SEAPOP Short Report 13-2009

Key-site monitoring on Spitsbergen in 2008

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The 2008 breeding season on Spitsbergen was variable when evaluating all species collectively. The kittiwake breeding population increased in relation to 2007, but its breeding success was low. Little auks also had a low breeding success and their adult survival was slightly lower than in previous years. Brünnich's guillemots also had low adult survival, but this may have been an artefact of the still short time series.

In 2008, we collected data for the third year in a row from the Brünnich's guillemot colonies at Diabasodden (78°22'N 16°08'E) in Isfjorden, at Ossian Sars (78°56'N 12°27'E) in Kongsfjorden and at Jock Scott (79°10'N 11°52'E) in Krossfjorden, and from the little auk colony in Bjørndalen (78°14'N 15°19'N) (Table 1). Kittiwake data were collected from one plot at Ossian Sars and at Grumantbyen (78°10'N 15°09'E) in Isfjorden. At the two key sites for Brünnich's guillemot (Diabasodden and Jock Scott) and at one site for kittiwake (Grumantbyen) the work continued with ringing of new individuals, re-sighting of previously ringed birds and counting of chicks and adults.

The kittiwake breeding population increased quite substantially both at Grumantbyen and at Ossian Sars. The Brünnich's guillemot breeding population declined between 2006 and 2007, and this trend continued from 2007 to 2008. The chick production of little auks, measured as the probability for an egg to result in a chick surviving the first 20 days, was much higher in 2007 (0.64) than in 2006 (0.38), but in 2008 the breeding success was back to the 2006 level. It seemed that 2008 was a relatively "cold" year and the diet of little auks consisted of mainly *Calanus glacialis* and some *Themisto* species.

Table 1 *Key population parameters (SE, n) of seabirds on Spitsbergen in 2008. Population change is the numeric change in size of the breeding population registered between 2007 and 2008 on the basis of plot counts (p) or total censuses (t). All survival estimates were derived from the basic CJS model(s) that fitted the data set best (i.e. that/those with ΔQAICc < 2 when adjusted for median c-hat).*

Species *Colony name*	**Population change**	**Annual adult survival** Period (yrs)	Estimate	**Reproductive performance** Sampling unit	Estimate
Fulmar	*No data*				
Common eider	[1]			Clutch size	[1]
Kittiwake					
Ossian Sars	+ 49.4% [p]	*No data*			
Grumantbyen	+ 34.8% [t]	*First estimate due 2010*		Large chicks/nest [2]	0.42 (*n*=31)
Brünnich's guillemot					
Ossian Sars	-10.8% [p]	*No data*		Large chicks/nest [2]	0.34 (*n*=73)
Diabasodden	*No data*	2005-08	0.87 (0.09,156)	No estimate yet available	
Jock Scott	-25.7% [p]	2006-08	0.79 (0.12, 138)	Large chicks/nest [2]	0.78 (*n*=78)
Little auk	*No data*	2005-08	0.75 (0.05, 152)	Chicks ≥ 20d/egg	0.38 (*n*=55)

1) Data collected by MOSJ not yet available; 2) Number of chicks observed in the last week before fledging divided by number of nests as judged from series of photographs

Estimating breeding success of cliff-nesting birds has always been difficult since it is not always certain that a nest site is inhabited and whether or not it contains egg(s) or chick(s). As a consequence, it is often very time-consuming to collect reproduction data of sufficient quality by observation only. In remote areas, such as in the Arctic, where the expenses in terms of manpower and logistics per unit effort spent in the colony are much higher than elsewhere, this can severely limit the success of seabird monitoring. The key-site work for SEAPOP in Spitsbergen has therefore focused on developing easier and more robust methods for such studies. In 2006, we started a project in which time-lapse cameras were used to automatically collect data that enables us to estimate the production and survival of chicks to fledging, as well as the true number of breeders. Purpose-built time-lapse cameras were installed facing the cliff, preferably from above, and pictures were taken every four hours throughout the breeding season. This was part of a Master's degree study that E. Lorentzen completed in 2008, and we are now in the process of publishing the results.

Our study showed that the method gives reliable results, but that its usefulness is very dependent on the camera angle and whether the ledges have crevices or not. The camera is best positioned above and perpendicular to the cliff wall. The method clearly underestimated chick survival rate on ledges where the chicks can hide in crevices, which is logical since some chicks can then be recorded as dead when they, in reality, simply remain undetected. We are currently developing the methods to further improve the precision of the method taking into account the problems (such as that of detectability) encountered in the pilot project.

Cover photo:
Field work at Diabasodden in 2008 (© H. Steen)

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Publication series information

SEAPOP Short Report (SSR) is published by the Norwegian Institute for Nature Research (NINA), the Norwegian Polar Institute (NP) and Tromsø University Museum (TMU) as a web-based newsletter presenting individual progress reports and analyses of projects within the *SEAPOP* programme. The individual SSRs have no ISNN/ISBN coding, but the reports for each year will be collated and published in the registered report series *NINA Report* as a SEAPOP annual report.

SEAPOP (SEAbird POPulations) is a long-term monitoring and mapping programme for Norwegian seabirds that was established in 2005 and implemented on the full national scale in Norway, Svalbard and adjacent sea areas in 2008. The programme is financed by the Ministry of the Environment, the Ministry of Petroleum and Energy and the Norwegian Oil Industry Association, and aims to provide and maintain the most important base-line knowledge of seabird distribution, demography and ecology needed for an improved management of these marine environments. More info about SEAPOP is found on the programme's web site www.seapop.no, including an up-to-date list of associated publications from which all reports can be freely downloaded as pdf documents.

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