

# MONITORING THE BOTTOM FAUNA IN THE DUTCH SECTOR OF THE NORTH SEA FOR 15 YEARS.

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**This programme has registered the development of the bottom fauna of the Dutch Continental Shelf (DCS) of the North Sea for a period of 15 years (1991-2006). Its goal has been to generate a time series, which can form a basis to detect trends in time and in space in four different regions of the DCS. On local scale, rather strong fluctuations were sometimes observed in the abundance of individual species. On a DCS wide scale however, the fauna showed hardly any trends.**

In 1989 the national program BIOMON was started for biological monitoring of the waters in the Dutch sector of the North Sea, the Wadden Sea and the Delta area. The program was initiated by the National Institute for Coastal and Marine Management (RIKZ) of the Ministry of Transport, Public Works and Water management. It comprises monitoring of all trophic levels in the food web, from plankton to top predators like birds and mammals. BIOMON is carried out by several institutes; NIOZ has contributed to the program from 1991 onwards with monitoring of the animals larger than 1 mm in body-size living in or on the bottom of the North Sea; the benthic fauna.

In the framework of BIOMON, 100 stations have been chosen in the North Sea, which were sampled every year with a boxcorer. The stations are located within the four regions Dogger Bank, Oyster Grounds, the southern offshore area and the Dutch coastal area. Within each region, the locations of the stations were chosen at ran-

dom, with the number of stations being proportional to the surface area of each region.

During 15 years of monitoring, over 400 species have been identified, mainly belonging to 4 taxonomic groups: polychaete worms, crustaceans, molluscs and echinoderms.

At the community level, there appeared to be no clear trends in the changes over the entire period. The species diversity was consistently highest at the Dogger Bank and in the Oyster Ground, on average twice as high as in the southern offshore and coastal areas. The overall faunal densities were generally the highest in the Oyster Ground. The highest biomass values were found in the coastal area, due to the presence of very densely populated banks of truncated surf clams (*Spisula subtruncata*) or American razor clams (*Ensis americanus*). The latter species has invaded the North Sea from the East-coast of the United States and Canada. At coastal stations where these bivalve species were absent, the biomass values

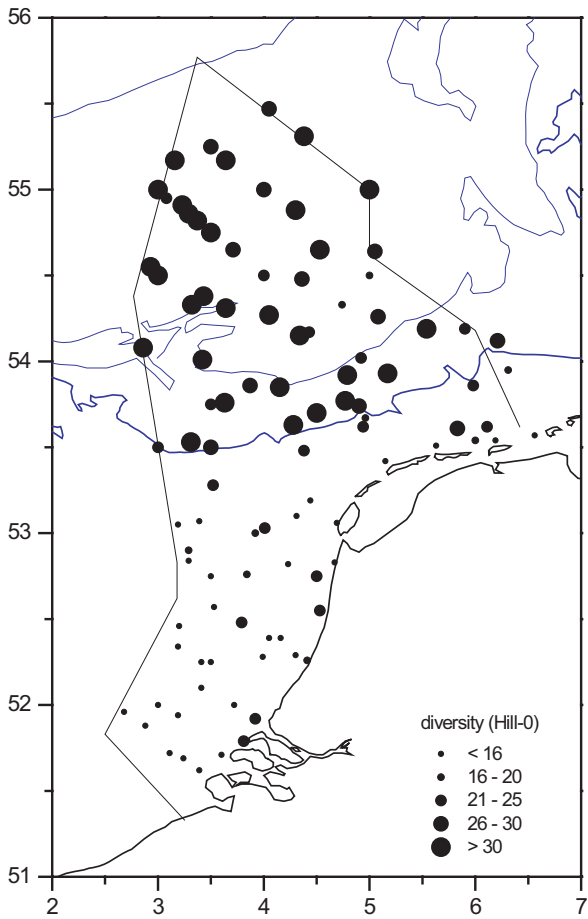
were usually the lowest of the whole DCS.

At the species level, there were some clear trends. At the Dogger Bank the small polychaete worm *Aricidea minuta* was common in the nineties, but the species completely disappeared after 1999. A few years later this sand dwelling species showed a decrease in the southern offshore area too. In the Oyster Ground there was a period

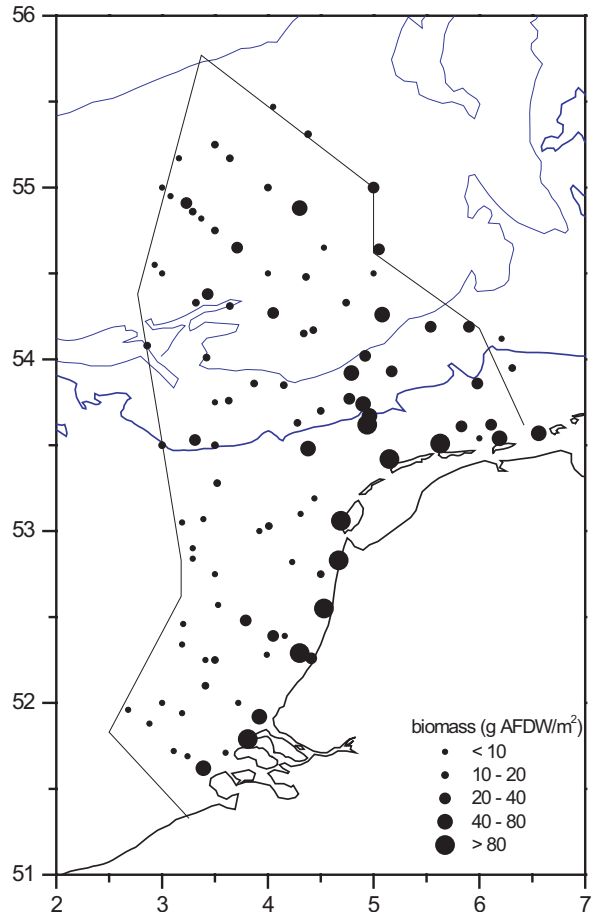


Sediment core collected in the Oyster Ground.

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Species richness: numbers of species per boxcore sample in 2005.



Total biomass of the benthic fauna in 2005.



Boxcorer.

of low abundance of the brittle star *Amphiura filiformis* and the mud shrimp *Callinassa subterranea* in the second half of the nineties, but the densities of both species recovered rapidly after 2000. In the coastal area there seemed to be a decrease in the densities of the truncated surf clam (*Spisula subtruncata*). Possibly there has been no successful spatfall in recent years, but it can not be excluded

that banks with extremely high densities of this species were not covered by our sampling stations.

In the Oyster Ground, a substantial decrease was observed in fine particles in the bottom, in particular the silt content (particles smaller than 63 micrometer) of the upper 10 cm of the sediment, from 2001 onwards. At the 42 stations in this area the average silt content decreased from 13 to 8% within a

period of 4 years. Before the decrease there were 12 stations with silt contents well above 20%, but after 2001 such high concentrations were no longer observed. The decrease was particularly dramatic in the highly productive Frisian Front area. However, there is no indication that the decrease of silt concentrations has affected the abundance of any of the common species occurring here.