



Studies of lesser black-backed gulls in northern Norway

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In the 1970s and 1980s, a strong decline was observed in the population of lesser black-backed gulls *Larus fuscus fuscus* in northern Norway, possibly due to the collapse in the stock of Norwegian spring spawning herring. However, little has been known about the ecology of lesser black-backed gulls in northern Norway, as little data has been collected. One exception is the annual monitoring of a few colonies at Helgeland (bird counts in the incubation/chick period) organized by the National monitoring programme for seabirds. These counts confirmed a dramatic drop in the colony sizes in the 1980s, but stabilization and a slight increase in some colonies from the early 1990s (Lorentsen 2007). However, in the 1980s a greyish-mantled subspecies was discovered in northern Norway alongside the original black-mantled *L. f. fuscus* (Strann & Vader 1992). This suggests that the gap left by the dwindling *L. f. fuscus* population was being filled by birds from southern areas where the lesser black-backed gull populations increased in the 1980s and 1990s. However, the origin of these birds is unknown, and interestingly they are only found in the northern parts of the *L. f. fuscus* distribution area (from Lofoten and north), but not in the southern parts of Nordland.

Thus, it became clear that there was a great need for more detailed population data on these gulls and some relevant studies have been conducted since 2000. In 2005, a study was started at Horsvær, southern Nordland, which provided data on a whole range of population parameters, in addition to feeding ecology. In 2008, we also made a preliminary visit to Hortavær, an archipelago south of Horsvær where about 200 pairs of lesser black-backed gulls breed. In 2009, we plan to increase our effort at Hortavær.

At present, there are several approaches within SEAPOP to the study of lesser black-backed gull in northern Norway, including studies of migration patterns, pollution, feeding ecology and population biology. In the following, brief descriptions of some of the results are presented.

Migration Patterns

In 2000, a banding program was started by Morten Helberg and between 2000 and 2008, 1350 juveniles and 220 adults were banded with colour rings in 12 different colonies in Troms and Nordland. So far, 99 birds have been observed outside the breeding colonies (16 adults and 83 juveniles). These data are now being published (Helberg et al. in press). Few adult *L. f. fuscus* (3.5% of banded birds observed) were reported, while many more birds (45.5%) of the greyish-mantled subspecies (*L. f. intermedius* or *L. f. graellsii*) were observed outside the colonies. This suggests that most adult *L. f. fuscus* probably winter in areas with few observers, possibly Eastern and/or Central Africa. Adults of the greyish-mantled subspecies had a western migration, wintering mainly in Western Europe and Northwest Africa (Figure 1).

Site fidelity to wintering areas was very high in adults. Birds banded as juveniles, which could not be identified to subspecies, had two different migration routes; a) one group (30% of the observed

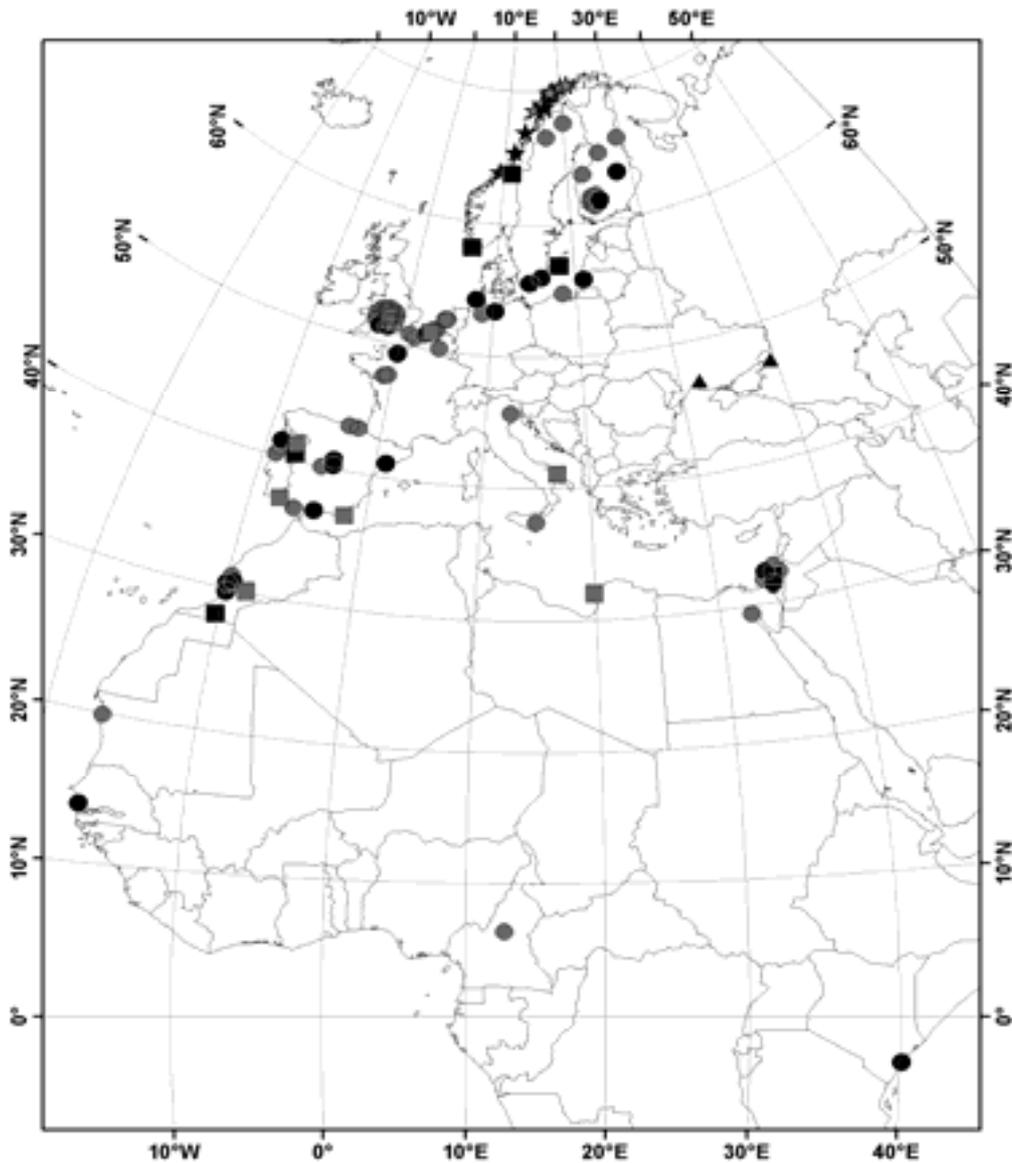


Figure 1

Observations (one observation per bird) of lesser black-backed gulls colour-ringed as adults (squares) and juveniles (circles) in different colonies in northern Norway (stars). Black squares are adults of the northern *Larus fuscus fuscus* subspecies, while grey squares are of a greyish-mantled subspecies. Black circles are birds banded as juveniles in pure *L. f. fuscus* colonies (black stars), while grey circles are from mixed colonies (grey stars) where both subspecies are breeding. Black triangles denote previous recoveries of *L. f. fuscus* from Norway. (From Helberg et al. in press)

birds) crossing the Scandinavian Peninsula to Finland and the Baltic countries, then to eastern Mediterranean (Israel and Egypt) down to East and Central Africa (Kenya and Cameroon), and *b*) one group (70%) following the European coast to wintering areas in the UK, the Iberian Peninsula, Morocco, Mauritania and Senegal (Fig. 1). Thus for juveniles, there appeared to be no distinct difference in migration pattern between those originating from mixed- or pure *L. f. fuscus* colonies. Differences in migration patterns between adult and juvenile *L. f. fuscus* may be a result of juvenile exploratory migration.

Environmental contaminants

In the Finnish population of lesser black-backed gulls there have been reports of high frequencies of chick mortality due to disease, and the levels of DDE (a DDT metabolite) have been high compared to levels assumed to cause reproductive effects in birds (Hario et al. 2004). It is therefore possible that the population decline in Finland results from a combination of natural stress and pollutants. In 2002, studies were started to map distributions and possible effects of persistent organic pollutants (POPs) in Norway, both legacy POPs and emerging ones. These studies have resulted in four scientific papers (Bustnes et al. 2006, 2008a, 2008b, Erikstad et al. 2009). In short they demonstrate that the levels of POPs are relatively low in lesser black-backed gulls in Norway, but that the *L. f. fuscus* and the greyish-mantled gulls had different pollutant compositions suggesting different migration patterns (Bustnes et al. 2006). The studies at Horsv er was aimed at understanding the potential effects of pollutants, and adverse relationships between legacy organochlorines (OCs), such as PCB and DDE, was found; i.e. that females with high levels of OCs produced more daughters, but also higher death rates among female offspring suggesting underproduction of females (Erikstad et al. 2009). Moreover, it was found that males with high levels of OCs suffered higher chick mortality and also lower return rates to the next breeding season (Bustnes et al. 2008a).



Figure 2

A greyish-mantled lesser black-backed gull photographed in Troms. These birds have been observed in northern Norway since the 1980s. (  Trond Johnsen)

Demography and feeding ecology

At present, Helgelandskysten is an important area for *L. f. fuscus*, and Horsv er in S mna municipality was selected as a study colony. Horsv er is the largest known colony of *L. f. fuscus* on the Norwegian coast, and surveys have been conducted there since 1980. The project focuses specifically on factors important for population growth and the following parameters are being monitored:

- **Reproduction**, as monitored annually by the number of nests, egg size, clutch size and breeding success. Data on sex ratio among chicks in different years have also been collected.

- **Recruitment**, as measured by monitoring the return and establishment of young, native birds previously colour-ringed as chicks (ringed annually since 2005).
- **Adult survival**, as monitored annually by using standard capture-mark-recapture procedures based on the re-sighting of colour-ringed adult birds.
- **Feeding ecology**, as measured by monitoring diet composition of chicks and adults.

Demography

The number of nests at Horsvær more than doubled between 2007 and 2008 (288 vs. 135), but was still considerably below the numbers in 2005 and 2006 (Table 1). Despite an increase in the number of nests in 2008, the production of young per nest was halved (≈ 0.6 vs. 1.1 large chicks per nest), suggesting that the feeding situation during the chick rearing was poor. One colony with 60 nests produced no chicks, suggesting that predators, e.g. otters *Lutra lutra*, may have been on the island. In 2007, the first nine birds marked as fledglings in 2005 appeared at Horsvær. In 2008, 25 new birds marked in 2005, most of them nesting, and two from 2006, were found in the colony. Thus, of the 246 fledglings marked with colour rings in 2005, at least 14% have returned within three years. Based on sex determination in 2005, 70% of the returning birds were males. Adult survival seems to be very high at Horsvær, and between 2005 and 2006 it was estimated at 90.1% (Bustnes 2008). So far no survival rate calculation has been made for later years, but of the 138 birds colour ringed between 2005 and 2007, 85 (61.6%) was observed in 2008, including nine (69%) of 13 birds ringed in 2007. This indicates that the winter survival of these birds is high and that the population decline cannot be attributed to poor survival.

Table 1 Results from the population study of northern lesser black-backed gull *Larus fuscus fuscus* in the Horsvær Archipelago 2005-2008.

Parameter	2005	2006	2007	2008	Total
Number of nests	378	385	135	288	
Number of adults with colour rings	83	42	13	16	154
Number of young ringed	371	226	52	94	743
Number of young with colour rings	246	218	46	94	604
Number of young in late July	400-500	350-400	150	150-180	1050-1180
Number of young banded 2005 returned	–	–	9	25	34
Number of young banded 2006 returned	–	–	–	2	2

Feeding ecology

Up to and including 2007, 72 food samples from Horsvær and 10 food samples from five colonies in Troms, were collected and analysed. In 2008, we were only able to get six new samples from Horsvær and Hortavær. At Horsvær, the dominating prey in 2005 and 2007 was saithe (*Pollachius*

virens), especially for the chicks; i.e. more than 80% of the samples from young contained saithe, while less than 15% contained herring. This was the case both in good and poor breeding seasons. The dominant size of the fish was about 10 cm. For adults, a surprisingly high proportion of the food samples contained snake pipefish *Entelurus aequor*, a species that has recently appeared in Norwegian waters. It is, however, poor in energetic value (Harris et al. 2007). In 2008, half of the six samples contained gadoids and the other half herring. In Troms in 2007, five (50%) of the chick diet samples contained sandeel *Ammodytes* spp. and four (40%) herring. Only three (30%) of the samples contained gadoids.

Climate and the number of breeding birds

Bustnes (2008) reported a preliminary analysis of data on nesting birds from Horsvær (dating back to 1980) and climatic variables (winter temperature and the North Atlantic Oscillation (NAO)) and herring data. This analysis showed a surprisingly clear relationship between climate and number of breeding birds; i.e. breeding numbers were strongly positively related to mean winter air temperature and NAO. Thus in mild years, the breeding population was high, while herring was not a significant factor in explaining variation in breeding numbers of lesser black-backed gulls. This may be because other fish, such as saithe, is presently the most important prey. A paper presenting this analysis is now accepted for publication in the *Journal of Ornithology* (Bustnes et al. in press).

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Cover photo: Pair of lesser black-backed gulls photographed in Vesterålen. (© Trond Johnsen)

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