



## Key site monitoring on Grindøya in 2009

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The study of common eiders breeding on Grindøya started in 1985 and is the most extensive time series study of common eiders in mainland Norway. In addition to the population studies, many aspects of the Grindøya eider population have been extensively addressed by PhD and master students, with special focus on parental care and parental investment. In 2008, a new project was started to analyse the relationship between climate and life history traits in two populations of common eiders; the Grindøya population and a population in arctic Canada. A *post-doc*, Sebastien Descamps at the National Wildlife Research Centre at Carleton University, worked full time on these analyses in cooperation with the Grindøya team from NINA and Nigel Yoccoz at the University of Tromsø. In 2009, one analysis examined the relationships between the winter North Atlantic Oscillations (NAO) and the variation in pre-laying body mass of female common eiders. Body mass is a good proxy for reproductive output in this species. In general, winter NAO affected body mass in both populations (Decamps et al. 2010).

The breeding population of common eider on Grindøya has declined greatly from an estimate of more than 500 pairs in 1995 to about 150 pairs in 2009. Annual spring counts of adult males in the surrounding fjord (Balsfjord) are consistent with this trend. From 2002 to 2009, the number of males declined from 2101 to 1185 (43.6%), and the 10.2% drop between 2008 and 2009 (from 1320 to 1185) was identical to the parallel drop in numbers of breeding females (Table 1).

**Table 1** Key population parameters (SE, n) of common eider on Grindøya in 2009. Population change is the change in number of adult males registered in breeding areas between 2008 and 2009 on the basis of total counts (t) of males. The listed survival estimate of females breeding on Grindøya was derived from the basic model(s) that fitted the data set best (i.e. the one with the lowest AICc value).

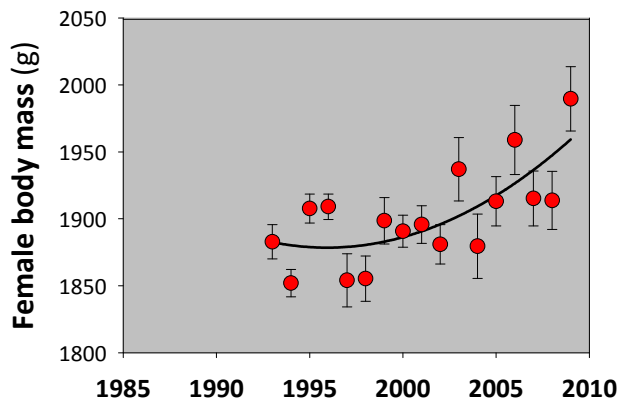
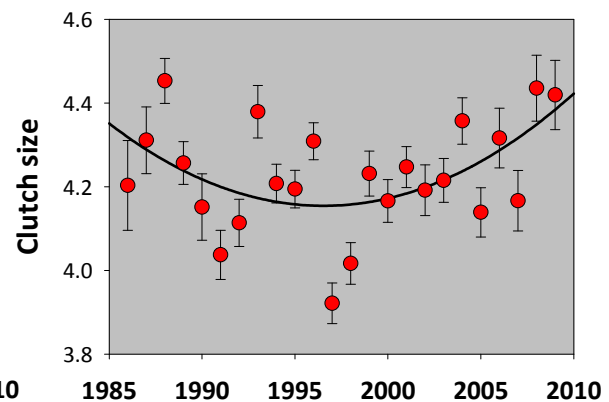
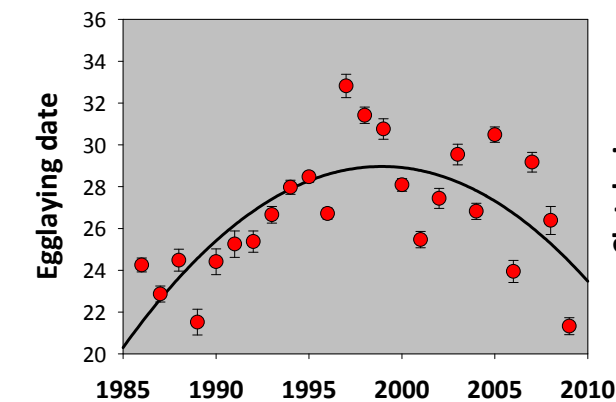
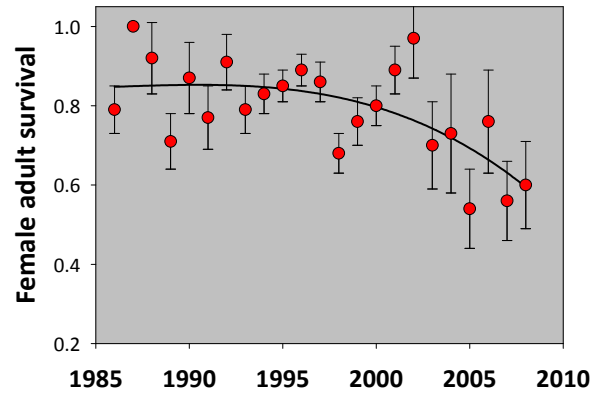
Species	Population change	Annual adult survival		Reproductive performance	
		Period (yrs)	Estimate %	Sampling unit	Estimate
Eider	- 10.2% <sup>t</sup>	2007-08 (1)	60.0 (0.11, 1278)	Clutch size	4.42 (0.08, 93)

The survival of breeding females has declined dramatically since 2002 and is now at a very low level (Figure 1). The mean survival in 1986-2002 (>80%) was much higher than that observed in 2003-2006 (<70%), and the decrease around 2002 coincides with an increase in predation by feral mink *Mustela vison* on incubating females (see also SEAPOP report for 2008).

The mean clutch size in 2009 was 4.42 eggs/nest (Table 1) which is “normal”, and within the upper range of that observed between 1986 and 2008 (range from 3.1 to 4.5 eggs). For the whole time period (1986 to 2009) the mean egg-laying date shows a sigmoid trend with a range of 11 days (from 21 May to 2 June, Figure 2). The clutch size shows a similar but opposite trend. There has been a strong upward trend in female body mass early in the incubation period since 1993 (Figure 2).

**Figure 1**

Estimates ( $\pm 1$  SE) of adult survival of female common eiders breeding on Grindøya, Troms in 1985-2008.

**Figure 2**

Egg-laying date (days since 1 May), clutch size and female body mass at day five in the incubation period for female eiders breeding on Grindøya, Troms.

Female body condition is a key factor in eider life history and population dynamics. During the period before egg laying the female accumulates large amounts of body reserves that are used during egg production and incubation, a period when the female starves and loses about 40% of her mass. Female body mass has been shown to be positively correlated with the NAO with one year lag (Descamps et al. 2010). This suggests that weather conditions in one year affect the female body condition in the following year indirectly through effects on the food chain. The main food for eiders in the area is blue mussels *Mytilus edulis* and warm winters may have a positive effect on the spawning of mussels around Grindøya and, thereby, their availability in the following year. Since eiders from Grindøya winter close to the breeding colony (i.e. within Balsfjord), this suggests that

lack of food is not the main factor causing the decrease in the survival of adult females since 2002. The most likely explanation seems to be the increase in predation by feral mink on incubating females since 2002 (see also SEAPOP Short Report 7-2009).

## References

Descamps, S., Yoccoz, N.G., Gaillard, J.M., Gilchrist, H.G., Erikstad, K.E., Hanssen, S.A., Cazelles, B., Forbes, M.R. & Bety, J. 2010. Detecting population heterogeneity in effects of North Atlantic Oscillations on seabird body condition: get into the rhythm. **Oikos** **119**: 1526-1536.

**Cover photo:** A newly hatched eider chick peeking out under its mother. (© T. Anker-Nilssen)

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