

SEABIRDS IN SHETLAND: THE 1989 BREEDING SEASON

ZEEVOGELS OP DE SHETLAND EILANDEN: HET BROEDSEIZOEN 1989

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Background

Since 1984 a growing number of Shetland's seabird species have suffered poor breeding success, mainly through the starvation of chicks. Sandeels, especially *Ammodytes marinus*, are the principal food of most seabirds in Shetland during summer and in recent years adult birds have been less able to find sufficient sandeels to sustain growth of their chicks. Arctic Terns *Sterna paradisaea* have fledged virtually no young since 1984, Kittiwake *Rissa tridactyla* breeding success fell in 1985 and that of Puffins *Fratercula arctica* in 1986. These are the three species which Arctic Skuas *Stercorarius parasiticus* kleptoparasitise most and their breeding success has also fallen dramatically. By 1988, Great Skua *Catharacta skua* breeding success was very low and there were indications that the productivity of Fulmars *Fulmarus glacialis* and (in some areas) Razorbills *Alca torda* and Black Guillemot *Cephus grylle* had declined.

The 1989 breeding season

In general, species which suffered low breeding success in 1988 also did so in 1989, although there was considerable variation between colonies, suggesting that food availability was patchy within Shetland as a whole.

Fulmar Noordse Stormvogel

Although chick production was somewhat higher in 1989 than in 1988, it was below that of 1985 (table 1) and breeding success was especially low among inland-nesting birds. On the Yell Sound Islands (figure 1), 69 chicks were ringed at sites where 300-370 were found in the early 1980s, while chicks along the same stretch of coast on Fetlar in early August 1977, 1981 and 1989 totalled 539, 936 and 319 respectively.

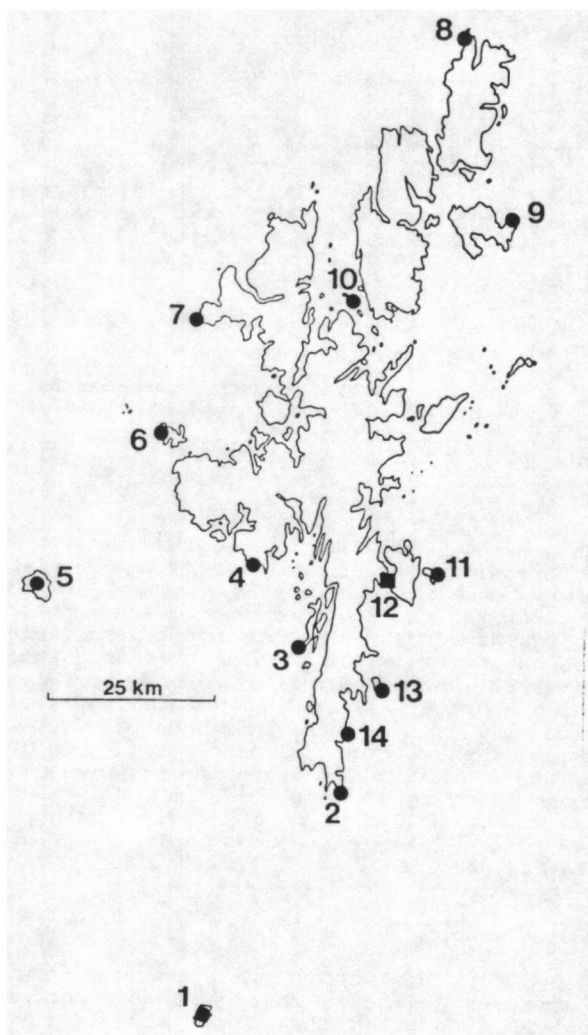


figure 1. Map of Shetland showing the location of seabird colonies and places mentioned in the text.

figuur 1. Kaart van de Shetland eilanden en de ligging van zeevogelkolonies en plaatsen die in de tekst worden genoemd.

1. Fair Isle, 2. Sumburgh Head, 3. Kettlaness, 4. Westerwick, 5. Foula, 6. Papa Stour, 7. Eshaness, 8. Hermaness, 9. Fetlar, 10. Yell Sound Islands, 11. Noss, 12. Lerwick, 13. Mousa, 14. Troswick Ness.

table 1. Fulmar chick production at monitored colonies 1985-89, defined as the number of chicks fledged per mean count of occupied sites during June.

tabel 1. Jongenproductie bij de Noordse Stormvogel op enkele kolonies van 1985-89, gedefiniëerd als het aantal uitgevlogen jongen per gemiddeld aantal bezette nestplaatsen in juni.

year	colonies	number of chicks fledged range	mean
1985	4	0.54-0.69	0.59
1986	5	0.47-0.55	0.51
1987	5	0.42-0.66	0.49
1988	5	0.27-0.46	0.35
1989	6	0.38-0.49	0.46

Arctic Skua Kleine Jager

Breeding success was monitored on Fair Isle, Foula and at 10 other locations throughout Shetland and was highest on Fair Isle, where 0.33 chicks fledged per 'Apparently Occupied Territory' (AOT). The corresponding figure on Foula was 0.15/AOT and in the other 10 monitored areas, containing 172 AOTs, breeding success was only 0.11/AOT compared to 0.13 in 1988. As in 1988, no chicks fledged on Papa Stour where 90-100 pairs of Arctic Skuas bred in the mid-1980s. Most chicks died within 2-4 days of hatching, mainly through starvation although predation by Great Skuas was high on Foula.

Great Skua Grote Jager

Breeding success at five monitored colonies was variable, although low overall (table 2). Dead and predated chicks were found at all

table 2. Great Skua chick production at 5 Shetland colonies in 1989, defined as the number of young assumed to have fledged per AOT. Previous values on Foula were an average of 1.24 between 1960 and 1980 and < 0.01 in 1988.

tabel 2. Jongenproductie van de Grote Jager op 5 kolonies in 1989, gedefiniëerd als het veronderstelde aantal uitgevlogen jongen per territorium. Op Foula werd tussen 1960 en 1980 een gemiddelde van 1.24 vastgesteld en in 1988 < 0.01.

colony	chick production
Fair Isle	0.80
Foula	0.50
Hermaness	1.03
Fetlar	0.13
Noss	0.16

colonies and on Foula low parental attendance led to many chicks being killed by neighbouring skuas. Increased predation by Great Skuas of other seabird chicks and adults (Puffins, Kittiwakes, Arctic Skuas and Eiders *Somateria mollissima*) was reported throughout Shetland.

Kittiwake Drieteenmeeuw

Breeding success (chicks fledged per pair laying) at monitored colonies during 1986-89 is summarized in table 3. As in 1988, breeding success was higher in north-west Shetland, suggesting better feeding conditions along that coast, although large numbers of fledged young were predated at these colonies by Great Skuas. Most nest failures occurred at the early chick stage, following brood reduction and low parental attendance.

table 3. Kittiwake breeding success in study plots at 9 Shetland colonies, 1986-89, defined as the number of chicks assumed to have fledged per pair laying eggs.

tabel 3. Broedresultaat van de Drieteenmeeuw op 'study plots' in 9 kolonies op Shetland, 1986-89, gedefiniëerd als het aantal kuikens dat is verondersteld te zijn uitgevlogen per eierlegendend paartje.

colony	breeding succes (chicks fledged/pair)			
	1986	1987	1988	1989
Fair Isle	1.02	1.00	0.09	0.34
Sumburgh Head	0.64	0.66	0.003	0.07
Kettlaness		0.58	0.00	0.00
Westerwick		0.03	0.00	0.00
Eshaness	0.70	0.68	0.46	0.65
Hermaness				0.42
Fetlar		0.11	0.00	0.00
Noss	0.35	0.24	0.00	0.00
Troswick Ness	1.11	0.47	0.00	0.006

Arctic Tern Noordse Stern

Preliminary results from a census of Shetland colonies, carried out by the Royal Society for the Protection of Birds (RSPB), indicated that breeding numbers had declined by 70% since the previous census which located ca. 31,800 pairs. On Fair Isle, 36 chicks fledged from 283 pairs, but throughout the rest of Shetland fewer than 100 young were estimated to have survived to fledging. Most chicks died within a few days of hatching, mainly through starvation although some predation occurred. Chick were commonly fed insects, which for terns in Shetland was most unusual.

Razorbill Alk

Although no direct measurements of breeding success were made, numbers of chicks at Fair Isle, Sumburgh Head and Hermaness ap-

peared normal. At Hermaness, however, biometric measurements showed that chick growth rates were significantly lower than on Fair Isle. On Foula, few adults were seen carrying fish, very few large chicks were found and a major breeding failure was suspected.

Black Guillemot Zwarte Zeekoet

Breeding success was considered normal on Fair Isle and Mousa, but no adults were seen carrying fish to nests on Foula where breeding success appeared to have been zero.

Puffin Papegaiduiker

Breeding success (defined as the number of chicks fledged per occupied burrow) was monitored at three colonies and found to be highly variable: 0.76 on Fair Isle, 0.00 at Sumburgh Head and 0.04 at Hermaness. The high success on Fair Isle followed two equally good breeding seasons. Sumburgh Head is only 38km from Fair Isle, yet few adult Puffins were seen carrying fish there at any time of the breeding season and an almost complete breeding failure was assumed to have occurred. Many chicks were found dead at burrow entrances at Hermaness and on Foula, where few adults were seen carrying fish and chick production was thought to have been negligible, as in 1988.

Seabirds maintaining high breeding success

Some species of seabird have maintained conspicuously high breeding success in recent years. Gannets *Sula bassana* have been feeding on Herring *Clupea harengus* and Mackerel *Scomber scombrus* during summer and chick production has remained high, with the colonies on Noss and Fair Isle continuing to increase in size. There has been no evidence of reduced breeding success in Cormorants *Phalacrocorax carbo* and little evidence of it in Shags *Phalacrocorax aristotelis*, although some non-breeding may have occurred in 1989. Guillemot *Uria aalge* breeding success has also remained high and while there has been a recent, marked reduction in numbers at colonies, this is thought to be due to increased winter mortality.

Comment

There has been much debate over the reason(s) for the scarcity of sandeels, with suggested causes ranging from 'oceanographic changes' to increased predation of larval sandeels by Herring. In Shetland, many people believe that the local commercial fishery for sandeels has at least played a part in the decline of sandeel stocks, although opinion is divided over whether it has been the main cause or just a contributory factor.

During the 1988/89 winter, conservation organisations made strong representations to the British Government over two measures. The first being the need for a programme of integrated research into

both the feeding ecology of seabirds in Shetland and the distribution, abundance and behaviour of sandeels. In July 1989 Glasgow University was awarded a substantial grant to carry out the seabird aspects of this research, which will compare the feeding and breeding ecology of selected species at one or more Shetland colonies with colonies elsewhere in northern Scotland where breeding success has remained 'normal'. The sandeel side of the research will be carried out by Government fisheries scientists using funds made available by various government departments, conservation bodies and commercial sponsorship.

The second measure was the need for effective control over the local sandeel fishery, and preferably its closure. The fishery started in 1974 and landings rose rapidly to a peak of 52,600 tonnes in 1982. During 1981-84, average annual landings were 41,575 tonnes but have declined since to only 4,800 tonnes in 1988. In 1989 boats were unable to locate sandeels in commercial quantities on traditional grounds close to the port of Lerwick and most of the catch of c. 2,000 tonnes was obtained around Fair Isle. Until 1989, there was no statutory control over the fishery which, at its peak, was limited only by the quantity that the fish meal factory at Lerwick could process. In June 1989, the government announced that the fishery would be closed from 1st July each year in order to protect juvenile sandeels, which appear in the catch during June and traditionally formed a large part of the annual landings. A fishery will be allowed during the first half of 1990 and subsequent years, but no decision has yet been made as to how it might be controlled or what limit will be placed on landings. However, in the present circumstances the most effective conservation measure for the greatly reduced sandeel stock would be to close the fishery entirely. It may have little immediate effect but it is the only action we can take to help improve a very worrying situation.

Acknowledgements

Information on breeding success was collected by the following organisations: British Trust for Ornithology, Fair Isle Bird Observatory, Glasgow University, Leicester Polytechnic, Nature Conservancy Council, Royal Society for the Protection of Birds, Shetland Oil Terminal Environmental Advisory Group and the Shetland Ringing Group.

Samenvatting Sinds 1984 hebben meer en meer zeevogelsoorten op de Shetland Eilanden problemen gekregen bij de jongenproductie. De voornaamste oorzaak is de onvoldoende beschikbaarheid van zandspiering *Ammodytes marinus*, het voornaamste voedsel van deze soorten in de zomer. In dit artikel een bespreking van de broedresultaten in 1989, in vergelijking met de tegenvallende resultaten in eerdere jaren. Over het geheel genomen viel het broedsucces van soorten die in 1988 al slechte resultaten boekten ook in 1989 tegen, maar er was een aanzienlijke variatie van plaats tot plaats, vermoedelijk als gevolg van verschillen in de beschikbaarheid van voedsel.

Bij de Noordse Stormvogel was het broedresultaat iets beter dan in 1988, maar nog steeds duidelijk minder dan in 1985 (tabel

1). De resultaten waren vooral teleurstellend bij broedparen in het binnenland. De Kleine Jager had de beste resultaten op Fair Isle (0.33 jongen per territorium; voor plaatsnamen zie figuur 1) en ronduit teleurstellende resultaten op Foula (0.15) en in 10 andere gebieden (totaal 172 territoria; 0.11). Verhongering van de jongen en verhoogde predatie door de Grote Jager waren belangrijke factoren. Het broedsucces van de Grote Jager was over het geheel gezien vrij laag, maar wisselde van plaats tot plaats (tabel 2). Veel kuikens werden geconsumeerd door naburige broedparen omdat de ouders te lang bij de nesten wegbleven en op heel Shetland werd vastgesteld dat de Grote Jager op veel uitgebreidere schaal dan normaal kuikens van andere zeevogels roofde. Het broedsucces van de Drieteenmeeuw was een fractie beter dan in het treurige seizoen van 1988 (tabel 3), vooral op de noordwestelijke kolonies. De populatie van de Noordse Stern is sinds 1980 (31.800 paren) met 70% afgenomen. Seizoen 1989 was wederom rampzalig (36 uitgevlogen jongen van 283 paren op Fair Isle, minder dan 100 uitgevlogen jongen op de rest van Shetland). De meeste kuikens stierven enkele dagen na het uitkomen door verhongering en, hoogst ongebruikelijk, veel kuikens kregen insecten aangeboden door de ouders. Van de Alk zijn geen concrete gegevens van het broedsucces bekend. Op Hermaness leek de groei van de kuikens achter te lopen en op Foula leek het broedseizoen een totale mislukking te zijn geweest. Zwarte Zeekoeten kenden een goed jaar op Fair Isle en Mousa, maar op Foula zijn vermoedelijk geen jongen uitgevlogen. Het broedsucces van de Papegaaiduiker, onderzocht op een drietal locaties, liep sterk uiteen: 0.76 kuikens per bewoond hol op Fair Isle, 0.00 op Sumburgh Head en 0.04 op Hermaness.

Een aantal zeevogelsoorten is in staat gebleken om ook de laatste jaren 'normale' aantallen jongen te produceren. De Jan van Gent fourageert tegenwoordig hoofdzakelijk op Makreel en Haring en de kolonies op Noss en Fair Isle groeien nog steeds. Van de Aalscholver en Kuifaalscholver zijn geen tegenvallende resultaten bekend geworden. De Zeekoet heeft nog steeds goede broedresultaten. Dat de populatie van deze soort toch sterk afneemt wordt geweten aan toegenomen sterfte in de winterkwartieren.

Over de precieze oorzaak van het geringe aanbod zandspiering is nog steeds onduidelijkheid. De in 1974 begonnen commerciële visserij op zandspiering is vermoedelijk een belangrijke factor in het geheel, maar het is volstrekt niet zeker dat deze visserij de enige oorzaak van de schaarste is. Aangedrongen wordt op geïntegreerd onderzoek, naar de ecologie van Shetland's zeevogels en naar de verspreiding, de talrijkheid en het gedrag van zandspiering. Voorts wordt gesuggereerd om effectieve maatregelen ter beheersing van de zandspiering visserij te nemen of, liever nog, deze visserij geheel te sluiten. Het direct sluiten van de visserij wordt als enige mogelijkheid gezien om nu iets aan de zorgwekkende toestand te doen, ook al is het directe effect misschien klein.

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