Areas of rock in UK marine waters – where is it and why is it important to know?

Marine Objective Theme: State of the Marine Environment

What's the problem?

Seabed substrates are extremely important in determining the composition of benthic communities. One of the most significant substrates found in marine waters is rock or hard substrate. Our national geological maps of the sea bed are based on sea bed sampling and seismic data. More problematic however is that the main suite of maps show the particle size of sea bed sediments and the bedrock beneath the Quaternary sediments, but don't highlight areas where the sediments are thin or locally absent. This means that these maps may not identify some areas where rock habitat exists (but is covered by a very thin layer of sediment). We need to improve our understanding of the distribution of sea bed habitats to ensure that we can select the right sites for marine conservation as rocky habitats are often biologically diverse. Knowing where rock habitat is may also be important for marine planning, and so this project has been established to help rectify the current problem.

What are the aims of the project?

We need to update maps to better define areas where rock is outcropping seabed and where sediment cover is thin or absent.

This project has involved British Geological Survey (BGS) reassessing the sample information and shallow seismic database to highlight areas where rock outcrop is likely to occur. New information including Olex and multibeam data was also sourced and used to update the maps and to increase confidence in the interpretation of features that were previously only recognised from seismic records. The distribution of moraines, which are any glacially formed accumulation of unconsolidated glacial debris at the sea floor, is an example where detailed feature mapping can identify areas where boulders and cobbles are likely to occur on the seabed due to glacial deposition of coarse materials.

A second aim of the project was to assess the confidence in the interpretation, thereby highlighting knowledge gaps for future detailed mapping of the seabed to improve resolution of seabed geology and habitat information.

This project completed in May 2010 and covers English, Welsh, Scottish and Northern Irish territorial waters, English and Scottish offshore waters.

Figure 1. Example of marine rocky reef habitat (Image: Crown copyright DTI)

Which policy areas will the research inform?

The outputs of this project have been provided to those taking forward the selection of Marine Conservation Zones (MCZ), as part of the Marine and Coastal Access Act 2009.

The availability of these data layers will also be of importance to the Marine Management Organisation (MMO) who are responsible for Marine Planning (e.g. licensing) in English marine regions.

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What are the results from the project and how will they be used?

The main aim of this project was to deliver new data layers showing where hard substrate can be found at or near (within 0.5m) the sea bed. This will help inform the selection of sites for MCZ purposes, and also be of use in informing marine planning. 'Data layer' is a term used to describe information that is represented graphically on maps. See Figure 2 for an illustration.

Because of the scale of the work, the UK seas were divided into regional project areas (Irish Sea, South West; English Channel, North Sea, East Scotland, West Scotland, and Northern Ireland territorial seas), and delivery of the outputs were staggered throughout 2009 up to 2010. Phase 1 was completed in March 2010 (English, Northern Irish and Scottish territorial waters and offshore waters).

It's intended that all data layers will be made available to all regional MCZ projects to inform the selection of MCZs. More widely, these data layers will be available to the funding bodies and other public bodies who will find them useful in other aspects of marine planning and the management of human activities at sea. The new map layers will also be used to update the BGS sea bed sediments maps (DigSBS250, see http://www.bgs.ac.uk/products/digitalmaps/seabed.html) and the results will be available to support the many offshore industries, such as marine renewables, aggregate extraction, cable companies, oil and gas companies and the fishing industry.

The outputs from this project include a data layer presenting assessment of confidence for the interpretation of hard substrate at the sea bed. This was based on data density and quality and includes the full range of data sources used.

Future Work

This project has provided a clearer picture of the distribution of hard substrate at or near the seabed than currently available. For most of the UK Continental Shelf coverage of multibeam data is absent. The results could be enhanced by more detailed work based on utilising single beam digital bathymetry (available from SeaZone) and more detailed analysis of new and existing multibeam.

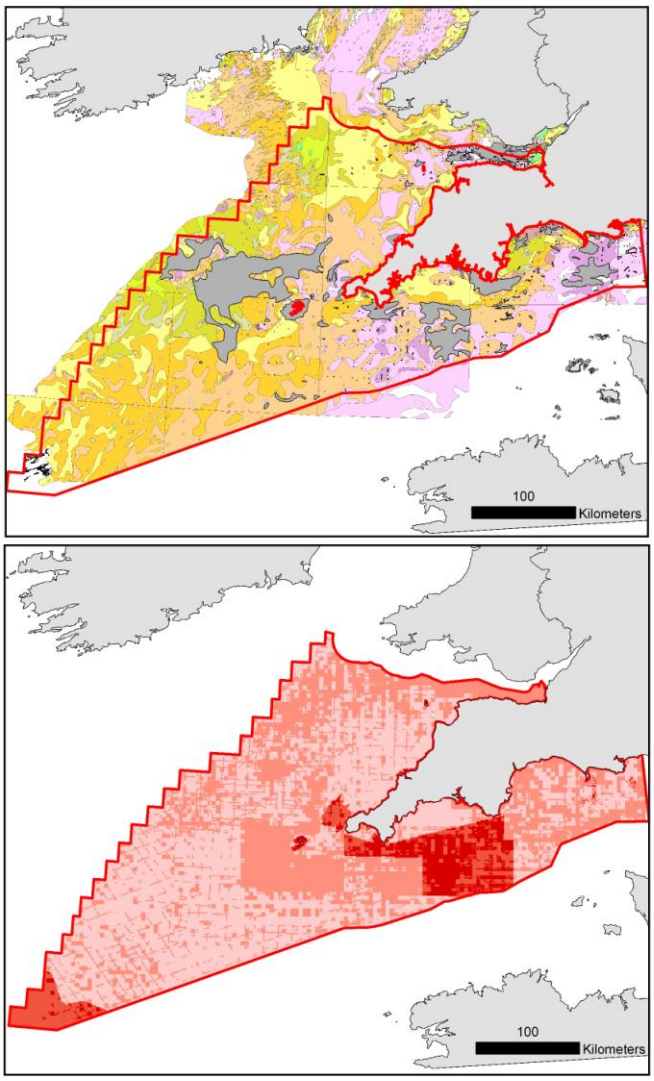

Figure 2. Upper map shows the distribution of hard substrate at the sea bed in dark grey, overlain on the sea bed sediments for the Finding Sanctuary project area. Lower map represents the confidence levels for this data set, darker shading indicates higher confidence.

Where can I find further information about this and related research?

This project was delivered by BGS. For further information, please contact Robert Gatliff (rwga@bgs.ac.uk), Dave Long (dal@bgs.ac.uk), or Alan Stevenson (agst@bgs.ac.uk), British Geological Survey, Murchison House, West Mains Road, Edinburgh, EH9 3LA

Or alternatively, the Marine and Fisheries Science Unit, marinescience@defra.gsi.gov.uk

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