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REPORT

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Thick-billed Murre Studies on Digges Island, 1985

Richard D. Elliot

Canadian Wildlife Service

Box 9158, Station B

St. John's, Newfoundland

A1A 2X9

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## INTRODUCTION

Digges Island, N.W.T. (62°35'N, 77°45'W) was visited 20-26 July 1985 to follow up studies carried out there in 1979-1982 by Gaston et al. (1985). The main objectives were (i) to monitor breeding numbers of Thick-billed Murres (Uria lomvia) in comparison to those recorded previously, (ii) to determine the timing of breeding in 1985, and to see if levels of breeding success appeared to be normal, (iii) to determine whether colour-banded birds aged 3, 4 and 5 years old had occupied nesting sites and begun to breed, and (iv) to gather information on the number of Thick-billed Murres previously banded as adults which were still breeding.

## METHODS

The field team of Richard Elliot (RDE), David Noble (DGN) and Tony Erskine (AJE) camped at the site used in previous years at Camp Cove, and hiked to the breeding cliffs daily. Numbers of adult murres were counted daily between about 1700-1830 hrs. at ten plots set up on 1980 (Gaston et al. 1985). Counts were made by DGN and RDE who were familiar with the plots from previous years. Plots were photographed from the counting sites by RDE on 24 July between 1630-1830 hrs. to provide a current record of breeding numbers and distribution.

The numbers of Glaucous Gulls (Larus hyperboreus), and the approximate stage of their breeding season, were recorded on 22 July for the S<sub>2</sub> colony.

The timing of murre breeding was determined by climbing down to measure eggs and chicks on the egg plots at R (24 July) and T (23 July), with additional measurements at S<sub>2</sub> (25 July) to increase the sample

size. These measurements were used to calculate egg volume indices (length x breadth<sup>2</sup>) and egg density, used to estimate first and median hatch dates.

Murre chicks had been banded with year-specific colours in 1980 (red), 1981 (blue), and 1982 (light green), in addition to metal bands. We checked areas where chicks had been banded (plots R, S<sub>1</sub>, S<sub>2</sub>, T) to see whether birds of each year class (now 5, 4 and 3 years old, respectively) had taken possession of potential nest-sites, and had actually bred in 1985. We recorded the bands seen, the bird's location, its general behaviour, and whether it occupied a site and was incubating or brooding.

In conjunction with observations of murres banded as chicks, the presence and behaviour of murres banded as adults was similarly recorded at F<sub>3</sub>, R, S<sub>1</sub>, S<sub>2</sub> and T. These data will be used later when analyzing adult survival rates.

## RESULTS

Weather varied from good to excellent with no precipitation throughout the visit, and was generally warmer and calmer than indicated by the daily summaries recorded at 1900-2000 hrs. (Appendix 1). A summary of birds recorded is presented in Appendix 2. The only mammal seen was a lemming on 25 July.

### Thick-billed Murre plot counts

Plots were counted on six successive evenings (Table 1). The mean total of 1715 adults is slightly higher than in 1982, the highest of the three previous years that plots were counted, for the period about

seven days before the median hatching date. This slight difference probably does not indicate an upward trend in breeding numbers, as the consistently good weather conditions may have resulted in somewhat higher numbers of birds present on the cliffs than average.

#### Glaucaous Gull counts

The 24 Glaucaous Gull sites in the S<sub>2</sub> colony were checked on 22 July to determine the number of active nests, and to compare reproductive success with 1982. Two more nests were present than on 23 July 1982 (Table 2), although the number of chicks per nest was almost the same. We were unable to estimate the median hatching data for 1985, although it was probably very close to that recorded in 1982 for S<sub>2</sub>, of about 26 July.

One breeding adult from the pair at site A had a metal band on the right leg, and a blue band on the left. This combination was used at Digges in 1981, and confirms that this breeding gull (with 2 large chicks on 22 July) was four years old, and had probably returned to its natal colony to breed.

#### Egg and chick biometrics

The egg volume indices calculated for samples from plot R were much lower than in previous years, but those for plot T were higher (Table 3). However, as not all eggs present were measured on these plots in 1985, and as we could only reach peripheral sites at R, these comparisons may not be representative.

Calculations of actual egg densities, accounting for the proportions that were pipping, or had already hatched (Table 4),

indicated that the first egg hatched on 19 July, and the median hatch date was 30 July in 1985. This is the earliest first hatching date recorded at Digges, although the median date is within the range for 1980-1982 (Gaston et al. 1985).

#### Behavior of 3-, 4- and 5-year-old murres

Almost half of the murre

s apparently banded as chicks appeared to have lost the year-class colour band (32/65). This was probably mostly due to bands slipping over the foot before the chick was fully grown, as colour bands were often larger in diameter than the no. 5 metal bands used in most years. However, blue plastic (not Darvic) bands used in 1981 and returned to me by Newfoundland hunters are extremely brittle, and many probably fell apart after abrading on cliff ledges. Eleven definite 5-year-old birds were seen, only two definite 4 year olds, and 20 definite 3 year olds.

Most three year olds were loafing in areas separate from breeding concentrations (Table 5), and only one was at a potential breeding site. One of the two 4 year olds was also present, but not incubating, at a potential site, but the sample is too small to conclude that no birds breed at this age.

None of the 5 year olds was seen loafing outside the breeding area, and all but one were on potential breeding sites. Excluding birds seen in the air, 33% of 5 year olds were definitely breeding or associating with a breeding bird (calling and bowing to a bird and its chick). The egg of one 5 year old was measured at  $S_2$  as follows: 76.7 x 49.0 mm, 84.0 g (not pipping).

I assume that murre

s retaining only a metal band included all age classes, with a preponderance of 4 year olds whose plastic bands were

probably lost at the highest rates. This assumption is borne out by the distribution of observed behaviour, with 60% loafing in non-breeding areas, and one metal-only bird apparently the mate of an incubating murre (Table 5).

The difference in the distribution of 3 and 5 year olds between loafing and breeding areas is evident from observations of the banding plots at  $S_2$ . We initially watched from point V, about 80 m above the plot, and primarily observed 3 year olds, most of which were on peripheral loafing ledges (Table 6). As bands on stationary birds amongst the dense breeding concentrations were unlikely to have been seen from V, we climbed down to the colony and checked the same areas by gradually moving some birds from the breeding areas. There we recorded a preponderance of 5 year olds which were not visible from above the plot.

I checked both legs for bands from samples of murrelets on the  $S_2$  banding plot and nearby control areas above  $S_2$  (within 60 m) and below the plot (within 20 m). Although about 5% of the murrelets checked on  $S_2$  had bands, none of those in the control areas did (Table 7), indicating that little or no movement from the natal sub-colony had occurred.

We recorded the presence of 29 murrelets banded previously as adults, although we were unable to see both legs of eight of these birds. Our observations are summarized in Appendix 3 for future reference.

#### DISCUSSION

Because of the short duration of our visit, our counts at breeding plots and measurements of eggs and chicks merely confirm that the 1985 breeding season differed little from 1980-82 when longer studies

were conducted. The disappointing loss of many of the colour-bands reduced the amount of information available from marked birds. This problem is reduced for the future by using Darvic only for bands, by placing the metal band below the colour band to hold it on the leg while the foot grows, and by using British D-shaped metal bands which are more likely to hold the Darvic bands.

However, the data we recorded on the behaviour and distribution of known-age Thick-billed Murres on Digges and Coats Islands in 1985 are the first for this species. It appears that a sizable proportion of the Digges Island murres breed in their fifth year, as one-third of those we observed still had an egg or chick in late July, after the period when most losses occur (Gaston et al. 1985). Birkhead and Hudson (1977) concluded that most Common Murres (Uria aalge) breed in their fifth year, but that most are not successful then. They reported (op. cit.) that two of 22 known 4 year olds bred, but were not successful. Lloyd and Perrins (1977) also found some Razorbills (Alca torda) first breeding at 4 years, with almost all breeding by 5 years, but again with very low reproductive success.

If thick-bills have similar low success when first breeding, many of the 5 year olds on potential sites in 1985 may have been unsuccessful in their attempts to breed. This may also apply to some 4 year olds identified only with a metal band. Swann and Ramsay (1983) found two of 26 Common Murres, whose age of first breeding was known, breeding at 3 years old, in an expanding Scottish colony where many potential sites were available for new breeders. A similar situation may exist in some Canadian thick-bill colonies as a result of extensive

hunting mortality. It seems unlikely from our observations that any 3 year olds do breed here, but it is important to consider the possibility further.

Visits to Digges in 1986 and 1987 to follow the 1982 chick cohort might clarify this situation, as we saw 20 banded birds in this cohort in 1985. Visits earlier in the season would be more productive by reducing the error resulting from undetected early egg loss by inefficient first breeders, but probably would not warrant the extra field time required (4-5 weeks). However, the magnitude of this effect could be assessed at Coats Island from 1987 on, if A.J. Gaston's proposal to have a student observe behaviour throughout the breeding season is carried out.

Our conclusion that little movement occurs between sub-colonies is similar to that reached by Southern et al. (1965), and Swann and Ramsay (1983), for Common Murres in Scotland. Both studies found that almost all such movement occurred before the murres reached breeding age, and Swann and Ramsay (op. cit.) reported that only 21.3% of banded pre-breeding murres moved between sub-colonies.

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#### REFERENCES

- Birkhead, T.R., and P.J. Hudson. 1977. Population parameters for the Common Guillemot Uria aalge. *Ornis Scand.* 8: 145-154.
- Gaston, A.J., D.K. Cairns, R.D. Elliot, and D.G. Noble. 1985. A natural history of Digges Sound. C.W.S. Rep. Ser. 46, 63 pp.
- Lloyd, C.S., and C.M. Perrins. 1977. Survival and age at first breeding in the Razorbill (Alca torda). *Bird-Banding* 48: 239-252.
- Southern, H.N., R. Carrick, and W.G. Potter. 1965. The natural history of a population of guillemots (Uria aalge Pont.). *J. Anim. Ecol.* 34: 649-665.
- Swann, R.L., and A.D.K. Ramsay. 1983. Movements from and age of return to an expanding Scottish Guillemot colony. *Bird Study* 30: 207-213.

Table 1. The mean numbers of Thick-billed Murres counted on ten plots at Digges Island from 21-26 July 1985 inclusive.

Plot	Mean	Standard Deviation
A <sub>1</sub>	82.8	4.9
A <sub>2</sub>	209.0	6.3
G	120.0	9.4
H	197.3	22.4
B	139.3	24.3
C	191.3	16.3
D	97.5	4.0
E	233.2	15.8
F <sub>1</sub>	181.0	16.2
F <sub>2</sub>	273.2	22.1
Total	1714.7	114.5

Table 2. Comparison of the numbers of Glaucous Gull nests and chicks present at the S<sub>2</sub> colony on 23 July 1982, and 22 July 1985.

	1982	1985
Number of active nests	12	14
Total number of chicks	23	28
Mean number of chicks/nest	1.92	2.0

Table 3. Egg volume indices ( $\text{cm}^3$ ) recorded on plots R and T in 1980-82 (from Gaston et al. 1985), and in 1985.

	plot R			plot T		
	x	S.D.	n	x	S.D.	n
1980	207.45	15.45	126	200.84	19.39	128
1981	205.80	15.96	160	201.83	19.96	123
1982	207.31	16.01	171	203.63	15.55	127
1985	200.87	21.68	30	211.47	16.56	48

Table 4. The proportion of sites with unpipped eggs, pipped eggs, and chicks at plots R and T in 1985.

	plot R (n=32)	plot T (n=60)
	24 July	23 July
unpipped eggs	84.4%	61.7%
pippped eggs	12.5%	18.3%
chicks	3.1%	20.0%

Table 5. Summary of behaviour of known-age murrelets at Digges Island in 1985, expressed as percentage of birds observed.

Behaviour	Age in years			
	Three (n=20)	Four (n=2)	Five (n=11)	3-5 <sup>+</sup> (n=32)
Loafing in non-breeding areas	60%	50%	-	60%
Loafing in breeding areas	5%	-	9%	9%
Aggressive interaction with non-breeder	10%	-	9%*	3%
Possible site but not incubating	5%	50%	9%	3%
Possible site - stays when disturbed	-	-	18%	-
Possibly associating with breeder	-	-	18%*	6%
Definitely associating with breeder	-	-	9%	3%
Definitely incubating or brooding	-	-	18%	-
Others (e.g. seen in air)	20%	-	18%	16%

\*one bird included in two categories

<sup>+</sup>birds with only metal band remaining

Table 6. Proportion of banded murres of each age class seen at the  $S_2$  banding plot from V (80 m above the plot) and from the edge of the breeding area at  $S_2$ .

	Proportion of each age class				n
	Three	Four	Five	3-5*	
Counted from V	36%	3%	6%	55%	36
Counted from $S_2$	11%	-	50%	39%	18

\*birds with only metal band remaining

Table 7. Proportion of murres observed with bands in areas where banding took place, and in nearby control areas.

	Number of murres		%
	checked	with bands	
<b>Banding areas</b>			
$S_2$ from point V	250	15	6.0%
$S_2$ from colony edge	180	8	4.4%
<b>Control areas</b>			
Between $S_2$ and V	68	0	0.0%
20 m below $S_2$ to north	125	0	0.0%

Appendix 1. Weather conditions recorded at 1900-2000 hrs on Digges Island in 1985 (see Gaston et al. 1985 for locations).

Date	Max. Temp. (°C)	Min. Temp. (°C)	Precip. (mm)	Pressure (mB)	Wind Speed (km/hr)	Wind Dir.	Cloud	Visib. (km)
21 July	15°	8°	0	1011	22	N	6/10	25
22 July	11°	5°	0	1014	19	N	1/10	5
23 July	10°	2°	0	1011	16	NE	4/10	5
24 July	13°	6°	0	1007	21	N	2/10	25
25 July	11°	4°	0	1009	20	N	2/10	25
26 July	13°	5°	0	1014	10	N	2/10	5

Appendix 2. Birds observed on Digges Island from 21-26 July 1985. (note:  
p = pairs, f = families).

Species	Date					
	21	22	23	24	25	26
Red-throated Loon			2	+	+	
Common Eider						+
Black Duck	+					
Gyr Falcon			+	+		
Rough-legged Hawk	2p	2p	2p	2p	3p	2p
Iceland Gull	+	+	+	+	+	+
Glaucous Gull	+	+	+	+	+	+
Semipalmated Plover					+	
Purple Sandpiper				1		
Razorbill	1					
Thick-billed Murre	+	+	+	+	+	+
Black Guillemot	2	+			+	+
Raven	3	+	3	2f	+	+
Water Pipit	+	+	+	+	+	+
Pine Siskin		+				+
White-crowned Sparrow				+	+	+
Snow Bunting	+	+	+	+	+	+

Summary of Predators

Gyr Falcon - apparently bred again near plot T, adults seen at customary roosts between T and F

Rough-legged Hawk - three pairs were present, one definitely nested on the cliff just north of camp cove, one definitely nested on the cliff (Hawk Cliff) west of Long Lake (at least one chick), and a pair probably nested at the site at the west side of the island used by ravens in 1982 (Raven Valley).

Ravens - at least 2 families were present; one with 3 juveniles near W end Delta Lake, and another with 2 juveniles just NE of plot F (24 July)

Appendix 3. Observations of murrelets banded previously as adults, at Digges Island in 1985.

Location	Date (July)	Bands		Behaviour
		Right	Left	
F <sub>3</sub>	25	Or/m	Wh	inc., mate not banded
		Bl/m	Wh	
		?	Or/Gr	aassoc. with inc. bird
R	24	Ye	lBl/m	inc. - ledge A
		m	Ye	inc. - ledge A
		lGr	Ye/m	inc. - ledge C
		lGr/m	Ye/lBl	ledge C
		-	lGr/m	close to egg, ledge AA
		-	lGr/m	close to egg, ledge AA
S <sub>1</sub>	21	?	Ye/Gr	poss. assoc. with inc. bird
		?	lBl or lGr/Re	inc.
	23	Re	?	poss. paired with inc. bird
	24	?	Ye/m	inc.
	26	?	Wh #	
		m	Bl/Gr	inc.
		Or/m	Wh/Re	inc.
		Or/m	Wh #/Ye	prob. assoc. with inc. bird
		?	Wh #	
?	Or	prob. inc./brood		
S <sub>2</sub>	25	m	Or	inc.
		m	Or	inc.
		m	Or	inc.
		m	Or	not at a site
		m	Or	
		m	Or	
T	23	lBl/m	Or	inc.
		m	Or	inc.
		dBl/m	Gr	inc.
		-	dGr/m	inc.



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Behaviour	Bands		Date (July)	Location
	Left	Right		
inc., mate not banded	Wh	Or/m	25	1
	Wh	Bl/m		
assoc. with inc. bird	Or/Gc	?		
inc. - ledge A	Bl/m	Ye	24	2
inc. - ledge A	Ye	m		
inc. - ledge C	Ye/m	IG		
ledge C	Ye/Bl	IG/m		
close to egg, ledge AA	IG/m	-		
close to egg, ledge AA	IG/m	-		
poss. assoc. with inc. bird	Ye/Gc	?	21	2
inc.	Bl or IG/Bl	?		
poss. paired with inc. bird	?	Bl	23	
inc.	Ye/m	?	24	
	Wh ?	?	25	
inc.	Bl/Gc	m		
inc.	Wh/Bl	Or/m		
prob. assoc. with inc. bird	Wh ?/Ye	Or/m		
	Wh ?	?		
prob. inc. brood	Gc	?		
inc.	Or	m	22	3
inc.	Or	m		
inc.	Or	m		
not of a wife	Or	m		
	Or	m		
	Or	m		
inc.	Or	Bl/m	23	3
inc.	Or	m		
inc.	Gc	Bl/m		
inc.	Or/m	-		