1976. Handbook of North American Birds. Volume 3: 323-344. Yale University Press, New Haven.
- Palmer, R.S. Editor. 1988. Handbook of North American Birds. Volume 4: , Yale University Press, New Haven.
- Milne, H. 1974. Breeding numbers and reproductive rate of eiders at the Sands of Forvie Nature Reserve, Scotland. Ibis 116: 135-152.
- Swennen, C. 1989. Gull predation upon eider (*Somateria mollissima*) ducklings: destruction or elimination of the unfit. Ardea 77(1): 21-45.
- Todd, W.E.C. 1963. Birds of Labrador Peninsula and adjacent areas. University of Toronto Press, Toronto.
- Vickery, P.D. 1988. Distribution and population status of Harlequin Ducks (*Histrionicus histrionicus*) wintering in eastern North America. Wilson Bulletin.

Table 1. Area and Coverage for 1987, 1988 and 1989 Helicopter Surveys for Harlequin Ducks in northern Labrador.

River (DFO No. after Anderson 1985)	River No.	Year	Coverage (km)	Harlequin Duck Observations <sup>1</sup>	Comments
<u>Hebron Fiord</u>					
Black Bark River (#104)	1	1987	10.0	3♀♀	
Primogenitor River (#105)	3	1987	18.0	0	
Ikarut River (#106)	6	1987	35.0	0	
Golden Eagle River (#103)	4	1987	8.0	0	
Golden Eagle River (#103)	74	1988	5.0	0	
Saddle Brook	5	1987	7.0	1♀	
N. Freytag I. Brook	75	1988	10.0	1♀ + 4(1c), 1♀ + 1(1c), 1♀	
Winnie Bay Brook	2a	1987	1.0	0	
Kameplain Brook	2	1987	10.0	0	
<u>Saglek Fiord</u>					
Kiyuktok Brook (#107)	7	1987	5.0	2♀♀	
Pangertok Inlet Brook (#108)	8	1987	1.0	2♀♀	
S. Ugjuktok F. River (#109)	9	1987	10.0	0	
N. Ugjuktok F. River (#110)	10	1987	12.0	0	
North Arm River (#112)	73	1988	14.0	0	
S. West Arm River (#111)	11	1987	3.0	4♀♀	
Nakvak Brook (#113)	12	1987	18.0	0	
Nakvak Tributary Br. (#113)	68	1988	6.0	0	
North Tributary	69	1988	7.0	0	
Nakvak Lake Outlet R. (#113)	70	1988	17.0	0	
WN Nakvak River Trib. (#113)	71	1988	5.0	0	
Brook 1245 (#113)	72	1988	8.0	0	
Kangalasiorvik Brook (#119)	13	1987	1.0	2♀♀	
East Pangertok Inlet Brook	14	1987	6.0	0	
Stecker River (#114)	67	1988	15.0	0	
Little Ramah Brook	15	1987	10.5	2♀♀	
Rowsell Hr. Brook	16	1987	6.0	0	
Delabarre Brook	17	1987	4.5	0	

Cladonia Brook	18	1987	2.75	0
Takkatat River	19	1987	7.0	0
North Napaktuk Brook	20	1987	1.0	1♀
South Napaktuk Brook	21	1987	11.0	0
Lost Chan Brook	22	1987	3.0	0

Table 1 (Cont...)

River (DFO No. after Anderson 1985)	River No.	Year	Coverage (km)	Harlequin Duck Observations <sup>1</sup>	Comments
<u>Okak Bay</u>					
Siyagak Brook (#102)	23	1987	40.0	4♀♀, 1♀, 5♀♀, 1♀, 1♀ 1♀2♀♀	(4♀♀ in estuary)
Sipukat Lake inlet Br. (#101)	24	1987	8.0	0	
Sipukat Lake outlet Br. (#101)	25	1987	2.5	1♀	estuary
North River (#100)	26	1987	21.0	2♀♀	
Palsa Brook (trib, N.River)	27	1987	13.0	0	
<u>Avakutak Bay</u>					
Avakutak River (#95)	28	1987	20.0	1♀	
Tasiuyak River (#97)	29	1987	21.0	11♀♀1♀1♀ + 5 (2b) 3♀♀	estuary
<u>Port Manvers River</u>					
N. Man of War Brook	30	1987	6.0	2♀♀	
<u>Webb Bay</u>					
Webb Brook (#94)	31	1987	17.0	0	
Little Webb Brook	76	1988	12.0	5♀♀4♀♀1♀	1♀ observed in estuary
Lister Brook	32	1987	1.5	0	
<u>Tikkoatokak Bay</u>					
Tikkoatokak Rapids (#93)??	33	1987	0.5	13♀♀3♀♀	
Kingurutik River (#93)	34	1987	55.0	1♀5♀♀	

Little Kingurutik Bk.	34b	1987	6.5	2♀♀ + 2 (2b)
Anaktalik River (#89)	35	1987	61.5	2♀♀ + 4 (2a)
				2♀♀ + 4 (1c)
				1♀
Kogaluk River (#84)	36	1987	6.5	0
Kamanatsuk River (#92)	37	1987	10.0	0
Shoal Cove Brook	38	1988	2.0	0
Seaplane Cove Brook	39	1988	2.0	0
<u>Komaktovik Fiord</u>				
Komaktorvik River (#118)	40	1988	24.0	0
N. Komaktorvik River (#118)	41	1988	10.0	0
Tower Mountain Brook	42	1988	9.0	0
Kangulaksiorvik River	43	1988	3.0	0
West Two Loon Brook	44	1988	7.0	0

Table 1 (Cont...)

River (DFO No. after Anderson 1985)	River No.	Year	Coverage (km)	Harlequin Duck Observations <sup>1</sup>	Comments
<u>Eclipse Channel</u>					
East Eclipse Channel Brook	45	1988	6.0	0	
Mid Eclipse Channel Brook	46	1988	8.0	0	
Eclipse Lake Outlet River	47	1988	2.0	0	
Eclipse River	48	1988	20.0	0	
North Eclipse River Trib.	49	1988	14.0	0	
<u>Noodleook Fiord</u>					
S. Noodleook Brook	50	1988	11.0	0	
N. Noodleook Brook	51	1988	10.0	0	
S. Ikkudliayuk F. Brook	52	1988	4.0	0	
Ikkudliayuk River	53	1988	2.5	0	
N. Shungmiyuk Brook	54	1988	0.5	0	
E. Noodleook F. Brook	55	1988	2.5	0	
Saglarsuk River	56	1988	8.0	0	
Abbate Point Brook	57	1988	8.5	0	

Nautilus Brook	58	1988	1.0	0
Trout Trap River	59	1988	10.5	0
N. Trout Trap Brook	60	1988	5.0	0
<u>Nachvak Fiord</u>				
Razorback Harbour Brook	61	1988	14.0	0
Mount Elizabeth Brook	62	1988	12.0	0
Nachvak River (#116)	63	1988	17.0	0
Little Nachvak River (#116)	64	1988	12.0	0
Palmer River (#115)	65	1988	22.0	0
Kogarsok Brook (#117)	66	1988	12.0	0
Barge Bay River	77	1989	7.0	0
Green Bay River	78	1989	10.0	0
St. Peter's River	79	1989	4.0	0
Trout River, Mary's Harbour	80	1989	22.0	0
St. Charles River	81	1989	12.0	0
St. Lewis River	82	1989	41.0	0
St. Lewis River Tributary	83	1989	7.0	0
Alexis River Tributary	84	1989	20.0	0
Alexis River	85	1989	28.0	0
Brook SSE of Charletown	86	1989	1.5	0
White Bear Arm Brook	87	1989	5.0	0
Hawke's River	88	1989	16.0	0

Table 1 (Cont...)

River (DFO No. after Anderson 1985)	River No.	Year	Coverage (km)	Harlequin Duck Observations <sup>1</sup>	Comments
Gilbert River	89	1989	23.0	0	
Bobbys Brook	90	1989	7.5	0	
Shinneys Waters	91	1989	9.5	0	
Sandhill River	92	1989	10.5	0	
Caplin Bay River	93	1989	9.0	0	
Black Bear River	94	1989	20.0	0	
Tom Luscombe Brook	95	1989	26.0	0	



Little Big River	96	1989	19.0	0
Big River	97	1989	46.0	1♀1♂1♀ 1♀ + 3 (2a) 1♀1♂  1♀, + 5 (1c)
Makkovik Brook	98	1989	10.0	2♀, 5 (2b)
Makkovik River	99	1989	10.5	0
Pamiulik River	100	1989	27.0	0
Stag Bay Brook	101	1989	12.0	0
Big River Tributary	102	1989	6.5	0
Adlavik Brook	103	1989	28.0	0
Flowers River	104	1989	45.0	2♀♀ 7 (2a) 1♀, 3 (2a) 1♀, 2♀♀, 4♀♀ 1♀, 3 (2b)
Flowers River Tributary	105	1989	7.5	1♀, 4 (1c)
Adlatok River Tributary	106	1989	11.0	0
Adlatok River	107	1989	125.0	0
Harp Lake Tributary	108	1989	6.0	1♀, 3 (1c) 2♀♀
Shapio Lake Tributary	109	1989	11.0	1♀1♂ 1♂c 7 @ 2b 1♀, 4 (2b) 3♀♀
Hunt River Tributary	110	1989	15.0	0
Hunt River	111	1989	15.0	1♀
Ujoktok Brook	112	1989	5.0	0

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Total 1987            474.3 km coverage / 81♀♀+ 4 broods / 0.17♀/km of river

Total 1988            401 km coverage / 17♀♀+ 2 broods / 0.04♀/km of river

Total 1989            670 km coverage / 32♀♀+ 10 broods/ 0.05♀/km of river

Grand

Total 1987,88,89    1545.3 km coverage /130♀♀+ 16 broods /0.08♀/km of river

- <sup>1</sup>    ♀♀ indicates more than one female - like Harlequin Duck  
 ♀ + 4 (1c) indicates one female with a brood of class 1c (after Gollop & Marshall 1954)  
 5 (2b) indicates unaccompanied brood of class 2b (after Gollop & Marshall 1954)

Table 2. Incidental Waterfowl Observations, Northern Labrador, 30 July - 6 August 1987

Latitude (°N) Survey Block	Canada Goose	Black Duck	Green-wing Teal	Other Dabblers	Goldeneye	Merganser	Common Eider	Scoter	Other Divers	U.I. Duck	Common Loon	Black Guillemot	Large Gulls	Other
56.5 - 57.0	136	135	15	3 Mallard	5	26	37	100	2 Scaup	29	26	44	206	
57.0 - 57.5	271	24	-	-	-	128	37							
57.5 - 58.0	465	289	7		18	60	85		1 Scaup		1	317	69	
58.0 - 58.5	518	304	26	1 Mallard		27	212	354			32		2	
58.5 - 59.0	78	45			50	25	4943	600						

Table 2 (cont'd.). Incidental Waterfowl Observations, Northern Labrador, 24 July - 28 July 1988

Latitude (°N) Survey Block	Canada Goose	Black Duck	Green-wing Teal	Other Dabblers	Goldeneye	Merganser	Common Eider	Scoter	Other Divers	U.I. Duck	Common Loon	Black Guillemot	Large Gulls	Other
56.0 - 56.5	18	37	39			86	578	340	17(OS)		9	84	229	
56.5 - 57.0		23				2	12	325					breeding 20	
57.0 - 57.5														
57.5 - 58.0	22													
58.0 - 58.5	43	7			67	3	294		4(OS)		5	58	43	
58.5 - 59.0	135						1917	300				6		
59.0 - 59.5	391	1			288	25	741	750	6(OS)		16	255	27	
59.5 - 60.0 Snow	455	2			70	92	70						107	1
				goose										
60.0 - 60.5	123						69					3	17	

Table 2. (cont'd.). Incidental Waterfowl Observations, Northern Labrador, 22 July - 30 July 1989

Latitude (°N) Survey Block	Canada Goose	Black Duck	Green-wing Teal	Other Dabblers	Goldeneye	Merganser	Common Eider	Scoter	Other Divers	U.I. Duck	Common Loon	Black Guillemot	Large Gulls	Other
51.5 - 52.0						38							746	
52.0 - 52.5	3	5	10			36	400						2898	Tern
52.5 - 53.0	3	2				16					3		Data on	B.L.Kittiwake 3000+
53.0 - 53.5	39		14		5	27	3		6(R.N.)			49	Large Gulls	Kittiwake-49 Tern - 73 Po.Jaeger - 2
53.5 - 54.0		89			36	63	8608	858	12(R.N.)		7	9	Discont.	Kittiwake-250 Murre - 430 Puffin - 22 Razorbill - 5
54.0 - 54.5						11	186	900		50	2			Gannet - 1 Murres - 6 Po.Jaeger - 2 Fulmar - 1
54.5 - 55.0	46	111	15		4	168	39	20			3			
55.0 - 55.5	116	35		2 Pintail	6	151	1069	125			5	222		
55.5 - 56.0		6				40							146	
56.0 - 56.5						9	183	346				73	50 (GG) GG Breeding	

Table 3. Raptor observations, Northern Labrador, 30 July - 6 August 1987.

Latitude, °N Survey Block	Red-tailed Hawk	Rough-legged Hawk	Peregrine Falcon	Gyrfalcon	Merlin	Osprey	Goshawk	Golden Eagle	Bald Eagle	Other
56.0 - 56.5					1 pr	1+ nest		1,1(imm)		Raven-2,1,1,1,2,1
56.5 - 57.0		1,		1 (grey phase)	1(♂),1,1pr,	1,	1	1(imm),1pr + 1 yg.		
57.0 - 57.5		1,1			1,					Raven - 2,5,1
57.5 - 58.0		1,1,1,1,1,1,1,1pr, 1pr,2yg	1pr 1pr+2yg(3.5wks)	1 (grey phase)				3		
58.0 - 58.5		1,1,1,1,1,1,1,1,1, 2 yg (~4 wks) 2 yg (~3 wks) 1 pr	1 adult,1 adult, 1 adult ♂+3 yg (<10 days old) 2 yg (~5 wks old) 1 adult ♂	1 (grey phase)				1 pr.		
58.5 - 59.0		1,1 3yg (~4.5 wks) 2yg (~4.5 wks) 3yr (~4.5 wks)		1pr (grey phase)						
56.0 - 56.5										Raven-1,1,2,1,1
56.5 - 57.0										
57.0 - 57.5										
57.5 - 58.0			1♀ (broody)							
58.0 - 58.5			1,1							nest +2yg (~5.5 wks)

Table 3 (cont'd). Raptor Observations, Northern Labrador, 24 July - 28 July 1988.

Latitude, °N Survey Block	Red-tailed Hawk	Rough-legged Hawk	Peregrine Falcon	Gyr Falcon	Merlin	Osprey	Goshawk	Golden Eagle	Bald Eagle	Other
58.5 - 59.0			1+2yg (~2.5 wks)	1 (dark phase)						Raven-2,
59.0 - 59.5			1 adult, 1	1 (dark phase)				1,1(sub), 1(imm)		Raven-2,4,5,
59.5 - 60.0			1 pr (territorial)					1 (imm)		Raven-1
60.0 - 60.5			1♀+2yg (1.5 wks) 1+3yg (2 wks)	1 imm(dark phase) 1 adult (dark phase)				1 pr 1 (imm)		Raven-1,1
51.5 - 52.0		1,1,1,1,1 1+3yg (~3 wks) 3 yg (~3 wks) 4 yg (~4 wks)								Raven- 3,3,1,1,1
52.0 - 52.5		1,1,1,1,1,1+nest 1+1yg,2+yg 1+4yg (~2 wks) 1+2yg (~2 wks)			1,1,	1,1,1,1,1,1,2			1 (adult)	Raven - 4,4,2,1,4, 1,1,1,1,4,3,1,
52.5 - 53.0		1+2yg (~2wks) 1,1,1 2 yg (~4wks), 1+nest, 2+2yg (~5wks), 1,1,1 +nest,1,2,1,1,1+3y g(~5.5wks)		1 (dark phase)		1,1,1,1, 1+nest				Raven - 1,2,1,2, 5,3,2,2,1,1,1, 1,1 Short-eared Owl - 1 Crow - 75

Table 3 (cont'd). Raptor Observations, Southern Labrador, 22 July - 30 July 1989.

Latitude, °N Survey Block	Red-tailed Hawk	Rough-legged Hawk	Peregrine Falcon	Gyr Falcon	Merlin	Osprey	Goshawk	Golden Eagle	Bald Eagle	Other
53.0 - 53.5		1+1yg, 1pr, 1, 1+nest, 2+3yg (~3.5wks) 1+3yg(~4wks), 1 nest, 1+2yg (~2 wks), 1,1,1, 1yg (~3 wks)				1			1 pr	Raven- 5,2,11,3,1,1,2,2, 1,2 Great-horned Owl-1
53.5 - 54.0		1+nest, 1,1pr 1+2yg(~5wks)	1♀ (territorial) 1♂, 1pr (territorial), 1 pr (territorial) 1pr+2yg (~2 wks)	1 adult (dark phase) 1,	1	1,				Raven - 2,6,1,1, 1,2 Short-eared Owl - 1
54.0 - 54.5										Raven - 2,3,2,2 Great-horned Owl - 1
54.5 - 55.0		1			1,	1,1pr				Great-horned Owl - 1
55.0 - 55.5		1,1,1,1,1,1,1,1,2, 2,1,1+2yg,1,1,1, 1,4 yg (~4wks)	1 pr. (territorial) 1 pr + 2 yg (~2 wks)	1 adult (dark phase) 1 adult (grey phase)	1,1,1,1♂	1,1,1,1,1				Raven- 2,3,1,2,1, 4,1,1,1,1,2 Shorted-eared Owl-1
55.5 - 56.0		1+3yg (~3 wks), 2,3yg,1+2yg,1,1 +3yg (~5wks)	1♂ (territorial)	1pr+ 1yg (white phase)	1,	1,1,1,	1			Raven-2,1

**Table 4.** Area and coverage for 1987 - 1991 helicopter surveys for waterfowl and raptors with incidental observations of Harlequin Ducks

River	River numbers <sup>1</sup>	Year of Survey	Kilometres surveyed	Harlequin Ducks Observed <sup>2</sup>	Source
Churchill River <sup>1/</sup>	120	1991	250	1 A ♂	C.W.S.
Minipi River	121	1991	65	3 pr + 1 A ♂	C.W.S.
Big Pinus River	122		47	0	C.W.S.
Little Pinus River	123		16	0	C.W.S.
Cache River	124		35	1 pr + 1 ♀	C.W.S.
Metchin River	125		55	1 pr	C.W.S.
Elizabeth River	126		27	0	C.W.S.
Shoal River	127		22	0	C.W.S.
Mistastin River <sup>2/</sup>	142		24.5	6 ♀♀	Ledrew-Fudge & Associates
Trib. to Mistastin R.	142a		24.5		
Trib. to Mistastin Lk.	142b		4.0		
Konrad Brook <sup>2/</sup>	144		20.3	6 ♀♀	Ledrew-Fudge & Associates
Kamanatsuk	37		8.0	0	Ledrew-Fudge & Associates
Adlatok R. & trib.	107		85.4	3 ♀♀(north stem)	Ledrew-Fudge & Associates
Harp Lake Tributary	108		6.5	6 ♀♀	Ledrew-Fudge & Associates
Hunt River	111		12.0	0	
Fraser R.	147		48.0	0	
Ikadlivik Bk.	146		46.6	0	
Igluvigaluk Bk.	145		14.0	0	
Kogaluk R.	143		63.5	0	
Notakwanon R. & trib.	141		31.3	0	
Kanairiktok R. <sup>3/</sup>	140		58	9	Ledrew Fudge Associates
Atikonak R.			42	0	Ledrew Fudge & Associates



Table 4 (Cont'd) Area and coverage for 1987 - 1991 helicopter surveys for waterfowl and raptors with incidental observations of Harlequin Ducks

River	River numbers <sup>1</sup>	Year of Survey	Kilometres surveyed	Harlequin Ducks Observed <sup>2</sup>	Source
Trib. into Minipi L.	121		6.0	0	Ledrew Fudge & Associates
Churchill R.	120		199	1 pr	Ledrew Fudge & Associates
Kenamu R.	128		8.0	0	Ledrew Fudge & Associates
Goose R.	129		21.0	0	Ledrew Fudge & Associates
Naskaupi R.	133		34.0	0	Ledrew Fudge & Associates
Crooked R.	130		24.5	1 pr	Ledrew Fudge & Associates
Caribou R.	131		4.0	0	Ledrew Fudge & Associates
Beaver R.	132		6.0	0	Ledrew Fudge & Associates
Tributary to Eagle R.	134		9.0	0	Ledrew Fudge & Associates
St. Augustine R.	115	1990	50	0	C.W.S.
Paradise R.	116	1990/91	60	0	C.W.S.
North R.	117	1991	40	0	C.W.S.

<sup>1</sup> River number references are shown in Figure 1

<sup>2</sup> 1A♂ indicates 1 adult male

6♀♀ indicates 6 Female-like Harlequin Ducks

pr indicates a breeding pair

<sup>1/</sup> Churchill River and tributaries surveyed under contract to Newfoundland & Labrador Hydroelectrical Coor. 3 - 5 June 1991.

<sup>2/</sup> Surveyed under contract to Department of National Defence ~26 - 30 July 1991.

<sup>3/</sup> Surveyed under contract to Department of National Defence 1 - 30 June 1987.

\* not indicated on figures

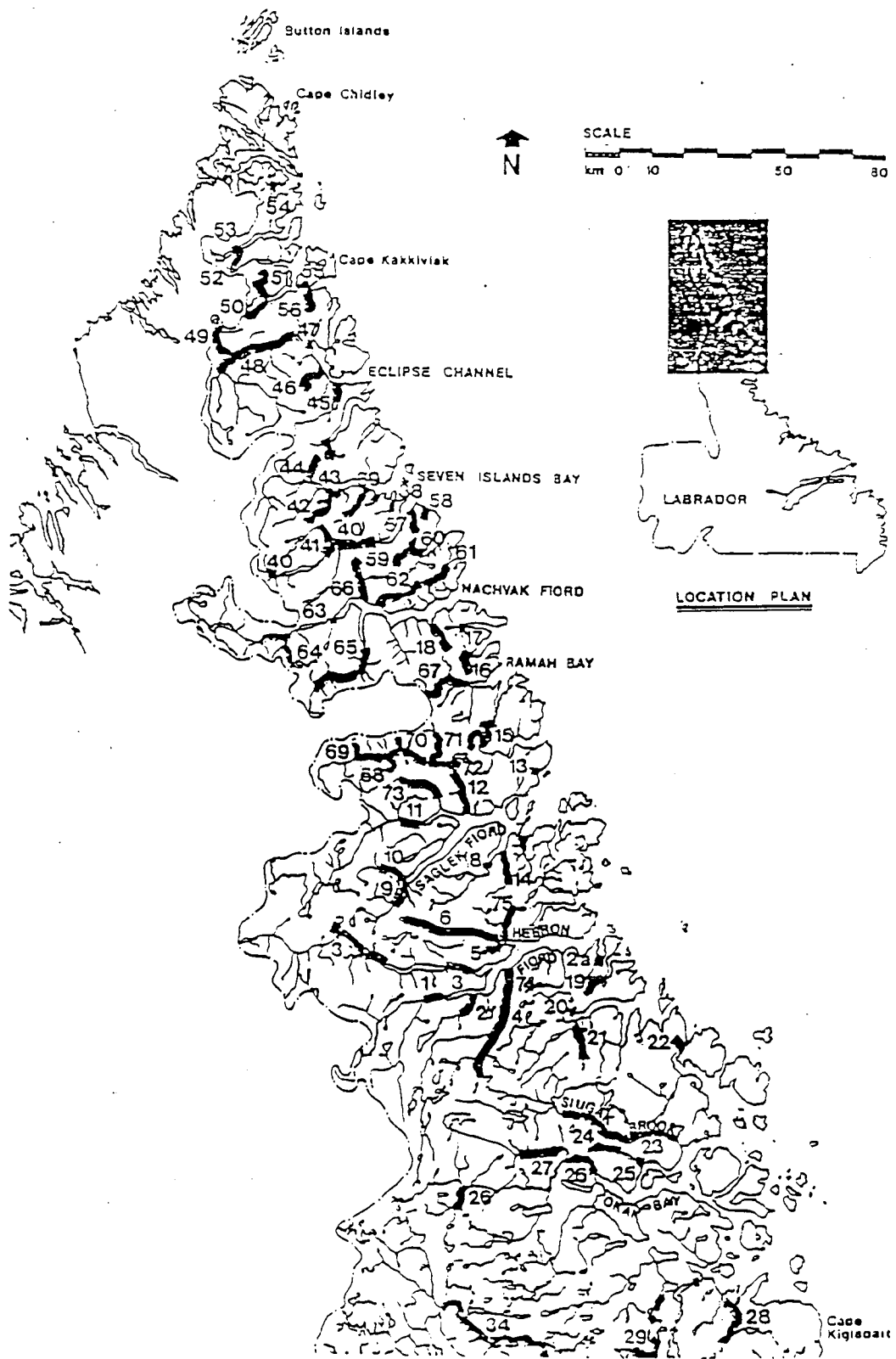


Figure 1. Rivers sureyed for Harlequin Ducks in Labrador 1987-89.

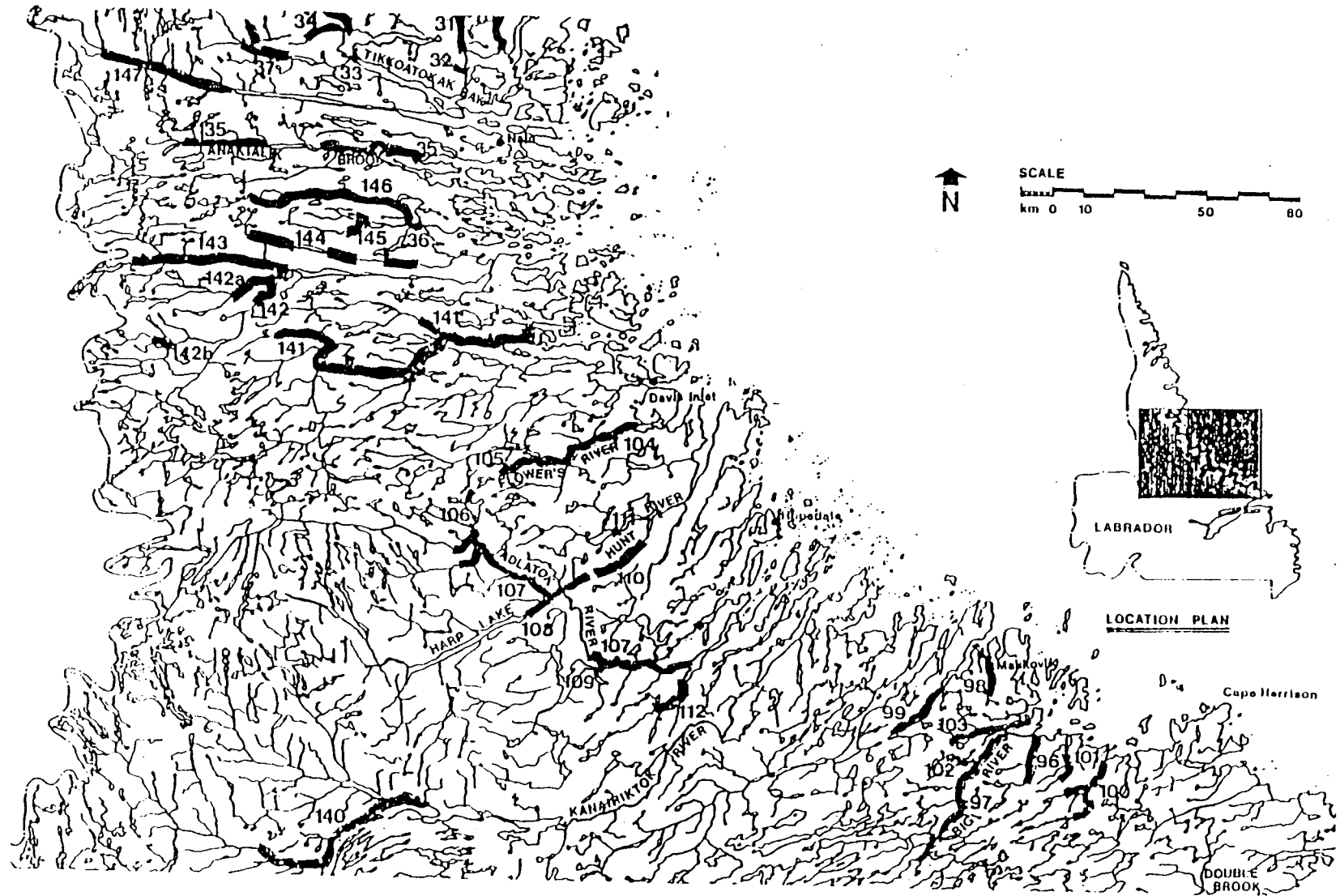


Figure 1. (Cont'd.)

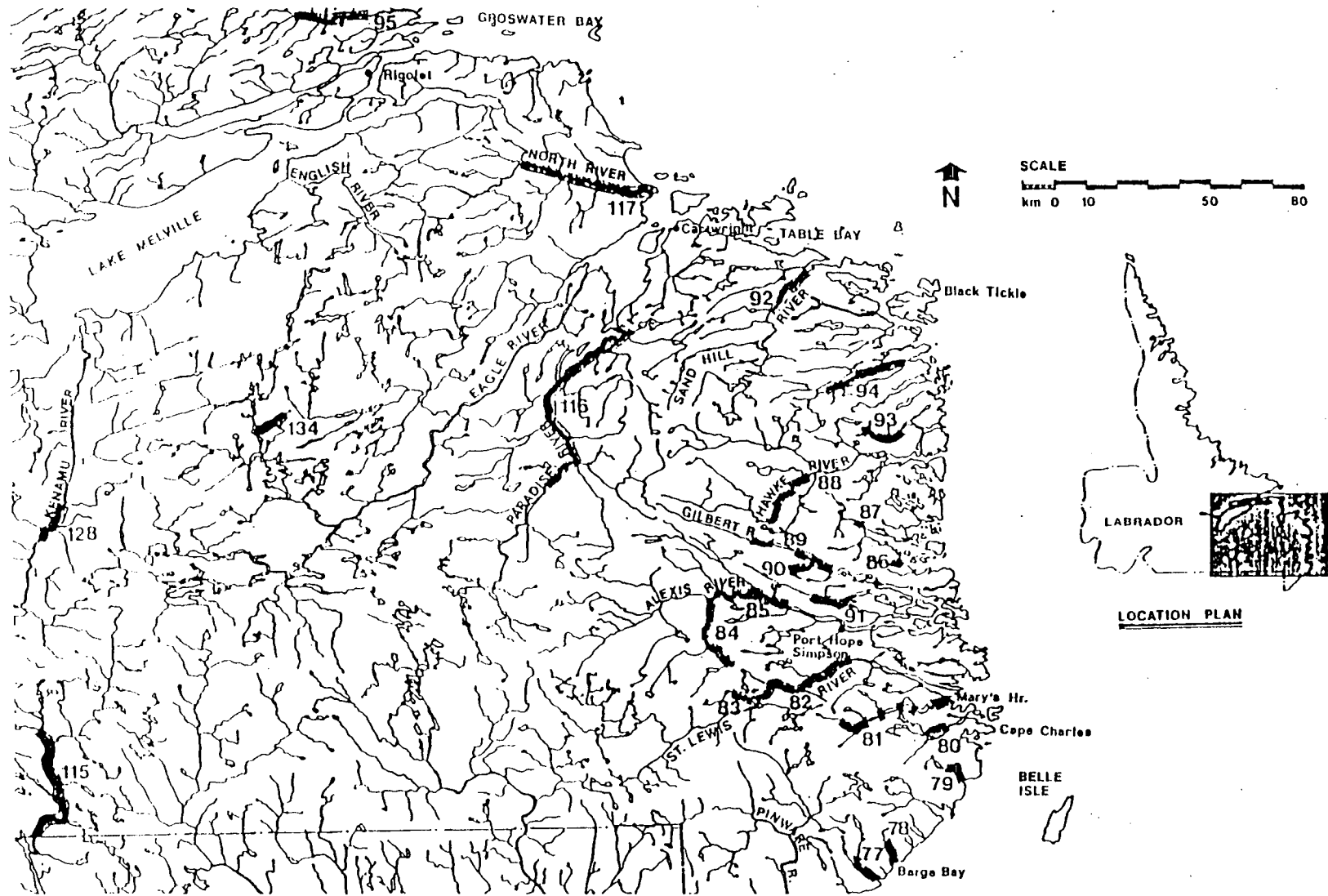


Figure 1. (Cont'd.)

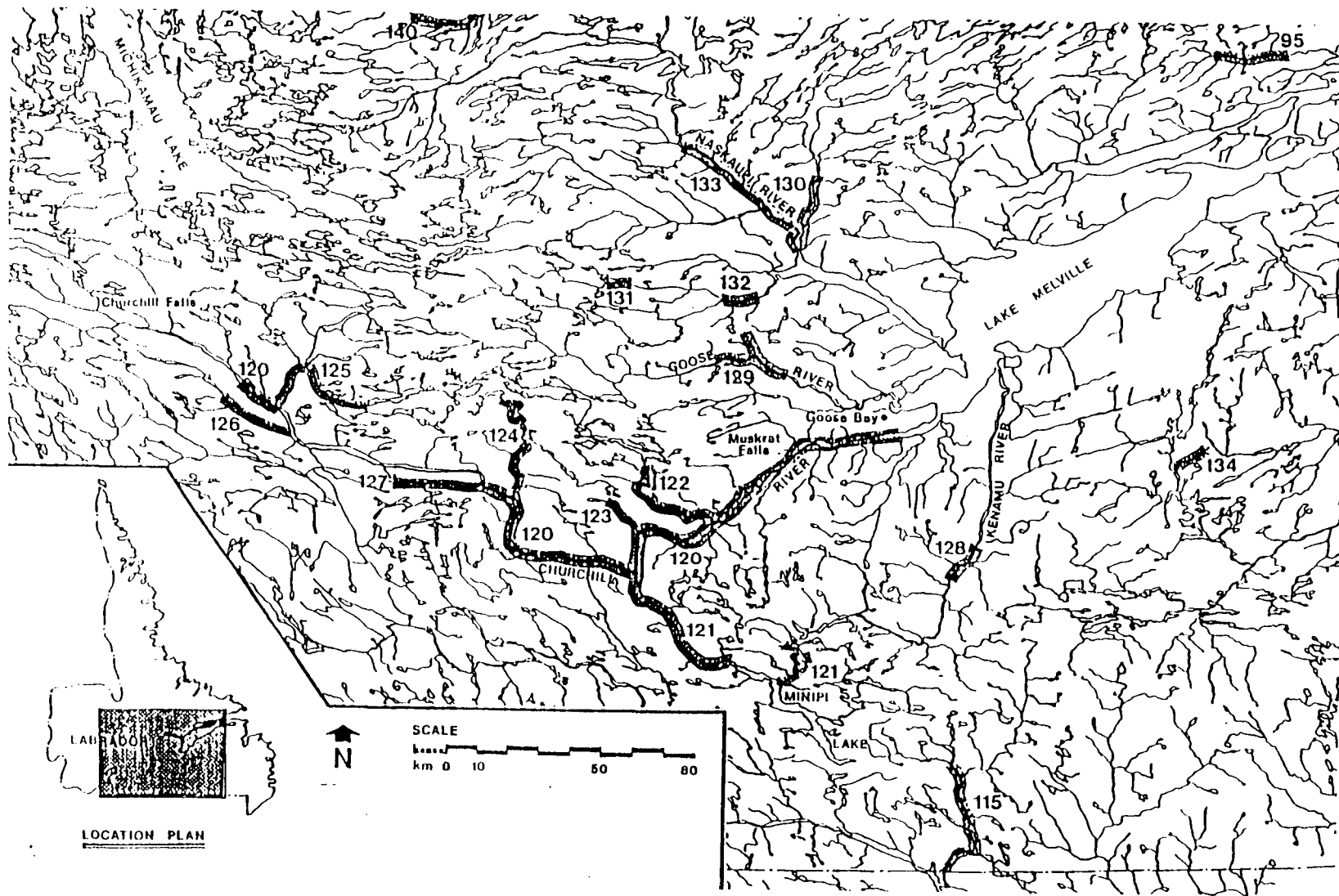


Figure 1. (Cont'd.)