Identification of new biotopes project summary

Project Objectives
1. To identify new biotopes from a reanalysis of benthic survey data including data collected since the last update of the Marine Habitat Classification for Britain and Ireland in 2004.
2. To assess the validity of existing biotopes and consider revising them.
3. To restructure the classification upper levels, if agreed by stakeholders
4. To arrange biotopes within the revised classification hierarchy.
5. To publish a new version of the classification that includes new and revised biotopes.
6. To revise the way biotope information / guidance is provided to the user to enable semi-automatic biotope matching, if possible.

Background
The Marine Habitat Classification for Britain and Ireland was originally developed in 1996 using data collected for the Marine Nature Conservation Review (MNCR). These data were predominantly from coastal waters down to 50 m depth. The classification was updated in 2004 at which time a number of additional sublittoral sediment biotopes were added based on literature review rather than analysis of survey data. There is still poor coverage of circalittoral rock and sediment habitats occurring in waters deeper than 50 m. Only one deep circalittoral rock biotope (‘Phakellia ventilabrum and Axinellid sponges on deep, wave-exposed circalittoral rock’) has been described on rock, one for offshore circalittoral mixed sediment, and two each for offshore circalittoral sand and coarse sediments. Those biotopes described for offshore circalittoral sediments often do not have characterising species information making them difficult to assign. There may also be some gaps in the shallower parts of the classification.

Since 2004, JNCC has undertaken numerous offshore surveys in circalittoral waters and it has often not been possible to match data to existing biotopes. The Country Agencies (NE, NRW, DOENI and SNH) and other government agencies (e.g. EA, SEPA, CEFAS, MSS) also have new data available from surveys undertaken surveys since 2004. We propose to analyse these more recent survey data, together with the earlier data used to inform previous versions of the habitat classification, to see if additional new biotopes can be discerned that could start to fill known gaps and uncertainties in the current system. The project will incorporate all available inshore and offshore data. The long-term aspiration is that the whole classification (excluding the deep-sea section which has just been updated) will be revised accordingly (with structural refinements adopted akin to those seen in the deep-sea section) to ensure biotopes are comparable across the classification and developed using the same methods.

The project represents an opportunity to address known issues and limitations with the existing system. Various user issues have been identified with the existing classification as it gets used for an increasing number of purposes. These have been summarised in a JNCC report (Parry, 2014). The ‘new biotopes’ project will take on-board some of the recommendations from the 2014 review.

The initial phase of the work will identify new biotopes (at levels 4 and 5 in the classification) from an analysis of all data available. The analyses will also consider the on-going validity of the current upper levels of the classification (2 and 3) and make recommendations on the need for, and scope of, subsequent more comprehensive structural modifications. Towards the start of the project, JNCC will clearly articulate the range of likely consequences, and

1 http://jncc.defra.gov.uk/page-6757
consult a wide range of stakeholders, prior to any fundamental re-structuring work. Intertidal, dive and video data will be analysed first to identify epibiotic biotopes, and these will be released as an interim product. Grab and core data will be analysed second to identify infaunal biotopes. These will be cross referenced with epibiotic biotopes to identify any known links with infaunal biotopes, which will be flagged up in biotope descriptions.

The identification of biotopes for the previous version of the classification was undertaken by dividing the data into subsets based on zone and substrate type and performing cluster analysis in PRIMER. This has limitations as the patterns between zones and substrates cannot be analysed. JNCC has run a small contract to get advice on options for analysing data for this project. Following advice, it is likely that ‘R’ will be used to allow the analysis of all data together. A variety of types of cluster analysis are available through R so a range can be tested and compared. The data will then be subdivided by gear type and reanalysed to look at differences in community recorded. A validation dataset will also be used to assess whether clusters change when new data are added.

Phase 2 of the work will involve restructuring the upper levels of the classification, placing the biotopes in the new hierarchy, and producing a report and biotope descriptions for publication. In the longer-term, therefore, this project could result in existing biotopes being changed or removed which would likely have knock-on impacts to other work areas (e.g. relevance to MPA protected features and MPA network assessment processes etc.). The Project Steering Group (see below for details) believe that changes are essential, timely and that the future nature conservation benefits (clarity on targeting of measures etc.) outweigh the envisaged consequences (which are largely related to translations between versions of the classification which have been addressed routinely as previous iterations of the classification have been issued). It should be noted that it is difficult to estimate the amount of time taken to undertake analysis, so the project timeline may change.

Matching new survey data to biotopes in the classification is currently a very subjective and time consuming process. Users often find it difficult to decide whether species data matches a biotope by simply looking at the descriptions, and different users will approach this in different ways causing inconsistencies. Ideally, biotopes described should be represented by stable clusters that always reappear when data are reanalysed. This would allow users to match new data to core biotope data, rather than subjectively comparing characterising species to biotope descriptions. Although there may be cases where core data are not sufficient to describe a biotope, the aim is to create a classification which facilitates more data-driven biotope matching in the future. Previous attempts to develop a semi-automated biotope matching tool were not wholly successful but significant advances have been made in recent years. The ‘new biotopes’ project aims to recommend a repeatable, data driven method of biotope matching, and potentially explore opportunities to release matching tool, as part of any phase 2 work.

The Deep-Sea classification - illustrating the changes that might occur

A deep-sea section for the classification has been developed and is due to be published by the end of 2014. The structure of this classification has been altered to address a number of user issues outlined in Parry (2014). The Steering Group support the adoption of this structure across the rest of the Classification, but stakeholders need to be consulted before making any larger changes. The overall structure is summarised in Figure 1.

The main changes made for the deep-sea section are:

- Each level in the classification represents the inclusion of only one additional characterising factor across all habitats.
- The only physical parameters used to characterise habitats are biological zone (defined by region, as well as depth and associated variables like water temperature and salinity), and substrate type. If any biotopes are driven by other environmental parameters then this should be mentioned in the biotope description.
- Level 4 broad communities and level 5 assemblages can be repeated in the classification where they are known to be associated with several zones or substrate types (e.g. M.AtMB.Mu.EreCor.AcaArb - Acanella arbuscula assemblage on Atlantic mid bathyal mud; M.AtLB.Mu.EreCor.AcaArb - Acanella arbuscula assemblage on Atlantic lower bathyal mud).
- Infaunal and epifaunal broad communities and biological assemblages are included separately in the classification as it is difficult to sample both at the same time and hard to link epifaunal assemblages to specific infaunal assemblages.

![Diagram of the deep-sea classification structure]

**Figure 1: Overview of the deep-sea classification structure**

**Project management**

This project is being led by the JNCC, but aims to meet the needs of other CAs and private sector classification users. A Steering Group has been formed with representatives of the following organisations:

- JNCC
- NRW
- SNH
- NE
- Cefas
- EA
- AFBINI
- DOENI