Broadscale mapping of hard substrates in the central English Channel
Progress in Year 1

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Background

This project is concerned with mapping seabed habitats in the English Channel so we can better manage our important biological and mineral resources. We know that large areas of the seabed in the central and eastern parts of the Channel are made of hard substrates such as gravel, cobbles and rock outcrops (Figure 1). These are important biological habitats, and gravel is a valuable source of aggregates used in the construction industry. The Government wishes to promote effective stewardship of the marine environment through a policy of integrated management, balancing the requirements for development with those of nature conservation.

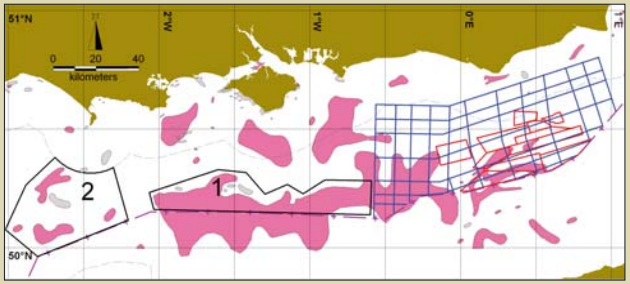

Figure 1: Research area in the central English Channel. The study areas (1 & 2) are indicated in relation to nominal 'gravel' substrates (pink), and extensive surveys (blue grid) around potential aggregate resources (red polygons) in the eastern Channel.

Project Objectives

1. To provide information on the distribution, extent and character of potential Habitats Directive Annex I reef habitat within the central English Channel region to facilitate the selection of SACs.
2. To compare and contrast communities of gravel habitats across the central and eastern Channel to underpin regulatory decisions relating to gravel regions likely to be affected by dredging.
3. To facilitate the development of adaptive survey strategies and provide guidance on best practice for surveying hard-substrate reef habitats.

Surveys in 2006

Acoustic surveys were conducted in Areas 1 & 2, using multibeam and sidescan sonar techniques in a nested survey design (broadscale survey lines augmented by selected areas of intensive cover; Figure 2). This was followed by directed ground-truth sampling, using grabs, trawls and video cameras to target features of interest that had been seen on the acoustic images.

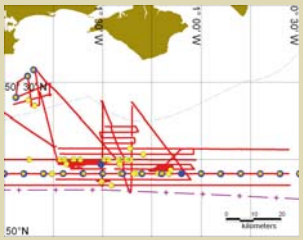

Figure 2: Acoustic survey lines and ground-truth stations in survey Area 1; blue dots indicate grab samples, yellow dots indicate video observations.

Preliminary results

1. Reef Habitats

Surveys unexpectedly revealed an extensive area of outcropping rock, approximately the size of the Isle of Wight, in survey area 1. This bedrock (Figure 3) supports a variety of rich and diverse biological communities, including massive sponge forms (Figure 3 inset). The easterly extent of the outcrop is currently unknown, but it is clear that the location and extent of outcropping rock formations does not correlate well with existing seabed sediment charts. This has implications for assessing the proportion of the UK seabed that might fall within the definition of an Annex I 'reef' habitat.

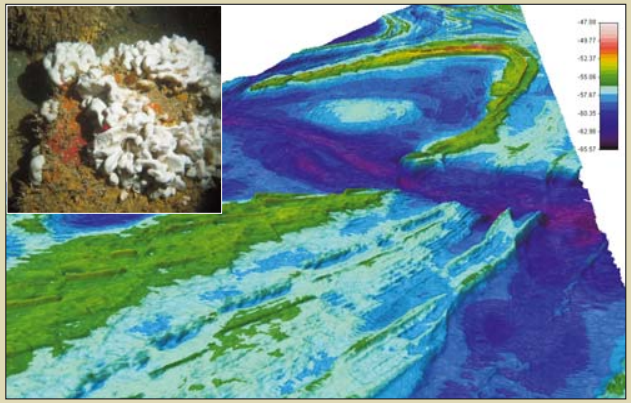

Figure 3: Multibeam sonar image of a small part of the bedrock outcrops found on the seabed of the English Channel south of the Isle of Wight. The inset photo shows one of the sponge communities found growing on the rock.

2. Gravel habitats

The nature of the gravel substrates in the survey areas appeared to differ markedly from those found in the aggregate prospecting areas in the eastern Channel (Figure 4), being predominantly 'lithic' (derived from the underlying bedrock) and poorly sorted (having many different sized particles; boulder, cobbles, pebbles, granules) rather than 'fluvial' (deposits accumulated in the valleys of ancient river systems) of well sorted material (grains of similar size; usually pebble/gravel). These different substrate types are likely to support different biological communities.

Figure 4: Comparison of gravel substrates: poorly sorted, lithic, gravels (left) are common in the central Channel, while well sorted, fluvial gravels (right) are more typical of the eastern Channel.

3. Adaptive survey strategies

An adaptive survey design was applied successfully to track distinct seabed features, such as the edge of a rock outcrop (Figure 5). The design requires the vessel to make (relatively) rapid reversals in steaming direction, and consequently its application may be limited by operational considerations such as local traffic, the vessel's ability to make rapid turns, and the experience/confidence vs. caution/timidity of the helmsman and bridge officers.

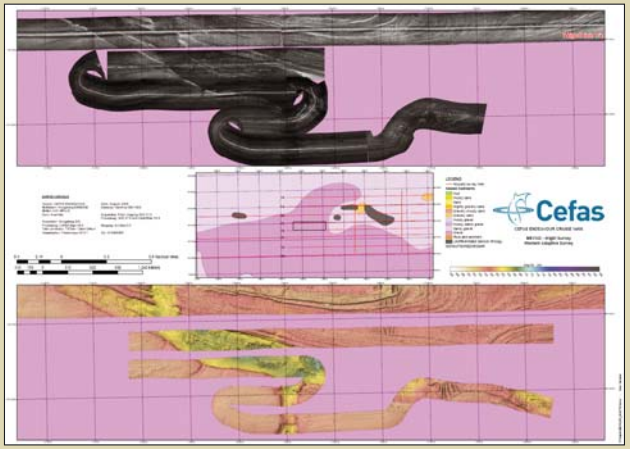

Figure 5: Adaptive survey design: in this case, the course of a relict river channel was tracked with sidescan sonar (top) and multibeam (bottom panel). The channel is clearly depicted as the yellow, green and blue colours in the multibeam image. The central inset shows the location of the small 'adaptive survey' (black rectangle) overlain on the BGS seabed sediment chart; red lines indicate tracks of the larger grid-based survey.

Future work

No further surveys are planned. In the next two years the project will focus on:

1. Full processing of acoustic data, grab samples and video images collected during the 2006 surveys.
2. An integrated interpretation of the resulting biological and acoustic datasets to address Objectives 1 and 2 of the project.
3. Mapping and delineation of rocky areas that may be consistent with the definition of a rocky reef under Annex I of the Habitats Directive.
4. Describing the communities found on gravel substrates and comparing these with communities know to exist in the gravel area in the eastern Channel.
5. Providing advice on the application and practicalities of the adaptive survey design.

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