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Key-site monitoring on Hornøya in 2010

Rob Barrett & Kjell Einar Erikstad

NINA Norwegian Institute for Nature Research
NORSK POLARINSTITUTT
UNIVERSITETET I TROMSØ

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Apart from the weather which was unusually wet, the 2010 breeding season on Hornøya was good for all species with high chick production (Table 1). All species except the herring gull and the great black-backed gull increased in numbers since the year before.

Table 1. *Key population parameters (SE, n) of seabirds on Hornøya in 2010. Population change is the numeric change in size of the breeding population registered between 2009 and 2010 on the basis of plot counts (p) or total censuses (t). For each species the listed survival estimate was derived from the basic model(s) that fitted the data set best (i.e. that (those) with ΔQAICc < 2 when adjusting for median c-hat). Note that for species with a variable survival from year to year (puffin and kittiwake) only the latest estimate (2008-09) is given, while for the other species no such variation was found and the estimate applies for the whole sampling period.*

Species	**Population change**	**Annual adult survival**		**Reproductive performance**	
		Period (yrs)	Estimate %	Sampling unit	Estimate
Shag	+ 28.0% [p]	2004-10 (6)	83.6 (1.2, 151)	Clutch size	2.55 (0.07, 149)
Herring gull	– 33.7% [t 2]	2005-10 (5)	Not yet analysed	Clutch size	2.95 (0.05, 55)
				Large chicks/nest	1.81 (0.14, 55)
Great black-b. gull	– 19.7% [t 2]	2001-10 (9)	83.1 (1.3, 184)	Clutch size	2.92 (0.05, 26)
				Large chicks/nest	2.26 (0.18, 26)
Kittiwake	+ 6.3% [p]	2008-09 (1)	85.2 (1.4, 1205)	Clutch size	1.92 (0.03, 634)
				Large chicks/nest	0.98 (0.03, 1118)
Common guillemot	+ 13.6% [p]	1988-10 (22)	95.8 (0.4, 205)	Fledging success [1]	0.88 (*n*=40)
Razorbill		1995-10 (15)	91.1 (0.6, 206)	Fledging success [1]	0.82 (*n*=73)
Puffin	+ 11.5% [p]	2008-09 (1)	88.1 (2.9, 725)	Fledging success [1]	0.80 (*n*=56)

1) *Medium-sized chicks/egg laid;* ***2)*** *Total from 2008 to 2010*

Breeding performance and population trends

Already in April there were reports of a lot of capelin in the waters around the island. The **kittiwakes** took advantage of this by starting the laying season during the latter half of April, long before we were prepared and before all the snow drifts covering some nests had thawed! Three nests with eggs were found 24 April, and several with three eggs 26 April. At the time of first hatching, the mean clutch size was 1.92 eggs/nest with 22% of the nests containing 3 eggs. Only in 1989 and 1999 have clutch sizes > 1.90 eggs/nest been previously recorded. The season continued positively for the kittiwakes, and the overall breeding success of 0.98 chicks/nest was also the highest since 1999 (Figure 1). Coupled with this was a slight respite in the long-term decline in the population with a 1% increase in breeding numbers since 2009. Compared to the previous 3-4 years, feeding conditions off Hornøya appeared to have improved considerably in 2010 with gulls (including kittiwakes) feeding in large and dense flocks immediately off shore. This was probably due to a ready availability of capelin that made up 99% of the kittiwake chick diet (Figure 2), and again strengthened our conviction that kittiwakes on Hornøya are dependent on capelin for a good breeding success.

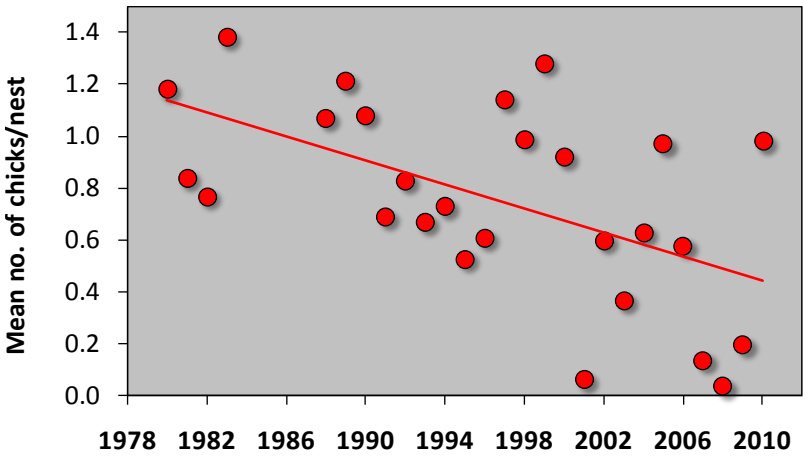

Figure 1
Breeding success of kittiwakes on Hornøya, 1980-2010. The negative trend is significant (r^2=0.31, p<0.003).

As for the kittiwake, egg laying among the **larger gulls** was very early. First nests with three eggs were found on 23 April for both herring gulls and great black-backed gulls. Their breeding season was also very good in 2010 for both species and even better than in 2009, which was considered an exceptionally good breeding season. For herring gulls the number of chicks surviving per nest until the age of 15 days was 1.8 and that for great black-backed gulls 2.3 chicks/nest (Table 1). Apparently, the large amount of capelin in the area had a positive effect on their breeding success. Data on the breeding population of gulls in study plots between 2008 and 2010, however, shows a strong decline for both species (33.7% for herring gulls and 19.7% for great black-backed gulls). The general impression is that there has been a substantial decline in numbers of both species over the last ten years.

Since 2005, **puffin** breeding numbers have declined, from ca. 11 000 pairs in 2005 to 8800 pairs in 2009. However, in 2010 they had increased again to 9800 pairs, again reflecting the overall positive season in the colony. The first eggs were laid very early, around 1 May, but the mean laying period was as normal, ca. 20 May. Despite the early start to season and the apparent abundance of food (capelin), the negative trend in egg volume documented since 1980 continued in 2010. Furthermore, the chick diet contained less capelin than expected and was comprised mostly of 0-group gadids (>90% by numbers, 79% by mass), mostly cod (Figure 2). Never before has so much gadid been recorded in the puffin diet on Hornøya, the previous maxima being 40-50% in 1996, 2000, 2002 and 2008. Chick growth rates were nevertheless normal (10-13 g/d) as was their fledging success (0.8 chicks fledged/egg laid).

The earliest **razorbills** started laying their eggs five days earlier than normal but again the main peak was normal. Chicks grew at the average rate of ca. 11 g/d during the period of maximum growth, and the fledging success of 0.8 chicks/egg laid confirmed a good season. Whereas razorbill chicks on Hornøya are generally fed mainly sandeels, 2010 was unusual in that a high proportion (29%) of the food loads contained 0-group gadids. However, in relation to total mass, gadids constituted only 9% of the food brought to chicks. As in earlier years, sandeels made up most (66%) of the razorbill chick food.

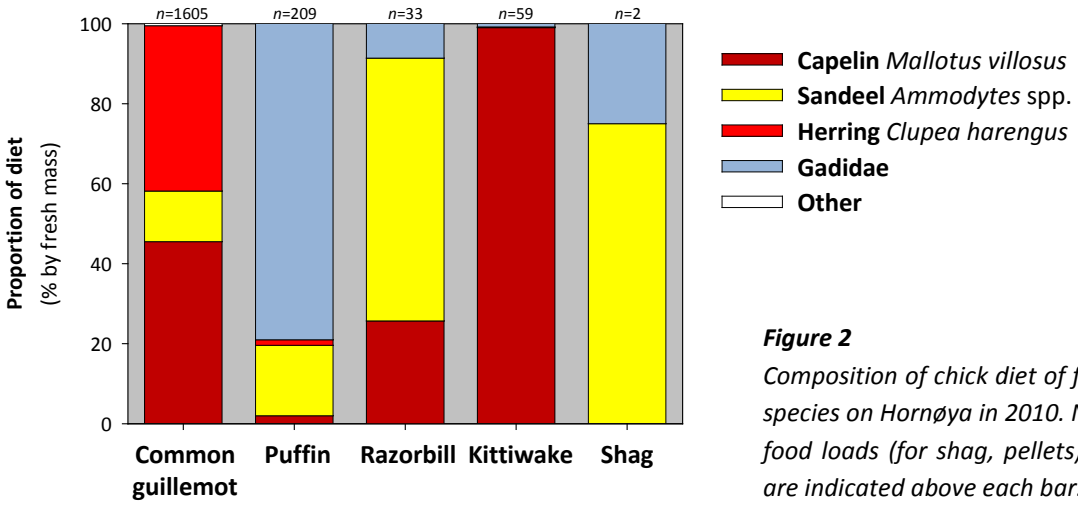

Figure 2
Composition of chick diet of five seabird species on Hornøya in 2010. Numbers of food loads (for shag, pellets) examined are indicated above each bar.

The **common guillemot** breeding population continued its steady increase since the collapse in 1986/87 and counts made in 2010 were 14% higher than in 2009. Many new sites and shelves were occupied causing problems with access to parts of the colony where we had worked every year previously. Hatching started in early June and the first chicks left the ledges ca. 1 July. After four years during which the mass of common guillemot chicks as they left the colony decreased to ca. 230 g in 2009 (i.e. ca. 15% lower than normal), those caught in 2010 had a mean mass of 266 g which is the average for the 20 years chicks have been weighed. Herring (46%) and capelin (41%) made up most of the diet by mass, with sandeels making up most of the remainder (Figure 2). The mean hatching date of chicks was somewhat earlier in 2010 (21 June) compared to the year before (24 June).Their breeding success was exceptionally good in 2010 (87.5%) as in the previous year (88.9%).

The rise in the **shag** population continued into 2010 with a 28% increase in the monitoring plots since 2009, giving an estimated total population of 664 pairs (having risen from 48 pairs in 1990). The mean clutch size was 2.6 eggs/nest and, although no count was made, the survival of eggs and chicks was high and the overall breeding success was good. Only two food pellets were sampled (Figure 2).

Survival rates

The addition of one more year of data had no important effect on the adult survival of shags (83.6%), common guillemots (95.8%), razorbills (91.1%) and great black-backed gulls (83.1%), which all remained high and constant over time (Table 1). Both the kittiwake and puffin have a variable survival between years. The estimates for the puffin (88.1%) and the kittiwake (85.2%) between 2008 and 2009 are somewhat higher than those for the preceding year (85.9% and 82.5% for the two species respectively). There is therefore no sign of reduced adult survival for any of the species studied and the year-to-year variation in population size of different species is seemingly caused by other factors such as recruitment of young and/or emigration and immigration of young birds.

Figure 3
As is common on Hornøya, capelin (many of which were gravid) made up much of the diet of common guillemot chicks and 99% of the diet of kittiwake chicks in 2010. (© Rob Barrett)

Cover photo: The kittiwake population is decreasing rapidly on Hornøya after many years of a steadily declining breeding success. 2010 was an exception with an above average breeding success of nearly 1 chick per nest. (© Rob Barrett)

Author contact information

R. Barrett, rob.barrett@uit.no, Tromsø University Museum, NO-9037 Tromsø
K.E. Erikstad, kjell.e.erikstad@nina.no, Norwegian Institute for Nature Research, Framsenteret, NO-9296 Tromsø

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Series editors
Tycho Anker-Nilssen, tycho@nina.no
Robert T. Barrett, rob.barrett@uit.no