

## INTRODUCED MARINE SPECIES OF THE NORTH SEA COASTS

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### Abstract

Approximately 80 nonindigenous species occur in the North Sea in self-sustaining populations. The main introducing vectors are shipping and aquaculture activities. Most invertebrate invaders originate from the Atlantic coast of America and were predominantly introduced by shipping, while most algae stem from the Pacific being introduced with live oysters imports. At the open North Sea coasts approximately 6% of the macrobenthic species are exotics, while in estuaries their share is up to 20%. About a quarter of the established non-natives are widespread and some inshore habitats are entirely dominated by exotics. However, the overall effect on the North Sea ecosystem seems to be more additive rather than one of displacement, suggesting that the coastal habitats of the North Sea are capable of accommodating newcomers. It has to be noted that this is no guarantee that the next invader may pose a negative impact. There is a need to reduce the number of new invaders, but current research on exotics in the North Sea is regarded as inadequate.

### 1 Introduction

Non-native species of the North Sea are here defined as species distributed outside the Atlantic coast of Europe (Gibraltar to North Cape). We further restrict this overview to species likely being introduced via anthropogenically supported vectors (intentional and unintentional introductions). North Sea boundaries are defined following the North Sea Task Force (1993), which includes the Channel region in the south, the Skagerrak and Kattegat in the east, and the Shetland Islands in the north. Species in brackish habitats were included when a salinity of > 5 PSU is regularly encountered at the sites.

This contribution briefly summarises invaders in the North Sea. A more extensive review is given by Reise et al. (1999).

### 2 Exotics in the North Sea

The number of invaders that established in the North Sea amounts to about 80 species (Table 1). This total number is lower compared to estuarine regions in North America, i.e., Chesapeake Bay (116 species), Great Lakes (137) and San Francisco Bay (212) (reviewed in Ruiz et al. 1997), but some of these studies include organisms from freshwater as well as terrestrial shores and wetlands, while this report focuses on marine and brackish water organisms. The majority of exotics in the North Sea are invertebrates (47), primarily crustaceans, molluscs, polychaetes and hydroids (Table 2). Introduced macroalgae comprise 20 taxa, mostly red and brown ones. *Chattonella* cf. *verrucolosa* (Raphidophyta) was first recorded from the North Sea in 1998 but it is not proven that