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Extensive investigations into the effects on seabirds of the oil pollution on the German North Sea coast

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Between 1983 and 1988 oiled seabirds were counted and collected on a number of sampling routes (total length 65 km) and additional 550 km of count-transects along the German North Sea coast. The aim of this study was to obtain information about which species were involved and on the regional differences in the extent of creeping oil pollution in the German Bight. All the collected seabird corpses were examined, oil remains in their feathers being analysed in the laboratories of the German Hydrographic Institute (DHI). During the study period a total of 40,516 birds were found dead along the sampling routes, 16,516 of which were oiled. Thus the oiling rate averaged 41.3%. The rate proved to be higher on island beaches facing the open sea than on mainland coasts opposite the islands. Auks (Alcidae), eiders (*Somateria mollissima*) and common scoters (*Melanitta nigra*) were the species suffering the greatest numbers of oil-victims. Fuel residues from ships' engines constitute the main source of creeping oil pollution.

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Seabirds are of prime importance as indicator organisms in securing reliable data on volume, extent and effects of creeping oil pollution in the marine environment. Extensive investigations into the numbers, species and distribution of oiled seabirds are urgently required in order to be able to keep track of long-term shifts in the extent of this threat to the environment.

As far back as 1960, the Bird Observatory (Vogelwarte) on the island of Helgoland began a systematic count of oiled seabirds (Fig. 1). Up to 1978, the number of oiled cadavers found averaged 40 per year. Fluctuation between years was relatively slight. A striking increase in the number of oil-victims was first observed in 1979, and this was to persist at least until the early eighties. Between 1979 and 1987, an average of 353 oiled birds per year was found on Helgoland. Camphuysen (1989) describes practically identical developments in the Netherlands.

The causes of this drastic deterioration could at first only be guessed at. The Federal Office of the Environment (Umweltbundesamt) reacted by instigating a research study, in the course of which counts, samplings and examinations of oiled seabirds were to be

evaluated and the type and origin of the oil identified through residue analyses. These latter were carried out in Hamburg by the DHI (German Hydrographic Institute).

Those parts of the coast checked between August 1983 and April 1988 are shown in fig. 2. Permanent sampling routes with an overall length of 65 kilometers were set up along the coast. In addition, fortnightly counts were carried out throughout the winter months along a total of approx. 550 km of coastline.

In all, 40,516 dead bodies were recorded in the above-mentioned period (Fig. 3). Of these, 41.3% (16,753) were oiled. This oiling rate (number of oiled birds expressed as a percentage of the total) varies strikingly from area to area.

The highest values - between 35% and 45% - were recorded on the islands and the exposed coasts. Stretches of coast sheltered by off shore islands returned lower values of between 22% and 30%. The 94% oiling rate in the area around the Elbe estuary can be regarded as an exception, being for the most part accounted for by the "Brady - Maria" incident on the 3/1/1986.

The bulk of the 16,753 oil victims were auks (Alcidae), eider (*Somateria mollissima*)

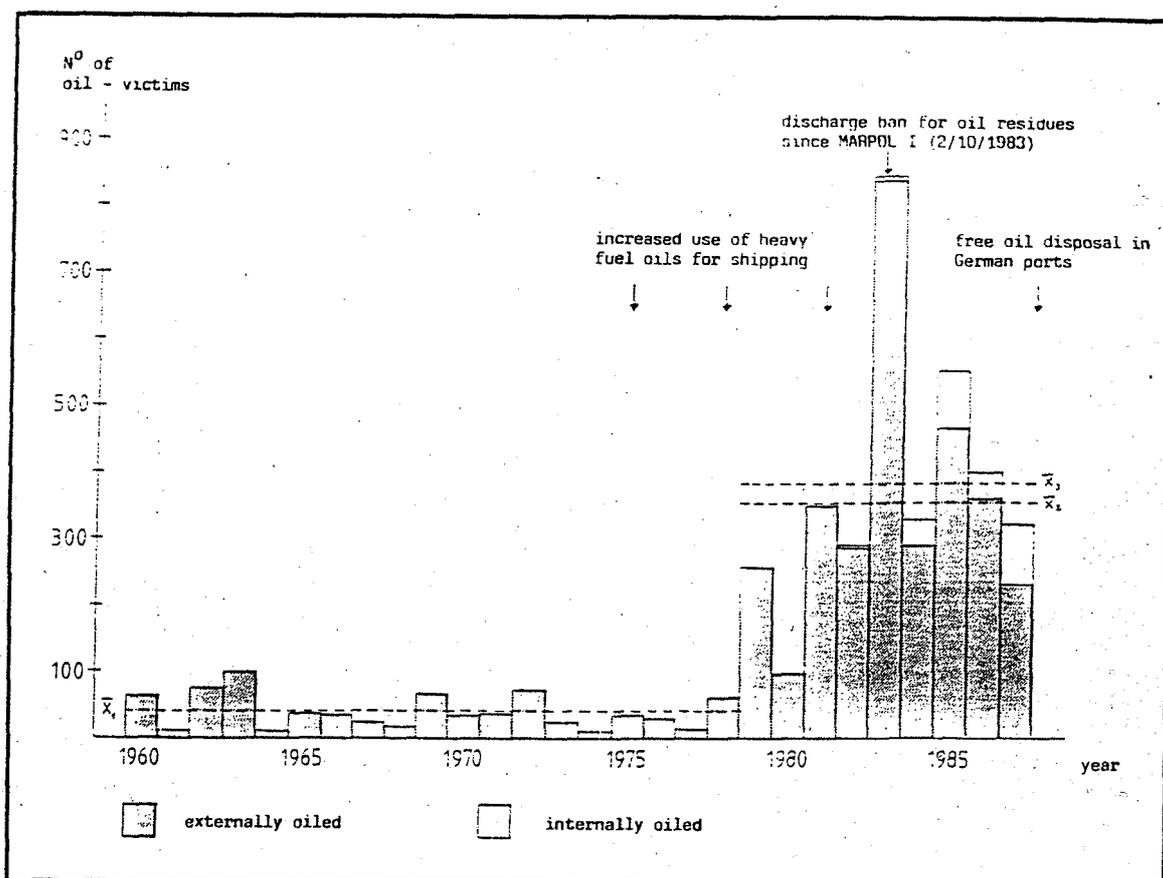


Fig. 1. The number of oiled seabirds found dead on Helgoland from 1960 to 1987.

and common scoter (*Melanitta nigra*) (Fig. 4). Other species suffering top oiling rates as a consequence of their way of life were divers and grebes (black-throated diver (*Gavia arctica*) and red throated diver (*Gavia stellata*) with oiling rates of 79.7%, red-necked grebe (*Podiceps griseigena*), great crested grebe (*Podiceps cristatus*) and dabchick (*Tachybaptus ruficollis*) with oiling rates of 68.9%).

Regional differences are observable. Whereas auks, principally guillemots (*Uria aalge*) and razorbills (*Alca torda*), species at home far out on the open sea, are the most frequent victims washed ashore on the East Frisian Islands and Helgoland, it is the sea ducks and larger gulls which make up the bulk of those found on the North Frisian Islands and on the coast of Schleswig Holstein and Lower Saxony.

As mentioned above, the determination of oil pollution sources in the North Sea is one of the main areas of investigation. The suspicion - at first glance very plausible -

that the increasing number of oil-victims in the late 70s was connected with the parallel expansion of North Sea oil-drilling activities proved to be unfounded at least for the North Sea coastal area after 2,537 oiled plumage samples had been analysed. 92.7% of the samples were found to be composed of fuel oil residues and a mere 2.7% of crude oil (Dahlmann pers. comm.).

As a consequence of the rising oil prices in the 70s, more and more propulsion units in sea going vessels were converted from the burning of expensive diesel fuels and adapted to the use of cheaper heavy oil. This fuel contains varying amounts of water and sludge, which get precipitated as waste products in the process of preparing the fuel on board and which require to be discharged in port. Obviously, it is cheaper and quicker simply to pump the waste overboard while still at sea, which accounts for about 100,000 tons of oil residues per year landing in the North Sea (Carlson, 1986).

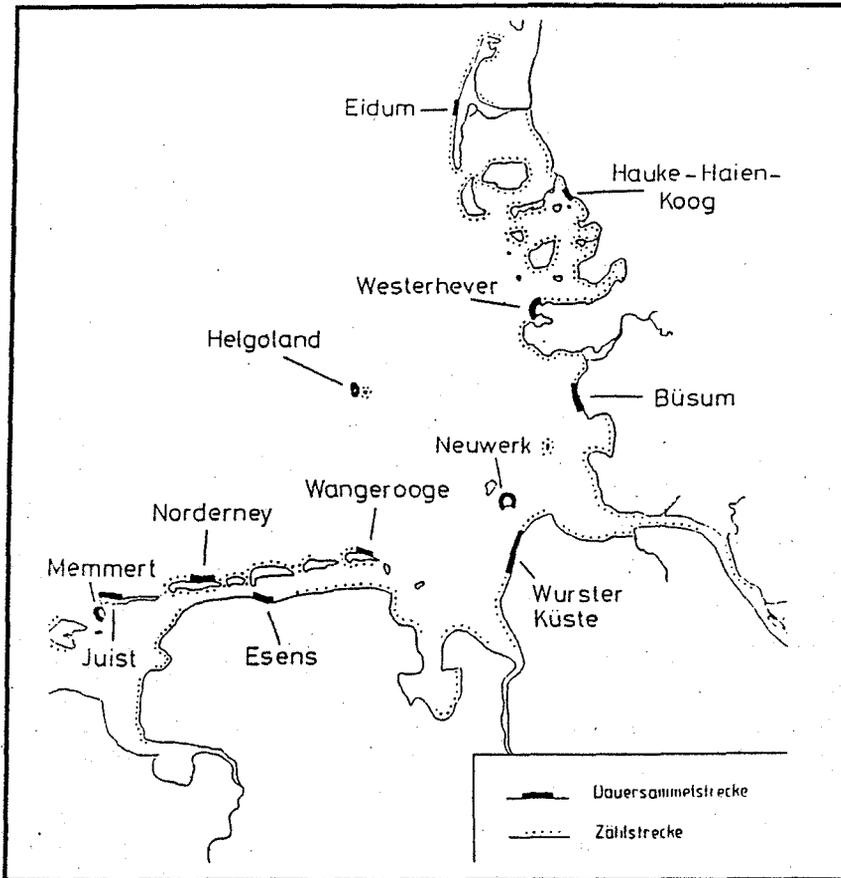


Fig. 2. The coastal areas on which oiled seabirds were sampled (black bars) or counted (dotted line) from August 1983 to April 1988.

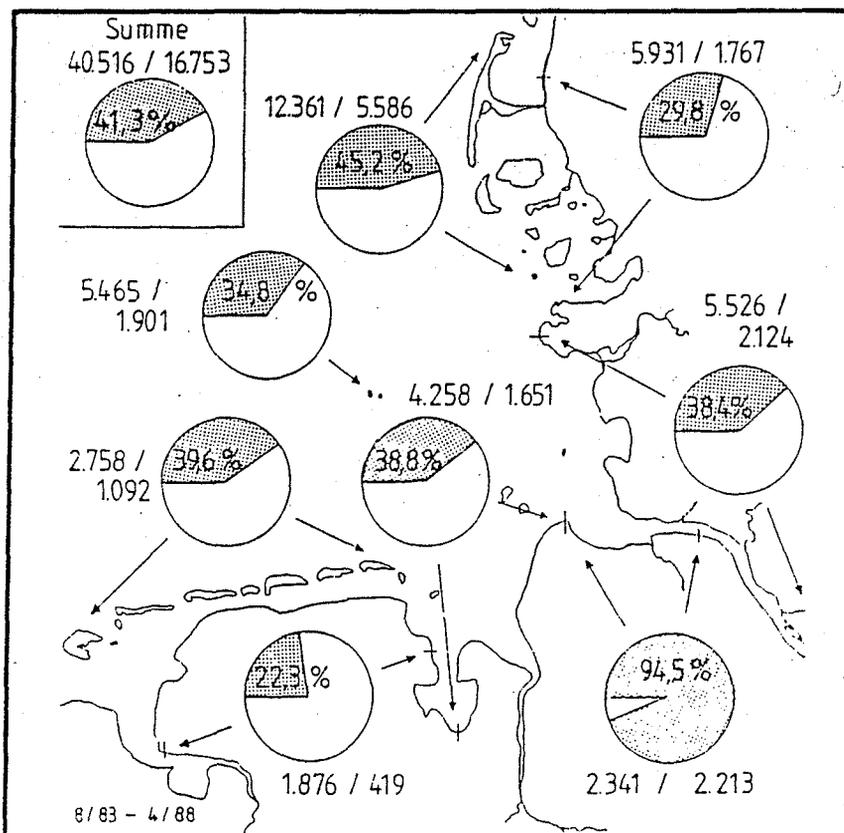


Fig. 3. Regional differences in oiling rate of birds found dead in the control areas from August 1983 to April 1988.

Numbers: total number of dead birds/oiled birds. Shaded: oiling rate.

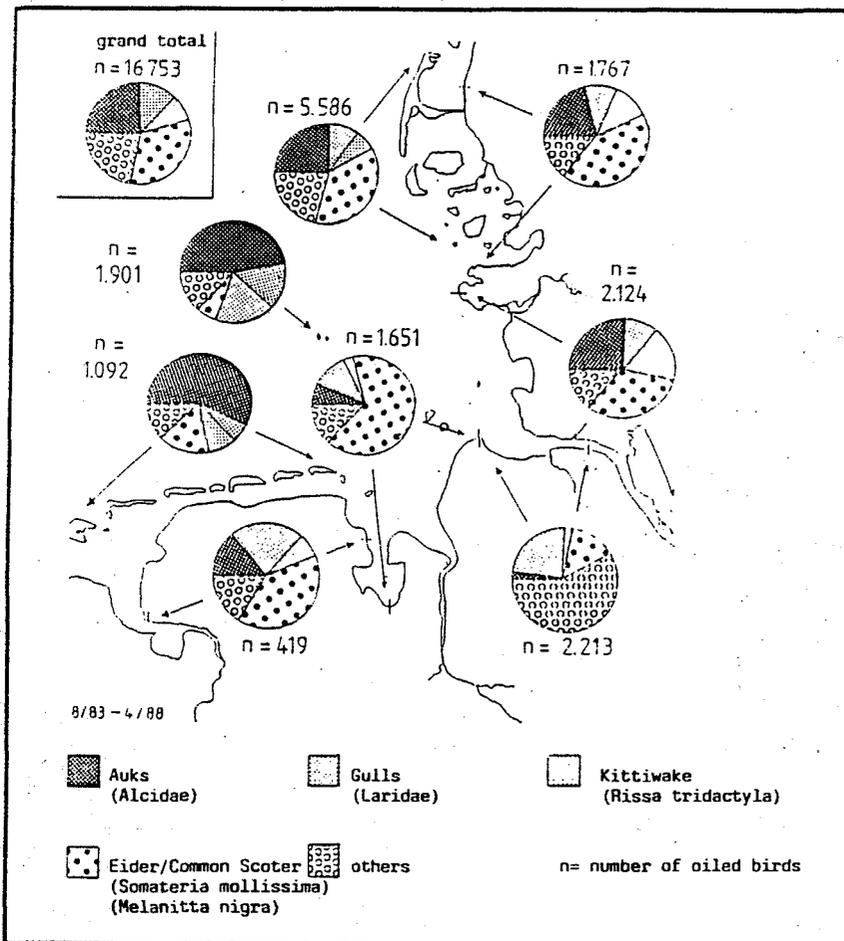


Fig. 4. Regional differences in species constellation of oiled - victims in the period from August 1983 to April 1988.

Since the 2/10/1983, it has been forbidden for the signatories of the MARPOL Convention (an international agreement on the prevention of the pollution of the marine environment through shipping) to release untreated fuel residues into the sea. It is, however, still permitted to discharge certain dilute concentrations of an oil/water suspension which leaves no visible oil film on the surface and which is thus thought not to endanger seabirds. Up to now, the monitoring programme, the rare successful prosecutions and the token punishment of offenders have done nothing to prevent the continued illegal pollution of the North Sea. With the aim nonetheless of achieving a significant reduction of the quantities discharged, a federal provincial convention on free oil residue disposal in German ports came into force, albeit initially limited to a three year period, on 1/6/1988 in the FRG. A monitoring project - financed once more by the Federal Office of the Environment - is running simultane-

ously in order to discover whether this measure succeeds in effecting a drastic reduction in the mortality of wintering seabirds in the southern North Sea. Similar methods will be used to continue the documentation of oil victims on 7 sampling routes for a further three years from 1988 to 1992.

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