

MEMORANDUM FROM THE NATURAL ENVIRONMENT RESEARCH COUNCIL IN RESPONSE TO THE ENVIRONMENTAL AUDIT SELECT COMMITTEE INQUIRY ON AN ENVIRONMENTAL SCORECARD

Introduction

1. The Natural Environment Research Council (NERC) is one of the UK's seven Research Councils. It funds and carries out impartial scientific research in the sciences of the environment and trains the next generation of independent environmental scientists. Details of NERC's research centres and research programmes are available at www.nerc.ac.uk.
2. This response is based on input from NERC's National Oceanography Centre (NOC).
3. The [National Oceanography Centre](#)¹ was formed on 1 April 2010 by bringing together into a single institution the Natural Environment Research Council's activity at the National Oceanography Centre, Southampton (NOCS) and the Proudman Oceanographic Laboratory (POL) in Liverpool. The NOC works in close partnership with the wider marine science community to create an integrated research capability. NOC is the focus for UK oceanography.
4. NOC welcomes the opportunity to respond to the Commons Select Committee inquiry into an Environmental Scorecard. The National Oceanography Centre (NOC) is a focal point for UK Marine Science and many of its programmes are funded through public money, accessed via NERC and ESPRC as well as other government departments such as DEFRA.

Question 1: The areas in which environmental protection has worsened most since 2010

5. Much progress has been made to improve marine environmental protection since 2010. In particular this can be seen through the implementation of the Marine Strategy Framework Directive (MSFD)², which aims to achieve Good Environmental Status (GES)³ across UK waters by 2020. Increasingly environmental protection of the marine environment is about looking at the entire ecosystem in order to better understand how it works and impacts on society. MSFD utilises such an ecosystem approach, ensuring that policy and science are integrated.

Question 2: The adequacy of the indicators and/or targets used to monitor protection in particular environmental areas

6. The MSFD is the main mechanism through which the environmental indicators and targets have been set for the marine environment. The European Commission has commissioned a review of the adequacy of these targets that have been set by all member states, including the UK⁴. In summary:

¹ www.noc.ac.uk

² MSFD is European Directive, which aims to develop a framework for community action in the field of marine environmental policy. It is a transparent, legislative framework for an ecosystem-based approach to the management of human activities and the sustainable use of marine goods and services. MSFD has been adopted at national level and is in the process of being implemented by UK government in collaboration with other European member states in the same marine region. Thus there is much progress being made in order to ensure that marine environmental protection measures are in place around UK national waters.

³ For full descriptions of the GES descriptors see <http://archive.defra.gov.uk/environment/marine/documents/legislation/msfd-descriptors.pdf>

⁴ http://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/implementation/reports_en.htm

- **Descriptors 1, 4, and 6: Biodiversity** – The set of targets to measure biodiversity in UK waters are extensive and include looking at benthic and pelagic habitats, distribution and abundance of species and marine food webs. **The targets that have been set are considered adequate.**
- **Descriptor 2: Non indigenous species** – The targets set for this descriptor aim to reduce the risk of introduction and spread of non-native species through improved management of high-risk pathways and vectors as well as reducing the impact of non-indigenous species (NIS). **The targets set are considered inadequate to achieve GES,** lacking specification of how the identified pressures and impacts from NIS will be reduced.
- **Descriptor 3: Commercial fish and shellfish** – The targets and indicators for this descriptor focus on ensuring exploitation is at or below maximum sustainable yields (MSY) or within plausible fishing mortalities consistent with MSY ensuring reproductive capacity is maintained at levels to sustain exploitation of stocks. **These targets are considered adequate.**
- **Descriptor 5: Eutrophication** – There is a broad range of targets and indicators for the eutrophication descriptor, including those, which ensure that there is no increase or downward trends in nutrient inputs and concentrations. **These targets and indicators are considered adequate.**
- **Descriptor 7: Hydrographic conditions** – The target set is to ensure that hydrographic conditions are not altered by marine development and impact biological ecosystems. Indicators include the extent of the area to be altered and the extent of the habitats within that area. **This set of targets and indicators is considered adequate.**
- **Descriptor 8: Contaminants** – The targets and indicators for contaminants focus on ensuring that concentrations of substances identified within relevant legislation and international obligations are below the concentrations at which adverse effects are likely to occur. **These targets and indicators are considered partially adequate.** Although the targets refer to the relevant EU and OSPAR standards the targets are deemed not sufficient to achieve GES. This is because there are no specific targets above which concentrations should not increase. Such a target is necessary to ensure GES.
- **Descriptor 9: Contaminants in fish and seafood** – The target set for this descriptor state that for contaminants where regulatory levels have been set, there should be a high rate of compliance based on relevant surveys and samples from commercial fishing grounds. **This target is seen as partially adequate** as it is potentially measurable via regulatory reference levels, but there is a lack of specificity of the threshold values.
- **Descriptor 10: Marine Litter** – The targets set for marine litter include an overall reduction in the number of visible litter items within specific categories/types on coastlines. **These targets are considered partially adequate,** lacking ambition and with no targets associated with the sea itself or to address the pressures causing marine litter.
- **Descriptor 11: Energy, including underwater noise** – The targets associated with underwater noise include establishing a noise registry to record, assess, and manage the distribution and timing of anthropogenic sound sources. **The targets defined are seen as adequate** especially given the little knowledge that is available regarding noise in the marine environment.

Question 3: The areas in which the need for improved protection is most urgent, and the nature of the improvements required

Invasive Species

Urgent work needed to improve protection of the marine environment against **non-indigenous, invasive species**. Key invasive species affecting the UK and European waters include the Mitten Crab, Asian Kelp and the Zebra Mussel⁵. There are significant economic and health risks associated with invasive species in the marine environment. **It is key that there is better scientific research being undertaken,** through long-term surveillance

⁵ http://globallast.imo.org/poster4_english.pdf

programmes, to help define and set targets and indicators for invasive species in the marine environment. Better research will lead to:

- Improved understanding and identification of the baselines for species, both native and invasive.
- A greater understanding of the pathways across which non-native species are transported between ocean regions (e.g. ship ballast water).
- Improved targets for reducing non-indigenous species.
- Improvements in government buy in to legislation and international agreements (e.g. the International Maritime Organisation, Ballast Water Management Convention⁶).

Underwater Sound

There is urgent work needed to improve understanding of ***underwater sound***. This is not simple given the wide range of different sound sources resulting from human activities in the marine environment and range of different species that may be affected. In order to improve protection against underwater sound there is a ***strong need for more research***, addressing:

- Which species are affected by underwater noise?
- The extent to which noise actually matters to animals in the marine environment?
- The cumulative effects of noise?
- The effects of low-level constant noise on habitat displacement?
- How animals are able to adapt to noise?⁷

Investments ***in monitoring programmes for underwater noise*** are needed to better understand ambient noise levels as well as one off “loud” events. There is also a need to ***improve standards against which noise can be measured and recorded***.

Contaminants

For descriptors 8, and 9 focussing on ***contaminants in the water and in shellfish***, there is a ***lack of scientific data underpinning*** at least some part of the targets set for the descriptors. This lack of data means that specific targets and thresholds cannot be specifically set, enabling GES to be clearly achievable. Consequently it highlights the ***importance of continued investment in marine scientific research to enable environmental protection measures to be appropriately implemented*** in line with European and national legislation.

Marine Litter

There is a ***need for further research to set appropriate baselines against which targets for reduction of marine litter can be quantified***. To improve protection of the sea itself from marine litter, strategies need to be developed to monitor floating marine litter, to find the source, and understand the spatial and temporal distribution of marine litter. Methodologies that could be implemented to monitor litter at sea could include open sea surveys, aerial surveys, net tows for macro litter and riverine litter monitoring⁸. Furthermore, the marine litter problem is part of a broader spectrum of waste management issues, which need to be better addressed as a cohesive set of legislation.

Marine Protected Areas

Around the coast of the UK several ***Marine Protected Area's (MPA's)*** have been established to protect the marine environment. Twenty-seven MPA's were designated in the first review and a further 37 sites are being considered in the second tranche⁹. During the future considerations it will be important to ensure:

⁶ <http://www.imo.org/OurWork/Environment/BallastWaterManagement/Pages/BWMConvention.aspx>

The ballast water convention aims to better regulate the use of ballast water in the shipping industry. Although the UK government fully supports the principles of the convention it has not yet ratified this convention due to a number of issues concerning the scientific principles, which will be used to enforce the convention. <http://www.publications.parliament.uk/pa/cm201415/cmselect/cmenvaud/385/385.pdf>

⁷ <http://ec.europa.eu/environment/integration/research/newsalert/pdf/FB7.pdf>

⁸ <http://publications.jrc.ec.europa.eu/repository/handle/111111111/30681>

⁹ <http://www.naturalengland.org.uk/ourwork/marine/mpa/mcz/>

- The process for designation **utilises all of the available scientific data appropriately and does not focus disproportionately in the gaps in the knowledge base.**
- The process is **driven from the bottom up**, engaging the stakeholders and users of the marine environment (e.g. fishermen and the tourism industry).
- There is a **holistic understanding of the benefits of MPA's**, including the indirect costs of area designation (e.g. carbon sequestration).
- Improve **understanding of monitoring processes needed for MPA's.**
- Greater value is placed on **communicating the value of MPA's to the public.**
- **Joint work with research programmes is undertaken** to share the costs of resources and expertise.
- There are **appropriate reference sites** available to measure the impact of MPA's.
- There are **well-defined procedures and statutory legislation** to manage the designated MPA's.
- **Sustained long term funding is made available** to key organisations (e.g. DEFRA and MMO) to ensure effective management¹⁰.

Question 4: Which policy levers are most (and least) appropriate to enable improved protection?

It is difficult to rank the policy levers mentioned in this inquiry in an order of most to least important. This is because in marine science multiple policy levers are often used in conjunction with one another to help improve environmental protection.

i. Legislation or regulation

The ocean is a multi-stakeholder environment and as such needs appropriate regulation through legislation to protect it. Marine planning is an area of environmental protection where legislation is appropriate to ensure a sustainable future for coastal and offshore waters. The implementation of this legislation has involved building upon a strong scientific evidence base, critical engagement of stakeholders and sustainability appraisal throughout the entire process to develop the marine plans for each region¹¹.

ii. Public education and campaigns; Publication and transparency of environmental information and statistics; and Community engagement/partnerships

The key to successful legislation at a national level is that it is **built from the bottom up with sufficient engagement with stakeholders and the public.** In particular it is important to ensure:

- All of the **relevant information is published in a transparent and clear manner**
- **Communication of the uncertainty of the data**¹².
- **Public education and campaigns** are undertaken, engaging with NGO's to champion ideas to the public.

iii. Benchmarking and league-tables

When examining how the marine environment is changing over time **it is vital to have a baseline/benchmark against which comparisons can be made.** In particular benchmarks/baselines provide and enable:

- An **understanding of what an environment was like** before implementation of protection measures (e.g. Marine Protected Areas)
- **Targets to be set to try and attain a good level of environmental protection.**

¹⁰ <http://www.parliamentlive.tv/Main/MeetingDetails.aspx?meetingId=14842>

¹¹ <http://www.marinemangement.org.uk/marineplanning/about/process.htm>

¹² <http://www.senseaboutscience.org/resources.php/127/making-sense-of-uncertainty>

Thus there is a need for **continued investment in scientific research** to better understand baseline measurements and set appropriate targets.

iv. 'Nudge' techniques

Nudge techniques have been used before in protecting the marine environment. In the early 2000's the public and fishing communities were educated as to the benefits of the closure of Lyme Bay to scallop fishing¹³. Through this nudge technique the bay was protected until 2005 when the rising price of fuel and market costs for scallops, along with the redevelopment of the West Bay harbour, resulted in the restart of scallop dredging.

The nudge was **initially successful** because there was **open and transparent stakeholder engagement** and buy in from the fishing communities in order that they could see the benefits of their actions in the short to mid term. However in the longer term **the nudge failed** when market forces came into play. In this scenario legislation had to be instated for longer-term environmental protection.

v. Fiscal penalties or incentives

Fiscal penalties or incentives are appropriate, as enforcement mechanisms as a last resort following failed implementation of other mechanisms. Fiscal penalties will only be appropriate in business driven industries that look to make a profit. The implementation of fiscal penalties needs to be supported by appropriate management. In the marine environment it is particularly difficult to monitor all of the necessary areas as seen through the implementation of the reformed Common Fisheries Policy in UK legislation¹⁴.

Question 5: Capacity and resources of the Government agencies, and non-governmental bodies, to ensure environmentally protective measures are carried out.

Appropriate funding resources need to be in place to ensure that environmental protection measures are carried out appropriately, through agencies such as DEFRA and the MMO. One solution to limited public resources is to **work with Non-Governmental Organisations (NGO's)** in helping to manage the protection of the marine environment, by assigning NGO's observer status within MPA's. This action requires **good working relationships between NGO's and government agencies**.

Learned Societies such as the Institute for Marine Engineering, Science and Technology (IMarEST)¹⁵ and the Society for Underwater Technology (SUT)¹⁶ can also play key roles in providing access to scientific communities thus can easily broker information between scientists and governments (e.g. the IMarEST Ballast Water Special Interest Group interactions with the International Maritime Organisation)¹⁷.

Question 6: The extent of coherence between Government policies and between Government and European Union policies, and the likely beneficial or detrimental impacts on the environment

There is a **good coherence between European Union and UK Government policy** with effective transposition and implementation procedures (e.g. transposition of EU MSFD into UK legislation).

¹³ Rees SE, Attrill MJ, Austen MC, Mangi SC, Richards JP & Rodwell LD (2010) Is there a win-win scenario for marine nature conservation? A case study of Lyme Bay, England, *Ocean & Coastal Management*, 53 (3): 135-145

¹⁴ In the UK the proposed it is proposed that the Inshore Fisheries Council Association's and Marine Management Organisation will be responsible for managing and monitoring the fishing fleet's catches in UK waters. Given the limited human resources that are available to police where boats go, technology is now being utilised to ensure appropriate levels of management. <https://consult.defra.gov.uk/fisheries/pelagic-landing-obligation-in-england>

¹⁵ <http://www.imarest.org/>

¹⁶ <http://www.sut.org.uk/>

¹⁷ <http://www.imarest.org/communities/special-interest-groups/ballast-water-expert-group-bweg>

In marine science the ocean is a shared resource. From a UK perspective within MSFD, there is good work being undertaken to cooperate and coordinate environmental protection measures and standards between other countries with shared marine resources. Working through bodies such as OSPAR¹⁸ the UK is building up an internationally coherent set of targets and indicators to help achieve GES.

However, continuing with MSFD as an example, there are also clear **issues with science-policy implementation**.

- There are **few resources available to ensure that all targets and monitoring programmes required are achievable**.
- There is a **mismatch in the timescales between the required policy implementation and the scientific data requirements**. Within MSFD the target to achieve GES by 2020, from a political perspective appears achievable and realistic. However from a scientific standpoint where time series of data and baselines need to be established over years to decades, the deadline is likely too short.

Consequently there is a **need to have better links between the scientific and policy communities during policy development**. NOC science has contributed to the development of:

- **Charting Progress II**, a comprehensive report, based on robust peer reviewed evidence, examining the state of the UK seas¹⁹. This was a key science-policy document, as it resulted in the UK government and devolved administrations publishing a government commentary, in which they highlight the important messages coming from the report and outline their approach to them in terms of environmental monitoring and protection²⁰.
- **Marine Climate Change and Impact Partnership (MCCIP) report card**, which provides information on the very latest updates of the scientific understanding of how climate change is affecting UK seas²¹.
- The **Intergovernmental Panel on Climate Change (IPCC) report**²², providing information on global climate change and sea level rise.

It is reports such as these, which NOC scientists have contributed to, that enable **improvements to be made in the science-policy communication, and help policy makers to understand the constraints and timescales over which science is undertaken**. In the context of the future development of environmental scorecards, it will be essential to ensure that all scientific evidence is clearly understood including its policy relevance and timescales for implementation.

¹⁸ <http://www.ospar.org/>

¹⁹ <http://chartingprogress.defra.gov.uk/>

²⁰ <http://chartingprogress.defra.gov.uk/resources>

²¹ <http://www.mccip.org.uk/annual-report-card/2013.aspx>

²² <http://www.ipcc.ch/>