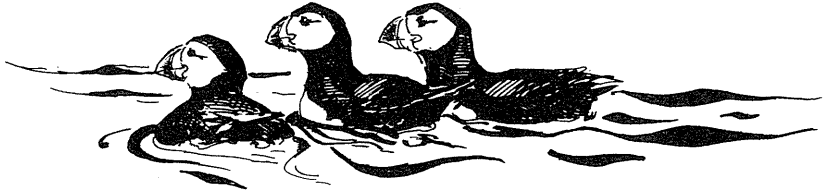


Marine distribution of seabirds in the Northeast Atlantic between Iceland and Scotland, June-September 1987 and 1988



FINN DANIELSEN, HENRIK SKOV, JAN DURINCK and DORETE BLOCH

(Med et dansk resumé: Udbredelsen af havfugle i nordøst-Atlanten mellem Island og Skotland, juni-september 1987 og 1988)

Data on seabird distribution, obtained during systematic surveys in two summer seasons, are presented as distribution maps for each species, accompanied by brief texts.

In the deep Norwegian Sea north and northeast of the Faeroe Islands, the most abundant species were Fulmar and Kittiwake, but also Gannet, Great Skua and Storm Petrel were common. In the more shallow areas on the Iceland-Faeroe Ridge and the banks south and east of the Faeroes, large concentrations were encountered of Sooty and Manx Shearwater, Storm Petrel, Kittiwake, Guillemot, Razorbill and Puffin. In particular the Faeroe Bank and the shelf areas south of the Faeroes, but also the banks to the east of the islands, were important to postbreeding Puffins and flightless, moulting Guillemots with chicks.

Large numbers of south-migrating Arctic and Long-tailed Skuas, and Arctic Terns, were observed west of 12° W, mainly in August. Among the large gulls, the Lesser Black-back had the most pelagic distribution, whereas Great Black-backed Gulls usually occurred within 50 km of land, and Herring Gulls in inshore waters only. Leach's Storm Petrel was common only in the southernmost part of the surveyed area.

In spite of the fact that the breeding colonies of seabirds on Iceland and the Faeroe Islands hold a large proportion of the Atlantic breeding populations of seabirds, information on the pelagic distribution and abundance of seabirds in this region is poor.

The first systematic study of pelagic seabird distribution in the North Atlantic was carried out by Poul Jespersen in 1913 and 1920-22. He found that during summer the number of seabirds at sea around the Faeroes was higher than in any other part of the North Atlantic (Jespersen 1929). Since then a number of ornithologists have collected un-systematic observations of seabirds from ferries and fishing vessels, but no systematic effort was put into force until 1979 when the Nature Conservancy Council of Aberdeen started a mapping pro-

gramme of seabirds in the North Sea. With later extensions this programme covered parts of the North Atlantic region S of 62° N and E of 7° W (Tasker et al. 1987).

Data on seabird distribution in the southeastern part of the region were recently given by Benn et al. (1988). In addition, systematic observations of migrating seabirds were carried out in 1982-84 at Akraberg, the southernmost point in the Faeroes (Bloch & Sørensen 1983).

Knowledge of seabird distribution at sea, and the factors governing the distribution, has important implications for conservation at a time when man's influence on the marine environment is rapidly increasing. The Faeroese Guillemot population has decreased by 70-90% since the 1950s (Olsen 1986), but the causes are not known. In Shet-

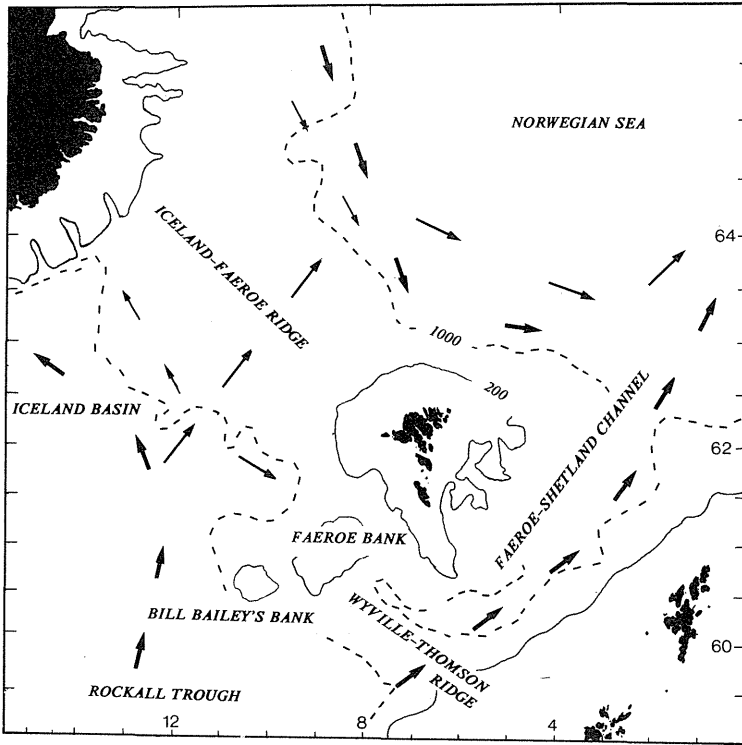


Fig. 1. Map of the study area, showing topographical features and the main surface circulation patterns (redrawn from Hansen 1985).

Kort over undersøgelsesområdet (after Hansen 1985).

land, many seabird species have experienced widespread breeding failures in recent years for reasons not fully understood, but a connection with the sandeel fishery is suspected (Heubeck 1989). Declines have also been reported from Orkney (Benn et al. 1987). Also, offshore hydrocarbon exploration is now, for the first time, being planned in the region considered here, enhancing the importance of locating potentially vulnerable concentrations of seabirds. The auks should be given special attention, considering their high sensitivity to marine oil pollution.

The present project was launched by the Danish Ornithological Society and Tórshavn Natural History Museum with the aim to gain a general overview of the distribution of seabirds in the region during the breeding and post-breeding seasons. This would provide a basis for more detailed studies of year-round seabird distribution at sea. Particular emphasis was put on foraging areas used by seabirds during the chick-rearing and moulting periods. Species exclusively feeding in inshore waters are not included in the present paper (Shag, Eider, Black-headed Gull, Common Gull, Black Guillemot).

Study area

The study area was the Northeast Atlantic between latitudes 59° and 66° N and longitudes 0° and $15^{\circ}30'$ W, covering 572 000 km². The Iceland-Faeroe Ridge and the Wyville-Thomson Ridge have depths less than 500 m (Fig. 1). These ridges split the deep water areas between Scotland and Iceland into the Rockall Trough and the Iceland Basin to the south and the Norwegian Sea to the north. The shallower banks south of the Faeroes, the Faeroe and Bill Bailey's Bank, lie more than 100 km from the closest seabird breeding sites.

The physical oceanography of the study area is dominated by a transport of Atlantic water over the ridges on both sides of the Faeroes in a north-easterly direction, and a weaker, irregular south-westerly flow of cold, less saline water masses mainly over the Iceland-Faeroe Ridge (Hansen 1985, Fig. 1).

Our coverage of the study area is shown in Fig. 2. In general less than 1% of the sea surface was covered, with the exception of parts of the Faeroese shelf. Effort was concentrated on shelf waters and banks around the Faeroes, and the deep-water areas of the Norwegian Sea. Effort was less over

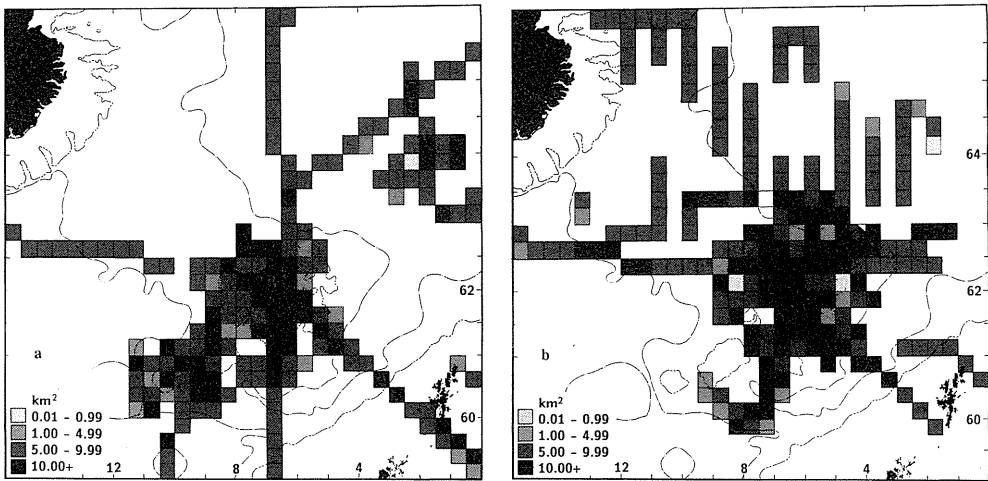


Fig. 2. Map of survey effort (1987 and 1988 combined). a: June-July. b: August-September. Shading represents number of km² surveyed within a 300 m wide transect.

Kort over dækningen i de to perioder (1987 og 1988 tilsammen): juni-juli (a) og august-september (b).

the Iceland-Faeroe Ridge, in the Faeroe-Shetland Channel and in the deep-water areas to the south-west. The temporal distribution of the effort is shown in Fig. 3.

Material and methods

The bulk of the observations were made during 13 cruises with the whale survey vessel *Hvítiklettur*, the research vessel *Magnus Heinason*, and the fishery inspection vessel *Hvidbjørnen*. These cruises took place during the periods 26 June - 30 September 1987 and 1 June - 30 August 1988. Additional data were collected from the ferries *Norrøna* and *Winston Churchill*.

Seabirds were recorded using the methods described by Tasker et al. (1984). All birds within a 300 m transect to one side of the ship were counted in a 90° view forward. Observations were compiled in 10-minute periods, detailing species, behaviour, age and sex etc. Shipfollowing birds were noted but not included in density calculations. Only positively identified birds were included, but identification problems were few so the influence of this conservative procedure on abundance estimates is insignificant. Data recorded in less than 300 m visibility, or when wind speed exceeded 15 m/s, have not been used.

The material was analysed using 15' N/S × 30' E/W rectangles as units. Densities are presented on maps for each species, in most cases showing numbers divided by transect area. Some less com-

mon species are presented as number of birds per km (all individuals, irrespective of distance, in a 180 degree scan ahead of the ship). Sampling effort varied, and in the species maps inadequately sampled squares are indicated by reduced-size symbols: less than 2 km² of transect survey (in the relevant period) in maps based on transect data, and less than 6 km surveyed in maps based on scan data.

Notes in the text on frequencies of age classes, colour morphs, and various behaviour patterns, are based on a sample of the cruises, with the entire season in both years represented.

HOURS · TIMER

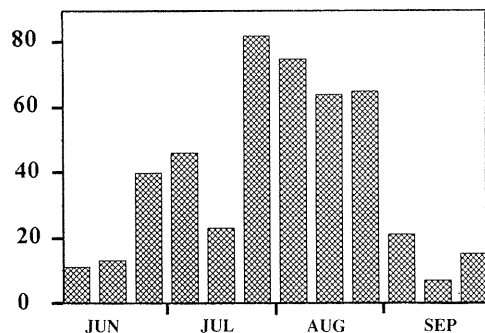


Fig. 3. Mean number of observation hours per ten-day period in 1987-88.

Det gennemsnitlige antal observationstimer pr 10-dagesperiode i 1987-88.

The term "juvenile" refers to a bird in its first calendar year, "immature" to older birds not yet in adult plumage.

Information on the number of breeding seabirds within or close to the study area is based on Bloch & Sørensen (1984), Croxall et al. (1984) and Benn et al. (1988), unless otherwise stated. The accuracy of these estimates varies according to species, being near-exact for, e.g., Gannet but little more than a guess for others (e.g., Storm Petrel).

Results and discussion

Fulmar *Fulmarus glacialis* (Fig. 4)

Within the study area the Fulmar breeds in the Faeroes (100 000 - 1 million pairs), Iceland (100 000 - 10 million) and Scotland (306 000 pairs). Maximum foraging ranges from a colony have been estimated at 120 km (Furness & Todd 1984).

The Fulmar depended more on fishery waste than any other species, barring the Lesser Black-backed Gull. In areas of convergence and turbulence in the northwest Atlantic, Fulmar distribution appears mainly to be controlled by oceanographic features (Brown 1970).

Sooty Shearwater *Puffinus griseus* (Figs 5a, 5b, 6)

The only breeding site of Sooty Shearwaters in the Atlantic is on the Falkland Islands off Argentina, where the population is estimated to be below 10 000 pairs. Since more than 100 000 Sooty Shearwaters are estimated to occur in Canadian waters (Brown 1986), many birds spending their nonbreeding season in the North Atlantic probably originate from the southeast Pacific.

The occurrence in our area fits well into the pattern known from the Canadian Atlantic. There, Sooty Shearwaters arrive in late April and move northeast to the waters off southern Greenland during late summer (Brown 1986). By the end of August only few Sooty Shearwaters are left in the northwestern Atlantic.

Salomonsen (1935) found that Sooty Shearwaters often occurred south of the Faeroes together with Great Shearwaters *P. gravis*, but only few Great Shearwaters were seen during our survey (Appendix). Sooty Shearwaters are seen regularly from Akraberg in September and October, with maximum numbers recorded during a period of strong southwesterly winds on 1 October 1982 (Bloch & Sørensen 1983). Our observations sug-

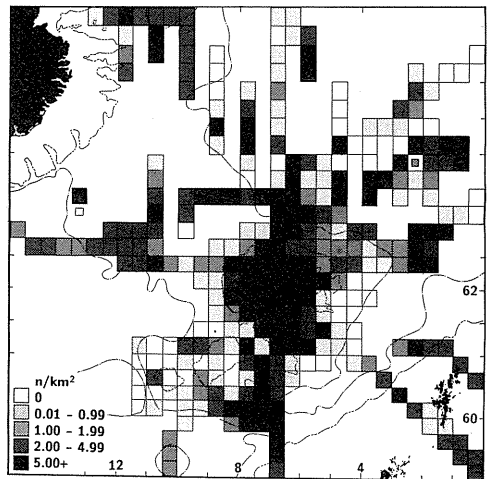
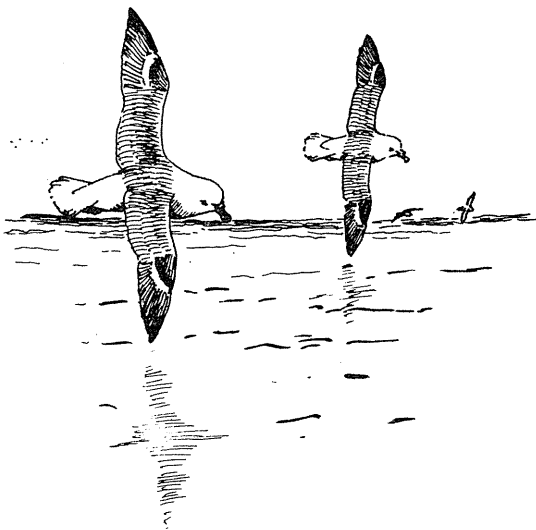


Fig. 4. Fulmar *Fulmarus glacialis*, June-September 1987-1988. The Fulmar was the most abundant species recorded at sea, and no seasonal change in the distribution was found. Birds around the Faeroes were mainly feeding on the surface of the sea, whereas most concentrations far out at sea, in particular to the north of the Faeroes, were following trawlers. Nearly half of the birds observed were shipfollowers (45%, $n=20\,223$). High densities of Fulmars were found with other seabirds in mixed feeding flocks over the southern part of the Faeroese shelf, less than 50 km from the nearest breeding colonies. 99.8% of the birds were white (type LL according to Fisher (1952)).

Malleuk Fulmarus glacialis, juni-september 1987-1988. Omkring Færøerne blev hovedparten af Malleukkerne set foragere på havoverfladen, mens koncentrationerne nord for øerne omfattede fugle i tilknytning til fiske-skibe.

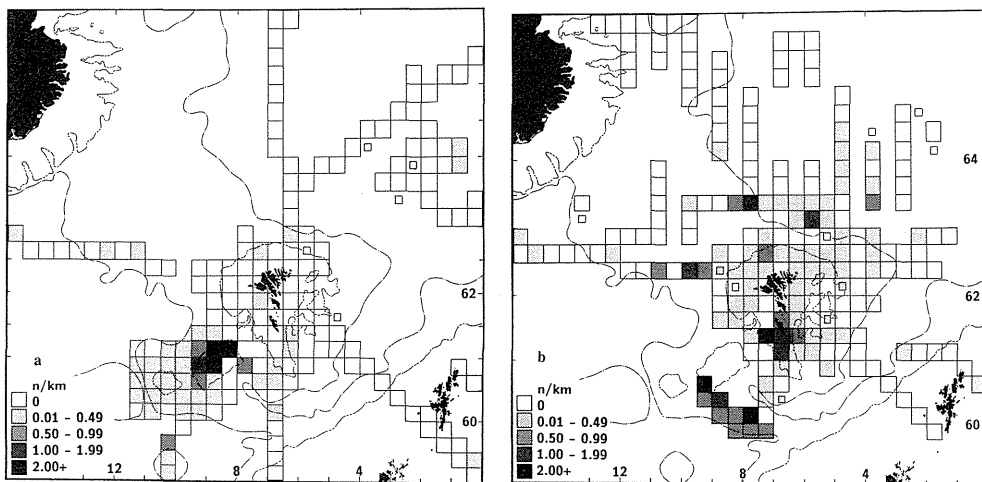


Fig. 5. Sooty Shearwater *Puffinus griseus*, June-July (a) and August-September (b) 1987-1988. Large numbers were recorded on the Faeroe Bank, and medium densities were found on the shelf around the Faeroes, especially south of Suduroy, and locally in the vicinity of fishing trawlers south of the Faeroe Bank. Smaller numbers occurred in other parts of the area. The ratio between Manx and Sooty Shearwaters in the core area south of the Faeroes was 2:3. *Sodfarvet Skråpe Puffinus griseus, juni-juli (a) og august-september (b) 1987-1988. Store koncentrationer af Sodfarvet Skråpe blev iagttaget på Færøbanken, og mindre koncentrationer blev fundet på soklen rundt om Færøerne, især syd for Suduroy, og lokalt nær trawlere syd for Færøbanken.*

gest that these birds most likely came from the Faeroe Bank area.

East of the study area high numbers of Sooty Shearwaters have been reported only from the approaches to the Scottish Isles and in the large Scottish bays (Tasker et al. 1987). The occasional mo-

vements related to east-travelling cyclones, which at times bring large flocks to the continental coasts of Europe (Jansen 1981, Blomqvist & Peterz 1984, E. V. Rasmussen 1985, J. Rasmussen 1985), may originate from the feeding areas between the Faeroes and Scotland, as no other concentrations have been reported in neighbouring waters.

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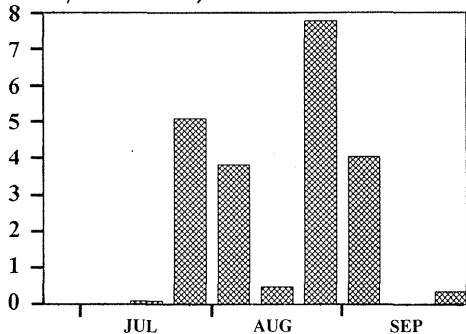
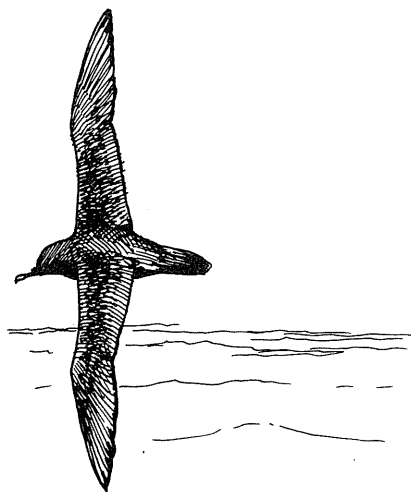


Fig. 6. The temporal distribution of Sooty Shearwater *Puffinus griseus* 1987-1988, showing the mean number of birds per hour in ten-day periods. Single birds were seen from 22 June onwards. *Tidsfordelingen af Sodfarvet Skråpe Puffinus griseus 1987-1988. Det gennemsnitlige antal fugle pr time i 10-dagesperioder.*





Sooty Shearwaters, Manx Shearwaters and Kittiwakes, August 1987. Photo: FD.
Sodfarvet Skråpe, Almindelig Skråpe og Ride. På Færøbanken og sydvest for Suduroy blev Sodfarvet og Almindelig Skråpe fundet i store antal i forholdet 3:2.

Manx Shearwater *Puffinus puffinus* (Figs 7a, 7b)

Within the study area the Manx Shearwater breeds with 10 000 - 15 000 pairs in the Faeroes, low 100's of pairs in Orkney, approx. 150 000 pairs in the Inner Hebrides, and 1000 - 10 000 pairs in southwest Iceland.

In the North Sea, high densities are found only in the northwestern parts (Tasker et al. 1987).

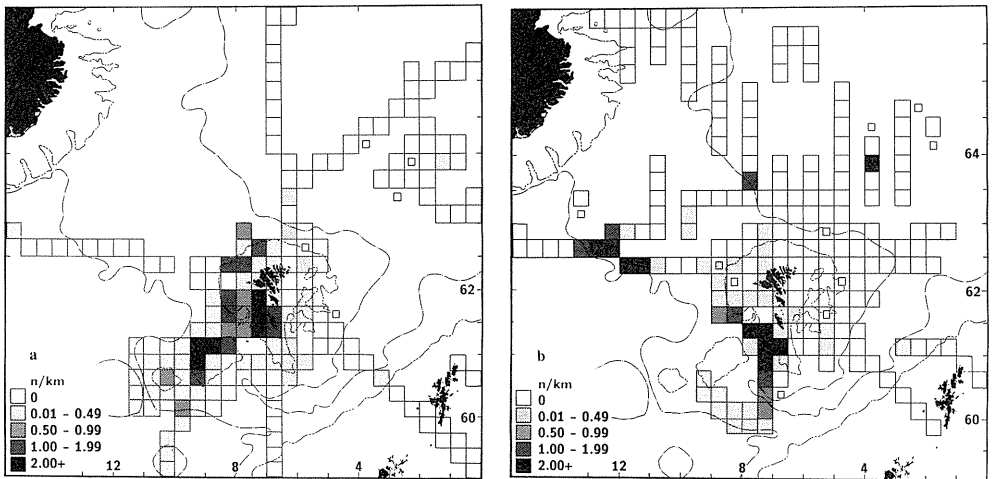
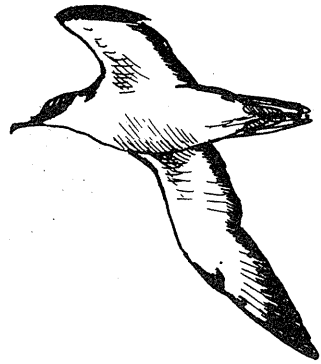


Fig. 7. Manx Shearwater *Puffinus puffinus*, June-July (a) and August-September (b) 1987-1988. Throughout the period most birds were found south and southwest of the Faeroes, on the Faeroe Bank and on the western part of the Iceland-Faeroe Ridge, while the species was rare in deep waters. The high densities just west of Sandoy probably were birds returning to their breeding sites at dusk. The species showed no marked change in the seasonal distribution during the period. South of the Faeroes, Manx Shearwaters often occurred in mixed flocks with Sooty Shearwaters. *Almindelig Skråpe Puffinus puffinus, juni-juli (a) og august-september (b) 1987-1988. Igenom hele perioden blev flst fugle iagttaget syd og sydvest for Færøerne, på Færøbanken og på den vestlige del af Island-Færøryggen, hvorimod arten kun sjældent blev iagttaget i de dybere havområder. De høje tætheder umiddelbart vest for Sandø er fugle, som om aftenen returnerede til kolonierne.*

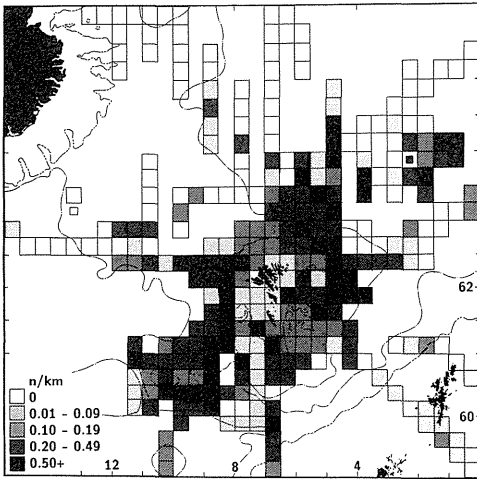


Fig. 8. Storm Petrel *Hydrobates pelagicus*, June-September 1987-1988. The Storm Petrel was common throughout most of the study area and was the fifth most abundant seabird species recorded at sea during the study. Storm Petrels were recorded in both shelf-break and oceanic areas, mostly as evenly-dispersed single birds or small groups. No seasonal change in the distribution was established between June and September. Only 11% of the birds observed were seen scavenging behind trawlers.

Lille Stormsvale Hydrobates pelagicus, juni-september 1987-1988. Lille Stormsvale blev iagttaget stort set over hele undersøgelsesområdet, med undtagelse af områder øst for Island og den allernordligste del af området.

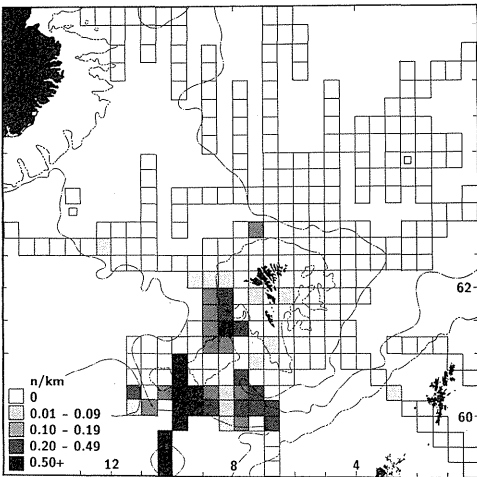
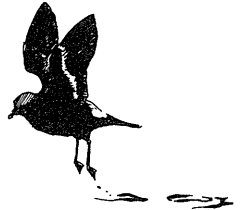


Fig. 9. Leach's Storm Petrel *Oceanodroma leucorhoa*, June-September 1987-1988. Concentrations were found in the southern part of the study area, adjacent to areas further to the south (south of Rosemary Bank) outside the present study area, where large numbers of birds were feeding. A discontinuity in water surface temperature in that area suggested the presence of a convergence of two watermasses.

Stor Stormsvale Oceanodroma leucorhoa, juni-september 1987-1988. Koncentrationer af Stor Stormsvale blev fundet syd for Rosemary Bank i et område, hvor der blev registreret store ændringer i havoverfladens temperatur.

Storm Petrel *Hydrobates pelagicus* (Fig. 8)

The population in the Faeroes is estimated at 50 000 - 100 000 pairs, in Scotland at 10-50 000 pairs, and in southwest Iceland at 1000 - 10 000 pairs.

Storm Petrels are summer and autumn visitors to the study area (Cramp & Simmons 1977). The large number recorded at sea suggests that the breeding populations in the area are underestimated. Most of the birds seemed to rely on natural food sources, but elsewhere, on the northwest Scottish Shelf, large numbers of Storm Petrels have been reported associated with trawlers (Benn et al. 1988).

Leach's Storm Petrel *Oceanodroma leucorhoa* (Fig. 9)

In the Faeroes a few hundred pairs breed on Mykines and Mykineshólmur. In Scotland 10-100 000 pairs are estimated to breed, mainly on St Kilda, while in southwestern Iceland 1000-10 000 pairs are estimated breeding.

The concentration south of the study area seemed connected with a steep gradient in the physical properties of the surface water. The species appears to be linked to areas of pelagic upwelling (e.g., Haney 1986).

In contrast to the Storm Petrel, Leach's Storm Petrel appeared not to exploit fishery waste at all and no birds were seen following fishing vessels.

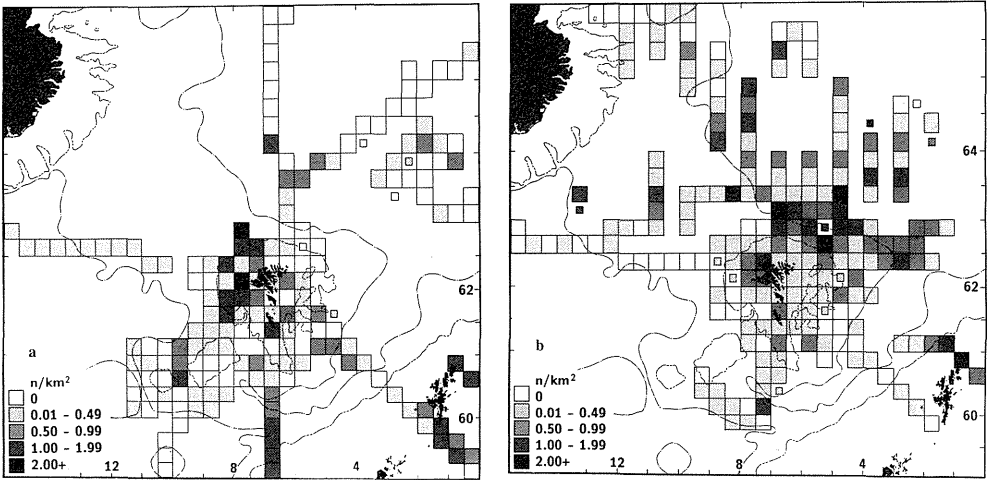


Fig. 10. Gannet *Sula bassana*, June-July (a) and August-September (b) 1987-1988. In June-July the highest densities were found on the Faeroese shelf. The main feeding areas of the Faeroese breeding birds seemed to be less than 80 km from the colony. In August-September birds had dispersed over a large area north of the Faeroes. Of 409 aged Gannets 6 (2%) were juveniles, 144 (35%) were immatures and 259 (63%) were adults. Very few birds were recorded near fishing vessels (2%, $n=583$).

Sule Sula bassana, juni-juli (a) og august-september (b) 1987-1988. I juni og juli blev de højeste tætheder registreret på den færøske sokkel indenfor 80 kilometers afstand af den færøske ynglekoloni. I august og september spredtes Sulerne især til områderne nordøst for Færøerne.

Gannet *Sula bassana* (Figs 10a, 10b)

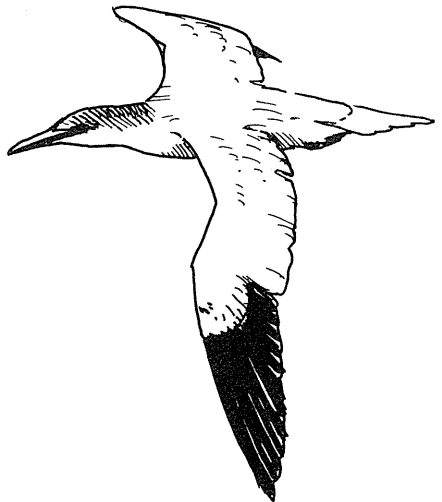
The breeding population in the Faeroes is 1500-2000 pairs, all on Mykines and Mykineshólmur. In northwestern Scotland 90 000 pairs breed just south of the study area, with 50 000 pairs on St Kilda and smaller colonies on North Rona, Sula Sgeir, Sule Skerry, the Flannan Isles and Shetland. The population in southwestern Iceland numbers 22 000 pairs.

The August and September distribution showed a dispersal to the north and northeast, in contrast to the distribution of species taking smaller fish, like shearwaters and auks.

Pomarine Skua *Stercorarius pomarinus* (Fig. 13)

In both years Pomarine Skuas were recorded regularly ($n=57$), dispersed over most of the study area. The majority seemed to be nonbreeding adults. Birds occurring in the northeast Atlantic probably all originate from the Palearctic breeding population (Cramp & Simmons 1983).

According to Salomonsen (1935), flocks of more than 100 birds pass the Faeroes, but the main exodus from the breeding areas is in September



(Dement'ev & Gladkov 1969), when our survey effort was relatively low. The main passage of juveniles is later still, in late October – early November along the North Sea coasts (Camphuysen & van Dijk 1983, Meltøfte 1979).

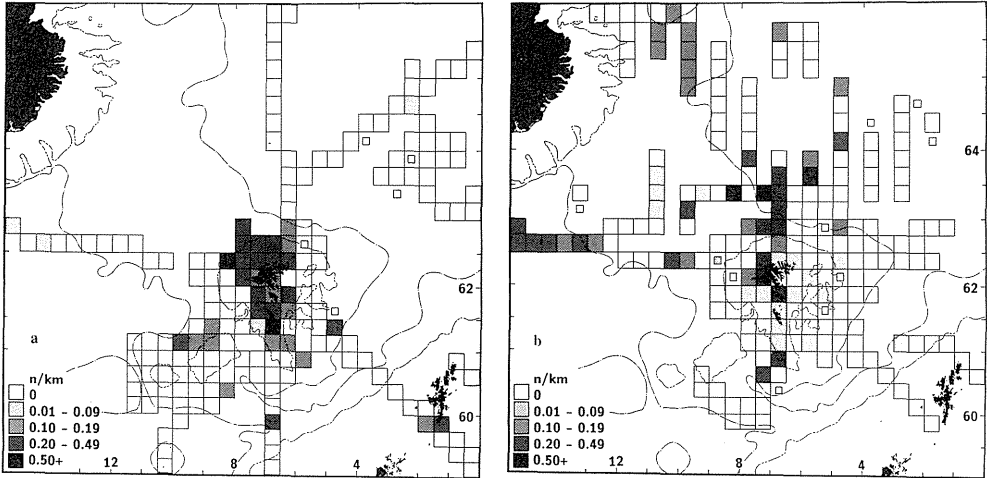


Fig. 11. Arctic Skua *Stercorarius parasiticus*, June-July (a) and August-September (b) 1987-1988. During June and July most of the Arctic Skuas were recorded from the inner Faeroese shelf. From late July onwards most birds (mainly adults) were flying south. Only three immature birds were seen at sea in 1987.

Almindelig Kjøve Stercorarius parasiticus, juni-juli (a) og august-september (b) 1987-1988. I juni og juli blev de fleste Almindelige Kjøver registreret nær Færøerne. Fra slutningen af juli blev der jævnlige tagttaget sydrækkende fugle over hele undersøgelsesområdet.

Arctic Skua *Stercorarius parasiticus*

(Figs 11a, 11b, 13)

The Faeroese breeding population is estimated to be 1200-1500 pairs, the Scottish population 2790 pairs, and the Icelandic 4000 pairs.

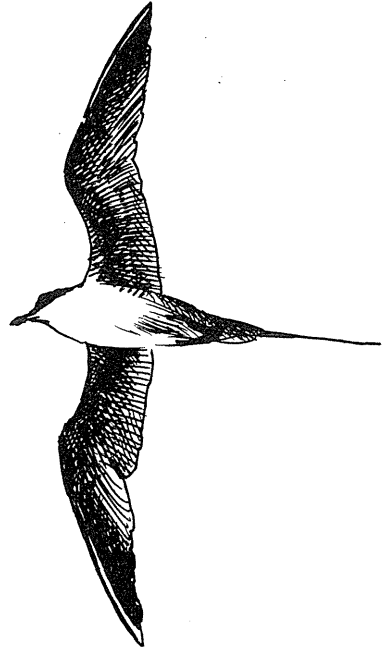
Most records during June and the main part of July probably were feeding birds from the Faeroes. Many adult birds recorded from late July onwards may have been migrants. Arctic Skuas passing south along continental Europe at this time mostly are juveniles (e.g., Camphuysen & van Dijk 1983).

Long-tailed Skua *Stercorarius longicaudus*

(Figs 12a, 12b, 13)

Closest breeding areas are in western Norway and eastern Greenland. Population numbers are unknown.

The majority of the birds in August and September were flying south and were probably migrating. The southward movement progressed partly in parallel to that of the Arctic Skua, and like this species it contained mainly adult birds. The species' use of an Atlantic migration corridor approximately along 20° W longitude both in spring and autumn is well documented (Cramp & Simmons 1983). An irregular passage of large flocks (>50



birds) at the Faeroes, mixed with Pomarine Skuas, was reported by Salomonsen (1935), but Bloch & Sørensen (1984) describe the species as a scarce migrant.

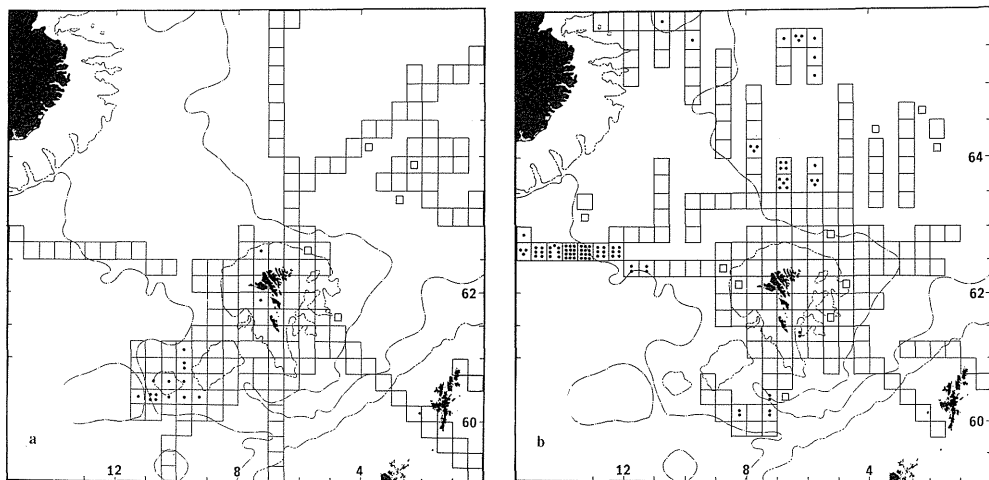


Fig. 12. Individual sightings of Long-tailed Skua *Stercorarius longicaudus* in June-July (a) and August-September (b). A total of 88 observations of 144 birds were made. A few birds (n=11), noted in June-July, probably spent the summer on the Faeroe Bank. From late July onwards the Long-tailed Skua was a common migrant between the Faeroes and Iceland, with most birds travelling southwest at about 13° W. Of the birds recorded in June-July, seven birds were aged; all were immatures. From late July most birds were adults (92%, n=93). One apparent adult of the dark type and two dark/intermediate immatures were recorded.

Iagttagelser af Lille Kjove Stercorarius longicaudus, juni-juli (a) og august-september (b) 1987-1988. I juni og juli blev 11 Små Kjover observeret på Færøebanken. Fra de sidste dage af juli og igennem august og september trak Små Kjover i forholdsvist stort antal mellem Færøerne og Island.

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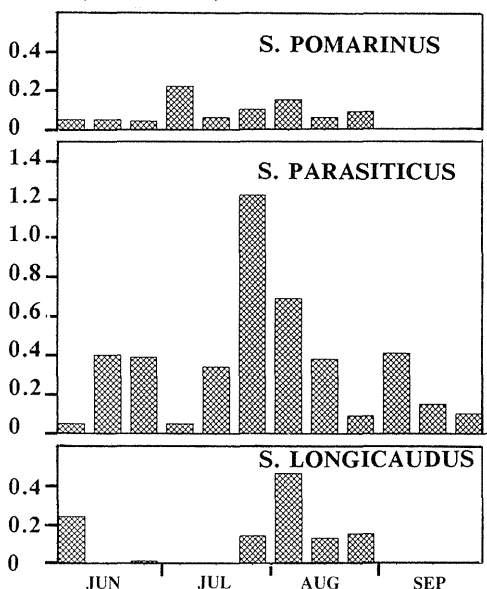
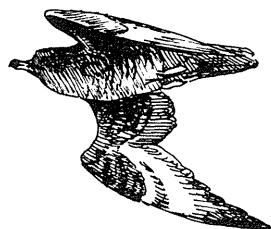


Fig. 13. The temporal distribution of small skuas recorded in 1987-88 (mean number of birds per hour in 10-day periods).

Tidsfordelingen af de små kjovearter 1987-88 (gennemsnitligt antal fugle pr time i 10-dagesperioder).



Great Skua *Stercorarius skua* (Figs 14a, 14b)

The breeding population is approx. 250 pairs in the Faeroes and 7140 pairs in Scotland. In Iceland an estimated 8500 pairs breed (Hansen & Lange 1985).

The seasonal change in the distribution was similar to that of the Gannet, showing a dispersal from Faeroese waters in June and July to the deep-water areas in the Norwegian Sea in August and September. Our observations do not indicate that Great Skuas make much use of fishery waste. In the Shetland area, however, 10-76% have been recorded as shipfollowers during June-September (Blake et al. 1984).

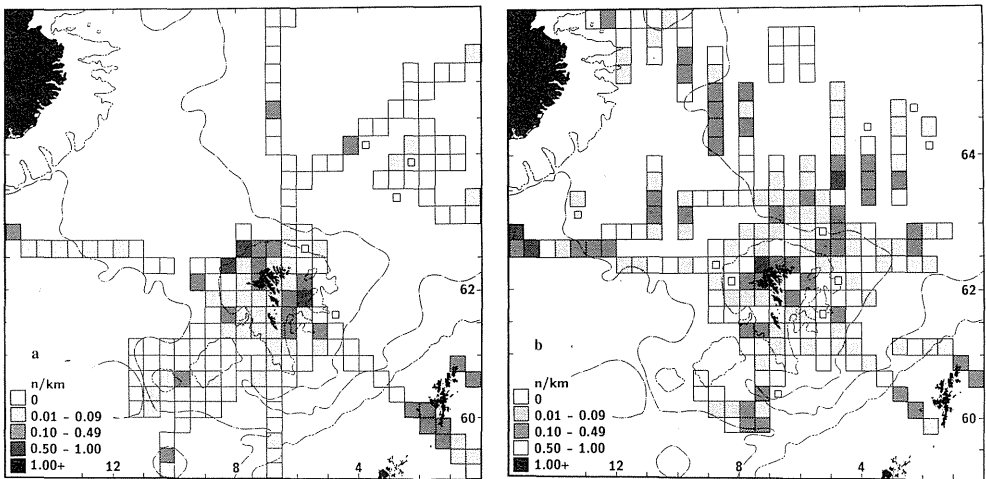
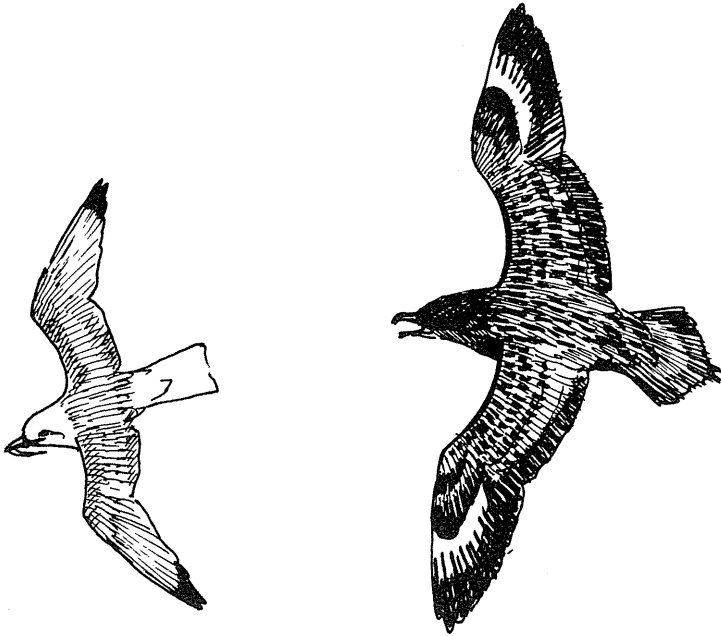


Fig. 14. Great Skua *Stercorarius skua*, June-July (a) and August-September (b) 1987-1988. During June-July most birds were observed on the shelf around the Faeroes and Shetland. In August-September fewer birds were found near the islands and more in the deep-water areas of the Norwegian Sea. Only one Great Skua (of 57) was seen following fishing vessels.

Storkjove Stercorarius skua, juni-juli (a) og august-september (b) 1987-1988. I juni og juli blev de fleste iagttaget omkring Færøerne og Shetland. I august og september blev færre fugle registreret her, mens flere blev set over den dybe del af Norskehavet.

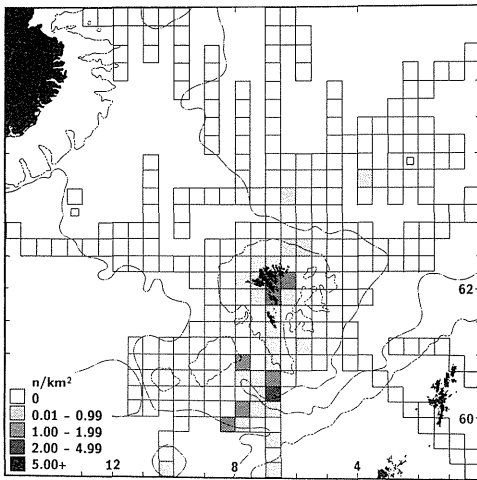
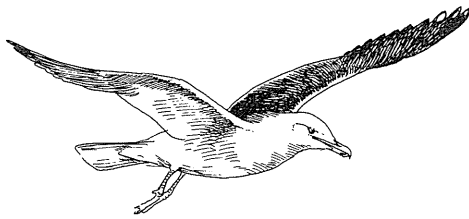


Fig. 15. Lesser Black-backed Gull *Larus fuscus*, June-September 1987-1988. The species was recorded in low densities close to the Faeroes and in offshore waters south hereof. Approximately 86% ($n=160$) of the birds were following fishing vessels. Nearly all observed birds were in adult plumage (98%, $n=256$), with only 1% immatures and 1% juveniles. Almost all birds seen at close range were of the subspecies *L. f. graellsii*, with only one typical *L. f. intermedius* recorded in August (cf. Barth 1975).

Sildemåge Larus fuscus, juni-september 1987-1988. Sildemåge blev registreret i lave tætheder nær Færøerne og på havet syd herfor, som regel i tilknytning til fiskeskibe.

Lesser Black-backed Gull *Larus fuscus* (Fig. 15)

A total of 18 000 pairs breed in the Faeroes, 8000 pairs in northern Britain, and 20 000 pairs in Iceland.

The species has the most pelagic distribution of the large gulls. Offshore, the Lesser Black-backed Gulls appeared largely to depend on fishing offal.

Herring Gull *Larus argentatus* (Fig. 16)

Several thousand birds breed in Iceland and 95 000 pairs in northern Britain, while the Faeroese population is relatively small with 3000 pairs.

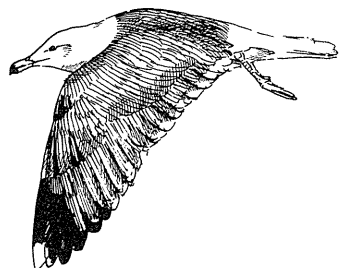
The limited distribution at sea suggests that the recorded birds all belong to the Faeroese population. In the North Sea the species changes feeding habits and distribution in connection with a late autumn influx of northern birds (Tasker et al. 1987). Within the period of this study, no influx of northern or eastern birds was apparent, and no birds showed interest in discard from trawlers.

Great Black-backed Gull *Larus marinus*

(Fig. 17)

A total of 2000 pairs breed in the Faeroes, around 30 000 pairs in northern Britain, and several thousand pairs in Iceland.

The birds encountered at sea after the breeding season could have been either postbreeding Faeroese birds dispersing from their colonies or birds arriving from elsewhere.



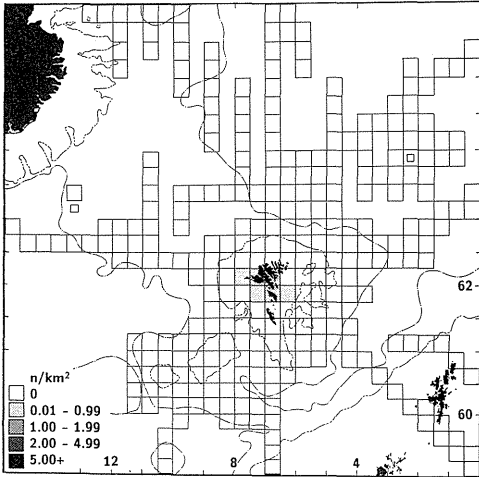


Fig. 16. Herring Gull *Larus argentatus*, June-September 1987-1988. The species was only recorded close to the Faeroes, feeding in the fjords. High numbers were never encountered. No birds were seen feeding at sea or joining the fishing fleet to feed on fishery waste.

Sølvmåge *Larus argentatus*, juni-september 1987-1988. Sølvmågen blev iagttaget i små mængder nær Færøerne, specielt i fjordene.

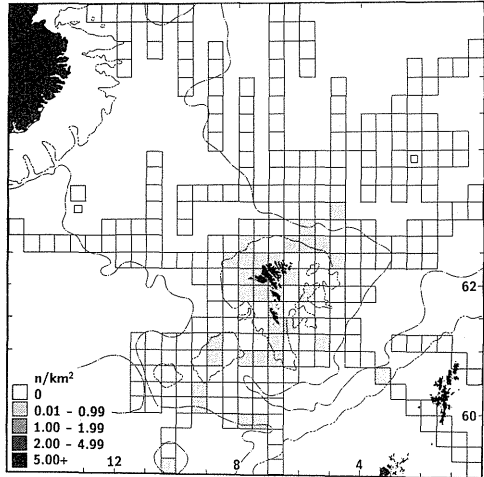


Fig. 17. Great Black-backed Gull *Larus marinus*, June-September 1987-1988. The species was often recorded offshore, usually in low numbers. The majority were seen within 50 km of the Faeroes and not until August were Great Black-backed Gulls commonly recorded over water-depths exceeding 200 m.

Svartbag *Larus marinus*, juni-september 1987-1988. Svartbagen blev ofte iagttaget i lave tal på det åbne hav, men størstedelen blev registreret indenfor en afstand af 50 km fra Færøerne.

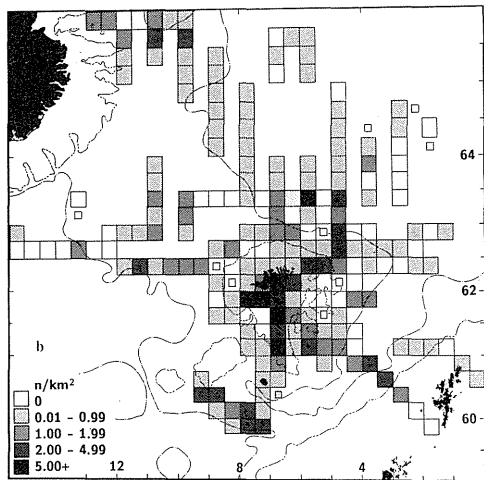
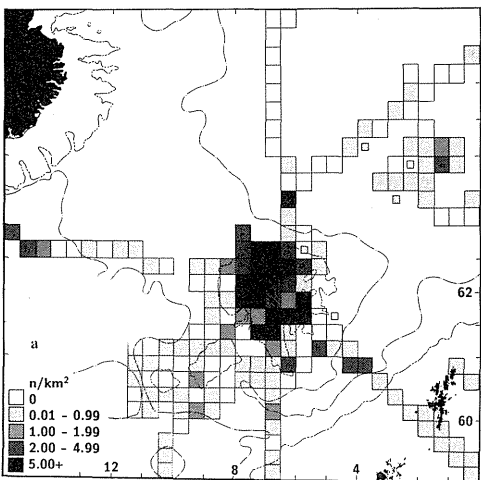


Fig. 18. Kittiwake *Rissa tridactyla*, June-July (a) and August-September (b) 1987-1988. During June and July high densities were found close to the breeding sites on the Faeroes and on the banks to the east of the islands (mainly within 100 km). During August and September, the densities were lower close to the colonies, and birds were distributed widely throughout the entire study area. No areas of concentration could be determined. The Kittiwake was the fourth most numerous bird recorded at sea. Only 4% of the birds observed were recorded as following fishing vessels ($n=2826$). A large proportion were sitting on the water (52%). The proportion of juveniles rose during the period: 0% in June, 11% in July, 52% in August and 86% in September. Only 2% of the birds were immatures (second calendar year) ($n=3180$).

Ride *Rissa tridactyla*, juni-juli (a) og august-september (b) 1987-1988. I juni og juli blev Riderne registreret i høje tætheder nær de færøske kolonier og på bankerne øst for øerne (hovedsageligt indenfor 100 km af øerne). I august og september spredtes Riderne til stort set hele undersøgelsesområdet.

Kittiwake *Rissa tridactyla* (Figs 18a, 18b)

The Faeroese and Icelandic populations are in the order of 100 000+ pairs, while the Scottish population numbers 402 000 pairs.

As is the case in the North Sea (Tasker et al. 1987), trawlers do not seem to play an important role in Kittiwake distribution during June-September. A late-autumn migration of northeast Atlantic and North Sea Kittiwakes (mainly juveniles) into the Canadian Atlantic has been established from ringing recoveries (Blake et al. 1984, Brown 1986), which is corroborated by the fact that most Kittiwakes recorded at sea in August-September were juveniles.

Arctic Tern *Sterna paradisaea* (Figs 19a, 19b)

Breeds in very large number (>100 000 birds) in Iceland and Orkney-Shetland. The Faeroese population numbers about 20 000 birds.

Terns recorded offshore were probably non-breeders and (in autumn) postbreeders migrating south. The distribution at sea is very similar to that of *Stercorarius parasiticus* and *S. longicaudus*.

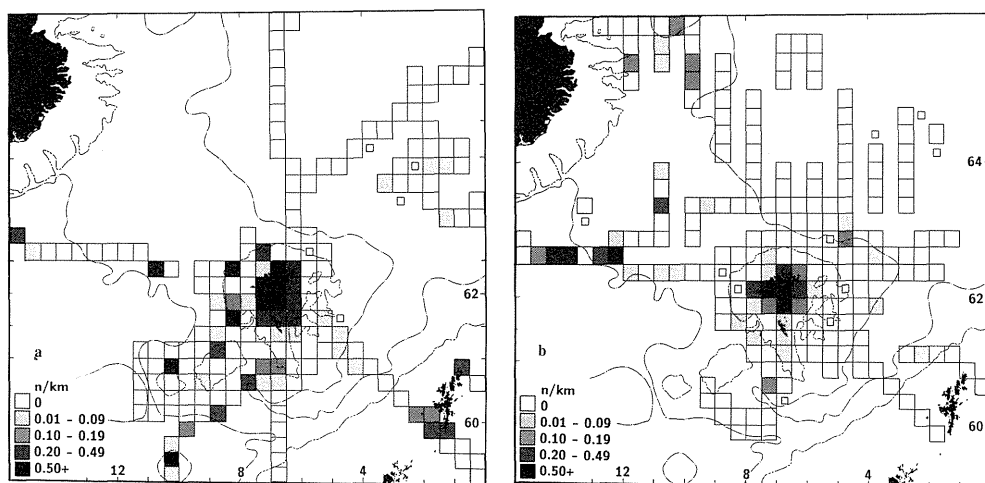
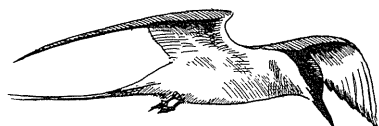


Fig. 19. Arctic Tern *Sterna paradisaea*, June-July (a) and August-September (b) 1987-1988. High densities were found close to the colonies in Shetland and the Faeroes and further offshore, perhaps related to southward migration. *Havterne Sterna paradisaea, juni-juli (a) og august-september (b) 1987-1988. Høje tætheder blev fundet nær ynglekolonierne på Shetland og Færøerne, men også til havs, muligvis i forbindelse med efterårstrækket.*

Guillemot *Uria aalge* (Figs 20a, 20b, 20c)

The Faeroese breeding population is 160 000 pairs. 656 000 pairs breed in Scotland and 0.8-1.6 million pairs in Iceland.

The first juvenile Guillemots were seen in the second week of July, so in the distribution maps the period is split into two: June - early July (the breeding season), and mid-July - September (the postbreeding season).

During the postbreeding period, the most important areas to Guillemots with chicks apparently are the areas south of Suduroy, the Faeroe Bank and the banks to the east of the Faeroes. In previous years fishermen have observed high densities of Guillemots with chicks southwest of Suduroy (B. Olsen in litt.). The concentrations recorded during our study may well comprise several thousand Guillemots with chicks. At this time of the year adult Guillemots moult their primaries and are flightless like the chicks which have not yet fully developed their wing feathers.

Ringing recoveries suggest that most Faeroese birds migrate northeast to waters off western Norway, and others appear to enter the North Sea in autumn (Baillie 1982, Olsen 1982). There is a striking discrepancy between the ringing results and our observations, and the postbreeding dispersal of Faeroese Guillemots needs clarification.

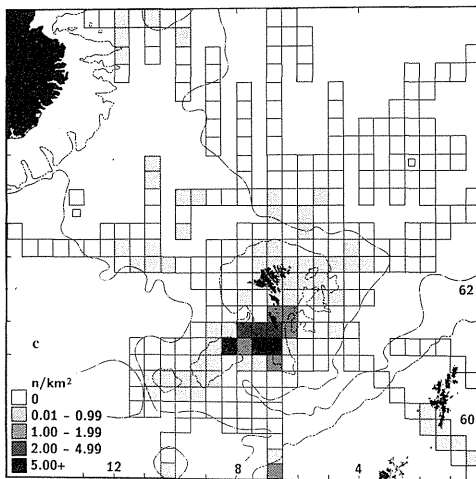
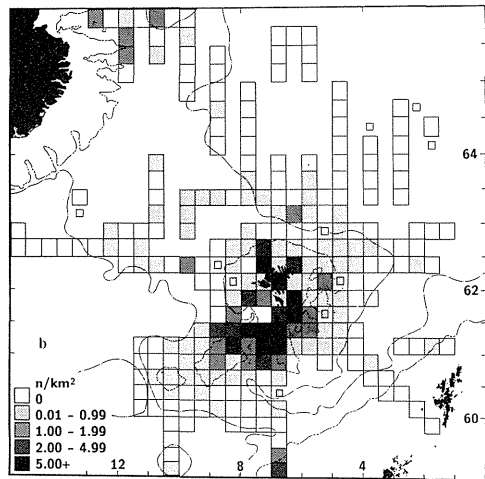
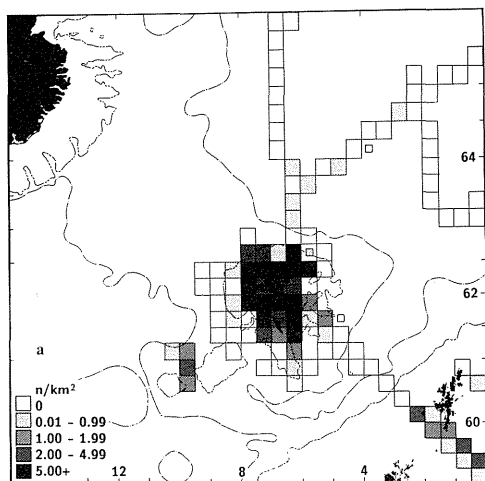
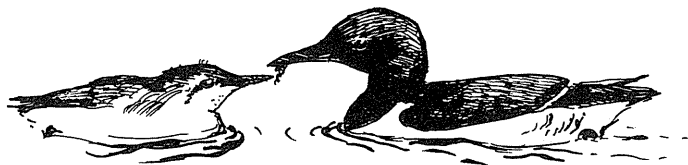


Fig. 20. Guillemot *Uria aalge*, June - early July (a), mid-July - September (b), and juveniles June-September (c) 1987-1988. During June and July high densities occurred on the inner shelves around the Faeroes and Shetland and on the banks southwest of the Faeroes. During the postbreeding period Guillemots dispersed over the outer Faeroese shelf and banks. Low densities were also recorded over the Iceland-Faeroe Ridge, but only very few birds were found in the Norwegian Sea. Large concentrations of juvenile Guillemots, not yet capable of flying at this time of the year, were found on the Faeroe Bank and south of Suduroy. Low densities of chicks occurred on the Iceland-Faeroe Ridge and on the banks east of the Faeroes. The proportion of juveniles increased from 11% in July ($n=341$) to 29% in August ($n=349$).

Lomvie *Uria aalge*, juni - primo juli (a), medio juli - september (b), og unger juni-september (c) 1987-1988. I juni og juli blev der registreret høje tætheder nær Færøerne og Shetland, og på bankerne sydvest for Færøerne. Fra medio juli blev Lomvier tagttaget over den færøske sokkel og på bankerne syd for øerne, samt i lave tætheder over Island-Færøryggen. De første unger blev set i den anden uge af juli. De blev siden registreret i stort tal syd for Suduroy, på Færøebanken og på bankerne øst for øerne.

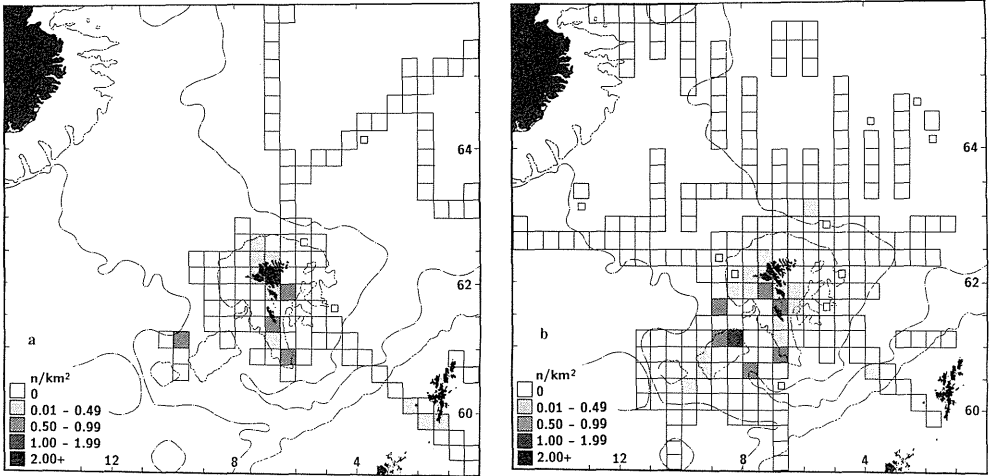


Fig. 21. Razorbill *Alca torda*, June-July (a) and August-September (b) 1987-1988. In June and July most birds were found within 50 km of the colonies in the Faeroes and Shetland. During the postbreeding period adult birds with their young aggregated in low densities south and southwest of the Faeroes.

Alk Alca torda, juni-juli (a) og august-september (b) 1987-1988. I juni og juli blev Alke set indenfor en afstand af 50 km fra kolonierne på Færøerne og Shetland. I august-september koncentreredes gamle og unge Alke syd og sydvest for Færøerne i de samme områder som Lomvierne.

Razorbill *Alca torda* (Figs 21a, 21b)

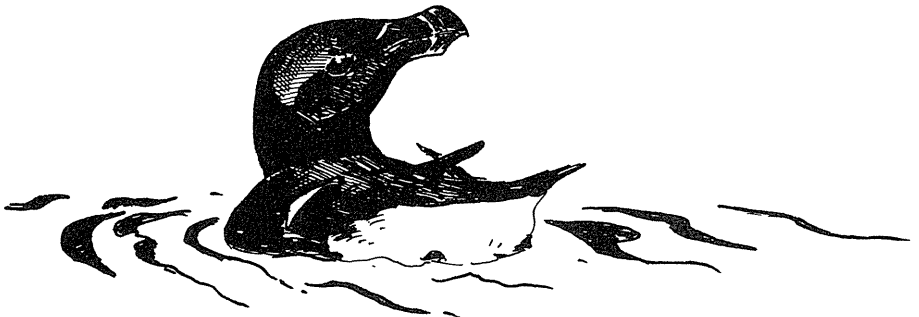
The Faeroese breeding population is small, 1000-5000 pairs, while 86000 pairs breed in Scotland and 100000+ pairs in Iceland.

The majority of birds during the breeding season were distributed on the shelf within 50 km of the colonies. During the postbreeding period adults with their young aggregated south and southwest of the Faeroes in the same area as the Guillemots. Most of the birds probably were from the relatively small Faeroese population.

Puffin *Fratercula arctica* (Figs 22a, 22b, 22c)

The breeding population in the Faeroes has been estimated at 500000 - 750000 pairs. About 645000 pairs breed in Scotland and 1-10 million pairs in Iceland. The abundance of Puffins recorded during this study suggests that the population estimate for the Faeroes may be too low.

The dispersal of birds over the Iceland-Faeroe Ridge after the breeding season may involve other than the local (Faeroese) birds, because most Puffins disappear from Scottish waters in late August and September (Benn et al. 1988). Puffins wintering in Faeroese waters appear mainly to be of Norwegian origin (Jensen 1986).



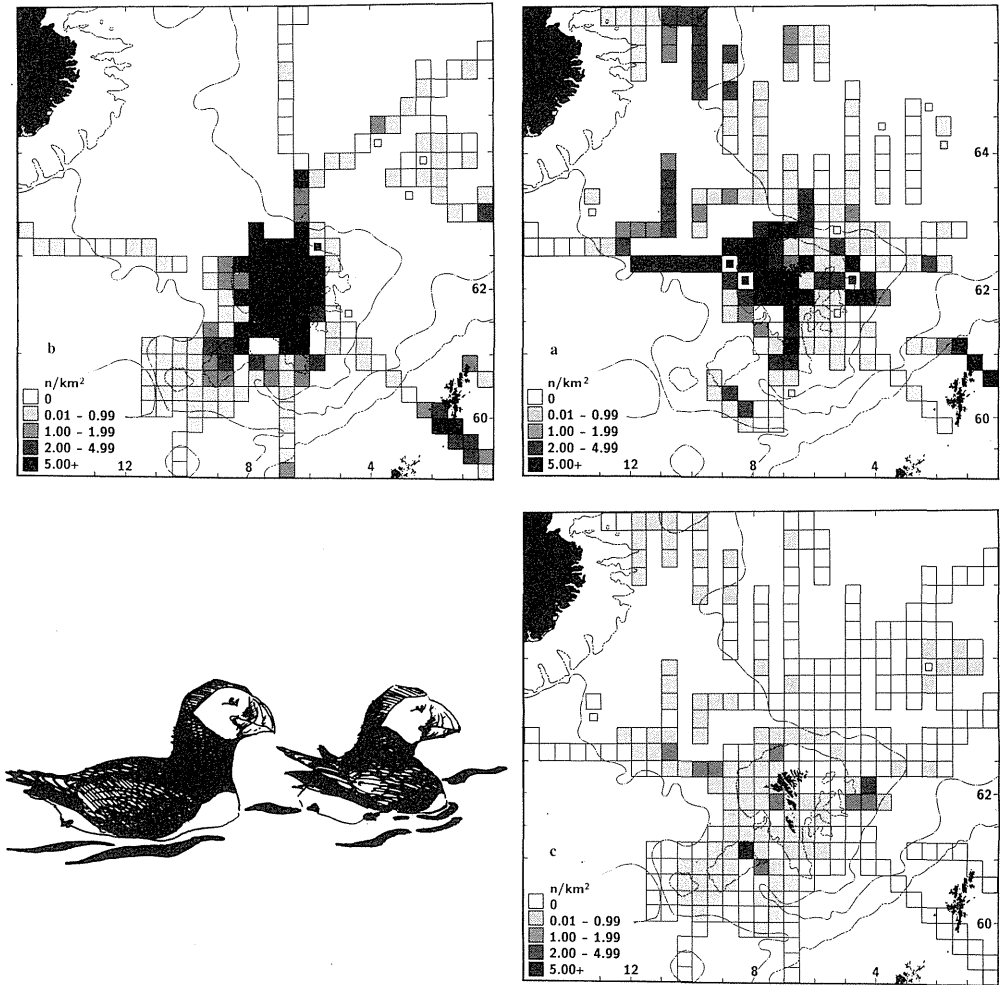


Fig. 22. Puffin *Fratercula arctica*, June-July (a), August-September (b), and juveniles June-September (c) 1987-1988. The Puffin was the second most numerous bird at sea. During the breeding period high densities were found all over the Faeroese shelf within 100 km of the breeding colonies. Very large feeding aggregations were seen over an extended area north of the Faeroes, 20-80 km from the northern islands. High densities were also recorded near Shetland. During the postbreeding period large numbers of adult and juvenile birds dispersed over the Iceland-Faeroe Ridge. The highest densities of juvenile birds were found on the Faeroe Bank. The first chicks were encountered in the fourth week of July, in the Norwegian Sea as well as on the banks south of the Faeroes. In the deep oceanic parts north and south of the Iceland-Faeroe Ridge only very few birds were seen.

Lunde Fratercula arctica, juni-juli (a), august-september (b), og unger juni-september (c) 1987-1988. I yngleperioden blev høje tætheder fundet over den færøske sokkel indenfor en afstand af 100 km fra ynglekolonierne. Meget store koncentrationer af fawagerende Lunder blev registreret i et stort sammenhængende område nord for Færøerne, 20-80 km fra kolonierne på de nordlige øer. I august og september fandtes mange gamle og unge fugle spredt over Island-Færøryggen. De højeste tætheder af unger blev iagttaget på Færøbanken.

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Resumé

Udbredelsen af havfugle i nordøst-Atlanten mellem Island og Skotland, juni-september 1987 og 1988

Selvom en forholdsvis stor andel af Nordatlantens bestande af havfugle yngler på Island og Færøerne, er kendskabet til havfuglenes udbredelse og levevis på havet i disse områder meget begrænset. Denne artikel præsenterer resultaterne af en systematisk kortlægning af havfugle, som blev gennemført fra færger, forsknings- og inspektionsskibe af Dansk Ornitologisk Forening i samarbejde med Tórshavn Naturhistorisk Museum i juni-september 1987 og 1988.

Udbredelsesmønstret for de enkelte arter i området er afbildet på kort. I juni og juli blev de største koncentrationer af havfugle fundet over den indre del af soklen omkring Færøerne, især nord for øerne og syd for Suduroy. I august og september blev store koncentrationer af fældende alkefugle fundet syd for Suduroy, på Færø-banken og på bankerne øst for Færøerne. På de forholds-

vis dybe havområder i Norskehavet, nord og øst for Færøerne, var de talrigeste fugle Malleduk og Ride, efterfulgt af Sule, Storkjove og Lille Stormsval. På højderyggen mellem Island og Færøerne og på bankerne syd og øst for Færøerne blev fundet store koncentrationer af Sodfarvet Skråpe, Almindelig Skråpe, Lille Stormsval, Ride, Lomvie, Alk og Lunde. I den sydlige del af undersøgelsesområdet fandtes koncentrationer af Stor Stormsval.

Appendix

Species of seabirds seen at less than five occasions at sea during the survey

Diver *Gavia* sp. One at 63°37' N 1°36' W on 30 June 1987, and one at 62°32' N 5°49' W on 10 August 1987.

Red-throated Diver *Gavia stellata* One at 61°40' N 6°24' W on 18 June 1988.

Great Shearwater *Puffinus gravis* 1987: late July 1, late August 2, and mid-September 1.

Cory's Shearwater *Calonectris diomedea* 1988: early July 1.

Grey Phalarope *Phalaropus fulicarius* 1988: mid-August 1.

Sabine's Gull *Larus sabini* One at 63°50' N 5°54' W on 23 August 1988.

Sandwich Tern *Sterna sandvicensis* 1988: early June 2.

Brünnich's Guillemot *Uria lomvia* 1987: early August 1. 1988: early July 1.

Little Auk *Alle alle* 11 birds on 28 September 1987. Two birds at 61°44' N 6°18' W, two at 61°19' N 5°12' W, four at 61°05' N 4°38' W and three birds at 60°38' N 3°34' W. (Unspecific data only are given in cases still awaiting treatment by the Rarities Committee.)



Michael Køie Poulsen

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Finn Danielsen, Henrik Skov and Jan Durinck
Ornis Consult
Vesterbrogade 140
1620 København V, Denmark

Dorete Bloch
Museum of Natural History,
FR-100 Tórshavn, Faeroe Islands

Fuglene i Danmark

– for dem der vil vide mere om fuglene end blot hvordan de ser ud

FUGLENE I DANMARK er et nyt standardværk om alle Danmarks fugle. 19 af landets mest kompetente ornitologer formidler her den nyeste viden om fuglenes økologi og forekomst i Danmark på en populær, men saglig måde.

FUGLENE I DANMARK er ikke et tørt leksikon, men levende beskrivelser af fuglenes liv året rundt i samspil med deres omgivelser og hinanden. Det er moderne økologisk naturhistorie om Danmarks fugle.

FUGLENE I DANMARK henvender sig til alle fugleinteresserede. Værket er fyldt med overraskende og fascinerende viden for den alment fugleinteresserede såvel som for den aktive ornitolog.

FUGLENE I DANMARK er redigeret af Hans Meltofte og Jon Fjeldså fra Zoologisk Museum i København. Værket er rigt illustreret med over 800 fotografier, akvareller, tegninger, diagrammer og kort i sort/hvid og farve.

Pressen skrev:

"En prægtig og levende fuglebog – ikke mindst i kraft af talrige fremragende fotos."
Frederiksborg Amtsavis

"Vil du have check på den sidst opdaterede viden om kongerigets fugle – og serveret på en kort, letlæselig måde – er Meltofte og Fjeldsås dobbeltværk lige sagen."

*Carsten Birket Andersen
i Helsingør Dagblad*

"Værket fortjener stor udbredelse. Både den erfarne ornitolog og den almindelige fugleinteresserede kan have stor glæde af værkets mange oplysninger. Det fortjener at blive en "klassiker"."

Vestkysten

"Jeg må indrømme, at jeg er imponeret over det væld af oplysninger, der præsenteres for hver art – og for mit eget vedkommende



var der tale om nye ting for så godt som hver eneste art."

Henrik Dissing i Pica

"Lad det være sagt med det samme, de 650 kroner, som værket koster, er godt givet ud, hvis man bare er en lille smule seriøst interesseret i fugle, og man skal være ret sløv, hvis man ikke når at blive meget interesseret før man er færdig."

*Jens Meulengracht-Madsen
i Danmarks Radio*

"Jeg læste bind 1 fra ende til anden i løbet af et par aftener... Og har gentaget seancen med bind 2 i julen. Selv John le Carré måtte vente, så spændende var de."

Søren Ryge Petersen i Politiken

"Fuglene i Danmark – et imponerende stykke arbejde."

Hans Ole Bachmann i Fyens Stiftstidende

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