

# How do we confirm the links between human activities and environmental pressures in marine ecosystems?

ME5218 Validating an Activity-Pressure Matrix

## What's the problem?

Coastal and marine ecosystems are subject to a number of human-induced pressures associated with a variety of marine activities. In 2013 the Joint Nature Conservation Committee (JNCC) compiled an activities-pressures matrix which has since been endorsed by the Healthy and Biologically Diverse Seas Evidence Group (HBDSEG) and the UK Marine Monitoring and Assessment Strategy (UKMMAS) pressures sub group. The matrix identified 39 human use activity categories and 34 human pressure types. The links within this matrix are, however, largely based on expert judgement. There is therefore a requirement to validate the activities-pressures matrix so that it can be used to inform the management and monitoring of the marine environment.

## What are the aims of the project?

The project was designed to provide greater transparency in the evidence that links human activities and pressures in the marine environment. The aims of the project can be summarised as follows:

- To increase the transparency of the identified activity-pressure links through the provision of scientifically robust evidence, thereby validating the use of the matrix for the management and monitoring of UK seas; and
- To describe the confidence in the activity-pressure links based on the quantity and quality of the evidence found.

These aims were met through the completion of a number of tasks which centred on understanding the characteristics and properties of all of the human activities listed in the matrix. The evidence base was derived through a detailed literature review and an understanding of ongoing initiatives in this field.



Figure 1. Example benthic habitats and species  
Copyright Andrew Pearson ([www.oceansedgephotography.co.uk](http://www.oceansedgephotography.co.uk))

## Which policy areas will the research inform?

The work will provide an evidence base that will underpin the development of suitable indicators to assess habitat condition and seafloor integrity both within the UK and internationally as part of the Marine Strategy Framework Directive (MSFD). A clear understanding of the linkages will also support the development of wider UK marine monitoring and assessment procedures as well as providing a source of conservation advice for the management of Marine Protected Areas (MPAs).



Department  
for Environment  
Food & Rural Affairs

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

The project has resulted in two key deliverables, an overarching project report and an updated activity-pressure matrix. The activity-pressure matrix has been structured so that it can be readily translated into a database. It contains all of the evidence that has been obtained for each of the activity-pressure relationships along with the accompanying confidence score. The level of contribution (in terms of extent and intensity) of each activity/ sub-activity to a given pressure was also assessed in terms of whether they met a pre-defined benchmark. This facilitated the identification of those activities that have the potential to result in a pressure at or above the benchmark and thereby have the potential to cause the greatest environmental effects. This further provided a mechanism to identify those sub-activity pressure relationships that may warrant further investigation.

The project report contains a full audit trail of the evidence base that has been used to populate the matrix. This includes the assumptions and limitations with respect to the pre-defined lists of activities, pressures and the benchmarks.

The tool will support risk based assessment of marine environmental quality across a range of needs within the Defra family.

It is anticipated that the outputs of this project will be used by:

- Defra and devolved administration policy officials, Statutory Nature Conservation Bodies and Environment Agency staff working on the implementation of European Directives such as MSFD and Water Framework Directive (WFD) and designation of MPAs;
- Regulatory bodies and their advisors with responsibilities for marine licensing and marine planning;
- Inshore fisheries managers with responsibilities for regulating commercial fisheries activities within European Marine Sites and other MPAs;
- Marine evidence groups such as HBDSEG and the Productive Seas Evidence Group (PSEG) that are involved

in work at a national level to understand human pressures and impacts in the marine environment;

- Marine industries that may be affected by decisions informed by the project outputs;
- Environmental Non-Governmental Organisations (NGOs) that have an interest in ensuring high levels of environmental protection are achieved; and
- Developers and their consultants as well as academics.



Figure 2. Example benthic habitats and species  
Copyright Andrew Pearson ([www.oceansedgephotography.co.uk](http://www.oceansedgephotography.co.uk))

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

For more information please contact Natalie Frost at ABPmer (023) 8071 1850, [nfrost@abpmer.co.uk](mailto:nfrost@abpmer.co.uk).

Alternatively, please contact Defra's Marine and Fisheries Science Unit:  
[marinescience@defra.gsi.gov.uk](mailto:marinescience@defra.gsi.gov.uk)

### Defra Science – did you know?

At any one time Defra manages over 2000 research projects covering a wide range of topics. For more information on current research see <http://randd.defra.gov.uk> and to find out about future research proposals see the Defra Research and Analysis page at: [www.defra.gov.uk/evidence/index/htm](http://www.defra.gov.uk/evidence/index/htm)