

How can changes in marine biodiversity be monitored?

Marine Theme Objective: State of the marine environment

What's the problem?

The huge diversity in the world's oceans is considered essential for maintaining healthy ecosystems and providing ecosystem services such as climate regulation and efficient nutrient cycling as well as maintaining healthy fish stocks. Many of these services are thought to be maintained and depend on organisms and ecosystems that are under threat due to the loss of biodiversity.

The loss of biodiversity in marine ecosystems is mainly driven as the result of human activities and climate warming which seems to be accelerating.

The IPCC WGII Fourth Assessment Report estimates that 20-30% of plant and animal species assessed so far are likely to be at an increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.

What are the aims of the project?

Among the numerous project aims one is specifically focused on identifying and understanding changes in biodiversity in UK marine waters.

With this in mind the Continuous Plankton Recorder (CPR) data is being used to monitor changes in marine biodiversity and to help in the development of indices that can assess the ecological health of U.K. regional seas.

Firstly, the project aims to map oceanic diversity in the North-east Atlantic and secondly quantify changes in marine biodiversity over decadal time-scales. Thirdly, the project aims to understand these changes in biodiversity in relation to environmental changes such as climate change and other human-induced factors such as eutrophication.

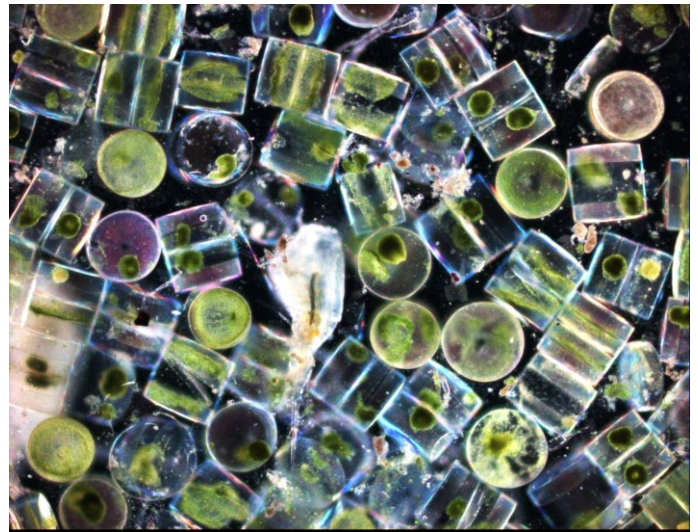


Figure 1: *Coscinodiscus wailesii*. Copyright: SAHFOS

Which policy areas will the research inform?

Results from this project have direct relevance to:

- the UN convention on Biological Diversity;
- the EU Habitat Directive;
- EU Common Fisheries Policy;
- the Oslo and Paris Convention (OSPAR) for the Protection of the Marine Environment of the North East Atlantic;
- the EU Water Framework Directive; and
- Marine Strategy Framework Directive (MSFD).

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

Through this contract a wide range of advice from the results is provided to the UK Government including underpinning evidence in support of marine stewardship policies and a major contribution to the report: 'Charting Progress II: An Integrated Assessment of the State of UK Seas' and providing input to the Marine Climate Change Impacts Partnership (MCCIP).

A Public Service agreement summarising plankton status is annually produced for the UK Government as part of this project. A wide range of Governments and Agencies have utilised data from the Survey and are making wide use of the database. The educational services provided by the Foundation have also reached a wide public audience.

The main outputs of this contract have been the Annual Report, Annual Ecological Status Report and scientific publications as well as web based developments such as WinCPR.

Over the last 5 years, results from the CPR survey have been included in over 200 published scientific papers, including many in the world's leading scientific journals *Science* and *Nature*.

Future applications of CPR data include using the data in climate and fisheries models, ecosystem indicators and providing information in the assessment of acidification in marine ecosystems.

This project finishes in March 2012



Figure 2: Crab larvae. Copyright: M E Edwards

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

The Sir Alister Hardy Foundation for Ocean Science (SAHFOS) manages the CPR survey and more information can be found at the SAHFOS website including an annual update of the ecological status of the North Atlantic, an Annual Report, current research and results and an educational resource for policy makers and the public.

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

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