

Project information

Project title

Seabird habitat use and migration strategies

Year

2013/2014

Project leader

Børge Moe, NINA

Participants

Leader: **Børge Moe** (NINA)

Participants:

- Strøm, Welcker, Gabrielsen, Descamps (NPI)
- Barrett, Reiertsen, Lassen (UIT)
- Sagerup (Akvaplan NIVA)
- Schultner, Skottene, Fenstad, Bech, Noreen, (NTNU)
- Helberg (UiO)
- Hanssen, Bustnes, Anker-Nilssen, Dalsgaard-Christensen, Erikstad, Lorentsen, Systad (NINA)
- France: Gilg (GREA), Chastel, Tartu, Goutte, Boulinier, Gremillet, Ponchon (CNRS)
- Spain: González Solís (Univ Barcelona),
- Netherlands: Oudman, Biersma, Loonen, Reneerkens, Van Bemmelen (Univ Groningen)
- Denmark: Fort, Frederiksen, Mosbech, Schmidt, Hansen (Århus Univ)
- UK: Phillips (BAS)
- US: Kitaysky (Univ Alaska Fairbanks)
- Russia: Krasnov (IMBI)

Flagship

Fjord and coast, Theme: Physical-biological coupling: Oceanography and habitat use by predators and their prey

Funding Source

Fram Centre, ArcticFieldGrant

Summary of Results

This project has provided important new knowledge about habitat use and migration strategies of seven arctic seabird species (kittiwakes, little auks, arctic skuas, long-tailed skuas, glaucous gulls, lesser black-backed gulls, common eiders), results that have relevance for conservation management. All the work has been part of large scale research networks to ensure multi-colony tracking at many Arctic and sub-Arctic locations.

1. One highlight is the publication rate in 2013, of which five manuscripts has been accepted and one is under revision. In the 2012-report, one of these were listed as 'awaiting editor decision after minor revision' and two were listed 'manuscripts ready for submission'. These papers have been published in the journals IBIS, PLOS One and Diversity & Distributions in 2013. In addition, three 'fresh' manuscripts have been produced in 2013, of which two manuscripts are 'in press' in Marine Ecology Progress Series.

One of the printed papers, Gilg et al 2013, highlighted the large scale of management implications (fig. 1), i.e. the fact that arctic seabirds with trans-equatorial migration depends on global ocean health to ensure population viability. Fort et al 2013 highlighted that shrinking sea ice and marine pollution from future oil and shipping activities are potentially threats for little auks wintering in the North Atlantic.

2. Another highlight is that we have managed to track the habitats and the movement strategies of juvenile kittiwakes during their 3 first years of life, i.e. from leaving the nests as fledglings to returning back to the natal colonies in Svalbard as 'prospectors' 3 years later. Knowledge about habitat use and migration strategies of the young age classes are among the knowledge gaps in this seabird ecology. This information is important for understanding recruitment of young into the breeding population. However, this is the first time such tracking data has been obtained. We aim at completing the tracking analyses and publishing the data in 2014.

3. A final highlight is that our study model is successful in terms of getting tracking data on the same individuals over several years. The data sets are promising for several of the species, especially for arctic skuas, long-tail skuas, kittiwakes and eiders. Investigating within-individual variability over different years with different climatic conditions is of high importance. With sufficient funding, it is realistic to produce one or two important papers on this issue in 2014.

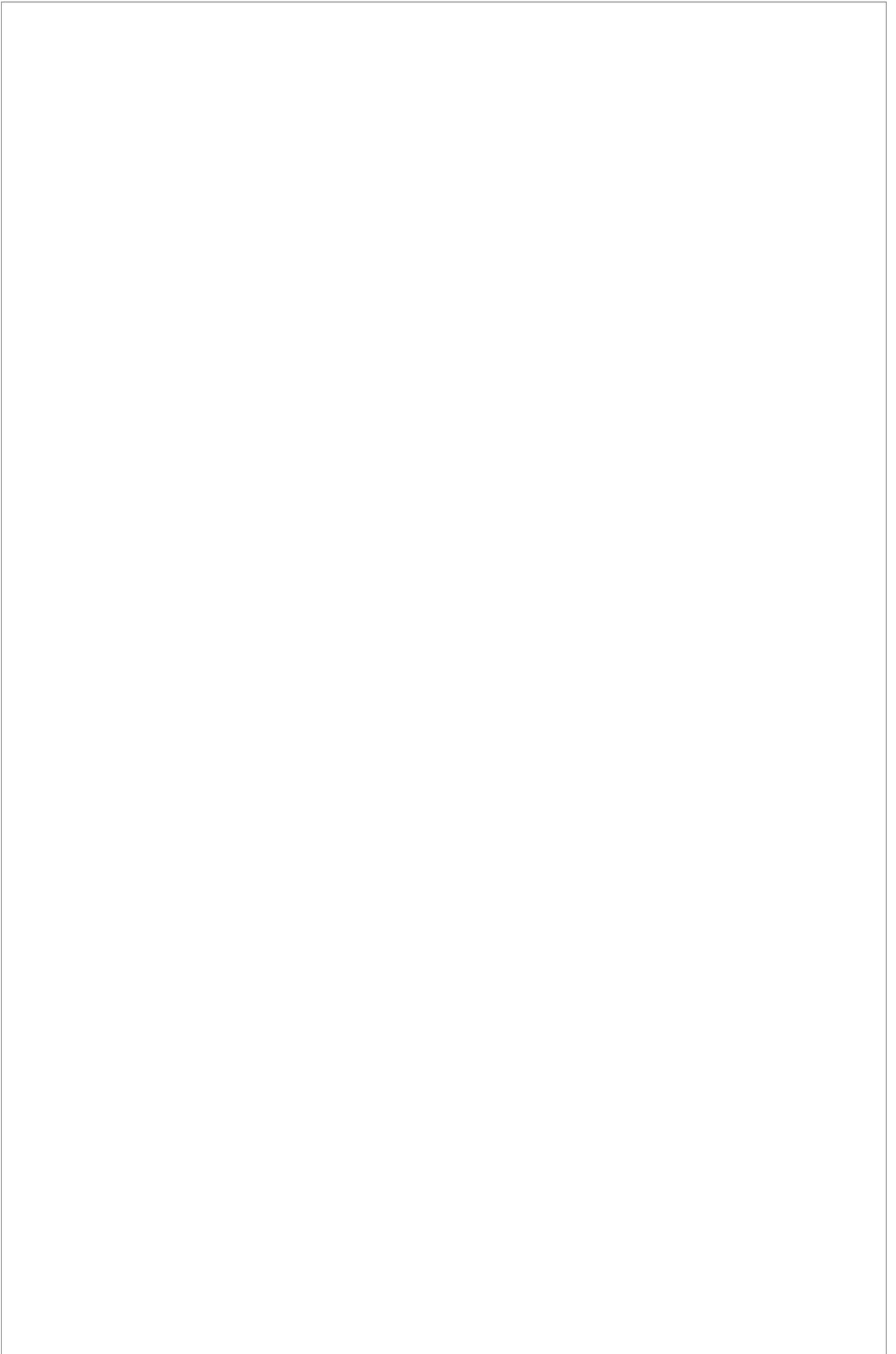


Fig 1. Tracking of long-tailed skuas from Svalbard and Greenland shows that this species depends on marine habitats along the entire Atlantic Ocean, even extending to the Indian Ocean. In the published paper (Gilg et al. 2013) we used a tracking-filter to identify positions in staging areas (blue circles/lines) and migration corridors (red circles/lines).

For the Management

The findings are highly relevant for management.

-The project reveals

a) sensitive marine hotspots, both in terms of migratory corridors, staging areas and wintering areas.

b) overlap with potential anthropogenic threats

c) breeding origin of seabirds distributed in different marine sectors. Hence, accidents or perturbations in a given sector can be linked to consequences on different seabird populations –often breeding far away from the given marine sector.

d) different scales of which management has to be applied, from local to global, to ensure healthy seabird habitats.

Published Results/Planned Publications

- Frederiksen, M., B. Moe, F. Daunt et al. (2012) Multi-colony tracking reveals the non-breeding distribution of a pelagic seabird on an ocean basin scale. *Diversity and Distributions* 18: 530-542
- Moe, B., Strøm, H., Chastel, O., Ponchon, A., Anker-Nilssen, T., Boulinier, T. et al. (2012) Post-breeding hotspot in the cold: geolocation and satellite tracking of kittiwakes in the Barents sea (submitted)
- Bustnes, J.O., B. Moe, Helberg, M., & R.A. Phillips (2013) Rapid long-distance migration in Norwegian Lesser Black-backed Gulls along the eastern flyway. *IBIS* 155: 402–406
- O. Gilg, B. Moe, S.A. Hanssen, N.M. Schmidt, B. Sittler, J. Hansen, J. Reneerkens, B. Sabard, O. Chastel, J. Moreau, R.A. Phillips, T. Oudman, E. Biersma, A.A. Fenstad, J. Lang & L. Bollache (2013) Trans-Equatorial Migration Routes, Staging Sites and Wintering Areas of a High-Arctic Avian Predator: the Long-tailed Skua (*Stercorarius longicaudus*) *PLOS One* 8(5): e64614.
- J. Fort, B. Moe, H. Strøm, D. Grémillet, J. Welcker, J. Schultner, K. Jerstad, K.A. Johansen, R.A. Phillips, A. Mosbech (2013) Multi-colony tracking reveals potential threats to little auks wintering in the North Atlantic from marine pollution and shrinking sea-ice cover. *Diversity and Distributions* 19: 1322–1332
- Schultner, J., B. Moe, O. Chastel, S. Tartu, C. Bech, A.S. Kitaysky (2013) Experimental evidence for corticosterone as a mediator of carry-over effects between breeding and migration. *Marine Ecology Progress Series* (in press)
- Goutte, A., et al (2013) Annual variation in the timing of breeding, pre-breeding foraging areas and stress hormones levels in an Arctic population of Black-legged kittiwake. *Marine Ecology Progress Series* (in press)
- Schultner J., B. Moe, O. Chastel, C. Bech, A.S. Kitaysky (2013) Migration and stress during reproduction govern telomere dynamics in a seabird. *Biology Letters* (in revision)

Communicated Results

Oral presentations. Workshops, users, symposia:

- Geolight seminar, 26 Nov 2013, University of Bergen, Bergen
- Framdagen, 8 Nov 2013, Framsenteret, Tromsø
- Workshop sjøfugl og olje, Norsk Olje og Gass, 1 Nov 2013, Framsenteret, Tromsø
- Forskermøte Framsenteret, Flaggskip fjord og kyst, 24 Okt, Tromsø
- SEAPOP seminar, Directorate for Nature Management, 10.-11. April 2013, Trondheim
- 11th NySMAC Seminar, 9.-11. Oct. 2013, Rome
- International Kittiwake workshop, 20.-21. March 2013, Trondheim
- Fram Webinar, 31. Jan 2013, Tromsø/www

Education:

- The results have been used in lectures at UNIS (AB-201, AB-202, AB-203) and UiT (Bio-3003) by GW Gabrielsen.

Press/media:

<http://www.forskning.no/artikler/2013/mai/357687>

<http://www.nrk.no/nordnytt/avslorte-fjelljoens-trekkrute-1.11042543>

<http://www.framsenteret.no/merket-og-avsloert.5220781-141503.html>

<http://www.nina.no/Aktuelt/Artikkel/tabid/945/ArticleId/2148/Fjelljoen-merket-og-avslort.aspx>

http://www.seapop.no/no/news/archive/2013/08-28-Artikkel_Bustnes_etal_Rapid_long-dist_migr_Lesser_Bl-b_Gulls.html

http://www.seapop.no/no/news/archive/2013/08-21-Artikkel_Gilg_etal_Trans-Equatorial_Migr_Routes_Long-tailed_skua.htm

- Nordlys. Article about arctic tern migration. 30.07.13

Interdisciplinary Cooperation

The project has benefitted from cooperation between researchers from different disciplines. The listed papers mainly belong to the following disciplines: Distributions/diversity, migration, spatial ecology, ecophysiology and climate change biology. Data from this project will also be used in the field of ecotoxicology.

Budget in accordance to results

The 250k funding from the Fram Centre has played an important role for financing fieldwork, equipment, tracking analyses and for writing papers, and has thus given us the opportunity to have a leading role in this large-scale cooperation. The project also benefitted from external funding as well as a substantial use of own research hours (egenforskning). This project is a huge cooperation, involving many researchers and costly field work and analytical work. Its large-scale success has depended on external funding for the field activities of project partners (e.g. extensive field operations in Greenland and other Norwegian colonies).

Most of the 250k has been allocated to fieldwork in Ny-Ålesund (Svalbard) and Brensholmen (Troms), equipment and tracking analyses, and there have been limited resources available for writing papers. Publication rate has, however, been very good due to international partners that have resources to publish the results. Any future funding above the allocated 250k would therefore increase our ability to publish as lead authors.

Money allocated to Fram Centre partners within the project:

- 80k was allocated to NPI and costs at the Sverdrup Station in Ny-Ålesund.
- 15k was allocated to Sagerup/Akvaplan NIVA for field work contribution in Ny-Ålesund.

Could results from the project be subject for any commercial utilization

No

If Yes

But, the results may have major implications for management and industry (e.g. oil industry, fisheries, shipping)

Conclusions

a) The project has established a strong basis for further work. We have a long-term perspective and will further develop the project to focus on climate effects on migratory strategies and habitat use in arctic seabirds. The project has provided a unique basis for assessing inter-annual as well as inter- and intra-individual variation habitat use, since we now have obtained several years of data from the same individuals and population, in a wide collaborative network.

This project has also been relevant for developing an application (SEATRACK) to the Ministry of the Environment (MD) and Barents 2020/Ministry of Foreign Affairs (UD) about large-scale tracking studies of seabirds in Norway, Russia, UK and Iceland. This application is made in collaboration between NPI and NINA. The application seems to be successful, as 5/7 of the funds have been granted, and we believe that the remaining 2/7 will be granted by the oil industry or other sectors.

b) The development of small-sized electronic tags has been a prerequisite for the project. However, there is a constant need for further decreasing the size, increasing the battery life and increasing the precision of the electronic tracking tags.