THE VALUE OF SEABED SEDIMENTS FOR BOTTOM-DWELLING COMMUNITIES

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Introduction

Many commercially important demersal fish and shellfish are typically associated with a specific seabed sediment and/or habitat type. Plaice, *Pleuronectes platessa*, for example, are commonly found inhabiting sandy substrates covered with prominent sessile epifauna. Fundamental relationships, however, between these benthic organisms and the seabed are largely unknown.

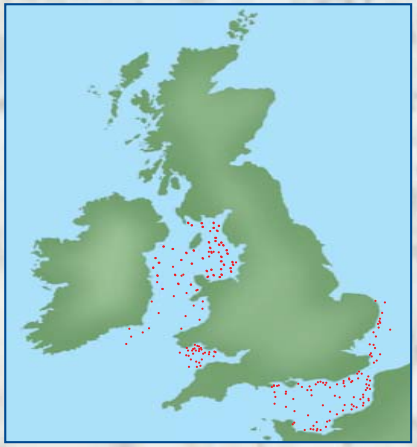
Developing a practical protocol for assessing the value of these environments for fisheries will have significant ramifications for long-term management and marine conservation. Such a protocol can be achieved by exploring the close relationships that exist between some demersal fish and macro-epibenthic assemblages, and different types of seabed sediment and benthic habitats.

The present study is the first step towards quantifying the extent, vulnerability and importance of sediment-demersal assemblages within UK waters.

Groundfish surveys

Over the past ten years large-scale groundfish surveys for demersal fish have been regularly undertaken by CEFAS in the English Channel and Irish Sea using a 4m beam trawl. These data are being used to examine the spatial distribution of various benthic assemblages and in recent years these surveys have also been used to quantify invertebrate by-catch.

Already close associations between a number of specific demersal fish and macro-epibenthic assemblages have been identified from over 240 species using multivariate analysis.



The locations of groundfish survey sites in the English Channel, Bristol Channel and Irish Sea.

A typical beam trawl catch of demersal fish and other macro-epibenthic fauna

Plaice, Pleuronectes platessa (B. Picton)

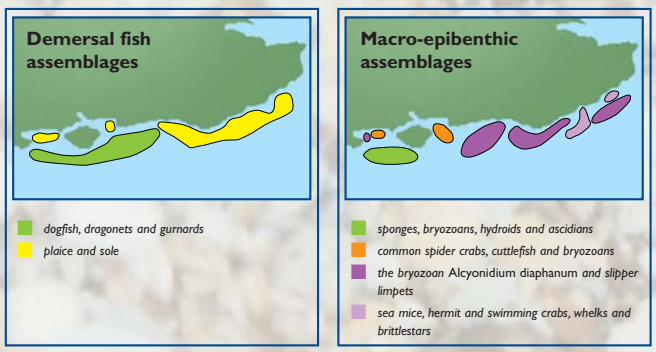
Common benthos; sponges and hydroids

Identifying benthic assemblages

The similarity between biomass of demersal fish and macro-epibenthic fauna collected in the north-eastern English Channel during our groundfish surveys was determined using cluster analysis.

Two important demersal fish assemblages were identified; one dominated by dogfish, dragonets and gurnards, the second by commercial flatfish such as plaice and sole. Four macro-epibenthic assemblages were also identified; the most distinct of these were dominated by sessile organisms such as, sponges, bryozoans and hydroids. This assemblage was typically found on coarse and rocky substrates.

Areas of demersal finfish and macro-epibenthic assemblages determined by cluster analysis within the coastal waters of the north-eastern English Channel.



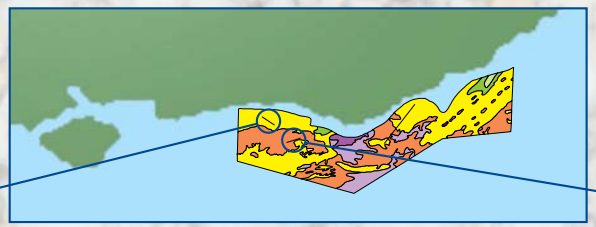
Classifying seabed sediments and habitats

Different seabed sediments ranging from coarse gravel to fine mud have been classified using remote seabed acoustic discrimination (e.g. QTC which identifies different seabed sediments based on the characteristics of an acoustic echo bounced off the seabed), and more conventional methods such as grab sampling and particle size analysis.

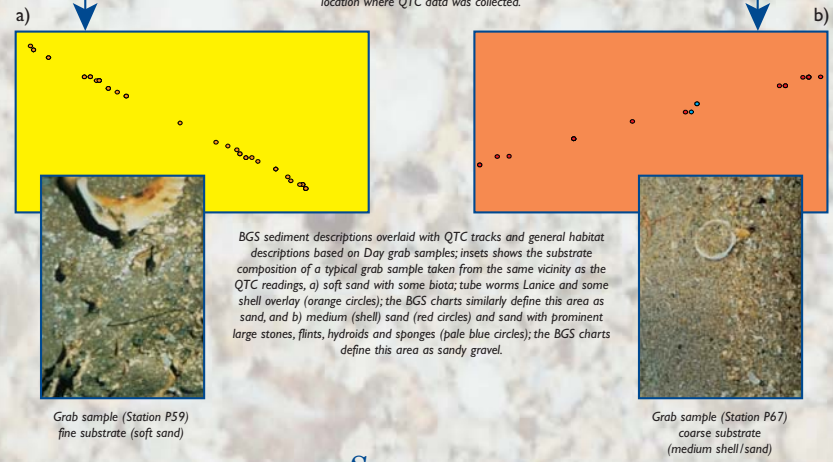
General habitat descriptions based on the presence of various sessile organisms such as, sponge, Alcyonidium and Flustra beds, which contributed to the overall bottom substrate complexity, have also been incorporated into these sediment classifications.

The degree of similarity between our sediment data and recently digitised BGS seabed sediment charts, which map the coastal waters of the north-eastern English Channel and the eastern North Sea, are being explored using GIS.

Geographical Information Systems (GIS) are suitable for conducting various quantitative and statistical analyses in order to interpret data referenced by spatial and geographical co-ordinates.



Digitised BGS seabed sediment chart covering an area between Shoreham and Dungeness; solid lines denote the location where QTC data was collected.



BGS sediment descriptions overlaid with QTC tracks and general habitat descriptions based on Day grab samples; insets shows the substrate composition of a typical grab sample taken from the same vicinity as the QTC readings, a) soft sand with some biota; tube worms Lanice and some shell overlay (orange circles); the BGS charts similarly define this area as sand, and b) medium (shell) sand (red circles) and sand with prominent large stones, flints, hydroids and sponges (pale blue circles); the BGS charts define this area as sandy gravel.

Grab sample (Station P59) fine substrate (soft sand)

Grab sample (Station P67) coarse substrate (medium shell/sand)

Summary

- **Some invertebrate assemblages have specific substrate requirements.**
- **Associations between these invertebrate and substrate components are becoming apparent from our wide-scale benthos sampling, and the use of remote acoustic methods to identify the physical structure of the seabed.**
- **The spatial distribution of various sediment types is known in detail for some areas using BGS charts.**
- **Therefore, the extent of some demersal assemblages can be inferred from their associations with particular sediment, and from the spatial distribution of these sediment types.**

This work was funded by the Department of the Environment, Transport and Regions and the Ministry of Agriculture, Fisheries & Food

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