

Aggregates are essential to the UK economy, but protecting vulnerable habitats is also a priority. **Sally Philpott** (BGS) and **Dave Limpenny** (Cefas) describe how high-resolution sea-bed mapping is helping to ensure the resource is exploited sensitively and sustainably in the English Channel.

Protecting marine habitats

Substantial aggregate resources are present in the Eastern English Channel and these resources are being evaluated by the aggregate industry for future development and exploitation. Assessing the impacts of potential aggregate dredging in a wider regional context is crucial. However, only limited information exists on the geological and biological nature of the sea bed surrounding the aggregate resource areas. High-resolution mapping of sea-bed habitats is an essential primary goal for the effective, sustainable management of this environment.

The BGS, the Centre for Environment, Fisheries and Aquaculture Science (Cefas), Marine Ecological Surveys (MES) and the Joint Nature Conservation Committee (JNCC) are working in partnership to produce integrated regional-scale sea-bed habitat maps for an extensive area, including the potential aggregate resource areas within the central part of the Eastern English Channel.

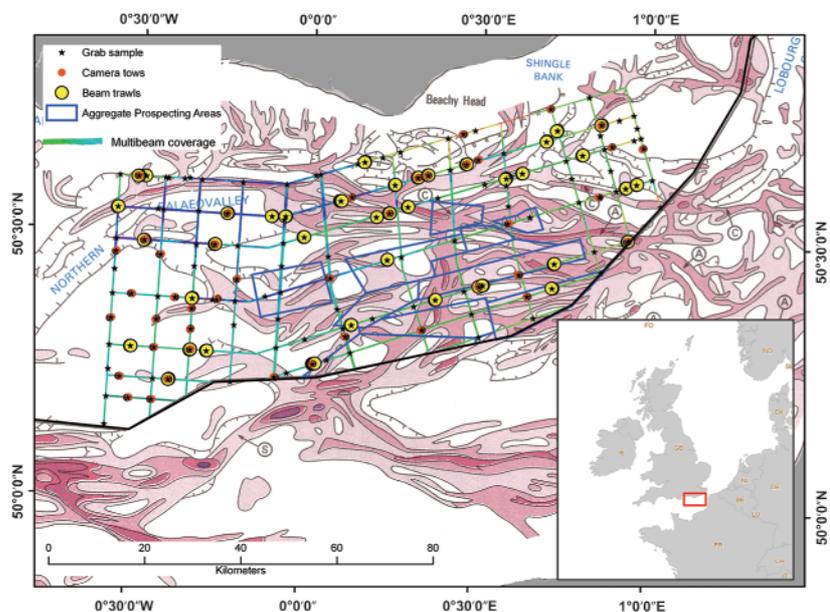
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Prior to the geophysical and biological surveys that took place over the summer of 2005, our knowledge of the sea-bed geology in the Eastern English Channel was based on regional surveys by the BGS.

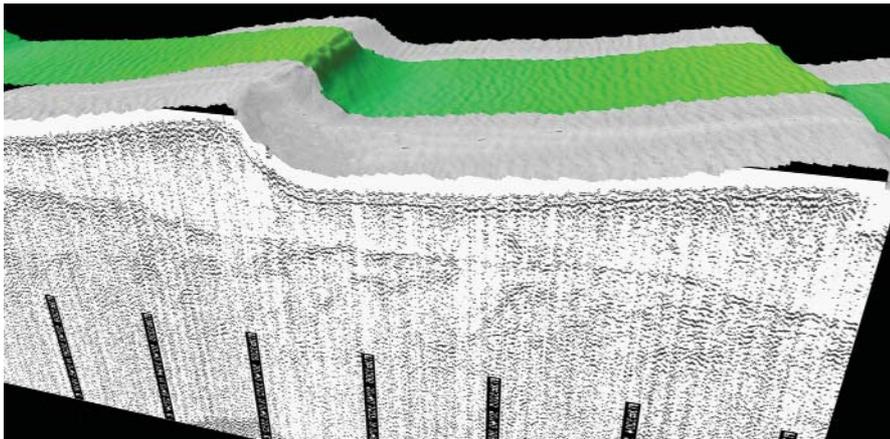
However, the geology in this area is likely to be more complicated than shown on the BGS sea-bed sediment maps. The area is significant for an extensive system of

sediment-infilled channels incised into bedrock, and it is the gravel deposited in and around these channels that is of interest to the aggregate companies.

Although the infilled channels generally appear to have no significant expression at the sea bed and their surface morphology is commonly smooth and merges with the surrounding sea bed, they may influence or control habitats. Large-scale sandy bed forms lie to the



Location of study area in the Eastern English Channel, and the position of the infilled channels, overlain by the geophysical data coverage and ground-truthing stations from the 2005 surveys.



Three-dimensional picture of the character of the sea bed across sand waves and their underlying geology.

east of the infilled channel area and generally thin gravels lie on bedrock elsewhere. The bedrock is diverse, ranging from Chalk to Tertiary mud and sand. These units exhibit important differences in terms of their physical properties including grain size, chemistry, density, porosity and hardness. This significant variability in sea-bed geology, both in terms of bedrock character and sea-bed sediments, is also likely to influence biotope variability.

Currently, the relationship between the various bedrock types and the sediments which overlie them, and the biotopes and habitats is poorly understood. Furthermore, the relationships between the habitats found within the sediment-filled channels and those surrounding them also needs to be explored. We need to understand whether variability in the underlying geology influences the overlying sea-bed habitats or whether other physical and biological criteria and processes have equal or greater

significance over a variety of spatial scales.

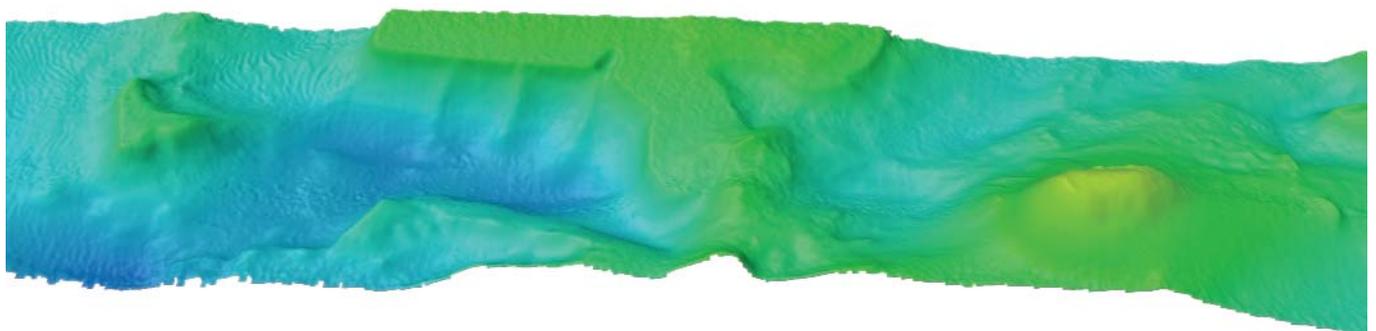
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To help understand these issues, new geological datasets were acquired using modern high-resolution geophysical survey techniques including multibeam, sidescan sonar and sub-bottom profiling. Twenty-one corridors of geophysical data, totalling 4000 line kilometres of data and covering an area of 120 by 60 km, were acquired during a month-long geophysical survey. The preliminary results from this survey were used to direct a comprehensive ground-truthing survey, which incorporated grab sampling, trawl sampling and

photographic techniques. A Hamon grab fitted with a video camera and CTD (conductivity, temperature and depth) probe was used to collect samples of the animals that live within the sediment (infauna), from 150 sites in the survey area. Samples of the larger animals that live on the surface of the sediment (epifauna) were collected at 40 stations using a small beam trawl. Photographic surveys were conducted at 40 stations using either a towed video sledge or drop camera, depending on the topography of the seabed. Photographic techniques were concentrated on areas of hard sea bed where grabs and trawls were less effective.

Interpretation of both the physical and biological data will enable us to define the various habitats that exist in the area. In particular, the photographic and video survey element has provided valuable biological information on the epifaunal communities present on reef and rocky habitats. This new data will be integrated with existing geological, geophysical and biological data within the framework of a geographical information system to provide comprehensive maps of the distribution of marine species, communities and habitats within the Eastern English Channel. They will enable us to identify sites of biological, fisheries and geological significance and highlight areas of significant biodiversity. It will also allow us to place the potential impacts of marine aggregate extraction into a wider regional context.

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Sea-bed multibeam image showing channels incised into bedrock.