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# EVALUATING THE MANAGEMENT EFFECTIVENESS OF MARINE PROTECTED AREAS

*Using UK sites and the UK MPA  
programme to illustrate different  
approaches*

A report for WWF-UK

S Gubbay

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## 1. INTRODUCTION

The first statutory Marine Protected Area (MPA) in the UK was designated around the island of Lundy in 1986. Today there are more than 50 MPAs in UK waters, most of which are also Special Areas of Conservation (SACs), forming part of the *Natura 2000* network of protected areas required by the EC Habitats and Species Directive.

There is still progress to be made in establishing a comprehensive network of MPAs in UK waters, but attention is also starting to shift towards evaluating the effectiveness of existing sites. This is important as it not only helps to determine whether the site management objectives are being met, but also demonstrates what is being achieved, identifies shortcomings, and provides lessons for improving management in the future.

A four volume global review of MPAs which was published in 1995<sup>1</sup> included an early attempt to evaluate the effectiveness of MPAs. The review identified 1,306 MPAs, but was only able to gather sufficient information to assess management at 383 [29 per cent] of the sites. Of these, only 155 [40 per cent] were assessed as having a high level of management and generally achieving their management objectives. Much has changed since the 1990s in terms of information gathering, site monitoring and expectations of site evaluation. The passage of time also means that more information should be available to support the evaluation of the management effectiveness of MPAs that were set up more than a decade ago.

In the case of *Natura 2000* sites – those designated as Special Areas of Conservation (SAC) and Special Protection Areas (SPA) – the European Commission requires reports on whether the sites are in favourable condition. The first of these reports needs to be submitted in 2006, but there is no obligation for them to include any evaluation of the effectiveness of management measures at *Natura 2000* sites. Nor has a methodology for carrying out such an evaluation been agreed at either European or UK level.

This report examines key issues in relation to the management effectiveness of two types of UK MPAs – Marine Nature Reserves and marine Special Areas of Conservation. It includes:

- a consideration of potential criteria for evaluating effectiveness;
- case studies that try to apply these criteria; and
- a discussion of some of the constraints and barriers to the effective management of MPAs in the UK.

The methodology is based on the approach to evaluating the management effectiveness of MPAs set out in two documents: a recently published IUCN Guidebook prepared in collaboration with WWF and NOAA<sup>2</sup>, and a World Bank 'Score Card'<sup>3</sup>.

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<sup>1</sup> GBRMPA/World Bank/IUCN (1995) A Global Representative System of Marine Protected Areas. Vols. 1-4. World Bank, Washington.

<sup>2</sup> Pomeroy *et al.*, (2004) How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland, Switzerland.

<sup>3</sup> World Bank (2004) Score Card to assess progress in achieving management effectiveness goals for Marine Protected Areas. The World Bank. 30pp.

## 2. MANAGEMENT EFFECTIVENESS

In 1997, the IUCN's World Commission on Protected Areas set up a Management Effectiveness Task Force to examine ways to monitor and evaluate the effectiveness of protected areas. It stated that the main objective of protected area evaluation was "to improve conservation and management effectiveness of protected areas – both for protected area systems and individual protected sites", and defined the management effectiveness of protected areas as "the degree to which management actions are achieving the goals and objectives of a protected area"<sup>4</sup>.

Three common uses of the evaluation of management effectiveness were identified:

- *promoting adaptive management* where information is used to improve the way management is carried out in the future;
- *improving project planning* where lessons learned – such as comparing results and identifying the best approach – will be applied to new programmes, and inform decisions on whether programmes should be continued; and
- *promoting accountability* for example by providing information about what is being achieved, and demonstrating whether the outcomes are commensurate with the effort and resources being expended, and in line with policy and management objectives.

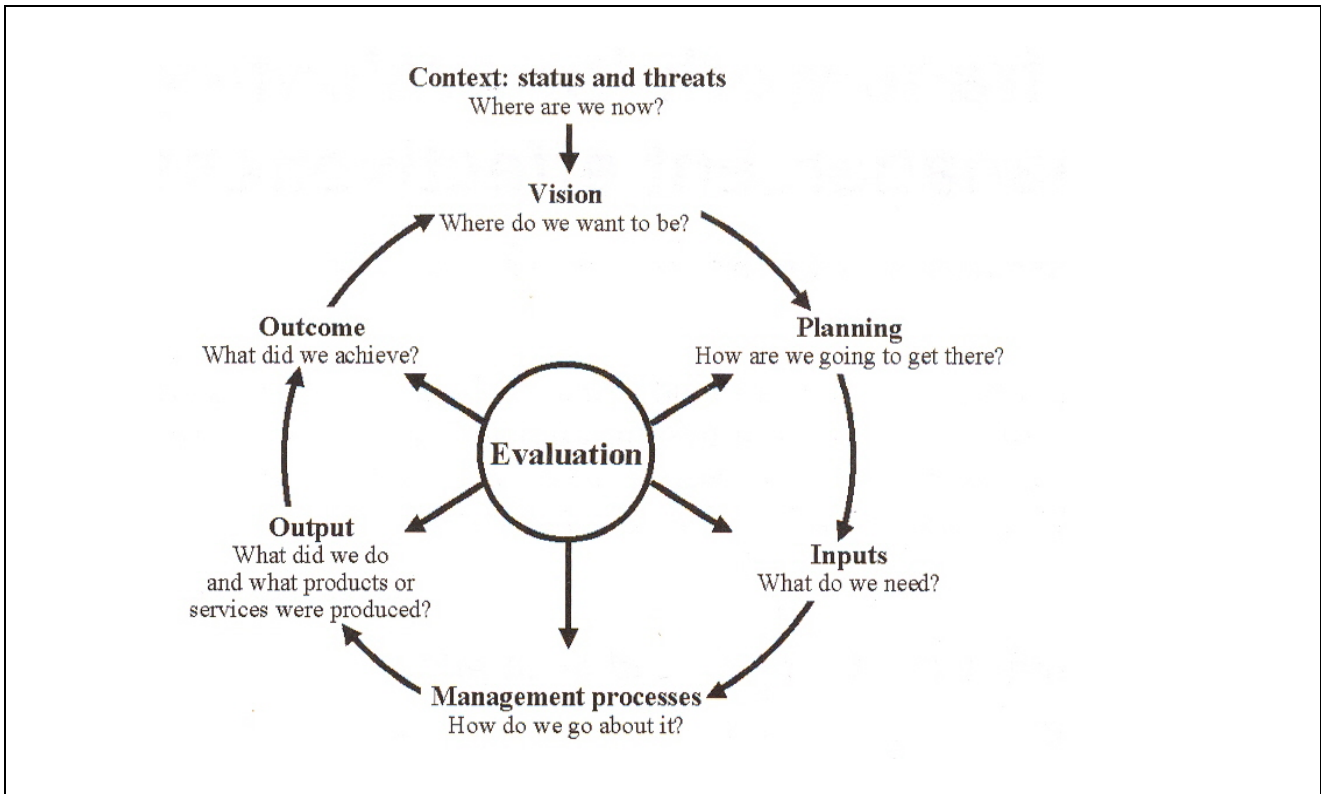
A framework for assessing the management effectiveness of protected areas was illustrated as a management cycle, with evaluation requiring a series of questions relating to design issues (context and planning), appropriateness of management systems and process (input and process), and the delivery of protected area objectives (outputs and outcomes) [Figure 1].

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<sup>4</sup> Hockings *et al.*, (2000) Evaluating Effectiveness: A Framework for Assessing the Management of Protected Areas. Best Practice Protected Area Guidelines Series No.6. IUCN, Gland, Switzerland.

FIGURE 1

The Management Cycle and Evaluation [Figure 2.1. from Hockings *et al.*, (2000)]



The World Bank has used this and a number of other tools to develop a Score Card for evaluating management effectiveness of MPAs<sup>5</sup>. The Score Card is one of the tools to help deliver obligations listed under the Convention on Biological Diversity. The World Bank approach is consistent with the IUCN framework, and has been designed to fulfil the six elements of evaluation included in the framework: context, planning, inputs, processes, outputs and outcomes. The Score Card is viewed as a ‘level 1 assessment’ – requiring little or no additional data collection, and focusing on the context of the MPA along with the appropriateness of planning, inputs and processes of management. Issues are broadly covered but the depth of analysis is generally low. The authors therefore recommend that it is used in combination with the IUCN Guidebook, which would provide a more detailed assessment tool for evaluating outcomes and achievement of management objectives.

This report tests the applicability of the IUCN Guidebook to evaluate the delivery of protected area objectives, and that of the World Bank Score Card to get an overview of the effectiveness of the UK MPA programme.

### 3. METHODOLOGY FOR ASSESSMENT OF INDIVIDUAL SITES

The methodology used to assess individual sites is taken from the 2004 IUCN Guidebook, which provides a basic and generic starting point for evaluating MPAs. The guidebook recommends that the evaluation

<sup>5</sup> World Bank (2004) Score Card to assess progress in achieving management effectiveness goals for Marine Protected Areas. The World Bank. 30pp.

process should be founded on five key principles: it must be useful, practical, balanced, flexible and holistic. A ‘toolbox’ of possible indicators is provided and the authors note that those using the guide should feel free to adapt, add to and improve on the approaches as necessary. They also state that the guidance should be viewed in a flexible way and integrated into approaches to evaluation that may already be underway. All of these points have been taken on board in developing the approach set out below for evaluating the effectiveness of a selection of MPAs in the UK.

The methodology set out in the IUCN Guidebook uses three clusters of indicators – biophysical, socio-economic, and governance indicators – cross-referenced to common goals and objectives of MPAs. Some examples are given in Figure 2.

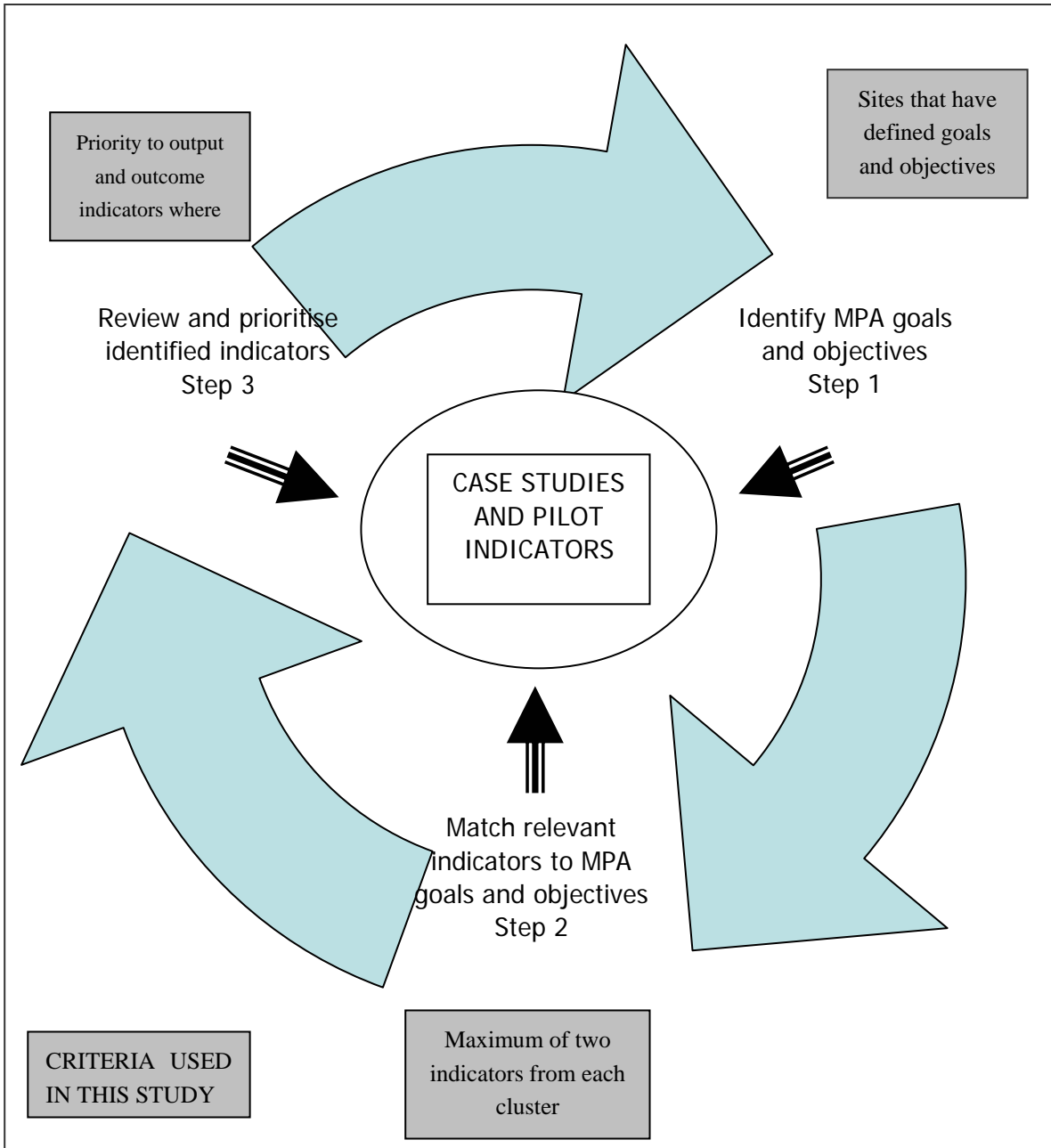
**FIGURE 2**

**Examples of potential indicators linked to frequently stated goals and objectives of MPAs**

<p><b>MPA goal:</b> Individual species protected  <b>MPA objective:</b> Focal species abundances increased or maintained  <b>Potential biophysical indicators:</b></p> <ul style="list-style-type: none"> <li>• Focal species abundance</li> <li>• Focal species population structure</li> <li>• Habitat distribution and complexity</li> <li>• Food web integrity</li> <li>• Type, level and return on fishing effort</li> <li>• Area showing signs of recovery</li> </ul> <p><b>MPA goal:</b> Livelihoods enhanced or maintained  <b>MPA objective:</b> Health of coastal residents and/or resource users improved  <b>Potential socio-economic indicators:</b></p> <ul style="list-style-type: none"> <li>• Perceptions of seafood availability</li> <li>• Quality of human health</li> <li>• Community and business infrastructure</li> </ul> <p><b>MPA goal:</b> Management plan compliance by resource users enhanced  <b>MPA objective:</b> Surveillance and monitoring of coastal areas improved  <b>Potential governance indicators:</b></p> <ul style="list-style-type: none"> <li>• Availability and allocation of MPA administrative resources</li> <li>• Level of stakeholder involvement in surveillance and monitoring</li> <li>• Clearly defined enforcement procedures</li> <li>• Enforcement coverage</li> </ul>	<p>[From Pomeroy <i>et al.</i>, (2004)]</p>
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For this study, a maximum of two indicators were selected from each ‘cluster’ to pilot the exercise, with emphasis given to output/outcome indicators (Figure 3). The case study locations were principally determined by sufficiency of information as well as being selected to include examples from different parts of the UK.

**FIGURE 3 - Approach to selection of case studies and pilot indicators**



#### 4. CASE STUDIES

To test whether the evaluation approach set out in the IUCN Guidebook could be used in the UK, three MPAs have been selected as case studies. The sites are Strangford Lough, Lundy Island and the Moray Firth (see Map A). The goals and objectives have been taken from management documents; data to support reporting on potential indicators have been gathered from published sources.

The IUCN Guidebook recommends a mix of “narrative reporting” as well as the use of quantifiable data to report on indicators. In many cases, site surveys are recommended to collect data specifically for the evaluation exercise. This report is based on a desk study, so the principal information sources were research reports, scientific journals and the internet. This has its limitations, but was considered sufficient to test whether the approach set out in the IUCN Guidebook could be used for UK MPAs, identify the information required to apply it more comprehensively, and highlight the most obvious data gaps.

**Given this approach, it is important to emphasise that the findings are meant to be illustrative rather than a comprehensive evaluation of the management effectiveness of each of the case study sites.**

The IUCN Guidebook does not suggest a particular format for presenting overall conclusions or giving an overview of the effectiveness of the MPA. The approach trialled here is to present a summary table using the same categories and symbols as those used to report on progress on UK indicators of sustainable development<sup>6</sup>. Future evaluations will need to take account of the ‘scoring’ from earlier reviews, and this could be prepared in the form of an evaluation database.

#### Key to summary tables



Significant change towards meeting objective



No significant change



Significant change, in direction away from meeting objective



Trend is uncertain or no quantitative data available

BP – Biophysical indicator

SE – Socio-economic indicator

GO – Governance indicator

#### Map A: Location of MPAs selected as case studies



<sup>6</sup> Defra (2004) Sustainable Development Indicators in Your Pocket. A selection of the UK Government's indicators on sustainable development. National Statistics/Defra.



#### 4.1 STRANGFORD LOUGH

##### MPA DESIGNATIONS

	TITLE	DESIGNATED
MNR	Marine Nature Reserve	1995
cSAC	Candidate Special Area of Conservation	1996
SPA	Special Protection Area	1998

##### CONSERVATION GOALS AND OBJECTIVES OF THE MPA

###### MNR

- The conservation of the physical system, biological diversity, and man-made heritage.

###### SAC

- To maintain the feature [large shallow inlets and bays, lagoons, mudflats and sandflats, reefs, annual vegetation of drift lines] and its characteristic species and habitats in favourable condition allowing for natural change.
- To maintain the population of seals in favourable condition allowing for natural change.

###### SPA

Maintaining the populations of qualifying species at internationally and nationally important numbers. In particular:

- To maintain in favourable condition the nationally and internationally important populations of breeding sandwich tern, breeding common tern and breeding Arctic tern, allowing for natural change.
- To maintain in favourable condition the nationally and internationally important populations of light-bellied Brent goose, knot, redshank and the wintering waterfowl assemblage, while allowing for natural change.

##### SOCIO-ECONOMIC AND GOVERNANCE GOALS AND OBJECTIVES OF THE MPA

###### MNR

- The provision of a healthy, safe and clean environment, continued commercial use, beneficial

new development, public enjoyment, study, scientific research and monitoring where these do not conflict with the conservation objectives.

- The coordination of uses.

###### SAC/SPA

- Develop a management structure.
- Agree and implement a joint monitoring and research programme.
- Develop positive management initiatives.
- Develop a shared data and information handling system.
- Address regulation issues.
- Develop a shared communication system.
- Management scheme and action plan review

##### RELEVANT GOALS AND OBJECTIVES FROM IUCN GUIDEBOOK

CLUSTER	GOALS	OBJECTIVES	INDICATORS
<i>Biophysical</i>	4	20	10
<i>Socio-economic</i>	1	4	4
<i>Governance</i>	5	21	15

(For full list see Appendix 1. Tables 1.1-1.3)

##### GOALS, OBJECTIVES AND INDICATORS USED FOR CURRENT EVALUATION

	GOAL	OBJECTIVE	INDICATOR
<i>Biophysical</i>	Marine resources sustained or protected (1)	Losses to biodiversity and ecosystem functioning and structure prevented (1B)	Habitat distribution and complexity (focusing on the SAC features)
	Individual species protected (3)	Focal species abundance increased or maintained (3A)	Focal species abundance (common seal, listed waders and wildfowl)
<i>Socio-economic</i>	Environmental awareness and knowledge enhanced (6)	Scientific understanding expanded through research and monitoring (6D)	Distribution of formal knowledge to community

Governance	Effective stakeholder participation and representation ensured (3)	Community organising and participation strengthened and enhanced (3C)	Existence and activity level of community organisations
	Resource use conflicts managed and reduced (5)	User conflicts managed and/or reduced within and between user groups and/or between users and local community, or between community and people outside it (5A)	Level of resource conflict

(numbers in brackets refer to reference in IUCN Guidebook)

## BIOPHYSICAL INDICATORS

### *Habitat distribution and complexity*

Changes in the distribution of the main sublittoral habitats in the Lough have been investigated using data from 1993, 2000 and 2003. This work has focused on the main fishing grounds in the central part of the Lough. The resulting broad-scale maps suggest that species and community abundance and distribution in this area is mostly unchanged. However, when compared with data from 1975-1986, a number of species were in decline (mostly long-lived, K-selected species associated with *Modiolus* beds), and there has been a corresponding increase in short-lived r-selected species.



*Subtidal rock in the Strangford Lough narrow*  
©Environment and Heritage Service, NI

In the 1970s and '80s, *Modiolus* beds were known to be extensive in Strangford Lough. North basin *Modiolus* communities are now very much reduced in extent and may no longer be in pristine condition. South basin *Modiolus* communities are more widely distributed. Several beds remain, and a number of these show greater or lesser signs of disruption. The *Modiolus* reefs are no longer in Favourable Conservation Status.

A comparison of rocky shore survey data from 1988 and 2003 revealed significant differences between the communities recorded at all the rocky shores sampled. Sediment shores show high spatial variability and any differences between the two surveys cannot with any certainty be attributed to temporal differences. There are informal reports of changes in some intertidal mud habitats.

Broad-scale change is evident in Strangford Lough intertidal communities since the mid-1980s surveys. The invasive alga *Sargassum muticum* is now present, and the distribution of the alga *Ascophyllum nodosum* on many rocky shores has changed. *Zostera* distribution and biomass has also changed, including loss of around 14ha of *Zostera* beds in the northern part of the Lough earlier this year. There have also been changes in the distribution of some species of molluscs over the last 10 years.

### *Focal species abundance*

Seal counts have been conducted by the Environment and Heritage Service (EHS) and the National Trust in Strangford Lough since 1976. Numbers of adult common seals recorded gradually rose in the late 1970s to early 1980s. A peak in numbers in 1987 has been followed by a steady decrease through the 1990s. The sharp increase in the 1980s may have been due to a migration of seals from other populations of non-breeding or immature seals. The morbillivirus (Phocine distemper), which struck in 1988, may not be solely responsible for this continued decline as other populations affected have now recovered to numbers higher than pre-virus levels. Food shortage and disturbance have been suggested as possible factors in this decline. The most recent five year average counts reveal that the number of pups is continuing to decline.

Strangford's rich marine life attracts a vast variety of birdlife. The area is a wetland of international importance and regularly attracts up to 60,000 wildfowl and waders in the winter months. It is internationally important for light-bellied Brent geese, shelduck, redshank, bar-tailed godwit and knot. There are internationally important numbers of breeding terns in summer.

Data from 1974/5-1999/2000 have been examined as part of the BTO Wetland Bird Survey. Eight of the 23 species evaluated, including one that occurs on the site at internationally important numbers (the knot) triggered alerts. The authors conclude that there is thus cause for concern at the site. A new evaluation including additional data to winter 2004/5 is due to be published in March 2006.

## **SOCIO-ECONOMIC INDICATORS**

### *Distribution of formal knowledge to the community*

The Strangford Lough Management Committee (SLMC) set up the Strangford Lough Information Network to provide and distribute information about the Lough and its management. Projects include booklets, education posters, outdoor information panels and a website about the Lough.

A Strangford Lough interactive CD was launched in 2003 and circulated to schools and school groups in the area. A computer interactive package, based on the CD, is touring visitor attractions around the Lough taking people on an exploration of the shore with marine biologists as guides. SLMC also publishes reports which are publicly available in printed form and on the internet.

Strangford Lough is used for field studies at all levels of education – many school groups visit the interpretive centres that have been established around the Lough. In addition, residential centres bring primary and secondary school parties to the Lough for study and training.

In the longer term, the need for a communications plan has been recognised. Potential objectives are: promoting understanding of management issues to staff

as well as the public; developing a range of materials appropriate for different sectors and for particular purposes; highlighting the importance of communicating with local people and Lough users, key opinion formers and decision makers; and supporting management initiatives by providing on-site information at key access points

## **GOVERNANCE INDICATORS**

### *Existence and activity levels of community organisations*

The Strangford Lough Management Committee (SLMC) provides advice to the government on the future management of the Lough. It is a public forum for debate and communication. Member organisations nominate representatives who are appointed by the Department of the Environment. They include local councillors and representatives of local and regional organisations such as the Strangford Lough Fishermen's Association and the Strangford Lough Nature Conservation Association. Some community organisations are therefore formally involved in the management structure of the MPA.

Leaders of organised activities have been encouraged to introduce voluntary codes for participants and club members. Two examples are the codes promoted by the Association of Strangford Lough Yacht Clubs and the Northern Ireland Federation of Sub-Aqua Clubs.

### *Level of resource conflict*

Management issues have been identified in the SAC/SPA Management Plan, and potential as well as actual areas of conflict are identified on a regular basis. The most recent is in the Action Plan. The longest-running resource conflict issue concerns the impact of mobile gear fishing on seabed communities in the Lough.

In December 2001, the Department of Agriculture and Rural Development introduced a temporary ban on the use of mobile gear fishing in Strangford Lough following a severe decline in the horse mussel (*Modiolus modiolus*) communities on the seabed.

Formerly, potting took place mainly in the Narrows and the periphery of the Lough, with Dublin Bay prawns, shore crabs, velvet swimming crabs, common whelks, Buckie whelks and lobsters being the most important target species. Since the introduction of the ban on mobile gear fishing, potting has increased substantially as fishermen have switched from mobile to static gear in the main body of the Lough.

Fishermen are seeking to ranch native oysters at the northern end of the Lough – this project is still under consideration. The growing of oysters could bring environmental benefits but there are questions about how the stock could be harvested in a sustainable way, and how the fishery could be restricted to authorised people.

There are proposals to develop recreational angling in the Lough, which could provide an alternative source of employment and economic benefit while at the same time being environmentally sustainable. The main interest is in sea trout.

It is difficult to quantify the level of resource conflicts within the MPA, but they are recognised and efforts are being made to tackle them. However, the time taken to agree and institute action to address some conflicts (e.g. damage to horse mussel beds) has had the effect of extending rather than resolving conflicts.

## SUMMARY

<i>indicators</i>		
		Change since
		MNR
BP	Habitat distribution and complexity	
	• Intertidal – rocky	⊗
	• Intertidal – sediment	⊙
	• Subtidal – general	⊙
	• Subtidal <i>Modiolus</i>	⊗
BP	Focal species abundance	
	• Seals	⊗
	• Wetland birds	⊗

SE	Distribution of formal knowledge to community	⊙
GO	Existence & activity level of community organisations	⊙
GO	Level of resource conflict	⊗

## KEY REFERENCES

Ards Borough Council (2001) Countryside Recreation Strategy 2001-2006.

EHS NI (1994) Strangford Lough Proposed Marine Nature Reserve Guide to Designation

EHSNI (2001) Strangford Lough Management Scheme; Special Area of Conservation (SAC), Special Protection Area (SPA).

Roberts, D., Davies, C., Mitchell, A., Moore, H., Picton, B., Portig, A., Preston, J., Service, M., Smyth, D., Strong, D. and Vize, S. (2004). Strangford Lough Ecological Change Investigation (SLECI). Report to Environment and Heritage Service by the Queen's University, Belfast.

Strangford Lough Management Committee (1999). Common Seal Research and Management, Recommendations to Government.

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BTO Wetland Bird Survey (WeBS) – Alerts. Strangford Lough.

<http://blx1.bto.org/webs/alerts/SPAs/9020111.htm>



*Islands Reagh and Mahee in Strangford Lough*  
©R.A.Brown

## 4.2 LUNDY ISLAND

### MPA DESIGNATIONS

	TITLE	DESIGNATED
MNR	Marine Nature Reserve	1986
cSAC	candidate Special Area of Conservation	1996
SAC	Special Area of Conservation	2005

### OVERALL AIM OF MPA MANAGEMENT

To manage the protected area for the benefit of the wildlife and to actively promote the ecologically sustainable use of resources and the use of the reserve for education and enjoyment of all aspects of marine conservation.

### CONSERVATION GOALS AND OBJECTIVES OF THE MPA

- To sustain and where possible enhance the character and range of natural habitats, communities and species within the MNR and to maintain the SAC listed habitats and species in favourable condition.
- To maintain or increase populations of Biodiversity Action Plan priority species and nationally rare and scarce species, especially those listed in the Red Data Book.
- To maintain or increase the populations of breeding seabird species and provide suitable habitat for migrant bird species.

### SOCIO-ECONOMIC AND GOVERNANCE GOALS AND OBJECTIVES OF THE MPA

- To use Lundy to promote marine conservation and the concept of ecologically sustainable use of marine, coastal and terrestrial resources.
- To optimise the interpretation and education potential of Lundy to island visitors and users.
- To encourage informed and sympathetic recreational use.
- To promote, encourage and report research that will help the achievement of other objectives and

advance understanding of marine and terrestrial ecosystems.

- To integrate nature conservation and archaeological interests.
- To maintain the extent and quality of the important terrestrial plant communities and archaeological sites
- To integrate objectives with legal constraints and obligations.
- To provide an administrative structure which facilitates decision making, reserve management and effective communication with outside bodies, and meets national and international conservation obligations.

### RELEVANT GOALS AND OBJECTIVES FROM THE IUCN GUIDEBOOK

CLUSTER	GOALS	OBJECTIVES	INDICATORS
<i>Biophysical</i>	4	9	10
<i>Socio-economic</i>	3	8	7
<i>Governance</i>	3	13	10

(For full list see Appendix 1, Tables 2.1-2.3)

### GOALS, OBJECTIVES AND INDICATORS USED FOR CURRENT EVALUATION

	GOAL	OBJECTIVE	INDICATOR
<i>Biophysical</i>	Marine resources sustained or protected (1)	Losses to biodiversity and ecosystem functioning and structure prevented (1B)	Habitat distribution and complexity
	Individual species protected (3)	Focal species abundance increased or maintained (3A)	Focal species abundance
	GOAL	OBJECTIVE	INDICATOR

Socioeconomic	Non-monetary benefits to society enhanced or maintained (3)	Recreation opportunities enhanced or maintained (3D)	Perceptions of non-market and non-use value
	Environmental awareness and knowledge enhanced (6)	Public's understanding of environmental and social 'sustainability' improved (6B)	Level of understanding of human impacts on resources
Governance	Effective management structures and strategies maintained (1)	Decision-making and management bodies present, effective and accountable (1C)	Existence of decision making and management body
	Effective legal structures and strategies for management maintained (2)	National and/or local legislation effectively incorporates rights and obligations set out in international legal instruments (2C)	Existence and adequacy of enabling legislation

(numbers in brackets refer to reference in IUCN guidebook)

## BIOPHYSICAL INDICATORS

### *Habitat distribution and complexity*

A literature review carried out in 2004 concluded that although there are relevant scientific data on the condition of some of the SAC features around Lundy, they do not necessarily help with providing historical records that can be directly compared to data collected today.

A condition assessment monitoring programme has been initiated to provide information on the SAC interest features (reefs, subtidal sandbanks, submerged or partially submerged sea caves and grey seals) and sub-features. In the case of reefs, for example, the identified sub-features are rocky shore communities,

kelp forest communities, subtidal vertical and overhanging circalittoral rock communities and subtidal bedrock and stable boulder communities. Fourteen attributes have been identified for these sub-features (e.g. water clarity, species composition of rock pool communities, distribution and range of kelp biotopes, distribution and range of circalittoral biotopes), although not all of them are going to be monitored. A monitoring programme is being developed for the MPA which should enable baselines to be agreed and enable future reporting on changes in habitat distribution and complexity around Lundy.

An overview of observations made around Lundy between the 1970s and the present time suggests that there have been significant changes in seabed marine life. They include the arrival of *Sargassum muticum*, and of *Solidobalanus fallax*, a southern species of barnacle, the decline and then reappearance of the brown algae *Zanardinia prototypes*, declines of the sponge *Thymosia guerneii*, the carpet coral *Hoplantia durotrix*, the red sea finger *Alcyonium glomeratum* and the blue spot sea slug *Greilada elegans*, and an increase in abundance of the trumpet anemone *Aiptasia mutabilis*. These changes have still to be quantified and the extent of either natural or unnatural causes determined.

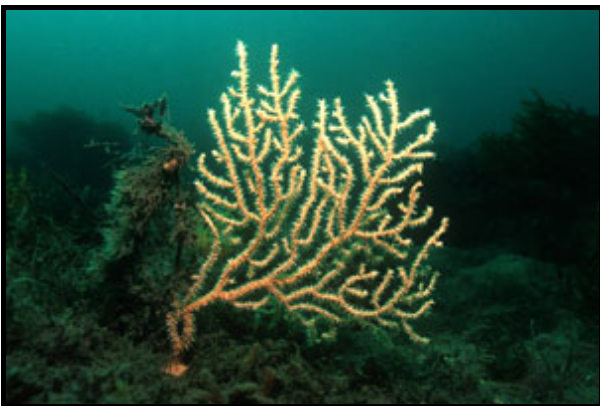
### *Focal species abundance*

The grey seal *Halichoerus grypus* is listed in the SAC specification as one of the "features" to be maintained in favourable condition. In 1975, the maximum number counted on any one occasion was 50 individuals. A survey of the northern quarter of the east side of the island in 2003 recorded 98 individuals. Current estimates are that around 60-70 seals are resident around the island, while an additional 60 or so visit during the summer months. Estimates of the number of pups born around the island range from 25 in 1977, 17 in 1986 and 1987, and 10 in 1996. The total number of grey seals appears to have increased over the past 20 years.



*Grey seal in waters around Lundy ©Paul Kay*

The sea fan *Eunicella verrucosa* is a nationally scarce species and a Biodiversity Action Plan priority species. Studies of the condition of Lundy's sea fans show a general improvement in the overall conditions of fans at all sites from 1997-1999, but then a decline from 1999-2001. This is one of two areas in the UK where the population has undergone a considerable decline in numbers, range and distribution beyond that expected by natural variability.



*Pink sea fan Eunicella verrucosa ©Paul Kay*

A sea fan survey carried out in 2001/2 recorded the sea fan coral *Leptopsammia pruvoti*, and *Parazoanthus axinellae*, both of which are Mediterranean Atlantic species at the northernmost extent of their range. *L. pruvoti* is a nationally scarce species and a Biodiversity Action Plan priority species.

The site was first photographed for monitoring purposes in 1983 and both species appear to be declining in numbers. For *L. pruvoti*, the decline in numbers during the 1980s and 1990s was around 1.1-1.8 per cent a year. Between 1984 and 1996, part of the monitored population at the Knoll Pins site had

declined by 22 per cent, and there has been no or negligible recruitment at this location since reporting began in the early 1980s. The degree to which this is influenced by its edge of range status around Lundy is not known.

## **SOCIO-ECONOMIC INDICATORS**

### *Perceptions of non-market and non-use value*

Some visitor survey data is held by the warden and may be useful for gaining an understanding of perceptions of non-market and non-use value. Visitors are attracted to Lundy for reasons such as the attractive scenery, the experience of a boat trip, and the quality of diving around the island. In 1996, for example, there were more than 2,500 diver days spent around the island during the summer.

The development of interpretive materials such as leaflets, booklets and a video are likely to enhance perceptions of non-market value, but there is no quantitative data on this at the present time. population around Lundy in poor condition. On average, more than 50 per cent of each fan was damaged. Many of the fans in poor condition were fouled by a 'turf' of small hydroids and bushy bryozoans. A number of the fans were also fouled by drift algae. The cause of the decline in the population is not clear. Suggestions include a change in temperature, water quality, the availability of nutrients or localised natural change.

A cave and adjacent rock surfaces at the Knoll Pins are colonised by large numbers of the rare yellow cup

### *Level of understanding of human impacts on resources*

There is no quantitative data to determine whether there has been any change in the level of understanding of human impacts on resources within the MPA, but there has been much work on disseminating such information. This includes the work of the Lundy Field Society, which has been carrying out conservation work supporting research on the island and publishing the results in the Annual Report of the Lundy Field Society. The warden also collects data on fishing effort, sea angling and other socio-economic parameters.



The preparation and dissemination of information about human impacts, and the presence of a warden on the island who can talk about such issues to visitors are likely to have improved public understanding. The successful establishment of a “No-Take Zone” within the MPA, in order to provide additional protection and support recovery of impacted areas, suggests that there has been an increase in the level of understanding of human impacts on the marine resources around the island.

## GOVERNANCE INDICATORS

### *Existence of a decision-making and management body.*

The overseeing body for the MPA is the Lundy MNR Management Group, which is made up of English Nature, the Landmark Trust and Devon Sea Fisheries Committee (National Trust, RSPB, DEFRA and Lundy Field Society). The work of the group is guided by the cSAC Management Scheme, which was agreed in 2001. The Management Scheme is revised every year and places a duty on each of the Competent and Relevant Authorities to complete the actions identified.

The Management Group liaises with the Lundy Marine Nature Reserve Advisory Group (formerly known as the Lundy Marine Consultation Group), whose members are drawn from local councils, fisheries interests, conservation groups, landowners and user groups such as dive charter interests. The Advisory Group was established in 1985 to:

- provide a nucleus of expertise on the marine habitats and waters surrounding Lundy;
- provide a forum for exchanging views on present and proposed activities around Lundy;
- safeguard the interests of all those who use the water around Lundy and its natural resources; and
- advise the management group for the Reserve.

English Nature and the Landmark Trust fund a warden who voluntarily enforces byelaws and undertakes education programmes.

### *Existence and adequacy of enabling legislation*

















The seabed around Lundy is owned by the Crown and leased to English Nature and the Landmark Trust. In 1973, the waters around Lundy became Britain’s first voluntary marine nature reserve. There was no statutory basis for the MPA, but a Code of Conduct was introduced, and an agreement reached with commercial fishermen that trawling and dredging would be banned within the reserve boundary. The 1981 Wildlife and Countryside Act [now superseded by the Countryside and Rights of Way Act, 2000] included provisions for the establishment of Marine Nature Reserves (MNR), and in 1986 Lundy became the first statutory MNR in the UK. A Zoning Scheme for the MNR was produced in 1995, which summarised the byelaws and other regulations affecting the various users of the Reserve.

The EU Habitats and Species Directive was transposed into law in England and Wales by the Conservation (Natural Habitats etc) Regulations, 1994. Under these Regulations, Lundy was nominated as a candidate Special Area of Conservation (SAC) and formally designated as a SAC in 2004 along with other sites in the Atlantic biogeographic region of the EU. A zoning scheme was developed, supported by sea fisheries byelaws, and this was updated in 2003 to establish the first statutory No-Take Zone for nature conservation in UK waters.

These provisions provide a sound legal foundation for the designation of the MPA. However, there are issues relating to the adequacy of legislation supporting the management of the MPA. At present, management measures are either agreed on a voluntary basis or drawn up by competent or relevant authorities using their respective statutory powers. The Devon Sea Fisheries Committee, for example, has introduced measures to regulate certain types of fisheries within the MPA. Legal powers to assist the management of the MPA are therefore spread across a number of bodies rather than lying with the Management Group. The legislation is also still too weak to support the management of the area primarily for wildlife.



## SUMMARY

<i>indicators</i>		Change since	
		MNR	cSAC
BP	Habitat distribution and complexity		
	• Reefs		
BP	Focal species abundance		
	• Seals		
	• Sea fans		
	• Sunset star coral		
SE	Perceptions of non-market and non-use value		
SE	Level of understanding of human impact on resources		
GO	Existence of decision-making and management body		
GO	Existence and adequacy of enabling legislation		

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## 4.3 MORAY FIRTH

### MPA DESIGNATIONS

	TITLE	DESIGNATED
cSAC	candidate Special Area of Conservation	1996
SAC	Special Area of Conservation	2005

### OVERALL AIM OF MPA MANAGEMENT

To help maintain the integrity of the site, so that the dolphin population is maintained, significant disturbance of the dolphins is avoided and the subtidal sandbanks and the habitats for the dolphins are maintained.

### CONSERVATION GOALS AND OBJECTIVES OF THE MPA

- To avoid deterioration of the habitats of bottlenose dolphins (the ‘qualifying species’), or significant disturbance to this species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving Favourable Conservation Status (FCS) for each of the qualifying features.
- To ensure for the qualifying species that the following are established then maintained in the long term:
  - population (including range of genetic types *where relevant*) as a viable component of the site;
  - distribution within site
  - distribution and extent of habitats supporting the species;
  - structure, function and supporting processes of habitats supporting the species;
  - no significant disturbance;
  - distribution and viability of the species’ host species (*where relevant*);
  - structure, function and supporting processes of habitats supporting the species’ host species (*where relevant*).
- To avoid deterioration of the qualifying habitat (sandbanks that are slightly covered by sea water

all the time), thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving FCS for each of the qualifying features.

- To ensure for the qualifying habitat that the following are maintained in the long term:
  - extent of the habitat on site;
  - distribution of the habitat within the site;
  - structure and function of the habitat;
  - processes supporting the habitat;
  - distribution of typical species of the habitat;
  - viability of typical species as components of the habitat;
  - no significant disturbance of typical species of the habitat.

### SOCIO-ECONOMIC AND GOVERNANCE GOALS AND OBJECTIVES OF THE MPA

There are no specific socio-economic and governance goals and objectives for the MPA. However, the SAC management scheme is committed to achieving its overall aim in a way that recognises the economic, cultural, social, recreational and scientific needs of all those who live and work in the Moray Firth area, and in a way that promotes sustainable development of all existing legal activities and interests, with regard to the qualifying features.

The development and implementation of the SAC management scheme was initiated by the Moray Firth Partnership (MFP) and facilitated by funding from the EU LIFE Environment Fund. Responsibility for the management scheme falls to the “relevant bodies” in terms of the SAC, represented by the SAC Management Group. The SAC group meets around twice annually. It is supported and facilitated by the MFP, whose aim is “to promote the integrated management of the natural, economic, recreational and cultural resources of the Moray Firth area in order to retain and enhance a high quality of life for all its residents and visitors”.

## RELEVANT OVERLAP WITH GOALS AND OBJECTIVES FROM IUCN GUIDEBOOK

CLUSTER	GOALS	OBJECTIVES	INDICATORS
<i>Biophysical</i>	3	11	10
<i>Socio-economic</i>	-	-	-
<i>Governance</i>	-	-	-

(For full list see Appendix 1, Table 3.1)

## GOALS, OBJECTIVES AND INDICATORS USED FOR CURRENT EVALUATION

	GOAL	OBJECTIVE	INDICATOR
<i>Biophysical</i>	Biological diversity protected (2)	Rare, localised or endemic species protected (2C)	Focal species abundance
	Individual species protected (3)	Unnatural threats and human impacts minimised inside and/or outside the MPA (3C)	Water quality

(numbers in brackets refer to reference in IUCN guidebook)

## BIOPHYSICAL INDICATORS

### *Water quality*

The boundary of the MPA includes the Beaully Firth, Inverness Firth, the entrances to the Cromarty Firth and Dornoch Firth, and the inner Moray Firth.

In 1992, the Highland River Purification Board and the Marine Laboratory, Aberdeen, took part in a national survey of nutrient pollution in estuaries. This showed that the Cromarty, Dornoch, and Inverness firths were the cleanest of the estuaries on the east coast of Scotland, with the lowest nutrient levels. Over the last five years the generally high quality of estuarine waters in the north of Scotland has been maintained.

The water quality of the Moray Firth as a whole is very variable. There are areas of high water quality but there

are also areas of much poorer water quality around Inverness, Fraserburgh, Banff, and Buckie.

Classification of coastal and estuarine water quality around the Moray Firth in the 1990s showed patchy areas of “unsatisfactory” and “poor” water quality. However, between 1999 and 2002, the water quality in Inverness Firth has improved. For example a monitoring site, near Allanfean improved from class B (good) to class A (excellent) following improvements to the sewage works that serves Inverness.

As designated bathing waters, two sites at Nairn on the southern shore of the Moray Firth are monitored for faecal and total coliforms. Nairn (East Beach) has been monitored since 1994 and Nairn (Central Beach) since 1999, although earlier data are also available. In 2004, the results were categorised as “excellent” for Nairn East and “good” for Nairn Central. In both cases there have been more reports in the excellent category in recent years. A new disinfection system at Nairn is likely to have contributed to this. Further upgrades have been requested by SEPA before the start of the 2005 bathing season.

River basin districts in Scotland have been characterised for the purposes of implementing the Water Framework Directive (WFD). The pressures and impacts on these water bodies have also been analysed. Within the Moray Firth all four “categories of risk” are present. These are:

- at significant risk of not meeting the environmental objectives of the WFD by 2015;
- probably at significant risk;
- probably not at significant risk;
- not at significant risk.

Of these, the water bodies closer to the coast are mostly in the higher risk categories. The four risk assessment categories will be used to prioritise and target the UK WFD monitoring programme.

### *Focal species population abundance*

The Moray Firth contains one of the best-known resident groups of bottlenose dolphins, *Tursiops truncatus*, in UK waters. Surveys have been carried out

since the late 1980s, providing data from shore-based counts, photo-identification and acoustic and video recordings, which have been used to estimate the size and condition of the population.

Data from 1989 estimated there was a minimum population size of 62 individuals. Most animals were observed in the inner part of the Moray Firth particularly in the narrow mouths of the Cromarty, Beaully and Inverness firths. In 1992, population abundance estimated using mark-recapture methods applied to photo-identification data suggested a population size of 110-175 individuals. Data on calves observed and carcasses recovered suggested that the population could be increasing or decreasing at an annual rate of up to 5 per cent.

A more recent study suggested that numbers are in decline (about 6 per cent a year) and that at current levels, the population cannot be described as viable.

A 2000 comparison of data collected using different techniques pointed to a recent decline in numbers using the Kessock Channel (within the inner Firth). This ties in with other data that indicate that between 1990 and 1993, the inner Moray Firth area was visited year round, and visited annually by at least 90 per cent of the population. From 1991 onwards, sightings became more frequent further afield. Photo-identification work suggests that rather than shifting their range outside the inner Moray Firth, the individuals had expanded their range.



*Dolphin-watching in the Moray Firth*  
©Charlie Phillip]

## SUMMARY

<i>indicators</i>		Change since
		cSAC
BP	Water Quality	
	• Estuarine water quality	✓
	• Coastal water quality	✓
	• Bathing waters	✓
BP	Focal species population structure	
	• Bottlenose dolphin	✗

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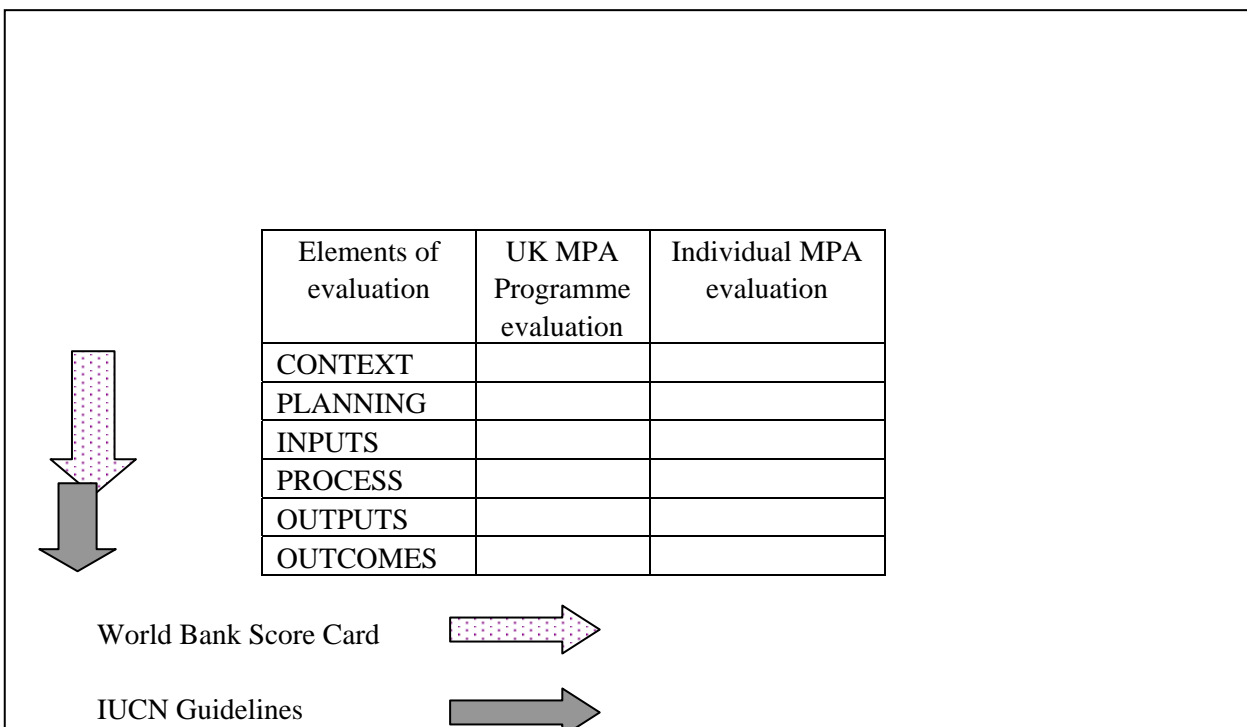
## 5. METHODOLOGY FOR ASSESSING THE UK PROGRAMME

The World Summit on Sustainable Development adopted a number of targets for action including the establishment of representative networks of MPAs by 2012. Partly in response to this, the World Bank developed a Score Card to be used by MPA managers to assess and report on their progress with MPAs in a standardised way.

The Score Card approach has been built around the IUCN framework, which recognises six elements of protected area management (see Figure 1). The authors suggest that the Score Card is likely to be most useful for prioritising issues and improving the management process, rather than evaluating outcomes and achievement of management objectives. Like the IUCN Guidebook, it is not intended to be prescriptive but rather a tool that can be adapted based on site and regional needs, and which can be used with other resources. With this in mind, the potential for the Score Card to be used to report on the context, planning, inputs and process of the UK MPA programme as a whole is tested below. This makes it complementary to the site specific assessments (illustrated by the case studies in Section 4) that focus on outputs and outcomes and which were undertaken using the more detailed IUCN indicators (Figure 4). This split approach has been taken to test both the Score Card and Guidelines although, in practice, both could be applied to evaluate all six elements of MPA management identified in the management cycle.

**FIGURE 4**

**Using the World Bank Score Card and IUCN Guidelines to evaluate six distinct elements of MPA management**



Questions on the Score Card are grouped by management element and the answers are ranked to score between zero and three. Some additional actions are indicated, scoring extra points. The guidance recognises that this is an approximate process and that there are situations where none of the four alternative answers appears to fit conditions in the protected area very precisely. Users should therefore choose the answer that is

nearest and use the comments section to elaborate. There is no ideal score, no 'pass' mark, and no 'fail' mark. The results are a guide to strengths and weaknesses of the management action and, if it is used over a period of time, the results could be used to show any trends.

The Score Card questions, answers, and scores relating to context, planning, inputs, and process of the UK MPA programme (as represented by MNRs and marine SACs) are shown in Table 1. Both the highest and lowest potential score for any of these MPAs are given. While no single site is likely to have all the highest scores or all the lowest scores, this approach reveals the best and the worst case scenarios. Total scores are shown in Table 2.

**TABLE 1 – Using the World Bank Score Card to report on the UK MPA programme**

	Score	Highest scoring site	Lowest scoring site	Comments
<b>A. Context: Where are we now? Assessment of important threats and policy environment</b>				
<b>1. Legal status - does the marine protected area have legal status?</b>				
The MPA is not gazetted	0			
The government has agreed that the MPA should be gazetted but the process has not yet begun	1		1	A number of potential offshore MPAs have been identified. The government has agreed that they will receive legal protection in due course using Offshore Regulations (which have still to become law)
The MPA is in the process of being gazetted but the process is still incomplete	2			
The MPA has been legally gazetted (or in the case of private reserves is owned by a trust or similar)	3	3		More than 50 MPAs have been legally gazetted as SACs and/or SPAs under national regulation
<b>Additional point</b>				
a. The MPA has received national and/or international recognition for its importance	1	1		More than 50 MPAs have been legally gazetted as SACs and/or SPAs by the European Commission in compliance with the EU Habitats and Species Directive
<b>2. MPA regulations - are unsustainable human activities (e.g. poaching) controlled?</b>				
There are no mechanisms for controlling unsustainable human activities in the MPA	0			
Mechanisms for controlling unsustainable human activities in the MPA exist but there are major problems in implementing them effectively	1		1	There are examples of sites that have suffered because measures have not been implemented effectively
Mechanisms for controlling unsustainable human activities in the MPA exist but there are some problems in implementing them effectively	2	2		Mechanisms include by-laws, codes of practice, discharge consents, and EIA. Implementation difficulties include time taken to reach agreement or respond to issues by which point damage may have occurred
Mechanisms for controlling unsustainable human activities in the MPA exist and are being effectively implemented	3			
<b>3. Law enforcement - can staff sufficiently enforce MPA rules?</b>				
The staff have no effective capacity/resources to enforce MPA legislation and regulations	0			
There are major deficiencies in staff capacity/resources to enforce MPA legislation and regulations (e.g. lack of skills, no patrol budget)	1		1	Many MPAs have no on-site staff and those with staff may have limited capacity and resources, e.g. no vessels to monitor site use, no enforcement powers
The staff have acceptable capacity/resources to enforce MPA legislation and regulations but some deficiencies remain	2	2		Some of the longer established MPAs have staff on site, interpretation centres, and good liaison arrangements with authorities to carry out enforcement. Shortfalls do still exist
The staff have excellent capacity/resources to enforce MPA legislation and regulations	3			
<b>Additional points</b>				
a. There are additional sources of control (e.g. volunteers, national services, local communities)	1	1		Enforcement of MPA regulations is not limited to MPA authorities but is a collaborative exercise, e.g. Sea Fisheries Committees enforce local fisheries by-laws using their own enforcement officers
b. Infractions are regularly prosecuted and fines levied	1			

	Score	Highest scoring site	Lowest scoring site	Comments
<b>4. MPA boundary demarcation - are the boundaries known and demarcated?</b>				
The boundaries of the MPA are not known by the management authority or other stakeholders	0			
The boundary of the MPA is known by the authority but is not known by other stakeholders	1			
The boundary of the MPA is known by both the management authority and other stakeholders but is not appropriately demarcated	2		2	All MPAs have defined site boundaries but information is not necessarily available at all access points (e.g. large sites). Other ways of disseminating the information are used but may not reach all stakeholders
The boundary of the MPA is known by the management authority and stakeholders and is appropriately demarcated	3	3		Information about the boundary of some MPAs is well known and clear to visitors. This is particularly the case to sites with limited access points and where there is considerable supporting material, promotion and on-site presence of staff
<b>5. Integration of the MPA in a larger coastal management plan - is the MPA part of a larger coastal management plan?</b>				
There is no discussion about the integration of the MPA in a larger coastal management plan	0			
There is some discussions about the integration of the MPA into coastal management plan but the process has not yet begun	1			
The marine protected area is in the process of being integrated into a larger coastal management plan but the process is still incomplete	2	2	2	Some MPAs are in areas which have coastal management plans/coastal fora, e.g. Moray Firth SAC. There is discussion about integration of MPAs into marine spatial plans but a marine planning framework for the UK is still at the ideas stage
The marine protected area is part of a larger coastal management plan	3			
<b>Additional points</b>				
a. The MPA is part of a network of MPAs which collectively sustain larger marine ecosystem functions	1			
b. The MPA is part of a network of MPAs which collectively represent the range of bio-geographic variation in a marine eco-region	1	1		MPAs that have been designated as SACs represent biogeographic variation of certain specified habitats in the Atlantic biogeographic region of the EU, e.g.reefs
<b>6. Resource inventory – is there enough information to manage the area?</b>				
There is little or no information available on the biophysical, socio-cultural and economic conditions associated with the marine protected area	0		0	Information on socio-cultural and economic conditions is limited for many MPAs as the selection process is driven by biophysical criteria
Information on the biophysical, socio-cultural and economic conditions associated with the marine protected area is not sufficient to support planning and decision making	1			
Information on the biophysical, socio-cultural and economic conditions associated with the marine protected area is sufficient for key areas of planning/decision making but the necessary survey work is not being maintained	2	2		Some MPAs have good baseline information on some aspects of the MPA. This supports key areas of decision-making but there is usually no guarantee of a long-term programme of surveying and monitoring
Information on the biophysical, socio-cultural and economic conditions associated with the MPA is sufficient for key areas of planning and decision-making	3			



<b>7. Stakeholder awareness and concern – are stakeholders aware and concerned about marine resource conditions and threats?</b>				
Less than 25% of stakeholders are aware or concerned about the marine resource conditions and threats and management efforts	0			
Approximately 25%-50% of stakeholders are aware or concerned about the marine resource conditions and threats	1		1	There is no quantitative information to report on this question or to distinguish between awareness and concern. However, the designation process for all sites has involved stakeholder consultation. This is therefore the most likely situation for the poorest sites
Approximately 50%-75% of stakeholders are aware or concerned about the marine resource conditions and threats	2			
Over 75% of stakeholders are aware or concerned about the marine resource conditions and threats	3		3	There is no quantitative information to report on this question or to distinguish between awareness and concern. However, the designation process for all sites has involved stakeholder consultation. This is therefore the most likely situation for the best sites
<b>TOTAL for Context (A): 26</b>			<b>20</b>	<b>8</b>
<b>B. Planning – where do we want to be? Assessment of marine protected area design and planning</b>				
<b>8. Marine protected area objectives – have objectives been agreed?</b>				
No firm objectives have been agreed for the MPA	0			
The marine protected area has agreed objectives	1			
The marine protected area has agreed objectives but these are only partially implemented	2		2	Designated MPAs have agreed objectives but not necessarily management schemes that guide implementation towards these objectives
The marine protected area has agreed objectives and is managed to meet these objectives	3		3	Some MPAs have supporting management schemes. These provide guidance to enable the sites to be managed to meet these objectives
<b>9. Management plan – is there a management plan and is it being implemented?</b>				
There is no management plan for the marine protected area	0		0	Not all MPAs have management plans
A management plan is being prepared or has been prepared but is not being implemented	1			
An approved management plan exists but it is only being partially implemented	2			
An approved management plan exists and is being implemented	3		3	Some MPAs have management plans and these are being implemented
<b>Additional points for planning</b>				
a. There is also a long term master plan (at least 5 years)	1			
b. The planning process allows adequate opportunity for key stakeholders to influence the management plan	1		1	Many MPAs have supporting advisory groups or other fora that enable stakeholders to influence the management plan
c. Stakeholder participation includes representation from the various ethnic, religious and user groups as well as representation from both genders	1		1	Stakeholder participation programmes usually seek the widest possible representation
d. The socio-economic impacts of decisions are considered in the planning process	1		1	Socio-economic issues are frequently a key discussion item in the planning process
e. The local culture, including traditional practices, social systems, cultural features, historic sites and monuments, is considered in the planning process	1		1	Attempts are made to consider all relevant elements in the planning process
f. There is an established schedule and process for periodic review and updating of the management plan	1		1	MPAs that have a management plan usually have a schedule for review and update
g. The results of monitoring, research and evaluation are routinely incorporated into planning	1		1	Those MPAs with monitoring and research programmes seek to take the findings into account. However, many have only been initiated recently, so opportunities to do this should improve in the future
h. Management plan is tied to the development and enforcement of regulations	1		1	Some MPAs have supporting regulations from other sectoral interests (principally fisheries). The enforcement of these regulations is enshrined into the MPA management plan
<b>TOTAL for Planning (B): 14</b>			<b>13</b>	<b>2</b>

<b>C. Inputs – what do we need? Assessment of resources needed to carry out management</b>				
<b>10. Research – is there a programme of management-oriented survey and research work?</b>				
There is no survey or research work taking place in the marine protected area	0			
There is some ad hoc survey and research work	1		1	There is a requirement for condition monitoring in all <i>Natura 2000</i> sites
There is considerable survey and research work but it is not directed towards the needs of marine protected area management	2			
There is a comprehensive, integrated programme of survey and research work which is relevant to management needs	3	3		Some MPAs have detailed survey and research programmes which have been developed to enable reporting on site objectives and responding to management needs
<b>Additional point</b>				
a. Carrying capacity studies have been conducted to determine sustainable use levels	1			
<b>11. Staff numbers – are there enough people employed to manage the protected area?</b>				
There are no staff	0		0	There are no site-based or site-specific staff for some MPAs, although all sites fall under the responsibility of specified staff in conservation agencies
Staff numbers are inadequate for critical management activities	1			
Staff numbers are below optimum level for critical management activities	2	2		Most UK MPAs are recently established and are building up a profile of staff needs. It is likely that many would report that numbers are below optimum levels
Staff numbers are adequate for the management needs of the site	3			
<b>Additional point</b>				
a. There is additional support from volunteer programmes, local communities, etc	1	1		A number of MPAs have volunteer programmes associated with them (e.g. to carry out survey work) and local community involvement
<b>12. Current budget – is the current budget sufficient?</b>				
There is no budget for the marine protected area	0			
The available budget is inadequate for basic management needs and presents a serious constraint to the capacity to manage	1		1	There is a budget for work on MPAs in general, but not necessarily a budget for every single site
The available budget is acceptable, but could be further improved to fully achieve effective management	2	2		Some MPAs have a budget, but in general improvements are always being sought
The available budget is sufficient and meets the full management needs of the protected area	3			
<b>Additional points</b>				
a. There is a secure budget for the marine protected area and its management needs on a multi-year basis.	1			
b. The budget is not entirely dependent on government funding; instead, funding also comes from NGO contributions, taxes, fees, etc.	1			Some MPAs have had additional funding from European programmes. Commercial sponsorship and NGO projects are examples of other ways in which the budget has been supplemented at some sites
<b>TOTAL for Inputs (C): 14</b>		8	2	

	Score	Highest scoring site	Lowest scoring site	Comments
<b>D. Process – how do we go about management? Assessment of the way in which management is conducted</b>				
<b>13. Education and awareness programme – is there a planned education programme?</b>				
There is no education and awareness programme	0			
There is a limited and ad hoc education and awareness programme, but no overall planning for this component	1		1	Not all sites have education programmes. Awareness is promoted nationally as well as locally
There is a planned education and awareness programme but there are still serious gaps	2	2		MPAs are promoted through education and awareness programmes both generally and at a site-specific level. The quality and quantity of information varies from site to site
There is a planned and effective education and awareness programme fully linked to the objectives and needs of the protected area	3			
<b>14. Communication between stakeholders and managers – is there communication between stakeholders and managers?</b>				
There is little or no communication between managers and stakeholders involved in the MPA	0			
There is communication between managers and stakeholders but this is not a planned or scheduled programme	1			
There is a planned communication programme that is being used to build support for the MPA among relevant stakeholders but implementation is still limited	2			
There is a planned communication programme that is being implemented to build support for the MPA among relevant stakeholders.	3	3	3	Most MPAs aim to build support among stakeholders
<b>Additional point</b>				
There is some communication with other MPA managers (and for example exchanges of good practices)	1	1		The statutory conservation agencies bring together MPA managers to encourage exchange of information and learning
<b>15. Stakeholder involvement and participation – do stakeholders have meaningful input to management decisions?</b>				
Stakeholders have no input into decisions relating to the management of the protected area	0			
Stakeholders have some input into discussions relating to management but no direct involvement in the resulting decisions	1		1	Stakeholder consultation is used in most MPAs to inform decision making, but stakeholders may not be directly involved in making the final decision
Stakeholders directly contribute to some decisions management	2	2		Only some stakeholders may contribute directly to making management decisions. These are usually stakeholders who have the necessary legal powers and responsibilities
Stakeholders directly participate in making decisions relating to management	3			
<b>Additional point</b>				
a. There are clear financial contributions/agreements between MPA and tourism operators to recover MPA resources rents for local benefits	1			

	Score	Highest scoring site	Lowest scoring site	Comments
<b>16. Indigenous people – do indigenous and traditional peoples resident or regularly using the MPA have input to management decisions?</b>				
Indigenous and traditional peoples have no input into decisions relating to the management of the protected area	0			
Indigenous and traditional peoples have some input into discussions relating to management but no direct involvement in the resulting decisions	1		1	Traditional users are involved in decision making in the same way as other stakeholders
Indigenous and traditional peoples directly contribute to some decisions relating to management	2	2		Traditional users are involved in decision making in the same way as other stakeholders
Indigenous and traditional peoples directly participate in making decisions relating to management	3			
<b>17. Staff training – is there enough training for staff? Your comments (list your major training needs)</b>				
<b>Score</b>				
Staff are untrained	0			
Staff training and skills are low relative to the needs of the marine protected area	1		1	Staff training and skills vary from site to site. In some cases they are likely to be considered inadequate
Staff training and skills are adequate, but could be further improved to fully achieve the objectives of management	2	2		Staff training and skills vary from site to site. In some cases they are likely to be considered adequate
Staff training and skills are in tune with the management needs of the marine protected area, and with anticipated future needs	3			
<b>18. Equipment – is the site adequately equipped?</b>				
There is little or no equipment and facilities	0			
There is some equipment and facilities but these are wholly inadequate	1		1	The equipment and facilities vary from site to site. In some cases they are likely to be considered inadequate
Most of equipment and facilities are adequate and maintained	2	2		The equipment and facilities vary from site to site. In some cases they are likely to be considered adequate
There is adequate equipment and facilities and it is well maintained	3			
<b>19. Monitoring and evaluation – are biophysical, socio-economic and governance indicators monitored and evaluated?</b>				
There is no monitoring and evaluation of the biophysical, socio-economic and governance context of the MPA	0			
There is some ad hoc monitoring and evaluation, but no overall strategy and/or no regular collection of results	1		1	Not all sites have monitoring programmes and it is unclear how they may be evaluated in the future
There is an agreed and implemented monitoring and evaluation system but results are not systematically used for management	2	2		Monitoring programmes are being developed and implemented for many MPAs, but it is still too early to determine how the results are being used
A good monitoring and evaluation system exists, is well implemented and used in adaptive management	3			
<b>Additional points</b>				
a. The MPA participates as a site in national or international environmental monitoring programs such CARICOMP, CPACC, GCRMN, AGGRA or similar. (Provide the name of the programme(s))	1	1		Some sites contribute to other environmental monitoring programmes, e.g. NMMP and OSPAR
b. There is an Emergency Response Capability in place to mitigate impacts from non threats	1			
<b>TOTAL for process (D): 25</b>		17	9	

**TABLE 2 - Summary of World Bank Score Card results applied to UK MPA programme as represented by MNRs and marine SACs**

Element of MPA programme	Total available	Highest scoring site	Lowest scoring site
Context	26	20 (77%)	8 (31%)
Planning	14	13 (93%)	2 (14%)
Inputs	14	8 (57%)	2 (14%)
Process	25	17 (68%)	9 (36%)

## 6. DISCUSSION AND CONCLUSIONS

### 6.1. Evaluation techniques

Two evaluation techniques were tested in this study. The IUCN Guidelines, which were used to investigate whether indicators linked to goals and objectives of individual MPAs could be used to evaluate UK MPAs; and the first four parts of the World Bank Score Card, which was used to evaluate the UK MPA programme in its entirety. Both techniques were only recently developed, therefore it has been useful to examine how they might work in practice. As the UK MPA programme is now established, it is also timely to test these approaches and consider their potential application in the UK.

#### *IUCN Guidelines*

- The desk study that tested the methodology on three sites shows that it is a relevant and feasible technique for UK MPAs.
- The evaluation technique was straightforward, and there were no problems listing MPA objectives and linking these to indicators for sites that had management plans. The suggested indicators cover familiar ground and are mostly relevant to UK sites.
- The mix of qualitative and quantitative data required to report on the indicators makes the approach both practical and useful. This also means that data can be drawn from many sources.
- The area of greatest weakness for UK sites, in terms of the availability of information, appears to be socio-economic data. This is likely to be lacking, or not specific enough to evaluate social-economic indicators for some MPAs.
- By identifying gaps and areas where information is limited, the IUCN Guidelines could have an additional benefit of identifying opportunities for future study and research.
- A careful consideration of which indicators to use will be necessary at the outset. It is unlikely to be necessary (or feasible) to use all the potential indicators. However, they should ideally be drawn from each of the three clusters in the IUCN Guidelines (biophysical, socio-economic and governance). There is scope to link some of these to existing indicators, e.g. those being used to report on site condition in SACs.

- There is a case for providing an overview and conclusions of the findings for each site. The approach tested here, which appears to be feasible, is to apply the same broad categories that are used to report on UK sustainability indicators.

### *World Bank Score Card*

- The Score Card was devised to give an overview of the management effectiveness of individual MPAs. The work undertaken for this report shows that it can also be used to evaluate the context, planning, inputs and process elements of an MPA programme. The outputs and outcomes questions are best addressed at the individual site level.
- The questions and scoring methodology are straightforward and could easily be applied to evaluate individual MPAs. Using them to evaluate an entire MPA programme requires awareness of the different stages and levels of progress of the sites that are part of the programme. Using the highest and lowest scores was a pragmatic solution to gaining a quick overview for a desk study.
- Including comments alongside the scoring is essential, especially as the questions are sometimes phrased in a way that does not suggest direct relevance to the UK situation. Comments will be especially valuable in highlighting gaps and indicating what actions should be taken to improve effectiveness.
- Using highest and lowest scores can be a useful way of showing what and how much needs to be done to bring all parts of the programme (and sites) up to the same standard. Examples of sites falling into the different categories, and perhaps some case studies, could be included to provide more detailed supporting material for a comprehensive UK evaluation exercise.
- The Score Card approach will give a view of the current situation but, because it provides an overview, it is probably most useful in showing trends. Repeat evaluations will therefore be needed to make best use of this method of evaluation.

### 6.2. Findings from test evaluations

The case studies and Score Card have been used to test the applicability of different evaluation techniques. It is important to emphasise that the findings are meant to be **illustrative** rather than a comprehensive evaluation of management effectiveness of each of the case study sites, and of the entire UK MPA programme. However, a number of patterns do emerge from the findings and are therefore worth highlighting.

There is considerable variation in progress across MPAs, as shown by the gap in the highest and lowest scores from the World Bank Score Card. The case studies used to test the IUCN indicators approach show that of the three reporting categories (biophysical, socio-economic and governance), the most positive trends are related to the development of governance structures. This is also reflected in the findings of the overall assessment, using the Score Card, where the highest percentage scores (even for the poorest sites) relate to questions of process, e.g. education and awareness programmes, communications between stakeholder and managers, and stakeholder involvement and participation, training, and monitoring.

The output and outcome indicators were selected on the basis of whether data were available to report on the indicator. Although this may not be representative of the site as a whole, it is worrying to note negative trends in biophysical indicators, especially as biodiversity conservation was the main reason for establishing

the three MPAs used as case studies. Determining the reasons for these trends is not a subject for this report, but such a determination clearly needs to be carried out to follow on from any evaluation exercise. This should bear in mind that the trends will be influenced by large-scale phenomena, such as climate change, as well as the effectiveness of local management measures, in achieving the site specific objectives of an MPA.

Both methods of evaluation reveal gaps in the information base. The indicators approach, for example, points to the need for more data on socio-economic trends in particular, and suggests that much of the reporting will be as narrative rather than quantitative data, at least in the near future. The evaluation exercise can therefore suggest areas for future research as well as where action needs to be taken to improve the effectiveness of the MPA.

Finally, it should be noted that while the evaluation methodologies examined here can be used to report on the current status of particular MPAs or the UK programme as a whole, their greatest value is likely to be in showing trends and changes over time. For a meaningful evaluation process, the exercise will need MPA management plans as a starting point (not all sites have these at present), and to be repeated on a regular basis to build up a database that can be examined to determine status and trends.

### 6.3 Constraints and barriers

The 1995 global review of MPAs identified the follow recurring themes as reasons for MPAs failing to achieve their management objectives:

- Insufficient financial and technical resources to develop and implement management plans, and lack of trained staff.
- Lack of data for management decisions, including information on the impacts of resource use and on the status of biological resources.
- Lack of public support and unwillingness of users to follow management rules, often because users have not been involved in establishing such rules.
- Inadequate commitment to enforcing management.
- Unsustainable use of resources occurring within MPAs.
- Impacts from activities in land and sea areas outside the boundaries of MPAs, including pollution and overexploitation.
- Lack of clear organisational responsibilities for management, and absence of coordination between agencies with responsibilities relevant to MPAs.

From the UK perspective, significant progress has been made on most of these issues in the last decade, but more action is also required.

- Financial and technical resources remain an issue for successful management of UK MPAs. There needs to be long-term commitment to funding management of MPAs, and budgets on time scales that allow planning for immediate needs as well as longer term programmes such as public education, research and monitoring. Technical expertise to support management is developing, but there are still many areas of uncertainty, e.g. linking cause to effects, and management actions to specific outcomes.
- Data gathering to inform MPA management has become much more systematic and structured in recent years. Much of this has been driven by the requirements for *Natura 2000* sites, which has led to the development and testing of ideas on what needs to be done and what is practical in terms of research and monitoring (e.g. the marine monitoring handbook published by JNCC). The adequacy of the data gathering and its focus has still to be determined and will become clearer once evaluation exercises are carried out for individual MPAs and the UK MPA programme.

- Considerable effort has been put into informing the public about the need for MPAs as well as their role in biodiversity conservation and sustainable development. Stakeholder participation has been encouraged in the development of management schemes for MPAs, but final decisions rest with management authorities. The fact that there are few restrictions on activities within current MPAs means that the willingness of users to follow management rules, and their support for such rules, has probably still to be tested.
- Management committees generally show good commitment to enforcing regulations within MPAs. However, the supporting administrative structures and practical considerations can make this difficult. For example, it is usually impossible to respond rapidly, or have a high presence on site to observe infringements and collect sufficient evidence for enforcement measures. In light of consideration of a Marine Bill, there is an opportunity to review and improve the procedural and legislative means to take action to avoid or halt negative impacts.
- The sustainability of activities within UK MPAs is still a matter of debate. Judging the situation is more straightforward for new plans and projects, which are subject to appropriate assessments. Existing activities may never have been assessed and there is the danger of assuming that, if no immediate damage is apparent, the activity is likely to be sustainable. The role of MPAs in sustainable use is another aspect that has been poorly studied. Interest in an ecosystem approach to management and establishing networks of MPAs means that this will need to be addressed in the future. This could usefully include studying the effects of different management strategies within and between MPAs, such as highly protected and multiple-use zones.
- External influences do affect the status of MPAs. The requirements to protect SACs from activities taking place outside their boundaries but which affect the protected areas have still to be tested. New obligations such as those in the WFD may be the way in which some of these wider issues will be tackled. Discussion about setting MPAs within a Marine Spatial Planning framework should also help, as should Strategic Environmental Impact Assessment requirements. However, none of these measures appears to guarantee that external influences will be adequately addressed, as illustrated by recent moves to open areas for oil and gas extraction in locations that were considered unacceptable by the associated SEA.
- The definition of organisational responsibilities and coordination between agencies that have a role in the management of MPAs has improved in the last decade. This has largely been driven by the objectives and requirements of the EU Habitats Directive. The coordination task in particular remains an area for improvement, given the many organisations involved and their different roles and responsibilities.

#### 6.4 Next steps

This report has examined how two methods for evaluating the effectiveness of MPAs might be applied to UK MPAs and the UK programme as a whole. With no significant shortcomings and considerable benefits identified, the next step is to determine how they might be used in the UK. The following recommendations are made with a view to incorporating these methodologies into the UK programme.

1. Apply the World Bank Score Card to report on effectiveness of UK MPAs to international bodies, such as OSPAR and CBD.

Next steps to include: examining Score Card questions to see if they need any modification to address the UK situation; deciding on the scoring method (only one approach was tested here); preparing a database of all UK MPAs, cross-referenced to the key questions; agreeing the timescale of initial and repeat evaluations to show any trends; organising a feedback mechanism that will support the improvement of management at individual sites.



2. Apply the IUCN Guidelines to a selection of MPAs in the UK.

Next steps to include: ensuring that all sites have management plans as the starting point for evaluation; deciding on a sampling strategy to identify a number of MPAs that could be used as “reference sites”; applying the methodology to these sites to give a detailed appraisal (using indicators which cross-reference to other evaluation requirements, e.g. *Natura 2000* where possible); identifying data gaps and opportunities for further work to improve the evaluation exercise; agreeing the timescale for repeat evaluations to show any trends; organising a feedback mechanism that will support the improvement of management at individual sites.

3. Apply any site-specific evaluations as required by statute and the wishes of the management body responsible for the site.

Next steps to include: examining links between existing commitments for data gathering to support management and evaluation exercises, e.g. *Natura 2000*.

4. Ensure that there is long-term commitment to evaluating the effectiveness of MPAs, and that the findings are used to improve the status and operation of these sites.

Next steps to include: clear policy and procedure for evaluating management effectiveness of MPAs.

## GLOSSARY

### *Habitats Directive*

The abbreviated term for Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora. It is the aim of this Directive to promote the conservation of certain habitats and species within the EU.

### *Birds Directive*

The abbreviated term for Council Directive 79/409/EEC of 2 April 1979 on the Conservation of Wild Birds. This Directive aims to protect bird species within the EU through the conservation of populations of certain birds and the habitats used by these species.

### *Marine Nature Reserve (MNR)*

A protected area designated under the 1981 Wildlife and Countryside Act

### *Marine Protected Area (MPA)*

The term Marine Protected Area is usually used to describe any area reserved by law or other effective means to protect part, or all of the enclosed environment. In this report it is limited to Marine Nature Reserves and marine Special Areas of Conservation.

### *Natura 2000 network*

The European network of protected sites established under the Birds Directive and the Habitats Directive.

### *Favourable condition*

The target condition for an interest feature in terms of abundance, distribution and/or quality of that feature within a site. A measure of the contribution that the site makes to the favourable conservation status of the feature.

*Favourable conservation status*

A range of conditions for a natural habitat or species at which the sum of the influences acting upon that habitat or species are not adversely affecting its distribution, abundance, structure or function throughout the EU in the long term. The condition in which the habitat or species is capable of sustaining itself on a long-term basis.

*Special Area of Conservation (SAC)*

A site of Community Importance designated by an EU Member State where the necessary conservation measures are applied for the maintenance or restoration, at a favourable conservation status, of the habitats and/or species for which the site is designated.

*Special Protection Area (SPA)*

A site designated under the Birds Directive by the Member States where appropriate steps are taken to protect the bird species for which the site has been designated.

APPENDIX 1

GOALS, INDICATORS AND OBJECTIVES FROM THE IUCN GUIDEBOOK THAT ARE RELEVANT TO CASE STUDIES FOR STRANGFORD LOUGH, LUNDY ISLAND AND THE MORAY FIRTH MARINE PROTECTED AREAS

Three tables are included for each case study, showing:

- the most relevant BIOPHYSICAL goals, indicators and objectives from the IUCN Guidebook;
- the most relevant SOCIO-ECONOMIC goals, indicators and objectives from the IUCN Guidebook;
- the most relevant GOVERNANCE goals, indicators and objectives from the IUCN Guidebook.

In each case:

The *objectives* selected for examination in the current analysis are highlighted in blue

The *indicators* selected for examination in the current analysis are highlighted in red

Table 1.1 Biophysical goals, indicators and objectives relevant to Strangford Lough

Table 1.2 Socio-economic goals, indicators and objectives relevant to Strangford Lough

Table 1.3 Governance goals, indicators and objectives relevant to Strangford Lough

Table 2.1 Biophysical goals, indicators and objectives relevant to Lundy Island

Table 2.2 Socio-economic goals, indicators and objectives relevant to Lundy Island

Table 2.3 Governance goals, indicators and objectives relevant to Lundy Island

Table 3.1 Biophysical goals, indicators and objectives relevant to the Moray Firth

**TABLE 1.1 Biophysical goals, indicators and objectives relevant to Strangford Lough**

BIOPHYSICAL GOALS, OBJECTIVES & INDICATORS											
		Focal species abundance	Focal species population structure	Habitat distribution and complexity	Composition and structure of the community	Recruitment success within the community	Food web integrity	Type, level and return on fishing effort	Water quality	Area showing signs of recovery	Area under no or reduced human impact
<b>GOAL</b>											
<b>1</b>	<b>MARINE RESOURCES SUSTAINED OR PROTECTED</b>										
1A	Populations of target species for extractive or non-extractive use restored to or maintained at desired reference points	○					○	○			
1B	Losses to biodiversity and ecosystem functioning and structure prevented			●	○	○			○		
1C	Populations of target species for extractive or non-extractive use protected from harvesting at sites and/or life history stages where they become vulnerable	○	○		○		○	○		○	○
1D	Over-exploitation of living and/or non-living marine resources minimised, prevented or prohibited entirely	○	○		○		○	○			○
1E	Catch yields improved or sustained in fishing areas adjacent to the MPA	○				○		○		○	○
1F	Replenishment rate of fishery stocks increased or sustained within the MPA	○	○					○		○	
<b>2</b>	<b>BIOLOGICAL DIVERSITY PROTECTED</b>										
2A	Resident ecosystems, communities, habitats, species and gene pools adequately represented and protected				○	○		○		○	○
2B	Ecosystem functions maintained						○		○	○	
2C	Rare, localised or endemic species protected	○	○		○						
2D	Areas protected that are essential for life history phase of species		○	○				○	○		○
2E	Unnatural threats and human impacts eliminated or minimised inside and/or outside the MPA				○				○		○
2F	Risk from unmanageable disturbances adequately spread across the MPA										
2G	Alien and invasive species and genotypes removed or prevented from becoming established	○			○						
<b>3</b>	<b>INDIVIDUAL SPECIES PROTECTED</b>										
3A	Focal species abundance increased or maintained	●	○	○			○	○		○	
3B	Habitat and ecosystem functions required for focal species' survival restored or maintained			○	○		○	○	○	○	
3C	Unnatural threats and human impacts eliminated or minimised inside and/or outside the MPA							○	○		○
<b>4</b>	<b>HABITAT PROTECTED</b>										
4A	Habitat quality and/or quantity restored or maintained	○					○	○		○	
4B	Ecological processes essential to habitat existence protected	○	○		○				○	○	
4C	Unnatural threats and human impacts eliminated or minimised inside and/or outside the MPA		○	○	○				○	○	
4D	Alien and invasive species and genotypes removed or prevented from becoming established	○			○				○	○	○

**Table 1.2 Socio-economic goals, indicators and objectives relevant to Strangford Lough**

SOCIO-ECONOMIC GOALS, OBJECTIVES AND INDICATORS					
		Local values and beliefs about marine resources	Level of understanding of human impacts on resources	Stakeholder knowledge of natural history	Distribution of formal knowledge to community
GOAL					
<b>6</b>	<b>ENVIRONMENTAL AWARENESS AND KNOWLEDGE ENHANCED</b>				
6A	Respect for and/or understanding of local knowledge enhanced	○		○	
6B	Public understanding of environmental and social 'sustainability' improved	○	○		○
6C	Level of scientific knowledge held by the public increased	○			○
6D	Scientific understanding expanded through research and monitoring	○			●

**Table 1.3 Governance goals, indicators and objectives relevant to Strangford Lough**

	GOVERNANCE GOALS, OBJECTIVES AND INDICATORS	Level of resource conflict	Existence of a decision-making and management body	Existence and adoption of a management plan	Local understanding of MPA rules and regulations	Existence and adequacy of enabling legislation	Availability and allocation of MPA administrative resources	Existence and activity level of community organisation(s)	Degree of interaction between managers and stakeholders	Proportion of stakeholders trained in sustainable use	Level of training provided to stakeholders in participation	Level of stakeholder participation and satisfaction in management	Level of stakeholder involvement in surveillance, monitoring and enforcement	Clearly defined management procedures	Enforcement coverage
GOAL															
1	<b>EFFECTIVE MANAGEMENT STRUCTURES AND STRATEGIES MAINTAINED</b>														
1A	Management planning implemented and process effective			○	○										
1B	Rules for resource use and access clearly defined and socially acceptable				○										
1C	Decision-making and management bodies present, effective and accountable		○												
1D	Human and financial resources sufficient, and used efficiently and effectively						○								
1E	Local and/or informal governance system recognised and strategically incorporated into management planning														
1F	Periodic monitoring, evaluation, and effective adaptation of management plan ensured														
2	<b>EFFECTIVE LEGAL STRUCTURES AND STRATEGIES FOR MANAGEMENT MAINTAINED</b>														
2A	Existence of adequate legislation ensured					○									
2B	Compatibility between legal (formal) and local (informal) arrangements maximised or ensured														
2C	National and/or local legislation effectively incorporates rights and obligations set out in international legal instruments					○									
2D	Compatibility between international, national, state, and local rights and obligations maximised or ensured														
2E	Enforceability of arrangements ensured					○							○	○	
3	<b>EFFECTIVE STAKEHOLDER PARTICIPATION AND REPRESENTATION ENSURED</b>														
3A	Representativeness, equity, and efficacy of collaborative management system ensured											○			
3B	Resource user capacity effectively built to participate in co-management										○				○
3C	Community organising and participation strengthened and enhanced							●							
4	<b>MANAGEMENT PLAN COMPLIANCE BY RESOURCE USERS ENHANCED</b>														
4A	Surveillance and monitoring of coastal areas improved						○						○	○	○
4B	Willingness and acceptance of people increased to behave in ways that allow for sustainable management								○				○		
4C	Local ability and capacity built to use resources sustainably									○					
4D	User participation in surveillance, monitoring and enforcement increased												○		
4E	Application of law and regulations adequately maintained or improved				○	○									
4F	Access to and transparency and simplicity of management plan ensured and compliance fostered														
5	<b>RESOURCE USE CONFLICTS MANAGED AND REDUCED</b>														
5A	User conflicts managed and/or reduced: 1) within and between user groups and/or 2) between user groups and the local community or between the community and people outside it	○													

**Table 2.1 Biophysical goals, indicators and objectives relevant to Lundy Island**

BIOPHYSICAL GOALS, OBJECTIVES AND INDICATORS											
		Focal species abundance	Focal species population structure	Habitat distribution and complexity	Composition and structure of the community	Recruitment success within the community	Food web integrity	Type, level and return on fishing effort	Water quality	Area showing signs of recovery	Area under no or reduced human impact
<b>GOAL</b>											
<b>1</b>	<b>MARINE RESOURCES SUSTAINED OR PROTECTED</b>										
1B	Losses to biodiversity and ecosystem functioning and structure prevented			●	○	○			○		
1D	Over-exploitation of living and/or non-living marine resources minimised, prevented or prohibited entirely	○	○		○		○	○			○
<b>2</b>	<b>BIOLOGICAL DIVERSITY PROTECTED</b>										
2A	Resident ecosystems, communities, habitats, species and gene pools adequately represented and protected				○	○		○		○	○
2B	Ecosystem functions maintained						○		○	○	
2C	Rare, localised or endemic species protected	○	○		○						
<b>3</b>	<b>INDIVIDUAL SPECIES PROTECTED</b>										
3A	Focal species abundance increased or maintained	●	○	○			○	○		○	
3B	Habitat and ecosystem functions required for focal species' survival restored or maintained			○	○		○	○	○	○	
<b>4</b>	<b>HABITAT PROTECTED</b>										
4A	Habitat quality and/or quantity restored or maintained	○					○	○		○	
4B	Ecological processes essential to habitat existence protected	○	○		○				○	○	

**Table 2.2 Socio-economic goals, indicators and objectives relevant to Lundy Island**

SOCIO-ECONOMIC GOALS, OBJECTIVES AND INDICATORS								
		Local marine resource use patterns	Local values and beliefs about marine resources	Level of understanding of human impacts on resources	Perceptions of non-market and non-use value	Community infrastructure and business	Stakeholder knowledge of natural history	Distribution of formal knowledge to community
GOAL								
3	NON-MONETARY BENEFITS TO SOCIETY ENHANCED OR MAINTAINED							
3D	Recreation opportunities enhanced or maintained				●			
3E	Cultural value enhanced or maintained				●			
5	COMPATIBILITY BETWEEN MANAGEMENT AND LOCAL CULTURE MAXIMISED							
5A	Adverse effects on traditional practices and relationships or social systems avoided or minimised	●	●			●		
5B	Cultural features or historical sites and monuments linked to coastal resources protected		●					
6	ENVIRONMENTAL AWARENESS AND KNOWLEDGE ENHANCED							
6A	Respect for and/or understanding of local knowledge enhanced		●				●	
6B	Public understanding of environmental and social 'sustainability' improved		●	●				●
6C	Level of scientific knowledge held by the public increased		●					●
6D	Scientific understanding expanded through research and monitoring		●					●



**Table 2.3 Governance goals, indicators and objectives relevant to Lundy Island**

	GOVERNANCE GOALS, OBJECTIVES AND INDICATORS	Existence of a decision-making and management body	Existence and adoption of a management plan	Local understanding of MPA rules and regulations	Existence and adequacy of enabling legislation	Availability and allocation of MPA administrative resources	Degree of interaction between managers and stakeholders	Proportion of stakeholders trained in sustainable use	Level of stakeholder involvement in surveillance, monitoring and enforcement	Clearly defined management procedures	Degree of information dissemination to encourage stakeholder compliance
GOAL											
1	<b>EFFECTIVE MANAGEMENT STRUCTURES AND STRATEGIES MAINTAINED</b>										
1A	Management planning implemented and process effective		●								
1B	Rules for resource use and access clearly defined, and socially acceptable			●							
1C	Decision-making and management bodies present, effective and accountable	●									
1D	Human and financial resources sufficient, and used efficiently and effectively					●					
1E	Local and/or informal governance system recognised and strategically incorporated into management planning										
1F	Periodic monitoring, evaluation and effective adaptation of management plan ensured										
2	<b>EFFECTIVE LEGAL STRUCTURES AND STRATEGIES FOR MANAGEMENT MAINTAINED</b>										
2A	Existence of adequate legislation ensured				●						
2B	Compatibility between legal (formal) and local (informal) arrangements maximised or ensured										
2C	National and/or local legislation effectively incorporates rights and obligations set out in international legal instruments				●						
2D	Compatibility between international, national, state and local rights and obligations maximised or ensured										
2E	Enforceability of arrangements ensured				●			●	●		
4	<b>MANAGEMENT PLAN COMPLIANCE BY RESOURCE USERS ENHANCED</b>										
4B	Increased willingness and agreement by people to behave in ways that allow for sustainable management						●	●		●	
4C	Local ability and capacity built to use resources sustainably							●			

**Table 3.1 Biophysical goals, indicators and objectives relevant to the Moray Firth**

BIOPHYSICAL GOALS, OBJECTIVES AND INDICATORS											
		Focal species abundance	Focal species population structure	Habitat distribution and complexity	Composition and structure of the community	Recruitment success within the community	Food web integrity	Type, level and return on fishing effort	Water quality	Area showing signs of recovery	Area under no or reduced human impact
<b>GOAL</b>											
<b>2</b>	<b>BIOLOGICAL DIVERSITY PROTECTED</b>										
2A	Resident ecosystems, communities, habitats, species and gene pools adequately represented and protected				○	○		○		○	○
2B	Ecosystem functions maintained						○		○	○	
2C	Rare, localised or endemic species protected	●	○		○						
2D	Areas protected that are essential for life history phase of species		○	○				○	○		○
2E	Unnatural threats and human impacts eliminated or minimised inside and/or outside the MPA				○			○			○
<b>3</b>	<b>INDIVIDUAL SPECIES PROTECTED</b>										
3A	Focal species abundance increased or maintained	○	○	○			○	○		○	
3B	Habitat and ecosystem functions required for focal species' survival restored or maintained			○	○		○	○	○	○	
3C	Unnatural threats and human impacts eliminated or minimised inside and/or outside the MPA							○	●		○
<b>4</b>	<b>HABITAT PROTECTED</b>										
4A	Habitat quality and/or quantity restored or maintained	○					○	○		○	
4B	Ecological processes essential to habitat existence protected	○	○		○			○		○	
4C	Unnatural threats and human impacts eliminated or minimised inside and/or outside the MPA		○	○	○			○		○	