

Seabirds and fisheries in the southeastern North Sea

Zeevogels en visserij in de zuidoostelijke Noordzee

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Introduction

There are various ways in which fisheries may influence seabird populations. Heavy exploitation of predatory fish probably caused shifts in the abundance and size distribution of fish species used as food by seabirds. Fisheries are liable to provide additional food in the form of offal and discards. Conversely, surplus mortality may occur, due to drowning in fishing nets and entanglements in filaments and nets. Finally fishery activities may, at least locally, cause disturbance among foraging or resting birds at sea.

In general, seabirds and many coastal birds benefit from fisheries in the southeastern North Sea (Hüppop 1991). First, the overfishing of large predatory fish, starting as early as the end of last century, seems to have increased the stocks and production of smaller sized fish (Daan *et al.* 1990), which are preyed upon by a large number



of seabird species. Presumably, the increase in seabird and coastal bird numbers since about 80 years was at least partly facilitated by an improved food base (e.g. Camphuysen 1990, Furness *et al.* 1992). Secondly, the overall increase of fisheries since World War II made an enormous amount of surplus food available to seabirds. The fisheries on gadoids and flatfish catch large quantities of fish that cannot be landed because they are undersized or because they are without economic value. These fish are discarded and mainly preyed upon by Gannets *Sula bassana* and large gulls (*Larus* spp.). Furthermore, fishes that are gutted or filleted at sea, provide large quantities of offal. Almost throughout the whole North Sea, this offal is used by Fulmars *Fulmarus glacialis* and gulls, including the smaller species, such as Kittiwake *Rissa tridactyla*, Common Gull *Larus canus* and Black-headed Gull *L. ridibundus*. Furness *et al.* (1988, 1992) gave detailed information on the use of discards and offal by seabirds around Scotland. However, there are hardly any data from other parts of the North Sea, including the German Bight. As the knowledge about the reasons of the increase in seabird numbers in this area is still fairly poor and hypothetical, the Institut für Vogelforschung "Vogelwarte Helgoland" started a study on seabird-fisheries relationships in 1990. This preliminary report contains some early results of this study.

Seabirds as scavengers at trawlers

The distribution of gulls, especially the larger species, at sea is mainly determined by the distribution of fishery vessels. Fulmars are scarce in the inner German Bight (there are about 80 pairs at Helgoland). Experiments on board RV *Uthörn* (Biologische Anstalt Helgoland) in 1991 have shown that 38% of all flatfish discarded ($n = 878$) and 88% of all roundfish discarded ($n = 645$) were taken by Herring Gulls *Larus argentatus*, Great Black-backed Gulls *L. marinus* and Lesser Black-backed Gulls *L. fuscus*. The roundfish catch consisted mainly of Cod *Gadus morhua*, Whiting *Merlangius merlangus* and Bib *Trisopterus luscus*, the flatfish of Dab *Limanda limanda*, Flounder *Platichthys flesus* and Plaice *Pleuronectes platessa*. Whereas in roundfish almost all sizes offered were taken (up to a length of 38 cm), in flatfish all sizes above 29 cm were rejected. The size distribution (figure 1) shows that Lesser Black-backed Gulls and Herring Gulls, on average, take significantly smaller fish than Great Black-backed Gulls in both flatfish and roundfish (ANOVA, $p < 0.0001$). The smaller proportion of flatfish taken compared to that of roundfish taken is due to the more complicated handling of flatfish (Hudson & Furness 1988, own observations) and to their higher survival rate

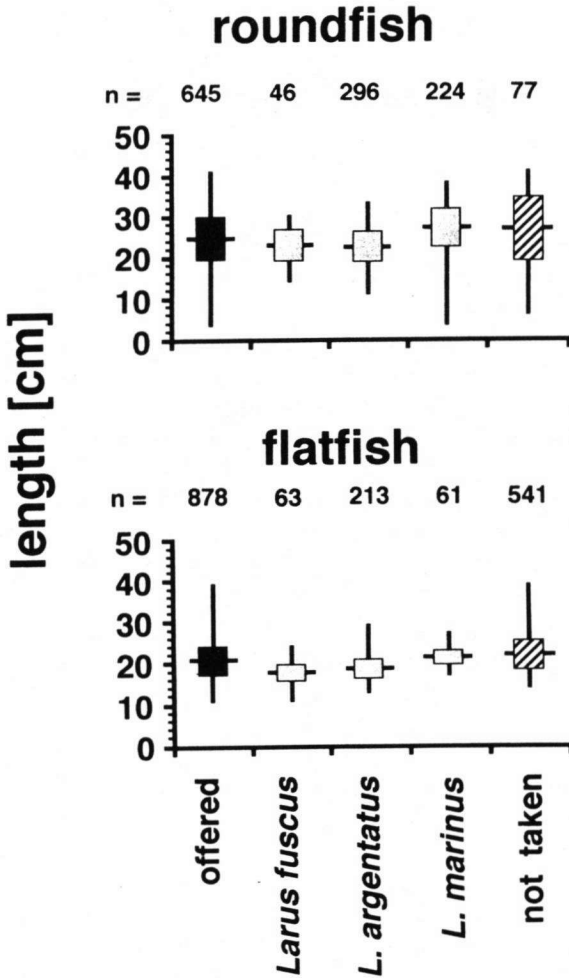


Figure 1. Length of roundfish and flatfish offered to and taken by Great Black-backed Gull, Herring Gull and Lesser Black-backed Gull near Helgoland, German Bight, North Sea. Mean (horizontal bar), S.D. (box) and range (vertical bar). Two roundfish taken by Yellow-legged Gulls *Larus cachinnans* are included in the 'offered' total.

Figuur 1. Lengte van rondvis en platvis aangeboden aan en opgepikt door Grote Mantelmeew, Zilvermeew en Kleine Mantelmeew nabij Helgoland, Duitse Bocht, Noordzee. Gemiddelde, S.D. en range. Twee rondvissen die door Geelpootmeewen werden opgepikt zijn verwerkt in het 'aangeboden' totaal.

when discarded (Kelle 1976). Near Helgoland, offal is mainly taken by Herring Gulls (58%, $n = 127$) and Lesser Black-backed Gulls (12%). In more offshore waters, Fulmars are the most numerous users of offal (Hüppop unpubl.). Based on a very crude estimate, about 300 g/kg of a roundfish haul and 150 g/kg of a flatfish haul are taken as food by seabirds in the German Bight (estimates of discard and offal according to Furness *et al.*, i.c., proportion used was derived from our own data).

At least in offshore waters of the German Bight, gulls are extremely dependent on fishery waste. Without fisheries (*e.g.* during periods of storm), the birds may suffer from food shortage already after 4-5 days. They then become very aggressive towards other birds, come on board the ship, where some of them can even be caught by hand, and take crustaceans (mainly *Lio-carcinus*) and starfish *Asterias rubens* in large quantities, which they normally do not take. Hence, it is reasonable to assume that fisheries are one cause of the increase of gulls in this area. This holds for breeding numbers as well as for staging birds. Nevertheless, it should be kept in mind that this increase coincided with a better protection of seabirds from the beginning of this century onwards. However, nowadays the numbers of some species (*e.g.* most gulls, Fulmar, Gannet) are probably even higher than before the beginning of their extensive exploitation by man. It is most likely that any change in fishery practices will affect both bird numbers and distribution.

Negative effects of fisheries on seabirds

Other influences of fisheries on seabirds are disturbances of birds and entanglements in lost nets and filaments. The fleeing distances away from boats of some species, *e.g.* scoters and divers, are as large as one km or more. It can be expected that fishery activities may keep these birds away from areas that are attractive for both birds and fishermen. Drowning in nets appears to be no problem in the German Bight (but it is in other areas, *e.g.* Strann *et al.* 1991). In contrast, entanglement is a considerable factor of mortality. Schrey & Vauk (1987) found that 2.6% of all Gannets observed at Helgoland were entangled in filaments and nets. The first breeding of the species on this island, in 1991, failed because the chick was confined to the nest by a nylon-thread (Müller 1992).

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Samenvatting

De mogelijke invloeden van visserijactiviteiten op zeevogels zijn velerlei. De onttrekking van bepaalde vissoorten door de visserij kan leiden tot een verschuiving in soort- en groottesamenstelling van de aanwezige vispopulaties. Als de onttrekking betrekking heeft op dezelfde soorten en grootteklassen als die door de vogels als prooi worden benut, zal de invloed negatief zijn. In de Duitse Bocht lijkt het echter eerder zo, dat de overbevisning van grote roofvis een verschuiving ten gunste van de kleinere soorten tot gevolg heeft gehad, waar zeevogels van kunnen hebben geprofiteerd. Een ander belangrijk voordeel dat zeevogels (met name meeuwen, Noordse Stormvogels en Jan van Genten) van visserij kunnen hebben is het fourageren op overboord gezet visafval en bijvangst. In de Duitse Bocht wordt de verspreiding van de grote meeuwesoorten vrijwel geheel bepaald door de verspreiding van vissende schepen. Noordse Stormvogels zijn in dit gebied schaars. Waarnemingen op zee leidden tot de schatting dat 38% van alle bijvangsten aan platvis en 88% van de bijvangsten aan rondvis benut worden door Zilvermeeuwen en Grote en Kleine Mantelmeeuwen. Van rondvis werden alle grootteklassen gegeten, terwijl van platvis de grotere exemplaren werden geweigerd. De meeuwen in dit deel van de Noordzee lijken zeer afhankelijk van de visserij. Na enkele stormachtige dagen waarbij niet gevisst kan worden, vertonen ze tekenen van uitputting door voedselgebrek. Tenslotte wordt nog kort aangegeven dat verstoring door de vissende schepen met name voor zwemmende zeevogelsoorten als duikers en zeeënden een negatieve invloed kan hebben.

References

- Camphuysen C.J. 1990. Fish stocks, fisheries and seabirds in the North Sea. Feasibility study for a detailed analysis of interactions between fish stocks, fisheries and wintering seabirds. Techn. Rapport Vogelbescherming 5.
- Daan N., Bromley P.J., Hislop J.R.G. & Nielsen N.A. 1990. Ecology of North Sea fish. Neth. J. Sea Research 26: 343-386.
- Furness R.W., Hudson A.V. & Ensor K. 1988. Interactions between scavenging seabirds and commercial fisheries around the British Isles, pp. 240-268. In: Burger J. (ed.). Seabirds & other marine vertebrates. Columbia Univ. Press, New York.
- Furness R.W., Ensor K. & Hudson A.V. 1992. The use of fishery waste by gull populations around the British Isles. Ardea 80: 105-113.
- Hudson A.V. & Furness R.W. 1988. Utilization of discarded fish by scavenging seabirds behind white fish trawlers in Shetland. J. Zool., Lond. 215: 151-166.
- Hüppop O. 1991. Artenschutzprobleme im Nordseebereich. Seevögel 12, Sonderh. 1: 45-52.
- Kelle W. 1976. Sterblichkeit untermaßiger Plattfische im Beifang der Garnelensfischerei. Meeresforsch. 25: 77-89.
- Müller H.H. 1992. Der Baßtölpel *Sula bassana* als neuer Brutvogel auf Helgoland. Orn. Jber. Helgoland 2: 57-61.
- Schrey E. & Vauk G. 1987. Records of entangled Gannets (*Sula bassana*) at Helgoland, German Bight. Mar. Poll. Bull. 18/6B: 350-352.

Strann K.-B., Vader W. & Barrett R. 1991. Auk mortality in fishing nets in north Norway. *Seabird* 13: 22-29.

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