

SBSTTA 17

14-18 October 2013

Case studies – United Kingdom

Case studies submitted by the United Kingdom as examples of tools and techniques used to support implementation of the Strategic Plan goals and Aichi targets

1. Ecosystems accounting within the National Accounts framework

What it is, what does it do, who benefits

Ultimate aim is to include the value of natural capital within the framework of the National Accounts. This would mean that the scale and condition of ecosystem assets and ecosystem services can be linked with the economic information contained within the National Accounts. The intention is to compile accounts in both physical and monetary terms, the latter would mean that the unpriced values of ecosystem goods and services are reported alongside indicators of economic growth such as GDP.

How does it help address Aichi target

It is a core part of Target 2, which states that 'by 2020, at the latest, biodiversity values ... are being incorporated into national accounting, as appropriate'.

What have we learnt, what is of interest to international audience?

Important to engage with National Accountants, as there is some wariness within many National Statistics Institutes which needs to be overcome if this target is going to be met. National Accountants tend to be reasonably comfortable with the valuation of provisioning services, but it is important to recognise that such a focus could be to the detriment of biodiversity more generally.

Temptation is to start with ecosystems for which data is readily available, but it's equally important to identify areas where the value-added of an accounting approach gives tangible policy gains. (For the UK, this is in the development of accounts for the Public Forest Estate.)

Don't let the best be the enemy of the good (it is better to be roughly right than precisely wrong).

Where to find out more

Roadmap on Natural Capital Accounting (ONS, 18 December 2012) <http://www.ons.gov.uk/ons/guide-method/user-guidance/well-being/publications/previous-publications/index.html>

initial accounts for woodlands (ONS, 26 June 2013) <http://www.ons.gov.uk/ons/rel/environmental/uk-environmental-accounts/2013/stb-ukea-2013.html#tab-background-notes>

2. Measuring the impacts on global biodiversity of goods and services imported into the UK

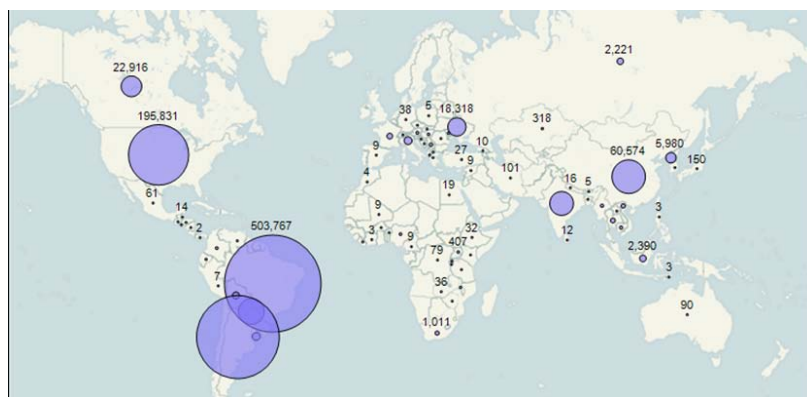
What is the 'global impacts' project, what does it do, who benefits?

The UK relies on a range of imported goods and services to satisfy growing demand, which may cause pressure on biodiversity and ecosystems beyond the UK's borders. The overall aim of this research project was to provide a methodology for linking UK imports of goods and services to geographically-defined impacts on biodiversity in a consistent and repeatable manner and to generate a database of these results.

A global trade model that retains product-level production detail and quantitative links to associated environmental impacts has been developed to allow top-down assessment of potential impacts. This model facilitates the selection of priority commodities and regions which can then be investigated in more detail using a case-study approach.

The assessment framework includes environmental extensions associated with production activities that incorporate indicators of land use, water use and scarcity, and fertiliser use, along with potential impacts on threatened species. The model makes no attempt to account for management or mitigation strategies aimed at reducing these threats, although these are considered in the case studies which form the final stage of the assessment framework. Figure 1 visualises an example of model output for production of soya bean in different countries in terms of total land area requirements necessary to fulfil UK consumption (including both direct consumption and soyabean embedded in processed products).

.Fig 1 Area of soya bean production to meet UK demand in 2007 (note: total area is equivalent to 20% of UK cropped land).



The approach presents a new perspective on the global impacts of UK consumption, which is potentially highly powerful for undertaking a wide analysis of potential drivers of biodiversity loss in producing regions, and simultaneously assessing a variety of different commodities in a consistent, comparable and repeatable manner.

How does it help to address Aichi target(s)?

The research project provides a policy support tool to address Aichi Target 4. The tool provides an important step towards assessment of possible impacts of UK consumption overseas. As the models utilise international trade data, the model may be applied to consumption in other countries.

What have we learnt, what is of interest to international audience?

- It is technically possible to utilise readily available trade data to determine the country of origin of commodities consumed directly in the UK, and those embedded within the supply chain of other products.
- The model identifies (for a small number of selected commodities) the scale and distribution of pressures, expressed in terms of land use, that UK consumption has overseas.
- The study explores approaches to assessment of environmental impacts of UK consumption but these are limited by the availability of in-country data.
- A case study is presented for impacts of UK consumption of soyabean produced in Brazil.

Where to find out more?

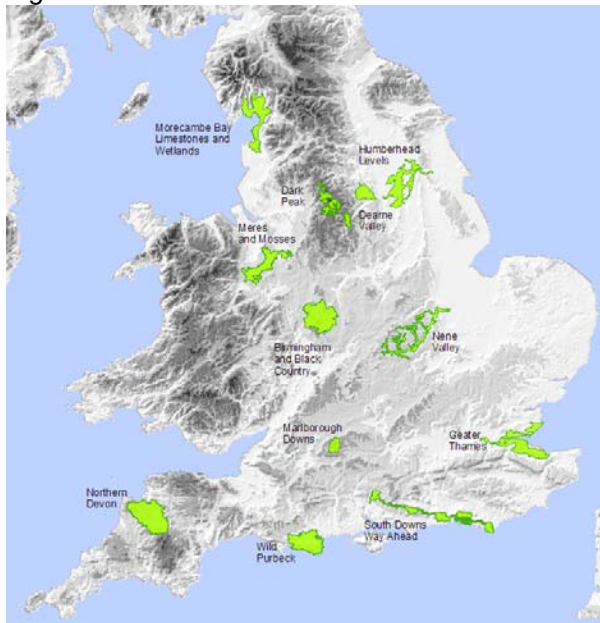
The research was undertaken for Defra by the Stockholm Environment Institute and further information is available at www.sei-international.org/-news-archive/2695 or contact: andrew.stott@defra.gsi.gov.uk

3. Monitoring and evaluation of Nature Improvement Areas (NIAs)

What are NIAs, how are they monitored and evaluated, who benefits?

Following a national competition, 12 Nature Improvement Areas (NIAs) were created in England in 2012 (see Fig 1). They are part of a new, integrated, and locally-driven approach to improving the natural environment. They aim to provide better places for wildlife on a large scale, to improve the natural environment for people, and to unite local communities, landowners and business through a shared vision. They have been developed and are being implemented by local partnerships between the voluntary and private sectors and government agencies. They will try out different approaches with the common aim of restoring biodiversity and improving ecosystem services. Whilst encouraging different approaches to delivery is part of the purpose, a consistent approach for monitoring and evaluation is necessary to be able to assess what works well, and potentially not so well, and to take stock overall.

Fig 1 Location of NIAs

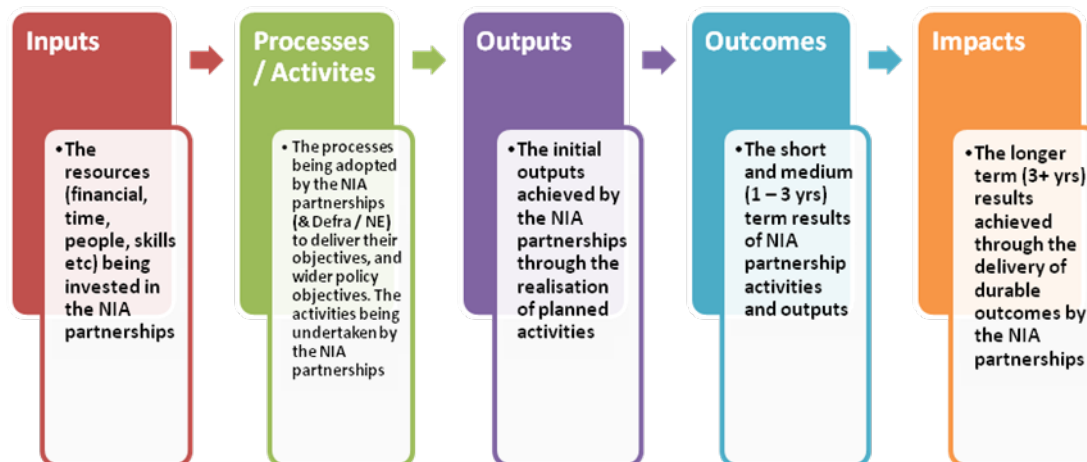


An indicator-based monitoring and evaluation framework was developed in consultation with the NIAs. The indicators cover four themes: Biodiversity; Ecosystem Services; Social and Economic Benefits and Contributions to Well-Being; and Partnership Working. The NIAs have each selected between 14 and 28 indicators from a menu of 'core', 'optional' and 'local' indicators. The data is captured via an online reporting tool. For some aspects relating to the social and economic benefits of NIAs a more deliberative and qualitative evaluation process is being developed.

The evaluation method uses a logic model (see Fig 2) which links the intended outcomes (both short term and longer term impacts) with the policy inputs, activities and processes. Within the logic model, evaluation objectives, sub-objectives and criteria have been structured under the four themes of the NIA M&E framework. Evaluation questions have been developed around each criterion, as a basis for the evaluation of individual NIAs and the NIAs collectively at the programme level

Annual reports of progress will be produced, with a tri-annual evaluation in 2015. Best practice will be shared amongst NIAs to continually improve performance and encourage. The tri-annual evaluation will aim to assess what the NIAs have achieved, what difference they have made, and whether they provide a cost-effective means of meeting the objectives of the England Biodiversity Strategy and the Aichi Targets.

Fig 2 The NIA evaluation logic model



How does it help to address Aichi target(s)?

The NIAs aim to address a number of Aichi targets, in particular 1, 5, 10, 11, 14, 15

What have we learnt, what is of interest to international audience?

- Bottom-up approach allows local solutions to develop, builds on local strengths and community interest – not just delivery of a national target or legal obligation;
- Important to build commitment and ownership to monitoring – need for flexibility within a national framework;
- Indicators provide a useful focus for monitoring and evaluation – however, data availability and quality at a local level is a limitation;
- Difficult to establish baselines and counterfactuals to determine the added value;
- The scientific underpinning and methods for some indicators, such as ecological connectivity and ecosystem services, are not fully developed;
- Project timelines are a challenge: difficult to (a) develop monitoring and evaluation approach in consultation; (b) provide early guidance and tools for its application; and (c) measure outcomes within a short timescale.

Where to find out more?

The report of the first year evaluation is available at:

<http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/funding/nia/monitoringandevaluation.aspx> or contact: andrew.stott@defra.gsi.gov.uk

4. Making Earth Observation work for UK biodiversity,

What is 'Making Earth Observations Work' for UK Biodiversity, what does it do, who benefits?

The 'Making Earth Observation Work' for UK Biodiversity (MEOW) project has been investigating the use of satellite and aerial imagery for the habitat surveillance and monitoring needs of the UK.

Nationally there remain gaps in knowledge about the location and quality of semi-natural habitats, which because of their scarcity, fragmented nature, their occurrence in complex mosaics and their often remote location are particularly difficult and expensive to map and monitor using traditional survey techniques.

This work has mapped habitats at a landscape scale and in more detail at a case study level, using a rule based approach built on an ecological understanding of the habitat types. The rule base allows an analysis of multiple spatial datasets, including imagery at different levels of resolution. Once the rule base has been developed it can be run again with updated imagery to build up a time series of data, so long as care is taken to deal with compatibility between images. The rule base can also be updated as our ecological understanding grows.

The project has explored the various levels of resolution of imagery (satellite, aerial, unmanned aircraft - drones) that can be used and how this affects what can be done. Costs for these data are very variable, but satellite data is becoming increasingly available at low or zero cost, e.g. NASA's Landsat data is now freely available and EU Member States can access data from the EU Copernicus programme.

The project has explored how parameters easily measured from remote sensing data can help understand the condition of habitats. Parameters include wetness, productivity, structure which in combination can diagnose enrichment, over or under grazing or other management related issues in some habitats.

How does it help to address Aichi target(s)?

The NIAs aim to provide evidence that contributes particularly to Aichi targets 5 & 7, makes some contribution to 8 & 10, as well as providing information for indicator construction.

What have we learnt, what is of interest to international audience?

- Many fine spatial scale and detailed habitat classes can be mapped accurately using modern rule based techniques or discriminated to level that reduces allows targeted field survey
- Data sharing between public bodies that commission and use remote sensing, particularly airborne sensors, can dramatically improve the data available for biodiversity applications.
- Success has come through being clear about matching the data remote sensing data can provide with knowledge of the ecological properties of the objects that it can discriminate on the ground i.e.: not starting by trying to emulate field based ways of mapping habitats.
- The techniques have application to landscapes with small habitat patches in support of targets for restoration, and the sustainability of forestry and agriculture, where more natural habitats are fragmented in more intensive land use.

Where to find out more?

More information on the Making EO Work for UK Biodiversity projects on the project pages <http://jncc.defra.gov.uk/EO> The outputs of the project include the methods for using different remote sensing data sources in combination to map or detect habitat condition for a wide range of habitat types. The information is presented as the 'Crick Framework' in a format aimed at practitioners.

5. The Non-native Species Information Portal (NNSIP)

What is NNSIP, what does it do, who benefits?

The Non-Native Species Information Portal (NNSIP) has been developed to act as a “hub” for information about non-native species in Great Britain, to inform policy and action across Great Britain. The project is led by the Centre for Ecology & Hydrology, along with the British Trust for Ornithology and the Marine Biological Association, under contract to Defra.

The aim is to enable more comprehensive, dynamic and up to date reporting of non-native species and the analysis of species populations and distributions. The Portal provides access to distribution data for over 3000 non-native species in GB as well as additional information such as place or origin, date of introduction and methods of introduction. For 300 species much more detailed information is provided, including information on identification, impacts and control methods.

In Great Britain, species records are identified by a huge network of (usually voluntary) national schemes and societies, as well as Government agencies. A key aim of the project is to streamline the uploading of verified records for all non-native species to the National Biodiversity Network Gateway. This process has been enabled by initiatives including the iRecord website.

The “Alerts” system highlights a small number of non-native species of particular interest, often those for which rapid response may be necessary, providing a means of on-line reporting and rapid verification. Alongside this, “Recording Invasive Species Counts” (RISC) seeks records from the public on certain more easily observed species, as a means of raising public awareness of and engagement with non-native species issues whilst gathering distribution data.

As the portal is accessible to anyone the benefits are far reaching. For example local action groups tasked with tackling invasive non-native species are able to input their findings into the system and share results and ways of dealing with invasive non-native species nationally; policy officials can use the information to make decisions about which species should become priorities for control or eradication, and volunteers and other interested parties can learn how to identify a species, the impacts invasive non-native species can have on native wildlife and methods for control.

How does it help to address Aichi target(s)?

Invasive non-native species pose one of the greatest threats to our native biodiversity. The wealth of information on the portal will continue to help to work towards achieving Aichi biodiversity target 9. Its analysis of pathways and rate of arrival are crucial to enabling a strategic approach. The Alerts are key to enabling contingency planning and rapid response.

What have we learnt, what is of interest to international audience?

NNSIP is central to the UK’s ability to deliver against the surveillance, monitoring, reporting, early warning and rapid response requirements of the EU Invasive Alien Species Regulation. The portal should be of interest to the international audience as an example of effective mechanisms and protocols developed to manage and control invasive non-native species, such as the species alert system and contingency plans for species like the Asian hornet.

Where to find out more?

For further information visit the portal website at:

<https://secure.fera.defra.gov.uk/nonnativespecies/factsheet/index.cfm> .

6. Using environmental DNA to detect cryptic species

What is environmental DNA, what does it do, who benefits

The environmental DNA technique tests for traces of a species DNA left behind in its environment. The UK Department for Food, Environment and Rural Affairs (Defra), and partners¹, are currently investigating the use of eDNA to record occupancy of the great crested newt *Triturus cristatus* (GCN) in ponds, a cryptic species protected in Europe by the Habitats Directive. Water samples are collected from ponds and tested for traces of GCN DNA; as DNA in water degrades within 20 days, a positive result shows that the species has been present in the pond recently.

eDNA has a number of potential advantages, including ease of deployment (e.g. no restrictions on the time of day for sampling) and potentially more accurate detection ability. The GCN is an example of fairly cryptic pond species with a relatively low detection rate using traditional methods of sampling – several negative repeat samples of the same site are required to provide a reasonably high confidence that the species is truly absent; using eDNA it is believed a negative result will be a much stronger indication of true absence, and any individual GCN that is in the pond has a higher likelihood of being detected, even if conditions are not conducive to traditional sampling (e.g. murky waters).

Although the Defra study is focussed on detecting occupancy of GCN, using the eDNA technique allows for multiple species to be detected from the same water sample. The approach therefore has the potential to improve efficiency in monitoring a range of species that occupy the same environment.

How does eDNA help to address Aichi target(s)?

The eDNA methodology has the potential to provide an efficient means of monitoring the status of threatened species to help underpin Target 12 of the Strategic Plan for Biodiversity 2011-2020 (By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained). As a recently developed detection technique, eDNA also contributes towards Target 19 of the Strategic Plan (By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied).

Where to find out more?

The Defra study is ongoing, but due to be completed in early 2014 when the research report will be made available online on the Research section of the Defra website:

<https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs/about/research#science-research>

¹ Research project is being funded by Defra, Natural England, Joint Nature Conservation Committee and Scottish Natural Heritage, with in-kind contribution from Natural Resources Wales; and being delivered by the Freshwater Habitats Trust in collaboration with SpyGen.

7. National Biodiversity Network (NBN) Gateway

What is the National Biodiversity Network, what does it do, who benefits

- The NBN Gateway is a web based portal that acts as a central collation facility for biodiversity records across the UK. The data are held in a standard format and a range of reporting products / outputs are provided for users. These outputs include maps, lists of protected species occurring within a particular area etc.
- It has been running for roughly 10 years and now provides access to over 90 million records from approximately 180 different providers. Use of the system has also grown substantially over this time within operational, strategic and research applications.
- The situation in the UK is slightly different to many other parts of the world whereby the vast majority of the records available were collected by volunteer recorders. As a result of this there is not the same driver to make the data completely openly available. To address this, the Gateway has been built with a suite of access controls that allow the data owner to set who can see the data and at what resolution.
- Currently the system collates data from a range of primarily off-line sources. The focus from here is to begin to develop and promote more on-line capture of data with very efficient and rapid flows into the Gateway (or capture directly into the Gateway itself).

How does it help to address Aichi target(s)?

- **Target 19** (developing technologies relating to biodiversity): The Gateway helps to address this target from the perspective of the UK. However, over the next five years we also hope that much of the code underpinning the Gateway will be openly available and could be re-used by other parties. Additionally we hope that at least a portion of the development over that time can be aligned with the development of the global portal ([GBIF](#)) or the other tools supporting data mobilisation through this.
- Additionally the data mobilised through the Gateway will assist with underpinning a variety of other Aichi targets including **1, 2, 7, 9, 11, 12** and **13** by providing basic data to assessing trends in species abundance and distribution and to inform policy decisions. It is hoped that the range of standard reporting products from the Gateway will allow fairly direct integration and use within these.

What have we learnt, what is of interest to international audience?

- While there are a number of portals across the globe providing similar functionality fewer have attempted to establish access controls. The UK has found such a mechanism is both positive and negative. It has been a good mechanism to bring providers on board and provide limited access to genuinely sensitive data. However, it has perhaps made the UK rather slow to really challenge some of the positions of the data providers on data access.
- Significant national investment in a national mechanism has been very cost effective in the long term. A variety of uses that were previously very inefficient have been significantly improved (and further improvements are possible). Additionally the data have been applied in situations that would previously have been impossible (e.g. emergencies).
- Where on-line data capture has successful it has made very significant increases to efficiency and availability (again more than paying for the investment).

Where to find out more

The Gateway website: <http://data.nbn.org.uk>

8. Citizen science: volunteer recording

What is volunteer recording, what does it do, who benefits

Information on distribution, status and trends in species and habitats is used to inform local decision making; target conservation investment; support national reporting and assessment; and underpin policy relevant research.

The majority of the species information used in the UK is gathered by volunteers and it is estimated that the equivalent annual cost of collecting the same information in-house or commercially is estimated at > £40m (GBP).

Of the 90 million species occurrence records available on the National Biodiversity Network Gateway (see case study 6), >90% is sourced from the voluntary sector; c40% of these are shared freely through the Global Biodiversity Information Facility web-based portal.

How does this help to address Aichi target(s)?

Volunteer recording data are used in five out of the 24 UK indicators that are published to show UK progress with the Aichi targets (birds, bats, butterflies, threatened species and non-native species). Volunteer data are being further explored with the intention of producing an indicator for ecosystem services (probably pollinators) and an indicator of climate change impact and adaptation.

Volunteer datasets are also being used in spatial models to assess the relative importance of different environmental pressures on biodiversity change.

The activity is therefore relevant to the following targets:

- *Target 9:* Invasive alien species managed and controlled.
- *Target 10:* Multiple anthropogenic pressures minimized.
- *Target 12:* Improved status of threatened species.
- *Target 14:* Ecosystems providing essential services restored and safeguarded.

What have we learnt, what is of interest to international audience?

- The only significant datasets that allow us to calculate temporal trends in species abundance and range have been collected by volunteers.
- Only a relatively small proportion of volunteer surveillance schemes have both a standardised methodology and a robust sampling framework.
- The majority of volunteer surveillance is unstructured – presence is recorded, but there is spatial and temporal bias in the survey locations and different levels of recorder effort for sites that are visited.
- New modelling approaches can adjust for temporal and spatial bias and identify distribution trends over space and time, and correlate them with environmental factors. However, they are limited by a lack of information on recorder effort or on methods used within a site.
- Volunteer groups are generally open to collaboration with public sector funders to improve the quality of data collected. Small amounts of public funding can significantly accelerate adoption of improved sampling to improve data quality.
- There is a huge appetite for citizen science. Projects such as the Open Air Laboratory have been extremely successful in engaging the public.

Where to find out more?

National Biodiversity Network (NBN) Gateway www.data.nbn.org; NBN Trust www.nbn.org.uk/; National Federation of Biological Recorders www.nfbr.org.uk/; Association of Local Record Centres

www.alerc.org.uk/; Biological Records Centre www.brc.ac.uk/, Citizen Science info:
www.ukeof.org.uk/co_citizen.aspx

9 .Offshore Marine Protected Areas

What are offshore MPAs, what do they do, who benefits?

- The United Kingdom (UK) has been identifying sites in offshore waters (beyond 12nm out to limits of the UK Continental Shelf) since 2000.
- Originally the UK started with identifying and designating 'Natura 2000' sites as required under the European Union (EU) Habitats Directives and Birds Directives respectively; the UK has now moved on to identifying and designating other Marine Protected Areas (MPAs) under national legislation.
- There are currently 21 sites in UK offshore waters:
 - 20 of these are Special Areas of Conservation (under the EU Habitats Directive) identified to protect sandbanks, reefs and submarine structures made by leaking gases;
 - 1 is a Special Protection Area identified (under the EU Birds Directive) .
- The sites will afford protection to the habitats and species listed within the designation order.
- Now that the UK has started to identify and designate sites, work is ongoing to identify and to put appropriate management measures, and monitoring and assessment processes, in place to afford protection to the features of the sites.

How does it help to address Aichi target(s)

- This process contributes to achieving target 11 by establishing an ecologically coherent network of MPAs in both inshore and offshore waters;
- There is now 8.5% of the UK Continental Shelf (inshore and offshore) covered by MPAs.
- Additional sites are still to be designated.

What have we learnt, what is of interest to international audience?

- **Stakeholder involvement** – particularly in offshore waters, where enforcement is an issue, due to the large areas involved and the distance that they are from land, ensuring adequate stakeholder involvement, throughout the process of the identification of the sites and subsequent management measures, is key to increase the levels of buy-in from the stakeholder community and compliance with any management measures put in place.
- **International fisheries interests** – with offshore sites, there are more likely to be international fisheries interests and so it is important to engage not only with national fisheries organisations but also any international stakeholders with interests in the sites.
- **Data availability** – generally in offshore waters the availability of data for the areas that we are looking to designate is sparser than for areas closer to land. Sites have to be designated based on best available evidence and additional evidence gathered after designation through the management, monitoring and assessment cycle.
- **Offshore survey** – surveying offshore sites, particularly those in deep water, is expensive, time consuming and unpredictable given the likelihood of experiencing 'downtime' due to bad weather at sea. Therefore, wherever possible, it is helpful to seek to undertake collaborative surveys with other organisations and improve data sharing between organisations with interests in the UK offshore environment.

Where to find out more.

- Find out more on our website www.jncc.defra.gov.uk/marineprotectedareas
- And on our Interactive Map www.jncc.defra.gov.uk/page-5201

10. Method for Assessment of Priorities for international Species conservation (MAPISCO)

What is MAPISCO, what does it do, who benefits?

MAPISCO enables the identification of priority species which could be a focus for conservation effort in species-oriented MEAs, investments and conservation initiatives.

It is an IT-based science-policy tool that enables species to be ranked based on their combined contribution to a selection of the Aichi targets. Concentrated conservation effort on high-ranking species would theoretically result in the largest associated biodiversity benefits for other species, habitats, wider ecosystems, and ecosystem services.

How does it help to address Aichi target(s)

MAPISCO will allow policy makers and other users to target international species conservation activity in the most cost-effective way to deliver against the Aichi targets, especially but not limited to Target 12.

It scores species according to the contribution that their conservation would make to different Aichi targets, and includes data on range and threats. It will enable users to identify where and which conservation interventions are likely to have maximum impact in delivering against any combination of the Aichi targets. The weighting given to each target can be adjusted according to specific policy aspirations making it highly adaptable to changing policy objectives.

What have we learnt, what is of interest to international audience?

Development of this methodology has demonstrated the need for clearly articulated policy decisions in any prioritisation process. To be effective and useful to policy makers any prioritisation tool requires good engagement and meaningful dialogue between policy-makers and scientists at the science-policy interface. Unlike many other prioritisation tools MAPISCO is a highly policy relevant tool that is more adaptable and responsive to the practicalities of policy making than most.

Where to find out more.

A report of the outputs of the MAPISCO project can be found at:

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=2&ProjectID=17828>

A Beta-test tool can be found at: <http://mapisco.org.uk/>