Seabird Group Report on Work 2004

Survival, Dispersal, and Productivity of the Razorbill in Atlantic Canada

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In Europe, Razorbills (*Alca* torda) have been relatively well studied, but in North America, many areas of Razorbill demography remain unknown. In addition, studies that simultaneously examine species characteristics at multiple sites over a broad area are uncommon, usually due to the high costs associated with accessing multiple study sites. For this project I am collaborating with the Canadian Wildlife Service (CWS) and University of New Brunswick to examine the survival, dispersal, and productivity of the Razorbill at three different colonies across their breeding range including the Gannet Islands, Labrador (53°56'N, 56°32'W, Figure 1), Gull Island, Newfoundland (47°15'N, 52°46''W), and Machias Seal Island (MSI), New Brunswick (44°3'N, 67°06''W).

Annual survival for Razorbills banded as adults and chicks at the Gannet Islands from 1996 to 2004 was found to be 88.8% (SE = 0.02) and 85.2% (SE = 0.01) respectively. At MSI, annual survival for Razorbills banded as adults and chicks from 1995-2004 was 78.4% (SE = 0.04) and 68.5% (SE = 0.10). The survival estimates obtained for the Gannet Islands population are consistent with other studies, but the estimates for MSI were much lower than anticipated.

The low survival estimates obtained for MSI may be due to permanent emigration. To date, 24 Razorbills (15 banded as chicks and 9 banded as adults) have been resighted at a location different from where they were banded. For example, 2 Razorbills banded as chicks in Quebec in 1993 were confirmed as breeders on the Gannet Islands in 2004. In the case of MSI, 226 adult Razorbills have been banded since 1995, of which 6 have been resighted on the Gannet Islands more than 1300 kilometers away.

In 2004, Razorbill productivity was quite variable across their range. At MSI productivity values were comparable to previous years, with hatching and fledging success averaging 87% and 68% respectively. At Gull Island, Razorbill productivity had not previously been monitored, but was within expected values (70% hatching success, 68.5% fledging success, T. Diamond pers. comm.). However, at the Gannet Islands, productivity was significantly lower compared to studies by Birkhead and Nettleship (1983) and Hipfner and Bryant (1999) with only 38 of 119 nests producing a chick (Table 1). In addition, the chicks that did hatch were approximately 3 weeks late and many were still in the nest on August 23, 2004 (peak fledging is usually around August 10).

It is unclear at this time what may have caused such low productivity at the Gannet Islands, a trend that was not observed in the southern parts of it's range (Gull Island and MSI), but was observed in northern Europe (see "Disastrous 2004 breeding season?" Seabird Group Newsletter 97, June 2004). Depleted fish stocks and abnormally high sea surface temperatures (SST) may be to blame as the mean SST at the Gannet Islands in August 2004 was 10.8°C (average SST for August is 5-8°C) and exceeded 18°C on two occasions.

Population counts of Razorbills at the Gannet Islands in 1983 indicated that there were approximately 6,200 breeding pairs (CWS unpublished data). The survey was repeated in 2002 and showed that 10,500 breeding pairs were present. Given that Razorbill survival and especially productivity at the Gannet Islands are somewhat low, it is surprising that the population has almost doubled in only 15 years. It has been suggested that this may be due to emigration. As a result future efforts will include establishing additional monitoring sites in Labrador (Herring Islands) and in New Brunswick (Matinicus Rock and Old Man Island) in the hopes of resighting many of the Razorbills banded on the Gannet Islands and Machias Seal Island that have not been seen since their banding and may have dispersed to other colonies.

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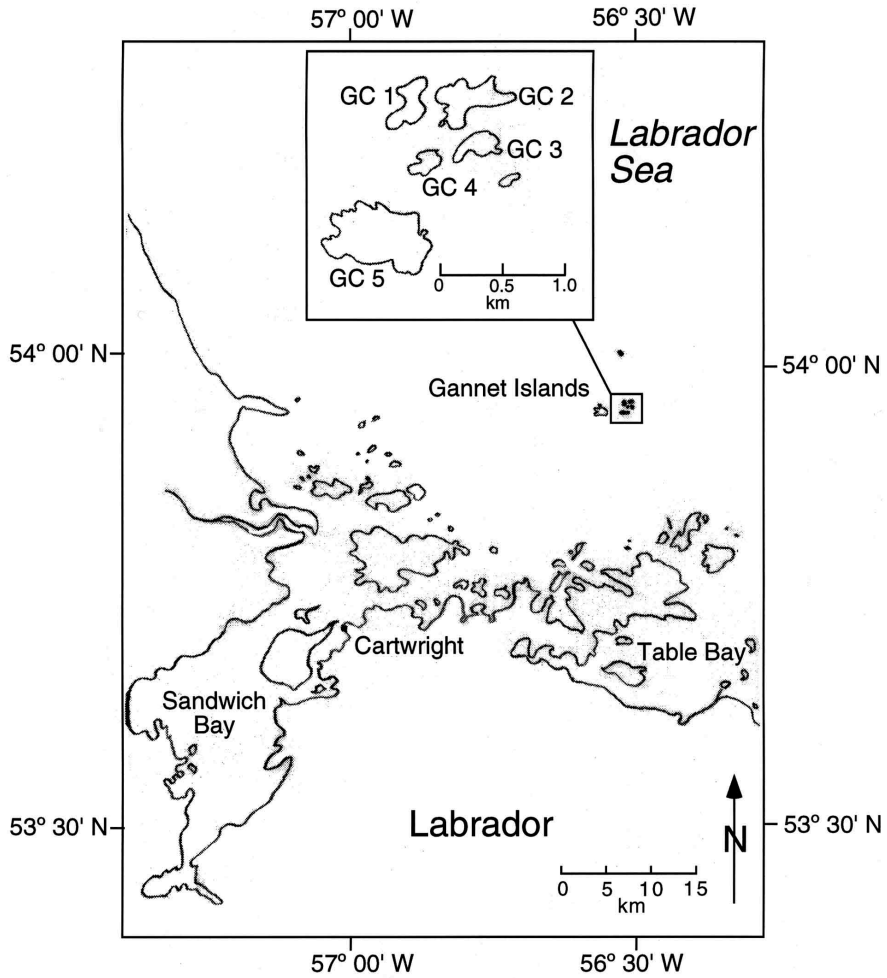

Figure 1. Map of the Gannet Islands, Labrador, Canada

Table 1. Razorbill productivity at the Gannet Islands in 2004

Plot Type	Hatch Success (%)	Fledge Success (%)	*Overall (%)
No Disturbance	13/21 (61.9)	12/13 (92.3)	12/21 (57.1)
Low Disturbance	19/53 (36.5)	10/19 (52.6)	10/53 (18.8)
High Disturbance	22/45 (48.9)	16/22 (72.7)	16/45 (35.5)
Total	54/119 (45.4)	38/54 (70.4)	38/119 (31.9)

* Overall breeding success, from egg laying to nest departure

Razorbill chick and egg (photo © Jennifer Coffey)

Gannet Islands, Labrador (photo © Ian L. Jones)