



## Key-site monitoring in Sklinna in 2009

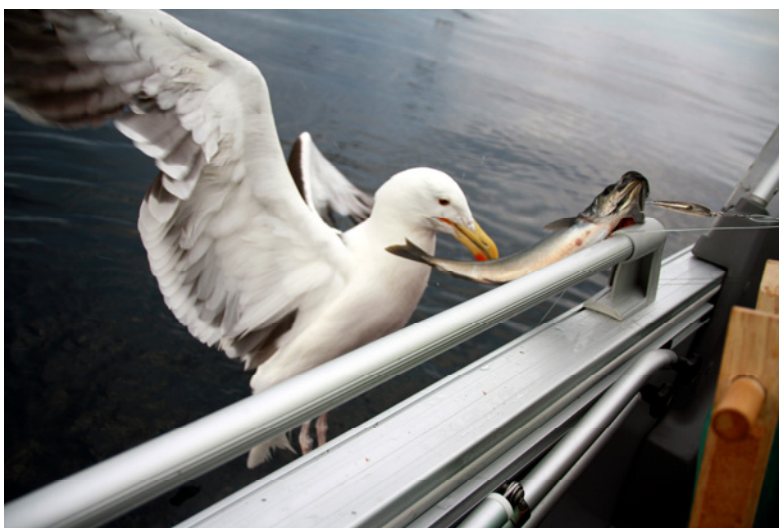
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## Key-site monitoring in Sklinna in 2009

Sklinna (65°13'N 10°58'E), a small archipelago off Vikna in Nord-Trøndelag, was established as a SEAPOP key-site in 2007. The main island Heimøya has been an important site for seabird monitoring since the early 1980s and the local populations of many of the monitored species have increased (Lorentsen & Christensen-Dalsgaard 2009, Table 1).

The common guillemot and the razorbill started to breed on the island in the early 1980s and their numbers have since increased. After reaching a maximum of 650 pairs in 2008, the breeding population of common guillemot decreased, however, to nearly 400 pairs in 2009. The overall growth rate of the common guillemot population since it was established at Sklinna in 1983 was still 21%, suggesting extensive immigration. This was, in part, confirmed by the observation of a British-ringed bird in the colony in 2008 and 2009, a bird that was ringed as a chick at Isle of Canna on the west coast of Scotland in 2001. The breeding population of razorbills is much smaller with about 30 pairs, but has increased at an annual rate of 6% since the early 1980s. The breeding population of great cormorants was record high in 2009 when 2200 pairs bred within the archipelago. At the same time, a nearby colony at Vikna was at an all-time low suggesting a movement of birds to Sklinna. The populations of both the great cormorant and the shag within the archipelago have increased over the past two decades, at annual rates of 2.7% (since 1979) and 6.5% (since 1984), respectively. However, in 2009, the shag population was at its lowest since 2002 with only 1850 pairs, a 39.4% decrease since 2008. The shags have greatly profited from the establishment in 1990 of a new breakwater in which they breed, but the numbers of birds breeding on the main islands have also increased considerably. In 2007, a pair of fulmars settled to breed within the harbour at Sklinna after a decade with prospecting individuals. The population has since increased to at least six breeding pairs in 2009. Herring gulls, which have been monitored since 2007, had their lowest breeding numbers in 2009 when 71 nests were counted within the study plot; compared to 115 and 106 pairs in 2007 and 2008, respectively.



**Figure 1**

2009 was a bad year for many seabirds and hungry great black-backed gulls, in addition to being the dominant predator on shag chicks and probably adult puffins (see figure 2), also tried to predate on our freshly caught saithe; even before it was taken off the hook!  
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**Table 1** Key population parameters (SE, n) of seabirds on Sklinna in 2009. Population change is the numeric change in size of the breeding population registered between 2008 and 2009 on the basis of plot counts (p) or total censuses (t). For each species, the listed survival estimate was derived from the model(s) that best fitted the data set (i.e. those with  $\Delta QAI Cc < 2$  when adjusting for median c-hat).

Species	Population change %	Annual adult survival		Reproductive performance	
		Period (yrs)	Estimate %	Sampling unit	Estimate
Fulmar <sup>1</sup>	+ 100% <sup>t</sup>				
Cormorant	+ 20.4% <sup>t</sup>			Clutch size <sup>2</sup>	3.35 (0.08, 124)
Shag	- 39.4% <sup>p</sup>	2004-09 (5)	76.4 (0.07, 224)	Clutch size <sup>3</sup>	1.83 (0.05, 493)
				Hatching success, nests	0.54 (n=52)
				Clutch size hatching	0.96 (0.14, 51)
				Chicks $\geq$ 10d/nest	1.65 (n=26)
				Chicks $\geq$ 20d/nest	1.54 (n=11)
				Chicks $\geq$ 30d/nest	1.60 (n=5)
Eider				Clutch size	3.00 (0.45, 5)
Herring gull	- 33.0% <sup>t</sup>		No estimate yet possible <sup>4</sup>	Clutch size <sup>5</sup>	1.34 (0.15, 71)
				Clutch size <sup>6</sup>	2.16 (0.12, 44)
Great black-b. gull				Clutch size <sup>7</sup>	2.29 (0.09, 59)
Kittiwake	- 86.4% <sup>t</sup>			Clutch size	0.00 (n = 3)
Common guillemot	- 39.3% <sup>p</sup>		No estimate yet possible <sup>4</sup>		
Razorbill	+ 4.8% <sup>p</sup>				
Puffin	- 16.0% <sup>p</sup>		No estimate yet possible <sup>8</sup>	Hatching success/nest	0.54 (n=52)
				Chicks $\geq$ 10d/nest	0.33 (n=52)
				Chicks $\geq$ 20d/nest	0.31 (n=52)
Black guillemot			No estimate yet possible <sup>4</sup>		

**1)** Only six pairs, three more than in 2008; **2)** Counted on 10 June; **3)** Counted on 2-3 June; **4)** Colour ringing for monitoring of survival rates was initiated in 2008; **5)** Including empty nests, counted on 2-4 June; **6)** Not including empty nests, counted on 2-4 June; **7)** Counted on 4-11 June; **8)** Colour ringing for monitoring of survival rates was initiated in 2007 but no adults were resighted in 2008.



**Figure 2**

This adult puffin, one of many killed by great black-backed gulls in 2009, was typically turned almost inside out before being gracefully arranged on a deep-green blanket of algae. (© S.-H. Lorentsen)

Two of the populations of seabird species monitored in Sklinna have decreased; the kittiwake and the puffin with annual rates of  $-8.4\%$  (since 1980) and  $-1.9\%$  (since 1981), respectively. In 2009, Sklinna had only three pairs of kittiwakes (on Heimøya), compared to 22 in 2008. The breeding population of puffins was estimated to be about 1760 pairs in 2009, a 16% decrease since 2008.

Monitoring of the adult survival rate of the shag was initiated in 2004 when 150 individuals were ringed with coded rings. This was continued in 2005-2009 with an additional 24, 0, 50, 35 and 25 individuals being ringed, respectively. The searches for ringed birds in 2005 and 2006 were inadequate, but with the improved effort in 2007-2009 we are now able to obtain more robust survival estimates. For the whole period 2004-2009, the survival of adult shags at Sklinna was estimated to 76.4% p.a. (Table 1). When compared to the previous estimate of 83.5% p.a. for the period 2004-2008, this could suggest a recent severe decrease in survival, but the small clutch size and low hatching success (Table 1) makes it more likely that many adults skipped breeding because of poor conditions. Future monitoring will show if this was the case. Monitoring of adult survival of puffins was initiated in 2007 when 101 apparent breeders were marked with coded rings. We did not read a single colour ring in 2008 due to a total breeding failure. Conditions were still poor in 2009, but 38 colour-ringed individuals from 2007 were observed, and a further 46 individuals were ringed.

A number of pellets from shags were collected, but these have not yet been analysed. We also sampled food loads from herring gulls (not yet analysed), puffins, and common and black guillemots (see below).

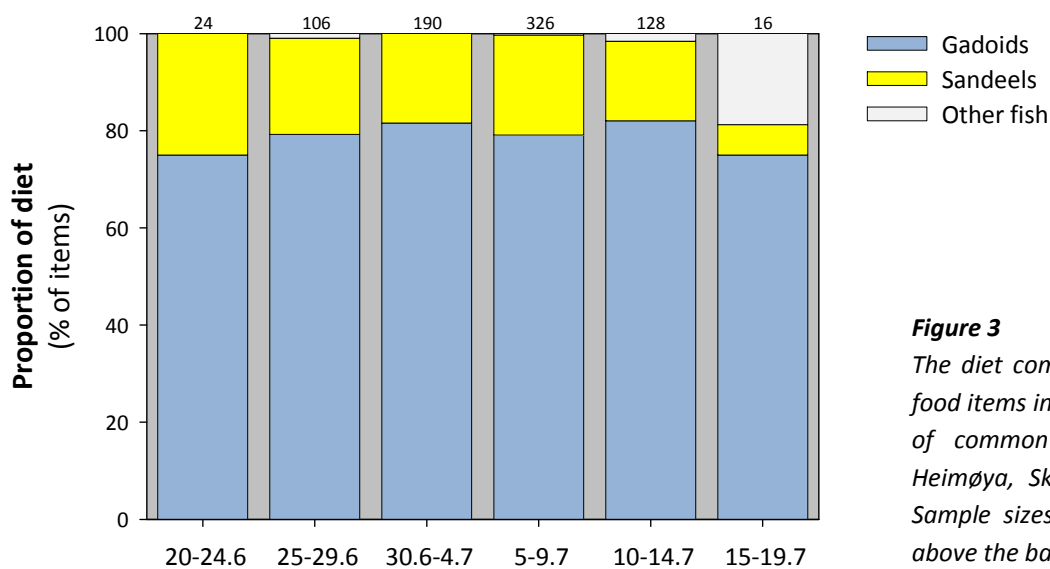
Results from the national monitoring programme for seabirds show that the breeding population of puffins in Sklinna decreased by 58% between 1981 and 2009. To estimate reproductive performance, 52 puffin nests on Heimøya were monitored throughout the 2009 field season. A chick was registered in 28 (54%) of these nests. We used growth curves for the head+bill length of chicks measured at Røst in poor years (Anker-Nilssen & Aarvak 2004) to estimate chick ages and thus compute an index of reproductive performance at Sklinna (Table 1). The first chick hatched on 14 June, and the mean hatching date was 25 June (21 June in 2007, no hatching in 2008). The hatching period was extended, and the last chick hatched on 15 July. At the age of 10 days, 33% of the chicks were still alive and, based on their body mass increase before we left the island, 31% were assumed to be alive at the age of 20 days. This result indicates little mortality after the first 10 days.

To estimate the reproductive success of shags, 52 nests were monitored throughout the field season. Chicks hatched in 28 nests (53.8%). The mean hatching date was 23 June, one day later than in 2007 and 2008, but as is normal for shags, hatching was spread over an extended time period (from 10 June to 8 July). At the end of the field period (17 July), the number of chicks of age at least 10, 20 and 30 days averaged 1.7, 1.6 and 1.6 per nest, respectively (Table 1). These figures do not reflect the real chick production, as many nests were predated or abandoned during the chick period.

The monitoring of adult survival initiated in 2008 for herring gulls, common guillemots and black guillemots was continued in 2009 when a further 13, 25 and 8 breeding individuals were ringed with coded rings, respectively.

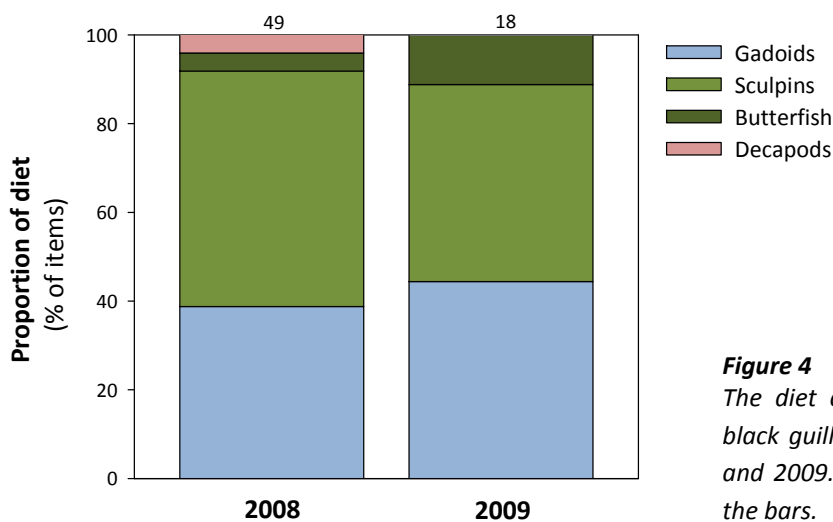


Food samples from black guillemots were obtained from birds captured for colour ringing and, as also for common guillemots, by visual inspection of food items brought to the nests. Gadoids, as in 2008, dominated the diet of common guillemots throughout the chick-rearing period. About 80% of all food items were gadoids, followed by ca. 20% sandeels (Figure 3). Black guillemots also fed their chicks with gadoids (40%) but sculpins (*Cottidae*) were equally frequent. Black guillemot diet was very similar in 2008 and 2009 (Figure 4). A total of 48 food loads from puffins were collected in Sklinna in 2009 (Figure 4) and, again, gadoids dominated the diet (39.2%), with herring and sandeels each constituting about 30% of the diet. Herring and sandeels dominated in late June and early July, followed by gadoid dominance in the second week of July. At the end of the study period, herring and sandeels again dominated the diet (Figure 5).



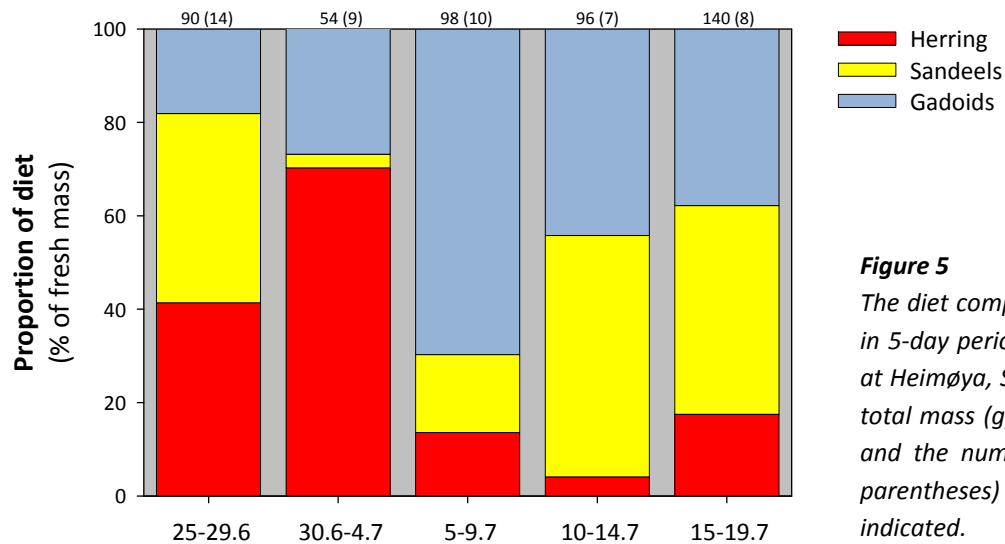
**Figure 3**

The diet composition (% of food items in 5-day periods) of common guillemot at Heimøya, Sklinna in 2009. Sample sizes are indicated above the bars.



**Figure 4**

The diet composition (% of food items) of black guillemot at Heimøya, Sklinna in 2008 and 2009. Sample sizes are indicated above the bars.



**Figure 5**

The diet composition (% by mass in 5-day periods) of puffin chicks at Heimøya, Sklinna in 2009. The total mass (g) of prey examined, and the number of samples (in parentheses) in each period are indicated.

### Thanks

Thanks are due to the Norwegian Coastal Administration and the County Governor in Nord-Trøndelag for allowing us to use the lighthouse buildings as a field station, to Arild Espelien, Hilde Syvertsen Berg, Ingeborg Engh and Rasmus Bøckman for excellent assistance during the field period, and to Frank Hansen and Hans Nygård for excellent support and help during the stay in Sklinna.

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### Cover photo:

In periods of certain wind directions, spray from a heavy swell engulfs shags resting on one of their favourite sites in Sklinna. (© S.-H. Lorentsen)

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