

Oceans 2025



Overview of the NERC Marine Centres' Proposed Strategic Research Programme 2007-2012



NOC



PML



POL



SAMS



SMRU



MBA



SAHFOS
SAHFOS

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Box 1 NERC marine Research Centres, Collaborative Centres and associated organisations contributing to the Oceans 2025 proposal

| Institution | Acronym | Status | Owning body | Current relationship with NERC since |
|--|--------------------|--------------------------|--|--------------------------------------|
| <i>National Oceanography Centre, Southampton (formerly Southampton Oceanography Centre)</i> | NOC (formerly SOC) | Collaborative Centre | Jointly owned between NERC and the University of Southampton | 1994 |
| <i>Plymouth Marine Laboratory</i> | PML | Collaborative Centre | PML (Company Limited by Guarantee with charitable status) | 2002 |
| <i>Proudman Oceanographic Laboratory (Liverpool)</i> | POL | Research Centre | NERC | 1969 |
| <i>Scottish Association for Marine Sciences (Dunstaffnage)</i> | SAMS | Collaborative Centre | SAMS (Company Limited by Guarantee with charitable status) | 1967 (updated 1994 and 2002) |
| <i>Sea Mammal Research Univ (St Andrews)</i> | SMRU | Collaborative Centre | University of St Andrews | 1996 |
| <i>Marine Biological Association of the UK (Plymouth)</i> | MBA | Grant in Aid funded body | MBA (Company Limited by Guarantee with charitable status) | 1965 (modified 1987 and 2001) |
| <i>Sir Alister Hardy Foundation for Ocean Science</i> | SAHFOS | Grant in Aid funded body | SAHFOS (Company Limited by Guarantee with charitable status) | 1990 |
| Other NERC Centres with marine interests but not part of Oceans 2025 (funding already in place) | | | | |
| <i>British Antarctic Survey</i> | BAS | Research Centre (Survey) | NERC | |
| <i>British Geological Survey</i> | BGS | Research Centre (Survey) | NERC | |

Box 2 The defining characteristics of Research Council institutes (Research Centres and Collaborative Centres). *From the Quinquennial review of the grant awarding Research Councils (OST, 2002)*

- provide national capability in science and technology
- create a critical mass of research capability, effort and expertise
- provide enhanced research productivity, visibility, exploitability; permitting the rapid strengthening of under-developed areas when needed
- foster coordinated and cooperative multidisciplinary approaches to sciences and technology
- encourage long-term research vision and strategy, including for UK science and technology as a whole
- working with others, enable long-term survey, monitoring and data management activities underpinned by research
- provide scope for a full-time research-centred environment
- open up scientific career paths and opportunities which may not be available within usual university faculty structures
- develop and provide facilities and services
- allow greater investment in capital equipment and the skills of research and support staff.

Oceans 2025

A child born in 2007 will be an adult in 2025.

"Our vision for the marine environment is clean, healthy, safe, productive and biologically diverse oceans and seas. Within one generation we want to have made a real difference"

UK Government 2002

By 2025

- Total human demand for natural resources will increase by at least a third, due to population growth
- Sea levels may rise by 10-15 cm (IPCC, 2001) whilst ocean pH may fall by ~0.2 units (Royal Society, 2005)
- A loss of ~30% in coverage of Arctic sea-ice is predicted, radically changing ecosystems whilst accelerating high latitude climate change
- Cod might either be extinct in UK waters (if present trends continue), or else abundant (if recovery plans succeed)
- The UK expects to generate more than 20% of electricity from renewable sources, mostly marine-based

We face three closely-related challenges

- To know the rules of ocean behaviour: We need a good understanding of the present-day dynamics of physical, chemical and biological interactions in order to set initial boundaries on future conditions, for scenario development and risk assessment.
- To be aware of what is actually happening: We need to keep track of the many changes that are already occurring to the ocean component of the Earth system, through satellite sensors, *in situ* observing systems and other monitoring studies. Such information is essential not only for iterative improvement of predictive capabilities, but also for evidence-based policy guidance.
- To find creative and adaptive solutions: We need to use new and existing knowledge to promote human well-being through sustainable economic development of marine resources, building new businesses whilst adapting to change, mitigating adverse effects, and ensuring stewardship of the seas for future generations.

Strong national linkages are required to address these issues effectively, coordinating and enhancing the capabilities and facilities in the NERC-supported institutions that have special responsibility for strategic marine research. Implementation also requires wider partnerships and societal engagement – with other scientists, research-users and the public, across the academic, industrial and policy-making interfaces – to identify, address and resolve nationally-pertinent research questions, whilst remaining at the forefront of European and global expertise.

Purpose of this overview

- To set out the prize to be achieved by a coordinated approach that harnesses the full strength of seven NERC marine Centres and associated organisations, focused on strategic concerns
- To summarise the overall programme structure of *Oceans 2025*, for the benefit of research users, the academic community and others interested in UK marine research
- To provide reviewers of the programme renewal process with a common context for the detailed proposals for the component research Themes and National Facilities, each of which will be peer reviewed separately.

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19. *Oceans 2025* will support the UK's domestic and European policy needs (see Fig 1) for knowledge on the marine environment relevant to its international leadership roles and obligations (across EU, Government, public agencies including the devolved administrations and their executive agencies). It will also enhance entrepreneurship and wealth creation, by industry and commerce. The programme takes a wide and long-term perspective, encompassing both present and anticipated future needs.

The components and context of Oceans 2025

- 20. Ten major science Themes and three underpinning National Facilities provide the focus for the *Oceans 2025* strategic research programme. This structure is summarised in Tables 1 and 2, showing the direct involvement of the participating marine Centres, together with main links to other organisations and programmes.
- 21. Additional summary information on the Themes and National Facilities is given in Annex 2.

For Themes, Annex 2 gives a brief non-technical abstract, together with the titles of component Research Units (the management grouping, each under a single Centre) and Work Packages (relatively discrete science topic areas). Details of rationale, specific objectives, methods, schedule, linkages and main deliverables are provided to NERC and reviewers in separate Theme proposals.

- 22. As a strategic programme, *Oceans 2025* has been developed in the context of national policy needs. Defra, SEERAD and DARDNI are the lead UK government and devolved administration departments concerned with environmental policy. Each has its own Executive Agency (e.g. Environment Agency and Scottish Environment Protection Agency) responsible for implementing policy and regulating the environment. The stated marine-related priorities of these departments, most explicitly articulated by Defra, are summarised in Table 3 together with the match of these priorities to the science Themes addressed by *Oceans 2025*.

Figure 1

How Oceans 2025 meets UK needs

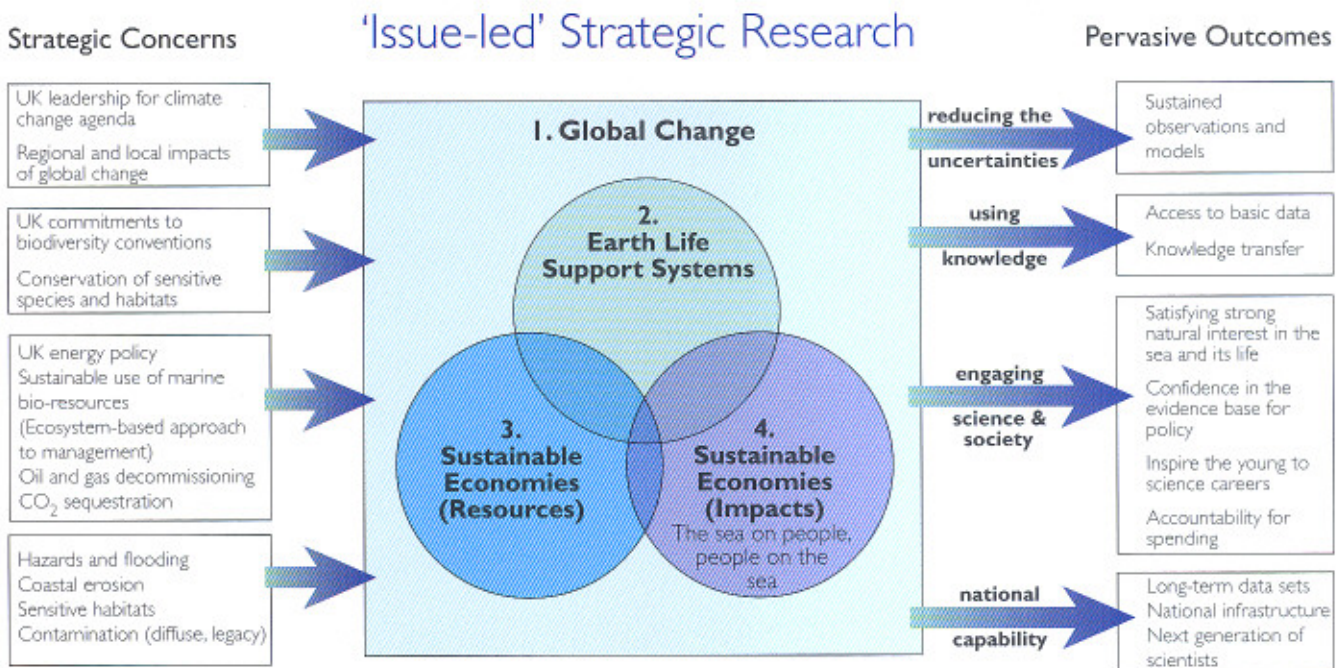


Table I. Oceans 2025 at a glance

| 'National need' drivers (NERC priorities) | Strategic research Themes and National Facilities | NERC marine Centres and associated organisations with major involvement | | | | | | | Main links to other stake- holders and <i>programmes</i> | | |
|--|--|---|--|-----|------|------|-----|--|--|--|--|
| | | NOC | PML | POL | SAMS | SMRU | MBA | SAHFOS | | | |
| Global change Earth's life support systems Sustainable economies | Note that these differ in scale of effort and resources required | | | | | | | | NERC Centres and programmes in bold . IACMST links and university partners in most areas. Additional information in Theme proposals | | |
| | | Theme 1 | Climate, ocean circulation and sea level | | | | | | | | BAS , Defra, Hadley Centre/ Met Office, GEOSS, GOOS, WCRP NSF, NOAA RAPID, QUEST, IPY, GLOSS CLIVAR, EuroOcean |
| | | Theme 2 | Marine biogeochemical cycles | | | | | | | | Hadley Centre, Defra, ICSU , IOC, NSF, NOAA UK SOLAS, QUEST, IGBP (IMBER and SOLAS), EurOceans, MarBEF |
| | | Theme 3 | Shelf and coastal processes | | | | | | | | CEH, BGS , Defra/Cefas, SEERAD/ FRS, DARDNI, EA, SEPA, EN/NE, SNH, CCW RELU, FREE, EurOceans |
| | | Theme 4 | Biodiversity and ecosystem functioning | | | | | | | | BAS, CEH , Defra/Cefas, SEERAD/ FRS, EA, EN/NE, SNH, CCW, JNCC MarBEF, GLOBEC, IMBER, HERMES, DIVERSITAS, CoML |
| | Theme 5 | Continental margins & deep oceans | | | | | | | BAS, BGS , DTI, Defra, FCO, NSF, hydrocarbon industry HERMES | | |
| | Theme 6 | Sustainable marine resources | | | | | | | BAS, BGS , Defra/Cefas, SEERAD /FRS, DARDNI, SNH, EN/NE, EA, DTI, UKERC, ICES, energy industry GLOBEC, HERMES, MarBEF | | |
| | Theme 7 | Health and human impacts | | | | | | | DoH/NHS, MRC, Defra, FSA, Wellcome Trust Environment & Human Health | | |
| Underpinning technologies & observations | Theme 8 | Technology development | | | | | | | DTI, Defra, EA, marine technology & sensor industries; QinetiQ, DSTL | | |
| | Theme 9 | Next generation ocean prediction systems | | | | | | | NCOF, MetOffice /Hadley Centre, WCRP CLIVAR | | |
| | Theme 10 | Integration of sustained observations (details in Table 2) | | | | | | | Defra (inc MDIP/MMAG), SEERAD, Met Office, NCOF, GEOSS, GOOS EurOceans, CLIVAR, HERMES, | | |
| National Facilities* | NF1 (BODC) | British Oceanographic Data Centre | | | | | | | Defra (via MDIP/MMAG) UKHO, GOOS | | |
| | NF2 (PSMSL) | Permanent Service for Mean Sea Level | | | | | | | Defra, GOOS, GLOSS, FAGS | | |
| | NF3 (CCAP) | Culture Collection for Algae and Protozoa | | | | | | | UKNCC, BBSRC, DTI, Blue biotech industry BlueMicrobe KT | | |
| Strategic Ocean Funding Initiative (SOFI) | Targetted topics for collaborative research and networking, to be detailed via Announcements of Opportunity (in early 2007) | | | | | | | UK university research groups and others eligible | | | |

*Other national facilities supported at NERC marine Centres but not seeking funding through Oceans 2025 include: Marine Mammal Captive Facility (at SMRU); National Marine Biological Library (hosted at MBA); National Marine Facilities Division (including Research Ship Unit, UK Ocean Research Services, National Marine Equipment Pool and British Ocean Sediment Core Research Facility; all hosted at NOC); National Oceanographic Library (hosted at NOC); National Tidal and Sea Level Facility (hosted at POL); NERC Scientific Diving Facility (hosted at SAMS); and Remote Sensing and Data Analysis Service (hosted at PML). Also International Project Offices for GLOBEC (at PML), European Census of Marine Life (at SAMS) and CLIVAR (at NOC).

Table 2. Sustained observing activities (in Theme 10)

| | NOC | PML | POL | SAMS | SMRU | MBA | SAHFOS | Other Themes supported Details in Theme proposals |
|---|-----|-----|-----|------|------|-----|--------|--|
| Open ocean | | | | | | | | |
| SO 1 Atlantic Meridional Transect (AMT) | | | | | | | | 1, 2, 4 |
| SO 2 Porcupine Abyssal Plain deep ocean observatory | | | | | | | | 1, 2, 5 |
| SO 3 Meridional Overturning Circulation | | | | | | | | 1, 9 |
| SO 4 Extended Ellett Line | | | | | | | | 1, 2 |
| SO 5 Argo profiling floats: deployment and coordination | | | | | | | | 1, 9 |
| SO 6 Antarctic Circumpolar Current | | | | | | | | 1 |
| SO 7 GLOSS sea level network | | | | | | | | 1 |
| SO 8 Ships of opportunity | | | | | | | | 1, 2, 3 |
| SO 9 Climate-quality surface marine observations | | | | | | | | 1 |
| Coastal seas | | | | | | | | |
| SO 10 Western Channel Observatory | | | | | | | | 1, 2, 3, 4, 6 |
| SO 11 Liverpool Bay Coastal Observatory | | | | | | | | 1, 2, 3, 4, 6, |
| SO 12 Scottish West Coast Marine Amphitheatre | | | | | | | | 1, 2, 3, 4, 6 |
| SO 13 Arctic shelf time-series | | | | | | | | 1, 2, 3, 9 |
| Marine mammals | | | | | | | | |
| SO 14 Long-term observations of population dynamics | | | | | | | | 4, 6, 7 |
| Plankton | | | | | | | | |
| SO 15 Continuous Plankton Recorder (CPR) survey | | | | | | | | 2, 4, 6, 7 |

Table 3. Mapping of Oceans 2025 research themes on UK government (Defra) policy priorities*

| | | Policy priorities | | | | |
|---------------------|----------------------------------|---------------------------|--------------------------------------|-----------------------------|-------------------------------|------------------|
| | | Climate change and energy | Sustainable consumption & production | Natural resource protection | Sustainable rural communities | Sustainable food |
| Oceans 2025 drivers | Global change | Themes 1, 2, 4, 9, 10 | Themes 3, 4 | Themes 1, 4, 10 | Theme 1 | |
| | Earth's life support systems | Themes 2, 4, 9, 10 | Theme 2 | Themes 4, 5, 6, 10 | Theme 4 | |
| | Sustainable economies: resources | Theme 6, 10 | Theme 6 | Themes 5, 6, 10 | | Theme 6 |
| | Sustainable economies: impacts | Themes 3, 4, 10 | Theme 7 | Theme 7, 10 | Themes 3, 7 | Theme 7 |

*Government priorities and policy directions relating to the marine environment are brought together in Safeguarding our Seas (Defra, 2002a), with other important aspects covered in Defra, 2002b; Defra, 2005a, b, c & d; and PMSU, 2004.

Programme delivery and Knowledge Transfer

23. Each of the seven marine Centres contributing to Oceans 2025 has its own distinctive research identity. They also each have unique ownership histories and NERC-support arrangements (Box 1, Annex 1). The existence of such institutional diversity was in part the outcome of decisions made by NERC Council in 2000; such structures are not expected to change in the lifetime of Oceans 2025.

24. The delivery of Oceans 2025 will therefore be achieved primarily at the Centre level, and the Theme proposals have been constructed accordingly, within funding envelopes set by NERC on a Centre-specific basis. Nevertheless, two other components of programme delivery are crucially important, significantly increasing overall cost-effectiveness and efficiency: i) the engagement of the wider research community (through SOFI); and ii) the programme-wide coordination that will be maintained during the lifetime of Oceans 2025, particularly with regard