

# IMPACTS OF CLIMATE CHANGE ON NON-NATIVE SPECIES

**Philip C. Reid**

Sir Alistair Hardy Foundation for Ocean Science

## Executive Summary

Non-native species are taken as the macro fauna and flora that have been introduced from outside their natural range and have become established in the wild in UK waters. Some of these species can be considered to be invasive if they spread rapidly and cause environmental or economic problems. Most organisms have come from similar latitudes, largely from the Northern Hemisphere. Few if any of the introductions to date are a consequence of climate change although future temperature increases will enable a wider range of species to invade and there is a real possibility that new HAB species may become established. Smaller organisms (< 20 µm) are typically not unique to the UK as they tend to have a wider hemispheric or global distribution. More than 60 species of mostly red algae, polychaete worms, crustaceans and molluscs have been introduced over the last century; the vast majority of the introductions are not considered as invasive. The list includes five planktonic diatoms and at least one dinoflagellate that forms red tides is believed to be an introduction.

The number of records of introduced species recorded for Europe has increased with time, but there is no trend in the numbers that have established themselves in the UK. More than 50% of the introductions are believed to have originated from fouling on ship bottoms or ballast water and the remainder in association with deliberate introductions of shellfish for mariculture. Of the species deliberately introduced for aquaculture, only a few bivalve molluscs have become established in the natural environment beyond the confines of their cultivation. For example *Crepidula fornicata* has become a dominant mollusc in estuaries on the south coast and especially in the Solent, outcompeting oysters. The speed of spread of organisms is very dependent on their life cycle and if it includes a planktonic phase. Some planktonic diatoms have spread throughout the north-west European shelf and become important members of the ecosystem in less than 10 years. In general however, impacts on the UK marine environment have not proved to be as detrimental as reported from elsewhere in the world.

Commercially, some economically important species have been introduced, but some associated pests and parasites adversely affecting native species have also been unintentionally introduced. Control methods, where applied to nuisance species, are fairly ineffective and no non-native marine species have yet been successfully eradicated from British waters. Interpretation is still at an early stage as the impacts and ecology of the invaders is poorly known and to our knowledge no modelling studies have been undertaken.

## Level of Confidence

I suggest a medium level of confidence on both axes. This applies to non-native species overall and not to individual introductions as the potential risk from a new introduction in the future could be very high. Thus the level of confidence that the introductions to date are linked to climate change is high and the information available moderate.

## Key sources of Information

JNCC report (1997) Non-native marine species in British waters: a review and directory.

[http://www.jncc.gov.uk/pdf/pub02\\_nonnativereviewdirectory.pdf](http://www.jncc.gov.uk/pdf/pub02_nonnativereviewdirectory.pdf)

Website: Invasive non-native species in the UK. University of Liverpool

<http://138.253.199.114/IAAP%20Web/IAAPwebsite/index.asp>

ICES Working Group on Introductions and Transfers of Marine Organisms Documents annually from national reports the spread and impact of invasive spp.

<http://www.ices.dk/iceswork/wgdetailacme.asp?wg=WGITMO>

ICES/IOC/IMO Working Group on Ballast and Other Ship Vectors

<http://www.ices.dk/iceswork/wgdetailacme.asp?wg=WGBOSV>

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