

<b>Title: Designation of Marine Conservation Zones in English inshore waters and English and Welsh offshore waters</b>  <b>IA No:</b> Defra 1475  <b>Lead department or agency:</b> Department For Environment, Food and Rural Affairs  <b>Other departments or agencies:</b>	<b>Impact Assessment (IA)</b>		
	<b>Date:</b> 23/08/2013		
	<b>Stage:</b> Final		
	<b>Source of intervention:</b> Domestic		
	<b>Type of measure:</b> Secondary legislation		
<b>Contact for enquiries:</b> Kylie Bamford Kylie.bamford@defra.gsi.gov.uk 02072386331			

<b>Summary: Intervention and Options</b>	<b>RPC Opinion: GREEN</b>
--	---------------------------

Cost of Preferred (or more likely) Option			
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB on 2009 prices)	In scope of One-In, Two-Out? Measure qualifies as
£-32.7m	£-8.3m	£0.5m	Yes   IN

**What is the problem under consideration? Why is government intervention necessary?**

A biologically diverse marine environment is of high value to society. Market failure occurs because no monetary price is attached to many goods and services provided by the marine environment so market mechanisms cannot ensure that actions are fully paid for. This results in negative externalities as damage to the marine environment is not fully accounted for by users. Also, marine environmental goods and services are 'public goods' (in that no one can be excluded from benefiting from them). In such a case, individuals do not have an economic incentive to voluntarily contribute effort or money to ensure their continued existence.

**What are the policy objectives and the intended effects?**

The Government aims to have 'clean, healthy, safe, productive and biologically diverse oceans and seas'. Contributing to an ecologically coherent network of Marine Protected Areas (MPAs) is an essential part of this strategy, helping meet the UK's commitments to national, European and international agreements. Marine Conservation Zones (MCZs - a type of MPA) are an essential component of this and Government has a duty to designate MCZs under the Marine and Coastal Access Act 2009 (MCAA). The designation of MCZs will help to deliver the Government's aim of a well-managed network of MPAs that is understood and supported by stakeholders.

**What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)**

Preferred option is to designate a first tranche of 28 MCZs in 2013 where designation decisions are made using the best available evidence, ensuring we have effective and well-managed MCZs. These sites offer the right balance between the strength of the conservation advantages relative to the economic and social implications of designation.

The MCZs not included in the 2013 tranche are considered to be unsuitable for immediate designation due to a number of factors (see section 4 Consultation background).

Option 0 or the "do nothing option" is not a viable policy option in this instance because section 123 of the MCAA places a legal obligation on Government to create a network of marine protected areas which includes MCZs.

<b>Will the policy be reviewed?</b> It will/will not be reviewed. <b>If applicable, set review date:</b> Month/Year					
Does implementation go beyond minimum EU requirements?				Yes / No / N/A	
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.		<b>Micro Yes</b>	<b>&lt; 20 Yes</b>	<b>Small Yes</b>	<b>Medium Yes</b>
What is the CO <sub>2</sub> equivalent change in greenhouse gas emissions? (Million tonnes CO <sub>2</sub> equivalent)				<b>Traded:</b>	<b>Non-traded:</b>

*I have read the Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) that the benefits justify the costs.*

Signed by the responsible: Minister  Date: 30/10/2013

# Summary: Analysis & Evidence

# Policy Option 1

## Description:

### FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2013	Time Period Years 20	Net Benefit (Present Value (PV)) (£m)		
			Low: -£25.9m	High: -£102.6m	Best Estimate: -£32.7m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	23.3	0.6	25.9
High	56	4.2	102.9
Best Estimate	27.3	0.9	32.7

#### Description and scale of key monetised costs by 'main affected groups'

Best estimate average annual costs (including transition): renewable energy (0.09m/yr); ports, harbours (0.1m/yr); commercial fisheries (£0.25m/yr); aggregate extraction (£0.02m/yr); cables (0.002m/yr); flood & coastal erosion (0.001m/yr); national defence (0.008m/yr); oil and gas (0.05m/yr); public sector management (£0.59m/yr) and ecological surveys (£1.1m/yr).

#### Other key non-monetised costs by 'main affected groups'

Sectors where future projects were highly uncertain costs have not been quantified (see section 6). There are potential impacts on local communities from restriction/management of fisheries. Other public sector costs such as costs to inform users about MCZs (including setting up educational programmes), advise public authorities on impacts of proposed licensed activities to MCZs, and costs to the public authorities considering the advice.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional	Optional	Optional
High	Optional	Optional	Optional
Best Estimate			

#### Description and scale of key monetised benefits by 'main affected groups'

A number of the expected recreational benefits of MCZs have been monetised for illustrative purposes within this IA. Due to uncertainty concerning the scale of benefits calculated, they have not been included in the summary sheets.

#### Other key non-monetised benefits by 'main affected groups'

A combined area of approximately 10,100km<sup>2</sup> will be protected by designation of MCZs and over 165 features, which is likely to result in an increase in final ecosystem services (benefits) such as increases in provisioning (i.e. fish provision), regulating (i.e. climate regulation) and cultural (and recreational) services. An overall network of marine protected areas is likely to have additional benefits such as an increase in biological resilience to adapt to changed conditions.

Key assumptions/sensitivities/risks	Discount rate (%)	3.5
Following site designation 75% of affected fishing effort (landings value /GVA) assumed displaced and 25% lost (assumption tested at consultation). Uncertainty around application costs to future developments from MCZ designation (IA uses various sensitivity scenarios to provide high/ low estimates where possible). Mitigation of licensing activities impact on broad scale habitats protected by MCZs is negligible due to small footprint of the activities compared to the overall area protected.		

### BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OITO?	Measure qualifies as
Costs: 0.5	Benefits: 0	Net: 0.5	Yes	IN

# Evidence Base (for summary sheets)

## Contents

1. <u>Background</u> .....	5
2. <u>Problem under consideration and the rationale for government intervention</u> .....	7
3. <u>Policy objective and intended effects</u> .....	8
4. <u>Consultation background</u> .....	9
5. <u>Overview of baseline option</u> .....	11
6. <u>Costs under the baseline and preferred option</u> .....	13
7. <u>Benefits</u> .....	35
8. <u>Conclusion</u> .....	48
<u>References</u> .....	49
<u>Table 1: 28 Sites to be designated</u> .....	12
<u>Table 2: Summary of baseline costs to private industry and public bodies</u> .....	13
<u>Table 3: Summary of additional costs for designating 28 MCZs</u> .....	18
<u>Table 4: Additional Costs of Marine Conservation Zones</u> .....	22
<u>Table 5: Ecosystem services assessed in the IA</u> .....	35
<u>Table 6: Existing benefits of the UK marine environment under baseline</u> .....	35
<u>Table 7: Benefits from protection of MCZ features and designation of sites</u> .....	40
<u>Box 1: MCZs, Conservation Objectives and Management Measures</u> .....	6
<u>Box 2: Questions asked during MCZ consultation</u> .....	10
<u>Box 3: The stakeholder engagement process followed to identify management scenarios and industry costs</u> .....	15
<u>Box 4: Monetisation of recreational benefits</u> .....	44
<u>Figure 1: Illustrative MCZ and features under baseline</u> .....	11
<u>Figure 2: Illustrative MCZ and features with designation</u> .....	16

## List of Acronyms

AT – Angling Trust  
BMAPA – British Marine Aggregate Producers Organisation  
BS – Balanced Seas Conservation Zones Project  
BSAC – British Sub Aqua Club  
BSH – Broad Scale Habitat  
CCS – Carbon Capture and Storage  
CEFAS – Centre for Environment, Fisheries and Aquaculture Science  
CFP – Common Fisheries Policy  
CVM – Contingent Valuation Method  
DECC – Department for Energy and Climate Change  
DEFRA – Department for the Environment, Food and Rural Affairs  
EA – Environment Agency  
EANCB – Estimated Annual Net Cost to Business  
EH – English Heritage  
EIA – Environmental Impact Assessment  
EMS – European Marine Site  
ENG – Ecological Network Guidance  
EU – European Union  
FCERM – Flood and Coastal Erosion Risk Management  
FOCI – Feature of Conservation Importance (including HOCl and SOCl)  
FS- Finding Sanctuary Conservation Zones Project

GVA - Gross Value Added  
HOCI – Habitat of Conservation Importance  
IA – Impact Assessment  
IFCA - Inshore Fisheries and Conservation Authority  
ISCZ - Irish Sea Conservation Zones  
JNCC - Joint Nature Conservation Committee  
MCAA – Marine and Coastal Access Act  
MCAA – Marine and Coastal Access Act 2009  
MCS – Marine Conservation Society  
MCZ – Marine Conservation Zone  
MEA - Millennium Ecosystem Assessment  
MESAT – Maritime Environmental Sustainability Appraisal Tool  
MMO – Marine Management Organisation  
MoD – Ministry of Defence  
MPA – Marine Protected Area  
MSFD – Marine Strategy Framework Directive  
NE – Natural England  
NG - Net Gain Marine Conservation Zone Project  
OSPAR – Oslo-Paris Convention for the Protection of the marine Environment of the North-East Atlantic  
pMPA – Potential Marine Protected Area  
PO – Producers Organisation (Fishing)  
PV – Present Value  
RA – Reference Area  
RAMSAR sites - marine components of RAMSAR sites<sup>1</sup>  
rMCZ – Recommended Marine Conservation Zone (from the Regional Project process)  
SAC - Special Areas of Conservation (SAC)<sup>2</sup>  
SAP – Science Advisory Panel  
SNCB – Statutory Nature Conservation Body  
SOCI – Species of Conservation Importance  
SPA - Special Protection Areas (SPA)<sup>3</sup>  
SSSIs - Sites of Special Scientific Interests<sup>4</sup>  
UK BAP - UK Biodiversity Action Plan  
UKHO – UK Hydrographic Office  
UKMMAS - UK Marine Monitoring and Assessment Strategy  
UKNEA – UK National Ecosystem Assessment  
VMS – Vessel Monitoring System, used to track the location of vessels  
WCA – Wildlife and Countryside Act  
WFD – Water Framework Directive

---

<sup>1</sup> Sites designated as Wetlands of International Importance under the Ramsar Convention (1971).

<sup>2</sup> Required by the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna).

<sup>3</sup> Required by the Wild Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds)

<sup>4</sup> Designated under the Wildlife and Countryside Act 1981 (as amended).

# Background

- 1.1 With a coastline of over 12,429 km, the UK has a large marine area rich in marine life and natural resources. It is important to recognise that the seas around the UK are not just places of important biological diversity; they also provide us with a variety of goods and services. This makes the marine environment essential to our social, economic and environmental well-being.
- 1.2 To deliver the vision of clean, healthy, safe, productive, and biologically diverse oceans and seas, the Government and Devolved Administrations have committed to developing an 'ecologically coherent' network of Marine Protected Areas (MPAs). This network will protect rare, threatened and valuable habitats in the seas around the UK, with enough sites to conserve a range of major habitats vital for the health of our marine ecosystems. The network will comprise of Special Protection Areas (SPAs)<sup>5</sup>, Special Areas of Conservation (SACs)<sup>6</sup>, RAMSAR sites<sup>7</sup>, Sites of Special Scientific Interest (SSSIs)<sup>8</sup>, and a new type of MPA, Marine Conservation Zones (MCZs, see Box 1), created under Part 5 of the Marine and Coastal Access Act 2009 in England and Wales.
- 1.3 MCZs will protect areas that are nationally representative and important to conserve for the diversity of nationally rare or threatened habitats and species they contain. Unlike other types of MPA, designation of MCZs will involve taking social and economic factors into account alongside environmental factors when identifying potential sites.
- 1.4 Department for the Environment, Food and Rural Affairs (Defra) is responsible for the MCZ process for non-devolved UK waters. These are comprised of English inshore waters (inside 12 nautical miles) and offshore waters adjacent to England, Wales and Northern Ireland (to 200 nautical miles or the agreed administrative boundary with neighbouring countries). The Devolved Administrations are running independent projects not examined here.
- 1.5 In England, Defra invited the Statutory Nature Conservation Bodies (SNCBs), Natural England (NE) and the Joint Nature Conservation Committee (JNCC), to make recommendations for locations for MCZs which had stakeholder support. To do this SNCBs established four regional stakeholder led projects (each of which chose its own name) covering the English North Sea ('Net Gain'), Irish Sea ('Irish Sea Conservation Zones'), South-East ('Balanced Seas') and South-West ('Finding Sanctuary'). This approach to open policy making not only allowed a diverse range of stakeholders to shape marine conservation; it also enabled social and economic considerations to be taken into account when sites were selected by the regional project stakeholder groups as recommended MCZs.
- 1.6 The SNCBs provided the Regional MCZ Projects with guidance on the criteria for selecting a network of MCZs, based on the OSPAR network design principles<sup>9</sup> in their regions (the Ecological Network Guidance (ENG)) and project delivery guidance setting out the process that should be followed to select site locations and complete an Impact Assessment (IA) accompanying the site recommendations. Defra also established an independent expert Marine Protected Areas Science Advisory Panel (SAP) to support the regional project process.

---

<sup>5</sup> Required by the Wild Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds).

<sup>6</sup> Required by the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna).

<sup>7</sup> Sites designated as Wetlands of International Importance under the Ramsar Convention (1971).

<sup>8</sup> Designated under the Wildlife and Countryside Act 1981 (as amended).

<sup>9</sup> Oslo and Paris Commission (Ospar) Guidance on Developing an Ecologically Coherent Network of Ospar Marine Protected Areas, (Reference number 2006-3)

1.7 The Regional MCZ Projects made their recommendation for 173 MCZs in 127 locations (108 MCZs, 46 reference areas (RAs)<sup>10</sup> within MCZs and 19 standalone reference areas) in September 2011. These were reviewed by the SAP which, while recognising that the recommendations had come from a stakeholder-led process, raised significant concerns about the state of the evidence base supporting the recommendations. As a result of these concerns, former Environment Minister Richard Benyon made a Written Ministerial Statement in November 2011 announcing that MCZ designations would be made in tranches with the best-evidenced sites designated first, revising the timetable for designation and announcing additional funding to support further evidence gathering. Formal advice to Ministers on site designation was also provided by SNCBs. This was presented to Defra in July 2012 alongside the IA from the regional projects.

**Box 1: MCZs, Conservation Objectives and Management Measures**

**MCZs** are a type of Marine Protected Area (MPA). They will protect areas that are nationally representative and important to conserve for the diversity of nationally rare or threatened habitats or species they contain. The features<sup>11</sup> listed for designation will ensure the range of marine biodiversity in the UK's seas is conserved. Unlike other MPAs, designation of MCZs took into account social and economic factors when identifying potential sites, alongside the best available scientific evidence.

For assessment in the IA, the social and economic impact of designating MCZs is assessed based on the conservation objectives.

Conservation objectives<sup>12</sup> define the change in feature condition being targeted, and hence have implications for the management of human activities that may impact on that feature:

Features with a conservation objective direction of travel of 'recover to favourable condition' are assumed to be currently in unfavourable condition but, with MCZ designation and appropriate management they will recover to favourable condition over time. A feature attains favourable condition when its extent or population is stable or increasing, it has the structure and functions (or habitat) that are necessary for its long-term maintenance, and the quality and occurrence of habitats and the composition and abundance of species are in line with prevailing natural conditions (Natural England and JNCC, 2011).

Features with a conservation objective direction of travel of 'maintain in favourable condition' are assumed to be currently in favourable condition. MCZ designation and continued appropriate management will protect the features against the risk of degradation from future, currently unplanned, human activities. Though it is assumed that in most cases mitigation of the impacts of human activities is not currently required, mitigation would, if necessary, be introduced (with the associated costs and benefits).

---

<sup>10</sup> Highly protected MCZs where all extraction, deposition or human-derived disturbance is removed or prevented to enable features to achieve reference condition (a state where there are no, or only very minor, changes to the values of environmental elements which would be found in the absence of anthropogenic disturbance)

<sup>11</sup> A feature is one of the habitats, species or geological features that MCZs are intended to conserve. Examples of features include intertidal mixed sediment (habitat), Native Oyster (species) and North Sea glacial tunnel valleys (geological feature).

<sup>12</sup> A Conservation Objective is a statement of the action need to achieve the desired ecological/geological state of a feature for which an MCZ is designated



## 2.

## Problem under consideration and the rationale for government intervention

- 2.1 A biologically diverse marine environment is of high value to society through the services that it provides and as a basis for human health and livelihoods (OSPAR, 2010). Fish landings and aquaculture from the marine environment have a market value, while non-traded services include education, flood control, recreation and research. Aside from its economic value to society, the natural environment has intrinsic or 'non-use' value<sup>13</sup>.
- 2.2 Human activities are having a detrimental effect on the extent and condition of many diverse habitats and their ecosystems, ranging from sediment, rock and reef to maerl beds and some endangered habitats such as deep sea cold water corals (OSPAR, 2010). Fishing affects large areas of the sea bed (the UK Marine Monitoring and Assessment Strategy -UKMMAS, 2010) and has large impacts on marine ecosystems (OSPAR, 2010). Pressures exerted by other activities including aggregate extraction, coastal defence, shipping and wind farms are increasing. OSPAR<sup>14</sup> (2010) noted that 'a reduction in the decline in biodiversity is still a long way off', and that combined pressures from human activities are not fully understood and need to be carefully managed to avoid undesirable impacts. The most threatened marine and coastal habitats in the UK (as identified in the UK Biodiversity Action Plan (UK BAP)) are continuing to decline, and maintaining or increasing the extent and condition of priority habitats is more difficult in coastal and marine areas than in the terrestrial environment (JNCC, 2010).
- 2.3 The reduction in extent and condition of marine habitats and ecosystems is due to market failures and public good characteristics, hence the need for government intervention to protect valuable features of the marine environment. Market failures occur when the market has not and cannot in itself be expected to deliver an efficient outcome.<sup>15</sup> In the context of the marine environment these failures can be described as:
- Public goods – A number of goods and services provided by the marine environment such as climate regulation and biological diversity are 'public goods' (no-one can be excluded from benefiting from them and consumption of the service does not diminish the service being available to others). The characteristics of public goods mean that individuals do not necessarily have an economic incentive to voluntarily contribute effort or money to ensure the continued existence of these goods (HM Government, 2011a) leading to undersupply or in this case under-protection.
  - Negative externalities – Negative externalities occur when damage to the marine environment is not fully accounted for by users. In many cases no monetary price is attached to marine goods and services therefore the cost of damage is not directly priced by the market. Even for those goods that are traded (such as wild fish), market prices often do not reflect the full economic cost, which ends up being borne by other individuals and society.
- 2.4 Government intervention is required to redress both these sources of market failure in the marine environment. Designation of Marine Conservation Zones and associated management measures to conserve features (e.g. habitats, species) will ensure negative externalities are reduced or suitably mitigated by users. Designation will also support continued provision of public goods in the marine environment, for example the features listed for designation will ensure the range of marine biodiversity in our seas is conserved.

<sup>13</sup> There are two forms of intrinsic value: anthropocentric and non-anthropocentric. Anthropocentric value is the intrinsic value assigned by humans to nature, which has practical implications for policy. Non-anthropocentric value is the value that nature has 'in itself'. As explained in Defra (2007), 'While it is recognised that the natural environment has intrinsic value i.e. is valuable in its own right, such non-anthropocentric value is, by definition, beyond any human knowledge'.

<sup>14</sup> The OSPAR Convention is the current legal instrument guiding international cooperation on the protection of the marine environment of the North-East Atlantic. Work under the Convention is managed by the OSPAR Commission, made up of representatives of the Governments of 15 Contracting Parties and the European Commission, representing the European Union

<sup>15</sup> HMT Green Book [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/220541/green\\_book\\_complete.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf)

### 3. Policy objective and intended effects

- 3.1 The UK Government and Devolved Administrations' vision for the marine environment is for 'clean, healthy, safe, productive and biologically diverse oceans and seas' (HM Government, 2011b). This vision recognises the economic, social and intrinsic value of a healthy marine environment and demonstrates a commitment to halting the loss of biodiversity and restoring it as far as is feasible (HM Government, 2011b).
- 3.2 The UK administrations have committed<sup>16</sup> to completing an ecologically coherent UK network of MPAs as part of a broad based approach to nature conservation. However, neither English waters nor UK waters are a single ecological entity within a biogeographic context. Our aim therefore is for the UK MPAs to contribute to an ecologically coherent network on a biogeographic basis and as a UK contribution to the wider OSPAR network. The UK is contributing to the development of methodologies through OSPAR and will continue to work with the administrations to agree an approach across the UK.
- 3.3 This network will be a key tool in contributing to achieving Good Environmental Status as required by the Marine Strategy Framework Directive (MSFD) and particularly in ensuring that biodiversity and seafloor ecosystems are protected, conserved and where appropriate recovered. The UK has also made a number of international commitments including delivering a contribution to the ecologically coherent network of MPAs under OSPAR, and to 'establish a representative network of MPAs' as set out in the World Summit on Sustainable Development (2002); and the Convention of Biological Diversity.
- 3.4 The network provided for in the Marine and Coastal Access Act (MCAA) and the MCZs in 'English'<sup>17</sup> waters will contribute to meeting these national and international commitments. Designation of MPAs will help to ensure that conservation of habitats and species is given greater priority in the regulation and management of human activities, enabling protection of features and conservation objectives to be achieved.
- 3.5 Management measures for MCZs will be set by the regulatory authorities after designation and be determined by what is required to meet a site's conservation objectives. Since these measures are not known in advance, this IA contains illustrative examples – including the best estimate – of likely management scenarios and their costs. There are likely to be a range of management measures across and within MCZs, delivering differing levels of protection depending upon the sensitivity of the species, habitats and geological feature (for which a site is designated) to the activities taking place in that area and on the conservation objectives for those features.

---

<sup>16</sup> UK Marine Policy Statement

<sup>17</sup> English inshore and English and Welsh offshore waters



## 4. consultation background

- 4.1 The Marine Conservation Zones Public Consultation was published on the 13th December 2012 (Impact Assessment **Defra 147518**). This IA included the option of designating all the recommended sites from the Regional MCZ projects (all 127 sites presented as Option 1) and additionally the benefits and costs of designating the 31 sites proposed for the 2013 tranche of MCZs (known as Option 2). This allowed the consultees to compare the two options available to Government against a baseline of no MCZs.
- 4.2 The 31 sites of preferred Policy Option 2 were chosen using the best available evidence, ensuring effective and well-managed MCZs. These sites offer the right balance between the strength of the conservation advantages relative to the economic and social implications of designation.
- 4.3 The MCZs not included in the 2013 tranche are considered to be unsuitable for immediate designation due to:
- Lack of certainty on presence, extent and condition of features – features (or sites) were excluded where there was not sufficient scientific certainty,
  - Uncertainty of economic impacts – the preferred option excluded sites with the potential for high unquantified costs,
  - Lower ecological benefits compared to higher costs,
  - Scientific advice on reference areas.
- 4.4 Weighing up conservation advantages against socio-economic costs was challenging because some of the economic impacts are expressed in monetary terms while the ecological benefits are expressed largely in qualitative terms. Greater ecological contribution was required for sites with higher socio-economic costs. MCZs in the top quartile were considered suitable for inclusion in the network only if they provided an opportunity to protect a feature where there are limited opportunities to protect it nationally; or it is the best example of the feature nationally; or included multiple features where there are limited opportunities to protect them regionally; and/or they are the best examples of the features regionally.
- 4.5 The consultation was used to test support and gather additional information, through the following nine questions mentioned in the box below. 40,632 responses were recorded, with around 95% in support of MCZs. The Government response to the consultation illustrates the breakdown of responses from sectors and organisations, as well as an overview of the main concerns raised.

---

<sup>18</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/82721/mcz-designate-ia-20121213.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82721/mcz-designate-ia-20121213.pdf)

## Box 2: Questions asked during MCZ consultation

**Q1** – Do you agree that this site and specified features should be designated in the first tranche? Please explain and provide evidence to support your views as necessary.

**Q2** – Are there any additional features (not recommended by the Regional MCZ Projects) located within this sites that should be protected? Please explain and provide evidence to support your views as necessary.

**Q3** – Do you have any comments on the proposed conservation objective(s)? Please provide evidence to support your comments as necessary.

**Q4** – Are there any significant reasons for alteration of this site's boundary? Please explain and provide evidence to support your views as necessary.

**Q5** – Is there any additional evidence to improve data certainty for features within this site? If yes please provide evidence.

**Q6** - Are there any additional activities (that may impact the recommended features) occurring within this site that have not been captured within the Impact Assessment? Please provide evidence to support your views.

**Q7** – Do you have any new information on costs to industry not covered in the Impact Assessment, that would be directly attributable to MCZs as opposed to costs stemming from existing regulatory requirements, or evidence that suggests the need for changes to the methodologies or assumptions used in estimating costs (including in relation to fishing displacement)? If yes please provide evidence.

**Q8** - Do you have any new information that was not available or used in the Impact Assessment to inform or quantify the value (of) the benefits of MCZs?

**Q9** - You may wish to provide comments on other aspects of this consultation such as evidence requirements, identification and treatment of high risk sites. Where you disagree with the approach taken please provide evidence to support your views

### 4.6 As a result of the consultation responses:

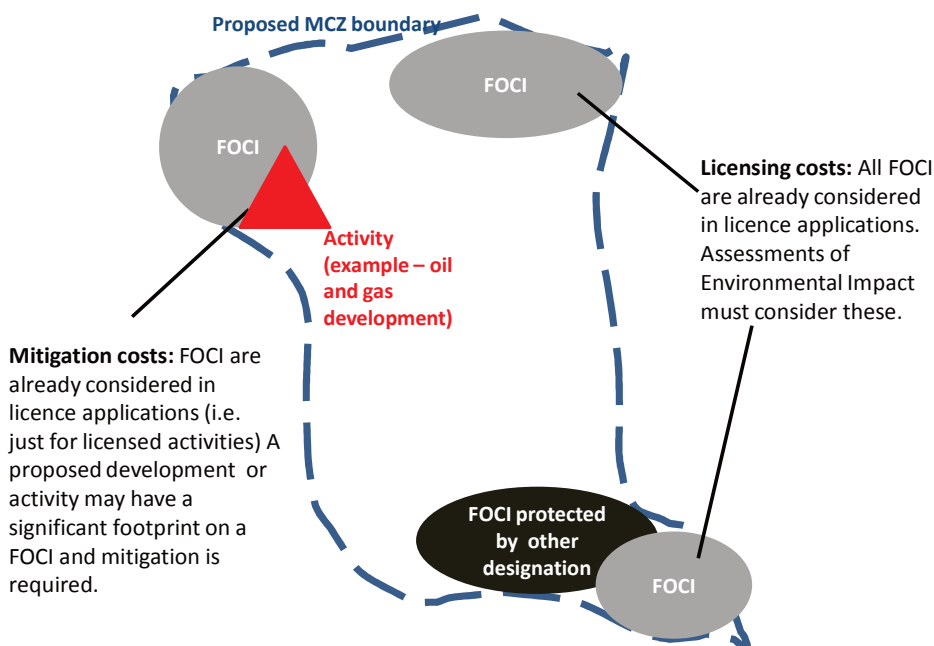
- Scientific and socioeconomic information and assumptions were amended due to additional information being submitted during the consultation and the evidence base strengthened through survey work. This has fed into the final selection process. Detail of changes to assumptions and costs are set out in section 6.8 to 6.35; detail of changes to benefits are explained in para 7.19.
- A total of 3 sites are not being taken forward from the 2013 site designation proposals (Hilbre Island Group, Stour & Orwell and North of Celtic Deeps were removed with Hythe Bay being deferred for further consideration) due to changes in the social and economic and/or scientific basis for which they were first recommended or due to consideration of responses to the consultation.
- Hilbre Island Group was excluded due to the minimal conservation value the site provided. Of the two features recommended, one is currently protected by an existing Special Area of Conservation (SAC)<sup>19</sup>, the other a poor example of the feature which does not warrant the level of protection that would be provided in an MCZ.
- Significant concerns were raised regarding the socio-economic impact at Stour & Orwell. Amending the site boundaries to exclude port harbour authority limits reduced the ecological integrity of this site, and with no other viable option available the site was dropped.
- North of Celtic Deeps site proposal is not being taken forward from the 2013 site designation proposals at the specific request of the Welsh Assembly Government whilst they consider further their contribution to the network. A decision on this site will be taken once the Welsh Government has concluded their considerations.
- A decision on Hythe Bay designation has been deferred until early 2014 to allow for further discussions to explore possible solutions with local fishing interests, Natural England and the local Inshore Fisheries Conservation Authority (IFCA) with the aim of delivering the conservation aims for the site and taking account of local fishing interests. Hythe Bay is included within the total number of sites considered in this IA, due to possible designation shortly after the 2013 tranche.

<sup>19</sup> SACs are designated under the EU Habitats Directive

## verview of baseline option

- 5.1 Baseline (option 0) or the “do nothing option” is not a viable policy option in this instance because Section 123 of the MCAA places a legal obligation on Government to create a network of marine protected areas. As such, the ‘do nothing option’ simply provides the baseline against which costs and benefits of MCZs are calculated (in line with IA guidance). The baseline encompasses all current protection and legislation, including the features already recognised under European Union (EU) or national lists, as illustrated in Figure 1<sup>20</sup> below. This shows that the effect of the activity (red triangle) on some of the features (Features of conservation importance (FOCI)) is already accounted for as these are already protected under existing legislation thus MCZ designation does not create additional costs. Figure 2 (discussed in para 6.4) states what type of *additional features* protected under MCZ designation are likely to lead to additional costs to activities.

Figure 1: Illustrative MCZ and features under baseline



- 5.2 The current condition of features depends on how past and current activity (e.g. fishing, or industry developments) has or has not had an impact on the feature. Location-specific information on the condition of features in the proposed MCZs is not currently available in all locations. Using knowledge of feature location and of activities that are occurring in that location, Vulnerability Assessments<sup>21</sup> were carried out to assess whether each feature in each MCZ is likely to be in favourable or unfavourable condition. Features assessed to be in favourable condition are given a ‘maintain’ conservation objective while those assessed to be in unfavourable condition are given a ‘recover’ conservation objective.
- 5.3 We do not have location-specific information on the trend in feature condition nor do we have evidence about how features will respond to possible impacts. We have therefore assumed that, at the same level of activity as currently experienced, the features will remain in their current

<sup>20</sup> All FOCI are subject to one or more of the following national and multi-lateral agreements: OSPAR List of Threatened and/or Declining Species (features that are considered to be under threat or in decline, and may be rare or particularly sensitive); UK BAP Priority Habitats and Species (features of international importance, at high risk or in rapid decline, as well as habitats that are important for key species); Wildlife and Countryside Act, Schedule 5 (species likely to become extinct from the UK unless conservation measures are taken, and species subject to an international obligation for protection).

<sup>21</sup> A vulnerability assessment takes into account information on fishing and recreational activity in an area alongside best available science on sensitivity of features to activities. Stakeholders were given the chance to amend based on local knowledge.

favourable or unfavourable condition in the absence of MCZ designation i.e. under baseline conditions<sup>22</sup>. In other words, we assume a static baseline rather than a declining baseline where the feature condition continues to deteriorate in the absence of MCZs being designated. There is a risk that this assumption is incorrect however we do not have information on the likelihood of this risk and so quantified benefits and costs of designation are assessed relative to the baseline of constant feature condition.

5.4 This assumption could be challenged as there is likely to be a continued increase in human use of the marine environment over the 20 years of the IA and there is a risk that action may not be taken to keep this at the current level. Non-MCZ management of such activities may also act to reduce pressures despite increased activity levels e.g. successful implementation of EU fisheries policies and the Water Framework Directive. At a UK-wide scale, there may also be increased pressures on the marine environment from climate change<sup>23</sup>. Whilst there is a risk of increasing pressures to the overall marine environment, it is generally not possible to predict the likely changes for specific features in specific locations with our current level of knowledge.

5.5 Activities in or near proposed MCZs were assessed in detail as part of the Regional Project process<sup>24</sup>. Assumptions on future activities (for example, licence applications for renewable energy developments) were made where feasible on a sector-by-sector basis and validated with industry and government bodies as appropriate. This information was updated with any additional information in response to the public consultation. All amendments to assumptions and costs from the consultation are highlighted in section 6 below. Please see Table 4 below for full assumptions.

5.6 As a result of the consultation results outlined in para 4.3, the following MCZs will be designated in 2013:

<b>Table 1: 28 Sites to be designated</b>	
<b>Finding Sanctuary</b>	<b>Balanced Seas</b>
The Canyons 3.1	Blackwater, Crouch, Roach and Colne Estuaries MCZ 3
Southwest Deeps (West) 3.2	Medway Estuary MCZ 6
East of Haig Fras 3.7	Thanet Coast MCZ 7
Poole Rocks 3.14	Folkestone Pomerania MCZ 11.4
South Dorset 3.16	Beachy Head West MCZ 13.2
Chesil Beach and Stennis Ledges 3.19	Kingmere MCZ 16
Torbay 3.22	Pagham Harbour MCZ 25.1
Skerries Bank and Surrounds 3.24	
Tamar Estuary Sites 3.27	* Hythe Bay deferred for further consideration
Whitsand and Looe Bay 3.28	
Upper Fowey and Pont Pill 3.29	
The Manicles 3.32	
Isles of Scilly 3.35	
Padstow Bay and Surrounds 3.38	
Lundy 3.41	
<b>Irish Seas Conservation Zones</b>	<b>Net Gain</b>
Fylde Offshore MCZ 8	Aln Estuary NG 13a
Cumbria Coast MCZ 11	Rock Unique NG 15
	Swallow Sand NG 16
<p>Note:            In England Defra invited the Statutory Nature Conservation Bodies (SNCBs), Natural England and the Joint Nature Conservation Committee (JNCC), to make recommendations for locations for MCZs which had stakeholder support. To do this SNCBs established four regional projects (each of which chose its own name) covering the English North Sea ('Net Gain'), Irish Sea ('Irish Sea Conservation Zones'), South-East ('Balanced Seas') and South-West ('Finding Sanctuary'). This approach to open policy making not only allowed a diverse range of stakeholders to shape marine conservation; it also enabled socio-economic considerations to be taken in to account when sites were selected as recommended MCZs.</p>	

<sup>22</sup> (Note that features considered to be in 'unfavourable' condition are those which would have a 'recover' conservation objective in MCZs and features considered to be in 'favourable' condition are those which would have a 'maintain' conservation objective if it were to be designated in an MCZ).

<sup>23</sup> Threats to marine ecosystems as a result of climate change are described in OSPAR (2010)

<sup>24</sup> <http://publications.naturalengland.org.uk/publication/1921610>

## Costs under the baseline and preferred option

### *Costs under the baseline scenario*

6.1 The baseline includes a number of costs relating to *existing* marine protection / regulation in these areas. These are not costs attributed to the designation of MCZs because they are already incurred<sup>25</sup>. They include:

- Costs of licence applications. In the baseline, applicants for marine developments and some activities have to carry out an assessment of environmental impact, of the proposed activity on FOCI, and upon requirements to meet the existing Water Framework Directive and Marine Strategy Framework Directive. Costs for Environmental impact assessments (EIAs) vary depending on project size - a study of 18 EU examples found EIA costs to range from 0.01% to 2.56% of the total development cost with the average being 0.5%<sup>26</sup>.
- Mitigation actions. Where a development / action may have an adverse impact on these listed features, licensed industry has to take actions to mitigate these impacts. (e.g., amending location, adding cushioning for cables, etc).
- Costs to fisheries. Commercial fisheries may incur costs in the baseline due to existing closed areas, quota, effort and/ gear restrictions.
- Public sector costs - monitoring of vessels, catches and species stocks; management of existing licence applications and protected areas.

**Table 2: Summary of baseline costs to private industry and public bodies. Note: all acronyms are explained on page 1 of the evidence base.**

Impacted Private Sector	Description of baseline costs
Aggregate extraction	Existing costs for obtaining a licence (other than assessment of environmental impact). Mitigation (conditions on where and how operation is carried out) costs may be incurred to avoid damage to these features.
Cables	Licence application costs, including assessment of environmental impact on features of conservation importance (FOCI). Industry undertakes this voluntarily in areas outside of 12nm. Mitigation activities may be required for some features protected under existing lists, such as frond mattressing.
Coastal development	Licence application costs, including costs of EIA to consider impact on FOCI. Mitigation (such as moving planned location, using different materials) may be required to avoid damage to these features.
Commercial Fisheries	Common Fisheries Policy (CFP) e.g. Limits on commercial fishing of quota stocks. UK fisheries management e.g. IFCA byelaws on vessel size Conservation e.g. Management of fishing in MPAs e.g. European Marine Sites (EMS) Voluntary codes of conduct.
Flood and coastal erosion risk management	Licence application costs, including costs of assessment of environmental impact to consider impact on FOCI. Mitigation (such as moving planned location or restrictions on construction activities) may be required to avoid damage to these features.
Historic Environment	Current costs for licence applications, including licence applications for archaeological activities on Historic Protected Wrecks. Depending on the scale and type of activity, the MMO or Natural England may advise that an assessment of environmental impact is undertaken. English Heritage (EH) requires that records of all sites of historic or archaeological interest are considered in any licence application. In some areas, vessel anchoring is restricted in the baseline through restrictions or codes of conducts in

<sup>25</sup> Note that, consistent with Impact Assessment guidance, we assume that these previous policies have been effectively implemented

<sup>26</sup> Costs in excess of 1% of capital costs were the exception, and occurred in relation to particularly controversial projects in sensitive environments, or where good EIA practice had not been followed, from 'EIA- a study on costs and benefits'

<http://ec.europa.eu/environment/eia/eia-studies-and-reports/eia-costs-benefit-en.htm>

	place to protect any sensitive features such as archaeological sites or seagrass beds.
Oil & Gas	Licence application costs, including costs of assessment of environmental impact to consider impact on FOCI. Mitigation activities (such as pipeline routes, chemical release), may be required to avoid damage to these listed features, in the absence of MCZ designation.
Ports, harbours, Commercial shipping and disposal sites	Licence application costs, including costs of EIA to consider impact on FOCI. Mitigation (such as moving planned location, using different materials, seasonal restrictions) may be required to avoid damage to these features, in relation to port activities such as dredging, disposal, laying and maintenance of moorings and development/expansion.
Recreation	Management and best practice advice in relation to potentially damaging activities such as anchoring and wildlife watching. Specific management of activities in MPAs.
Renewable Energy	Licence application costs, including costs of EIA to consider impact on FOCI. Mitigation (such as adjusting planned cable routes, using different turbine foundations, seasonal restrictions on activity), may be required to avoid damage to these features.
<b>Impacted Public Sector</b>	<b>Description of baseline costs</b>
National Defence	Costs of adjusting electronic tools and charts and annual costs of maintaining to include EMS, SPAs, SSSIs, etc., in the absence of MCZs; Additional planning considerations for these sites.
Costs to public sector for marine management	Costs to MMO, IFCA to monitor existing protected features and sites, enforce requirements of Common Fisheries Policy (CFP) <sup>27</sup> and administration of the marine licensing process.
Ecological Surveys	SAC and SSSI monitoring; biodiversity monitoring to meet existing requirements under EU legislation.

<sup>27</sup>The **Common Fisheries Policy (CFP)** is the fisheries policy of the European Union (EU). <http://ec.europa.eu/fisheries/reform/>



## Stakeholder engagement process for MCZ designation

6.2 Box 3 below provides information on stakeholder engagement process for the MCZ designation. In most instances, the regional MCZ projects collected information from stakeholders about the level and type of human activity in each MCZ (or group of sites). This informed the identification of management scenarios and identification of possible and preferred management measures. The regional MCZ projects invited the regional stakeholder groups to comment on the management scenarios and management measures, and to make further suggestions. As part of the Regional Project process, method papers were developed with input from stakeholders for each sector<sup>28</sup>. These methodologies were also independently peer reviewed by academic experts.

**Box 3: The stakeholder engagement process followed to identify management scenarios and industry costs.**

- 1) The management scenarios that are employed in the analysis for the IA were identified using information about the sensitivity of species and habitats recommended for protection in each MCZ, as well as information about the level and type of human activities in each site collected from stakeholders<sup>29</sup>.
- 2) The management scenarios used in the IA were also informed by advice provided by JNCC and Natural England on the mitigation that is likely to be needed. This advice did not pre-judge the advice that JNCC and Natural England will provide (as statutory nature conservation advisers) for specific licence applications or for any future site-specific licensing decision. In collaboration with the relevant regulators, Natural England developed draft assumptions about the mitigation of impacts of certain licensed activities on features protected by MCZs that could be used for purposes of the MCZ impact assessment. This advice was peer reviewed by industry representatives.
- 3) Specialists in JNCC and Natural England provided site-specific advice on the mitigation that is likely to be needed for proposed plans and projects *that are not yet consented and could impact on MCZ features*. JNCC and Natural England also continued discussions with developers for some specific sites to try to alleviate their concerns e.g. Atlantic Array and the Potential Co-location Zone.
- 4) Economists in the regional MCZ projects collaboratively developed draft management scenarios that reflected the mitigation that was likely to be needed, based on the information provided in (1) and (2) above. Feedback on these was sought from Defra, the independent academic peer reviewers appointed by Defra, specialists in JNCC and Natural England and representatives of the sectors concerned. At the same time, the regional MCZ project economists also sought information on the likely costs of the scenarios from representatives of the different sectors
- 5) In providing feedback on the draft management scenarios, representatives of some sectors raised concerns that the scenarios under-estimated the costs of mitigation that will be required. To address the concern, a high cost management scenario was added to the IA for renewable energy to capture some of the concerns raised by developers. JNCC and Natural England advised that this scenario was very unlikely to arise and to reflect this the regional MCZ projects attributed a low probability to this scenario when calculating the best estimate. A high cost management scenario for ports and harbours was added to the IA to take account of some of the concerns raised by industry representatives. Based on advice from Natural England, the best estimate was calculated as being towards the upper end of the resultant range in costs. To incorporate some of the concerns about impacts on oil and gas extraction and production, sensitivity analysis was employed in the IA.
- 6) In addition, in order to ensure that the views of representatives of industry were captured in the IA, the regional MCZ project economists presented the representatives' concerns (summarised in the evidence base and details provided in the documents in Annex H) and worked with industry to develop an 'industry' scenario. For three sectors ((1) renewable energy, (2) oil and gas exploration and production and carbon capture and storage, and (3) ports & harbours only) these concerns involve costs that are substantially higher than the costs of the management scenarios employed in the IA. However, there was little evidence that such costs would be incurred – most were found to be existing costs and were not 'additional' costs. The consultation process was used to clarify their additionality.
- 7) For all scenarios, industry costs are used. It is the assumptions about management which differ which are appropriately informed by the SNCBs and regulator. The best estimate scenario for sectors was informed by an assessment of likelihood of whether the low or high cost scenarios were the more likely. The IA material, including cost estimates by government departments, JNCC, Natural England, stakeholder representatives on the regional MCZ project regional stakeholder groups, and independent experts in environmental economics appointed by Defra. The regional MCZ projects revised the material as appropriate to reflect feedback from the review. The consultation process will further test the estimates and the assumptions underpinning them.

<sup>28</sup> These are available at <http://publications.naturalengland.org.uk/publication/2071071?category=1730361>

- |  |
|--|
| <p>8) Where there was a potential for high unquantified costs Defra considered that the site should be subject to further assessment and clarification of costs before being considered for designation. Further work will be undertaken on cost estimates on these sites before there is any decision as to whether recommend their designation at a later stage.</p> <p>9) The costs estimates were tested during consultation and revised where relevant.</p> |
|--|

### **Costs to designate 28 MCZs (preferred option)**

6.3 The costs to designate 28 MCZs can be considered in the context of market failures in the marine environment discussed above paras 2.3 and 2.4. In particular, management measures to conserve features help address the problem that damage to the Marine environment is not always taken into account by users, individuals and businesses alike. In line with Green Book Guidance<sup>30</sup>, only *additional* costs and benefits due to MCZs are included – no costs which would have taken place in the absence of MCZs are included. Some features, not included for designation as an MCZ but are located inside the MCZ boundary, already have protection which is part of the baseline as discussed above (see figure 1). The costs and benefits relating to the protection of these features under current legislation are not included. The costs include only the costs flowing from the *additional* management which is required (and, as described below, the benefits include only the benefits flowing from the *additional* protection which is offered under MCZs – mainly broadscale habitats referred). Costs and benefits are only included in relation to features which will be designated in MCZs in 2013. If any **further features in these MCZ are proposed for protection in the future, they will be subject to a separate Impact Assessment.**

6.4 Impacts are assessed over a 20-year period. The costs and benefits from designation are long term in nature and hence a 20 year appraisal was considered appropriate (to suit the profile of impacts). Annex D provides a breakdown of the costs each year and it shows that the majority repeat annually or periodically beyond 10 years; meaning a shorter appraisal period would omit several significant industry impacts (e.g. the 15 year license renewal assumption for aggregates). Furthermore, the regional projects which informed this impact assessment and engaged with stakeholders used a 20 year appraisal period meaning the same timeframe is required for consistency.

6.5 With regard to benefits, both studies used to inform this IA (RPA, 2013 & Kenter et al. 2013) also assess over a 20 year period. Due to the nature of ecosystem service processes, many significant benefits from designation (i.e. improvement in the condition of a feature if currently unfavourable) will not be realised until beyond 10 years, particularly within the marine environment. Therefore 10 years would not capture the full extent of recreational benefits to tourists, anglers and divers and non-use values to the wider public as many features would still be recovering or may have no improvement at all due to time lags. Monetised benefits, despite large uncertainties, are better represented over a 20 year appraisal period and especially when compared to costs for the reasons described in 6.4.

6.6 While the MCZ designations can reasonably be expected to generate costs and substantial benefits beyond 20 years, uncertainty beyond this point makes further analysis challenging. All values are presented as real values in 2010 prices unless otherwise stated and projected values are given in constant prices. The present value of the costs and benefits has been calculated using a discount rate of 3.5% as per Treasury Green Book guidance.

---

<sup>29</sup> Information on the sensitivity of MCZ features to human activities was provided through research commissioned by Defra .

The regional MCZ projects then undertook vulnerability assessments that were informed by the research and other best available data .

<sup>30</sup> <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

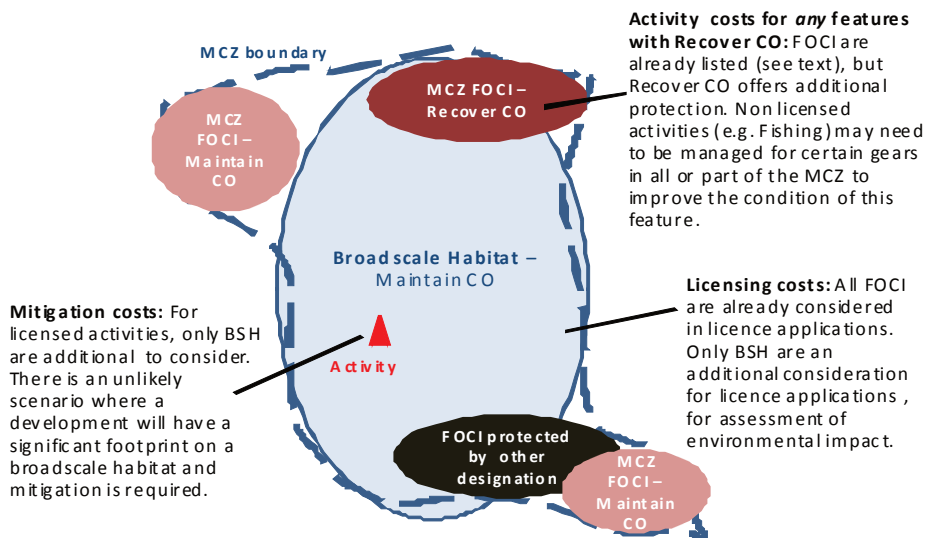


Figure 2: Illustrative MCZ and features with designation

6.7 The costs of preferred option can be split into 3 broad categories

- 1) **Activities where limited or no additional mitigation is required due to MCZs**, but there are additional costs of obtaining a license, for the assessment of environmental impact on BSH. This includes aggregate extraction, navigational dredging and disposal sites, oil and gas-related activities, port and harbour developments, and renewable energy developments. The operator has to apply for a licence (to the MMO, DECC etc.) in order to carry out the activity.

In the low cost scenario, no *additional* mitigation is required for these sectors since the majority of MCZ features must already be considered in an assessment of environmental impact for license applications. The additional features, not already considered in licence applications, are mainly BSH. Based on current knowledge, offshore BSH tend to be larger and therefore the relative size of the footprint of any sector activities is likely to be low. This means that no changes to the *activity itself* or the location is likely to be necessary for these sites. However, the size of inshore BSH are more varied which means that the relative size of the footprint may be larger – this is very site specific and has been assessed on a case by case basis when relevant to do so. This means that, for some sites, another scenario is included which estimates potential costs of mitigation was required for these BSH. This is described below.

- 2) **Activity where management will be necessary:** The main sectors which will have to change their activities due to designation of MCZs are fisheries and recreation, since other sectors are already required to mitigate impact on MCZ features of conservation protected on BAP, OSPAR and Wildlife and Countryside Act (WCA) lists, explained below. Management of activities for fisheries and recreation will be put in place by the regulatory authorities after designation<sup>31</sup>. These will be determined on a site-by-site basis, considering what is required (based on advice from the SNCBs) to meet a specific site's conservation objectives. For example, a particular gear type may be shown to damage a feature, and so this gear type may be managed over the specific area of the feature in order to 'recover' the feature to favourable condition. Management measures will be drawn up separately and put in place once sites are formally designated, therefore this IA assesses costs based on the most likely management scenarios, informed by advice from NE and JNCC and relevant stakeholders over the 2 year stakeholder project. A range of costs is given to account for uncertainty and a best estimate is given. Site-specific scenarios for management and the resulting costs are described in Table 3, Table 4 and Annex A (latter provides the fisheries management scenarios).

<sup>31</sup> Each management option will consider all alternatives to regulation through local discussion. Where regulatory measures will be used, there will be consultations on a site by site basis, where stakeholders will have a chance to comment. Regulatory measures will be subject to an Impact Assessment.

As described above, for sectors beyond fisheries and recreation some mitigation may be required, which has been assessed on a case-by-case-basis. In situations where the low probably, high cost, scenario does occur and results in mitigation costs that are prohibitively expensive (relevant for all licence applications), the MCAA (2009) Public Benefit Test will apply<sup>32</sup> – that is, the MMO will determine whether the benefit to the public of proceeding with the proposed development clearly outweighs the risk of damage to the environment that will be created by proceeding with it<sup>33</sup>. To be clear, this means that if the cost to society (from not proceeding with the licensed activity) outweighs the ecological cost (of proceeding with the activity measured in terms of market failures), it is unlikely that the activity will be restricted.

**3) Public sector costs** – There are potential costs to the Environment Agency (EA), for additional monitoring relating to Flood and Coastal erosion Risk Management (FCERM), and to the Ministry of Defence (MoD). In addition, there are costs to IFCA's, the MMO and other regulators for MCZ management, monitoring and enforcement, as well as the costs to Defra of ecological surveys. These are not included in the Estimated Annual Net Costs to Business (EANCB) figures.

6.8 The costs analysis in the IA has benefitted from an extensive consultation process for all sites considered and for all sectors affected as discussed above. This has resulted in costs being assessed on a very detailed basis, with assumptions often varying by site. Accordingly costs are presented at differing levels of aggregation as follows:

- Table 3 provides a high level overview of the costs by sector of designating 28 sites
- Table 4 presents a detailed summary of the *key* assumptions, methodology, scenarios (high and low cost) and non-monetised costs for each sector.
- Changes to the costs following consultation are discussed in paragraphs 6.10 to 6.33
- Annex D presents *detailed* cost tables and calculations for the 20 year period covered by the IA. This includes the best, low and high cost estimates by business sector.

<b>Table 3: Summary of additional costs for designating 28 MCZs</b>			
Full assumptions and the cost estimates for each sector are provided in Table 4			
<b>Impacted Private Sector</b>	<b>Best Estimate Cost £m/yr (low - high)</b>	<b>Best estimate PV Costs £m (low -high)</b>	<b>Description of Costs</b>
Aggregate extraction	<b>0.02m/yr (0.02-1.03)</b>	0.25m (0.25 – 15.4)	Licence application costs, to collect more information on impact on designated features <sup>34</sup> . Mitigation required under high cost scenario for site Kingmere - a three-month closure of marine aggregate extraction during the Black bream nesting period in the MCZ. Additional costs to British Marine Aggregate Producers Association (BMAPA).
Aquaculture	<b>0.006 (0-0.02)</b> <i>No costs in the Consultation IA</i>	0.09m (0 – 0.35)	Cost of MCZ under high cost scenario is based on 'compulsory use of triploid stock' and all pacific oyster production stops. The best estimate is 25 <sup>th</sup> Percentile of high cost scenario as risk of implementing high cost scenario is low.

<sup>32</sup> See s.126(7)(b) and (c) and the MMO's assessment process for MCZ licence applications- <http://www.marinemangement.org.uk/licensing/documents/guidance/13.pdf>

<sup>33</sup> and, if so, the applicant can satisfy the MMO that they will undertake or make arrangements for the undertaking of measures of equivalent environmental benefit to the damage which the act will or is likely to have in or on the MCZ. To weigh up societal and ecological costs, the MMO will use information supplied by the applicant with the licence application, advice from the SNCBs, other Government Departments, Local Authorities, Local Enterprise Partnership, the Marine and Coastguard Agency and others where appropriate.

<sup>34</sup> Considering impacts on BAP and OSPAR features as well as broadscale habitats in licence application since the BMAPAs new BAP process has come about as a result of the MCZ process, see Annex H2 for further explanation.

			See para 6.2
Cables	<b>0.002m/yr (0.001-0.003)<sup>35</sup></b>	0.03 (0.01-0.04)	Licence application costs for future developments, to collect more information of impact on BSH. Mitigation costs are very unlikely, since the footprint of cables is anticipated to be small compared to the extent of BSH, especially in offshore sites.
Coastal Development	<b>Non-monetised</b>	<b>Non-monetised</b>	Additional un-monetised costs although unlikely for MCZs in Blackwater, Crouch, Roach and Colne Estuaries, Medway Estuary and Cumbria coast, detailed in table 4.
Commercial Fisheries	<b>0.25m/yr (0.005-2.6)</b>  <i>Consultation estimates 0.005-2.04 best estimate 0.2</i>	<b>3.7m (0.07m-37.7m)</b>	Site and gear specific restrictions on fishing activities, for example restricting trawling in specific sections of an MCZ, where a particular feature is present. Costs are the best estimate of the range of management scenarios, with an assumption of 75% displacement, discussed below. These are calculated as loss in Gross Value Added (GVA), as for all sectors <sup>36</sup> . High scenario includes sensitivity of loss of <i>all</i> affected fishing GVA.
Historic Environment	<b>Not possible to monetise</b>	<b>Not possible to monetise</b>	Licence application costs, to collect more information on impact on designated features. Site-specific potential non-monetised cost – where potential intrusive archaeological activity could be restricted where anchoring restrictions in place.
Oil & Gas (including carbon capture storage at sea)	<b>0.05 (0.04- 0.07)</b>  <i>Consultation estimates<sup>37</sup> 0.05 (0.04-0.06)</i>	0.83 (0.6 - 1.07)	Licence application costs for future developments, to collect more information specifically of impact on BSH. Mitigation costs for future developments are very unlikely, since the footprint of oil & gas is likely to be small compared to the extent of BSH, especially in offshore sites. However, since there is uncertainty in the location of future developments, there remains an additional unlikely un-monetised cost.
Ports, harbours, Commercial shipping and disposal sites	<b>0.1m/yr (0.04 – 0.1)</b>  <i>Consultation estimates 0.07-0.18 best estimate 1.8</i>	2m (0.6 – 2.05)	Licence application costs for future applications to collect more information of impact on BSH. Some mitigation of activities is required on a site-by-site basis, including dredging, disposal at sea, maintenance, described in table 4. It is only possible to monetise costs where development plans are known. Unknown potential future costs have been minimised by changing MCZ boundaries to exclude costs where possible <sup>38</sup>
Recreation	<b>No monetised costs</b>	<b>No monetised costs</b>	Likely to be costs to sector arising from managing potential pressure (on subtidal mud) from increased anchoring outside the harbour area in MCZ site Torbay. Impacts have not been quantified due to uncertainty on the management required. Please see para 6.27.
Renewable	<b>0.09</b>	1.4m	Licence application costs for future

<sup>35</sup> As only two inshore sites have been dropped (Hilbre Island and Stour and Orwell) the changes in costs due to scaling down is very minor and not reflected in the estimates presented

<sup>36</sup> Gross value added, i.e. revenue minus costs associated with the activity

<sup>37</sup> During consultation errors were spotted during calculation of estimates which have been amended in this version. This has resulted in a minor change in costs.

<sup>38</sup> This has taken place for Beachy Head West, as well as Padstow Bay and Surrounds..



Energy	<b>(0.003-0.6)</b>	(0.05 -8.9)	developments, to collect more information specifically of impact on BSH. An unlikely high cost scenario describes additional mitigation of giving cables alternative methods of protection. As above, mitigation costs for future developments are very unlikely, since the footprint of renewable development is likely to be small compared to the extent of BSH, especially in offshore sites. However, since there is uncertainty in the location of future developments, this remains an unlikely un-monetised cost.
<b>Total annual and PV costs to private sector</b>	<b>0.5m/yr</b>	<b>8.3m (1.6 – 65.5) PV 2013 base year; 2010 prices</b>	EANCB figure <sup>39</sup> Best estimate figure is used for the EANCB (converted to 2009 prices and 2010 base year). These only reflect the costs as the benefits have not been monetised.
<b>Impacted Public Sector</b>	<b>Cost £m/yr (low-high)</b>	<b>PV cost £m (low-high)</b>	<b>Description of Costs</b>
Environment Agency (for FCERM)	<b>0.001m/yr</b>	0.01m	Licence application costs to Environment Agency for any future developments – additional costs to consider impact on broadscale habitats; plus one off cost for additional monitoring in Beachy Head West.
National Defence	<b>0.008m/yr<sup>40</sup></b>	0.12m	Costs of adjusting electronic tools and charts and annual costs of maintaining; Additional planning considerations
Costs to public sector of managing MCZs	<b>0.59m/yr (0.58 - 0.6)</b> <i>Consultation estimates 0.8–0.9 (0.8)</i>	8.7m (8.6 - 8.8)	Costs to MMO, IFCA and Defra for enforcing management measures.
Ecological Surveys	1.1m/yr (1.1 -1.9)	15.6m (15.6-28.2)	Costs of baseline surveys and costs of monitoring to JNCC and NE.
<b>Annual and PV costs to public sector</b>	<b>1.7m/yr</b>	24.4m (24.3 – 37.1)	
<b>Overall annual and PV costs</b>	<b>2.2m/yr (1.8 -7)</b>	32.7m (25.9 – 102.6)	Annualised total costs for public and private sector
Notes:			
<ul style="list-style-type: none"> <li>Costs unchanged from consultation unless specified.</li> <li>The annual costs (m/yr) for each sectors (including public costs) are total costs (transition plus annual) averaged of the 20 year period (2013 to 2032), presented in 2010 prices. The EANCB figure of 0.5m/yr is calculated by converting the figures to 2009 prices and 2010 base year.</li> </ul>			

6.9 The difference in these costs from the consultation IA are summarised below, in paras 6.10 to 6.33.

<sup>39</sup> Calculated on a calendar year basis, as per guidance.

<sup>40</sup> Costs have been scaled down as fewer sites designated (28 vs 31) but this has had minimal impact on costs.





**Table 4: Additional Costs<sup>1</sup> of Marine Conservation Zones**

Private Sector	Methodology, assumptions and sources	Best estimate scenario	Low / High cost scenarios	Non monetised costs
Aggregate extraction	<p>Aggregate extraction in or near MCZs mapped. Consultation with industry and British Marine Aggregates Producers Association (BMAPA) during Regional Project Process provided cost estimates for licence applications and mitigation, including proportion of consultancy fees (external costs) as well as developer time (internal cost, including overheads). The additional cost to a license application is estimated to be £27k.</p> <p><i>Confidence: Costs provided by industry. BMAPA is content for scenario 1 to be used as the best estimate.</i></p>	<p><b>£0.02m/yr</b></p> <p><b>Licence applications</b> within 1km of an MCZ (5 applications) need to assess potential impact (at additional one-off additional cost of £0.027m each), each licences renewed after 15 years. 3 applications*£0.027m occurring in year 2019 and 2 applications*£0.27m in 2027</p> <p>Cost of £0.010m/yr to BMAPA to provide information that operators can use for these assessments, baseline report in year 1 plus annual biodiversity action plan report in subsequent years.</p>	<p><b>£0.02m/yr - £1.03m/yr</b></p> <p>Sensitivity around number of licence applications and mitigation requirements.</p> <p><b>Low cost: As best estimate</b></p> <p><b>High cost:</b> In addition to best estimate, additional costs for <i>all future</i> licence applications in project areas (irrespective of distance from MCZ- estimated to be 140). 70 licences for existing production licence area renewed once over 20 years.</p> <p>High scenario of mitigation for one MCZ (Kingmere): a three-month closure of marine aggregate extraction during the Black bream nesting period in the MCZ. Costs of £0.831m - provided by BMAPA.</p>	<p>Possible mitigation costs on future licence applications in new areas (strategic resource areas). Location of future licence application in relation to MCZs not known so not possible to assess distance in relation to MCZs.</p>
Aquaculture	<p>Aquaculture activity in and near each proposed MCZ mapped during the Regional Project Process.</p>	<p><b>£0.006m/yr</b></p> <p>During consultation it was noted that there is a risk that possible management of aquaculture is required for site Upper Fowey Pont Pill. <b>The best estimate is 25%</b> of the high scenario cost of (compulsory use of triploid stock for the aquaculture business operating in this MCZ). It was advised that use of triploid stock is very unlikely so best estimates are based on 25% of high cost rather than 50%. See para 6.2 for more information.</p>	<p><b>£0m/yr - £0.02m/yr</b></p> <p><b>Low cost scenario</b> – No costs as no management is required</p> <p><b>High cost scenario</b> - Cost of MCZ under high cost scenario is based on 'compulsory use of triploid stock'. The management scenario assumed to equate to value of pacific oyster production (i.e. all pacific oyster production stops). The loss in GVA is estimated to be 0.24K every year over the 20 year period (Based on estimate of 10 tonnes pacific oyster each year based on Cefas (2010) report<sup>2</sup>, £4.30/kg)</p>	<p>None</p>
Cables	<p>Existing cables and known future cable routes mapped.</p>	<p><b>£0.002m/yr</b></p> <p>Existing or operational cables will not be impacted upon by MCZs.</p>	<p><b>£0.001m/yr - £0.003m/yr</b></p> <p>Sensitivity around number of licence applications over 20 years</p>	<p>There are potential significant</p>

<sup>1</sup> These costs are additional to the baseline (i.e. attributable to MCZs) and represent full financial costs (includes wages, overheads and NI)

<sup>2</sup> <http://cefas.defra.gov.uk/media/546232/final%20fowey%20sanitary%20survey%20report%202010.pdf>

	<p>Assumes additional cost to an operator of assessing impacts of future cable installation on broad-scale habitats protected by a MCZ. Since the location of future cable routes are not known, the number of potential licence applications were calculated on a regional basis for all MCZs and scaled down proportionally for the sites in the preferred option. Increased cost to operator of additional assessment of environmental impact upon MCZ features (broad-scale habitats only) for one licence application for one future cable installation is <b>estimated to be £10K</b>. Cost estimates provided by industry, at their discretion for inclusion of internal and external costs.</p> <p><b>Confidence:</b> UKCPC confirmed it is content with assumptions and provided cost estimates (pers. comm., 2011).</p>	<p>4 Licence applications in each years of 2017, 2022, 2027 and 2032 (<b>total 16 licences over 20 years</b>)<sup>3</sup> for the 99 inshore sites initially proposed by the Regional Project process. This was scaled down proportionally for the 24 inshore sites in the preferred option, resulting in costs of £0.01m in each of the above mentioned years,</p>	<p><b>Low cost scenario:</b> 2 licence applications in each year of 2017, 2022,2027 and 2032 (<b>total of 8 licenses over 20 years</b>) for 99 sites, This gives one off costs of £5K for each of the four years above (99 sites). This was scaled down resulting in costs of £0.005m in each of the above mentioned years. <b>High cost scenario:</b> 6 licence applications each year of 2017, 2022,2027 and 2032 (<b>total of 24 licenses over 20 years</b>). This gives one off costs of 15k for each of the years (for 99 sites). The costs are scaled resulting in costs of £0.015m in each of the above mentioned years.</p>	<p>unknown costs if cables passing within 12nm of the English coastline are required to install alternative types of cable protection at an additional cost, in order to protect MCZ features. However, Natural England (pers. comm., 2012) has said that such costs are very unlikely.</p>
Coastal Development	<p>There are two known proposed coastal developments within 1km of two MCZs, the Bradwell Nuclear Power Station (Blackwater, Crouch, Roach and Colne Estuary MCZ) and a marine landing facility planned at the new nuclear power station development at Sellafield in Cumbrian Coast MCZ. There are no other known coastal developments planned in the vicinity of any other MCZ (except port and harbour developments below).</p>	<p><b>No impact</b> anticipated on Sellafield's operations<sup>4</sup>. <b>Potential cost</b> to Bradwell Nuclear Power Station but subject to uncertainty as detailed proposals are not yet known.</p>	N/A	<p>Not possible to monetise as details of proposals not known in Blackwater, Crouch, Roach and Colne Estuary.</p>
Commercial Fisheries	<p>Fishing activity in each MCZ from MCZ fisheries Model, see, Annex H7<sup>5</sup>. Value of Landing information provided in the consultation was verified and in some instances replaces modelled values. <b>Costs are due to management of some fishing activities.</b> Gear types affected and management required are specific to the <b>site and the feature which the MCZ</b> is designated to protect. Management scenarios for each MCZ are summarised in <b>Annex A</b>. Costs are measured as loss in GVA i.e. the value of</p>	<p><b>£0.25m/yr</b></p> <p>Best estimate for each gear type is either the mid-point or 25% of the range of management scenarios (detailed in <b>Annex A</b>).</p> <p>For gears which were a primary reason for unfavourable feature condition in an MCZ, the best estimate is the 50<sup>th</sup> percentile i.e. the mid-point of the range of</p>	<p><b>£0.005m/yr - £2.6m/yr</b></p> <p>A range of management scenarios and displacement assumptions included: <b>Scenario 1:</b> Lowest potential management scenario. Assume 25% of value affected is lost. <b>Scenario 2,3 etc:</b> Highest potential management scenario, with no displacement of fishing to other areas, <i>i.e.</i> 100% of overlapping</p>	<p>Social and economic impacts on local communities from effects on fisheries; indirect impacts to processors etc of any reduced catch.</p>

<sup>3</sup> 16 licence applications for cables (either power or telecom) will be submitted over the 20-year period of the IA (4 in each regional MCZ project area within 12nm, 1 one in each regional MCZ project area at the end of each 5-year period). This is for the 99 inshore sites of the 127 sites recommended

<sup>4</sup> Based on the experience with the temporary landing facility that is already consented, Natural England feels that the permanent facility is unlikely to affect construction significantly and incur a significant cost (Natural England, pers. comm., 2011). This is because impact upon the MCZ features in the vicinity of the proposed facility are considered anyway. Therefore, MCZ 11 Cumbrian Coast will not impact on Sellafield's operations.

<sup>5</sup> <http://publications.naturalengland.org.uk/publication/1940011>

	<p>landings associated with the relevant area of fishing grounds, minus costs associated with these landings.</p> <p>The default of 75% displacement (and 25% loss) of fishing activity is based on low overlap of the MCZs with core fishing grounds. This assumption was updated for site Stour and Orwell where displacement was expected to be less but the site has been removed from 28 sites designated.</p> <p><b>Confidence:</b> <i>Medium, Sites with high, uncertain costs to non-UK fleets have been excluded from this preferred option. Figures for displacement and fleet earnings have been updated with consultation responses.</i></p>	<p>management scenarios. For gears which were not the primary reason, the best estimate is the 25<sup>th</sup> percentile i.e. a the lower end of the range of management scenarios.</p>	<p><i>fishing GVA is lost</i></p>	
Historic Environment	<p>Archaeological data sourced from numerous locations including consultation responses provided locations of currently designated sites and recorded finds. Mapped against MCZs. Archaeological surface recovery of artefacts and full site excavations will be prohibited in MCZs with exposed peat and clay beds with a 'recover' conservation objective. Diver trails, visitors and non-intrusive surveys will be unaffected in MCZs. Vessels can no longer anchor over sensitive features such as seagrass beds</p>	<p><b>No impact possible to monetise.</b></p> <p>Only restrictions in this tranche are in MCZs with peat and clay beds as listed features and areas where vessel anchoring may be restricted (see column 'non-monetised costs')</p>	N/A	<p>There are sites of historic or archaeological interest in all 28 MCZs. Further impacts upon intrusive archaeological activity in MCZs could arise if, eg. vessels can no longer anchor over sensitive features such as seagrass beds (Natural England, pers. comm., 2011). It is not possible to quantify this as it is not known where intrusive archaeological activity may occur in the next 20 years The MCAA 'Public Benefit Test' will apply to all licence applications in a manner appropriate and proportionate to a sites' historical or archaeological significance.</p>
Oil & Gas & other energy (including carbon capture and storage (CCS) at sea)	<p>Current activity mapped (including 26<sup>th</sup> and 27<sup>th</sup> Rounds) and potential future oil &amp; gas developments assessed in each MCZ project area. Additional costs for licence application resulting in increased developer time (internal costs, including overheads) and external costs for additional assessment of environmental impact. Estimates provided by industry representatives, split at the discretion of industry between external consultant costs and internal time.</p>	<p><b>£0.05m/yr</b></p> <p>For blocks in the 26<sup>th</sup> round, total estimated future licence application is 131 in 2013 and 311 in 2022 . There are an estimated additional 123 licence applications over the 20 year period (all in 2022) representing the additional areas for oil and gas extraction in the 27<sup>th</sup> round.</p> <p>Estimated application for CCS is 20</p>	<p><b>£0.04m/yr - £0.07m/yr</b></p> <p><b>Assumptions the same for best-estimate apart from the number of future licence applications in the 26<sup>th</sup> Round advised by DECC</b></p> <p><b>Low cost scenario:</b> Oil&amp; Gas: Number of future licence applications in blocks in the 26th Round with a 'significant discovery' or 'fallow block with discovery' 25% lower than best</p>	<p>The possibility of additional mitigation costs due to MCZs is not quantified in the IA due to the uncertainty about whether they could arise, and if so, where and to what degree. Additional mitigation costs could be incurred for future oil and gas installations if, for example, the footprint of the broad-scale habitat is small. However, the JNCC and Natural England advise that this is</p>

<sup>6</sup> DECC advise that it is unlikely that all of the costs incurred to the oil & gas sector (including CCS) are due to all rMCZs recommended (127 sites). Therefore, it is assumed that the costs to the sector stay the same but are incurred due to 52 and 72 rMCZs that are identified to be the nearest environmentally sensitive area to all blocks 'potentially awarded' in the 26th Round and 'on offer' in 27th round respectively.

	<p>Please see Annex D for the profile of undiscounted costs and further detail on the calculation of costs.</p> <p><b>Confidence:</b> DECC, Oil &amp; Gas UK and CCSA are content with assumptions of future licence numbers and additional costs.</p>	<p>over 20 years. Estimated license application for decommissioning is 88 over 20 years.</p> <p>Costs were calculated based on phases of the application process (for 26<sup>th</sup> round, 27<sup>th</sup> round and CCS) for all four regions<sup>6</sup>. The costs were then scaled down based on the proportion of 127 MCZs that are a) the nearest environmentally sensitive area to blocks 'potentially awarded' in the 26<sup>th</sup> Round and 27<sup>th</sup> round and that are b) included in the 28 MCZs.</p> <p>Please see Annex D with cost breakdown and further detail on calculations.</p>	<p>estimate. 50% less for remaining blocks.</p> <p><b>High cost scenario:</b> Oil&amp; Gas: Future licence numbers 25% higher than that used for the best estimate for those with 'significant discovery or fallow block with discovery'. 50% higher for remaining blocks.</p> <p>Costs were scaled down as per best estimate. Please see Annex D with cost breakdown and further detail on calculations.</p>	<p>very unlikely as the footprint of broad-scale habitat offshore is mostly very large. This remains as an unlikely unmonetised cost.</p>
<p>Ports, Harbours, Commercial shipping and disposal sites</p>	<p>Current activity mapped (i.e. ports, harbours, disposal sites and navigational dredges). Details of known proposed future developments reviewed. Additional one-off cost of £6750 per future licence applications (to consider potential impacts on broadscale habitats). Estimates provided by industry. This includes external costs for consultants (based on the average of two estimates from two UK environmental consultancy firms).</p> <p>Please see Annex D for further information on cost estimates and calculations.</p> <p><b>Confidence:</b> Due to the amendments in site boundaries (to exclude areas with potential developments), many potential future (unknown) costs are removed and there is greater confidence in the costs to this sector.</p>	<p><b>£0.1m/yr</b></p> <p>Best estimate is the midpoint of the low and high estimates in high cost scenario.</p>	<p><b>£0.04m/yr - £0.1 m/yr</b></p> <p><b>Sensitivity around licence application numbers and mitigation requirements.</b></p> <p><b>Low cost scenario:</b> Licence applications required within 1km of MCZ (navigational dredging, disposal and future port developments) incur additional one-off cost of £6750.</p> <p><b>High cost scenario:</b> Licence applications within 5km – including all future applications. It also includes incorporating MCZ features into existing / planned Maintenance Dredging Protocols<sup>7</sup>. (for navigational dredging only). Annex D for information on the assumption around MDPs. Site-specific mitigation costs were advised by Natural England. This scenario presents a low and high estimate (please see annex D for more information).</p>	<p>One-off costs to vessels to purchase updated charts and Sailing Directions with MCZ locations and management requirements has not been possible to monetise. There is not enough information of potential future developments (other than current proposals), to incorporate site-specific assumptions and so these remain as an unquantified cost.</p> <p>Additional costs to UK Hydrographic Office (UKHO), MCA and mariners to update/purchase charts with MCZs. Not possible to quantify due to considerable uncertainty.</p>

<sup>7</sup> A Maintenance Dredging Protocol (MDP) comprises a baseline document that describes all current maintenance dredging and establishes a baseline against which new applications are assessed in the context of the Habitats Directive (JNCC and Natural England, 2011a). MDPs potentially present cost savings to the ports and harbour sector in the longer term as they are able to undertake the assessment of environmental impact for a number of future licence applications for navigational maintenance dredges using the same baseline data. See method paper H12 <http://publications.naturalengland.org.uk/publication/1940011> for information on MDPs.

Recreation	Recreation activity in and near each MCZ was mapped as part of the Regional Project process, alongside vulnerability assessments of the sensitivity of features to the activities taking place.	<b>No monetised costs</b> Management scenarios for most MCZs are expected to have a negligible / no costs. Levels of the activity are low, alternative locations are available and the mitigation can be (or is already) provided through adoption of good practice (which should be adopted and existing codes of conduct	N/A	In some instances it was not possible to obtain sufficient information about potentially damaging activities on which to establish potential management scenarios (site Torbay).
Renewable Energy	<p>Existing and planned activity mapped against MCZs. DECC provided information of potential future developments within the next 20years. There are additional costs for licence applications for developments near MCZs, to assess the impact on MCZ broadscale habitats.</p> <p>There is a planned wind farm cable route through Blackwater, Crouch, Roach and Colne, as well as potential tidal and wave developments in South Dorset, Padstow and Surrounds and Isles of Scilly. An unlikely Scenario 2 assumes site specific mitigation costs (that these yet-to-be consented cables may need alternative methods of protection), with costs provided by developers.</p> <p><i>MCZs which are considered likely for future developments (i.e. with high, uncertain costs) have been excluded from this tranche.</i></p>	<p><b>£0.09m/yr</b></p> <p>For Wave and Tidal there are 3 licences for 3 sites over 20 years. For Wind energy there is 1 licence over 20 years. There are also potential additional costs for protection of cables (mitigation).</p> <p>The best estimate is 15% of additional mitigation costs in High cost scenario plus 100% of additional assessment costs (for both wind and wave and tidal). Site-specific costs provided by developers have been used where possible in order to account for the differences in renewable energy developers. <i>Industry and SNCBs consider mitigation under high cost scenario less likely and hence 15% assumption.</i></p>	<p><b>£0.003m/yr - £0.6m/yr</b></p> <p><b>Sensitivity around requirement for mitigation costs.</b></p> <p><b>Low cost scenario:</b> Additional assessment costs for licence applications, considering broad-scale habitats<sup>8</sup>. For Wave and Tidal there are 3 licences for 3 sites over 20 years. For Wind energy there is 1 licence over 20 years. No additional mitigation costs.</p> <p><b>High cost scenario:</b> In addition to additional costs for licence application (same as scenario 1 and best estimate) this scenario also includes site-specific mitigation costs: yet-to-be consented cables may need alternative methods of protection. See Annex H14<sup>9</sup> for full information <i>Industry and SNCBs consider this scenario to be less likely.</i></p>	<p>There is uncertainty around future licence applications within the 20 year period of this IA. <i>MCZs which are considered likely for future developments (i.e. with high, uncertain costs) have been excluded from this tranche.</i></p> <p>Sites which are considered likely for future developments within the next 20 years are excluded from this tranche.</p>
<b>Public Sector</b>	<b>Methodology, assumptions and sources</b>	<b>Best estimate scenario</b>	<b>Low / High cost scenarios</b>	<b>Non monetised costs</b>
Flood and coastal erosion risk management	MCZs assessed in relation to proposals in Shoreline Management Plans (SMPs). Based on advice from Natural England and the Environment Agency. Cost will be incurred by the Environment Agency.	<b>£0.001m/yr</b> This includes additional costs for licence applications and Beachy Head West – one off cost for additional monitoring of £0.010m. No additional	No sensitivity	None.

<sup>8</sup> Costs were assumed to incur to developments (existing or planned) in close proximity to rMCZs.

<sup>9</sup> <http://publications.naturalengland.org.uk/publication/1940011>



	<b>Confidence:</b> Costs provided by EA, who will incur costs.	mitigation costs are anticipated to impact tranche MCZs.		
National Defence	National Defence activity in and near to all potential MCZs assessed. Costs provided by MoD. <b>Confidence:</b> Anticipated costs are generic and may differ depending on the scale and nature of the military activities in each MCZ.	<b>£0.008m/yr</b> Costs provided by MoD. One-off cost of adjusting electronic tools and charts (£0.025m) and annual costs of maintaining (to ensure that MCZs are featured in planning for operations/ training) – of £0.015m/yr in the first 4 years, reducing to £0.010m/yr thereafter; Costs of additional planning considerations.  Costs scaled down for 28 sites (to 22%) as the costs applied for all the 127 sites	No sensitivity	The IA does not estimate the cumulative costs to MoD of impacts, on activities occurring in more than one MCZ, or activities being impacted on by more than one MCZ, due to lack of information about what MoD activities would take place and where and what they would comprise.
Costs to public sector of managing MCZs	Costs provided by local authorities, landowners, IFCA, MMO and Defra. For both options, only the cost of enforcement/surveillance of MCZ management measures is included in the headline figures in the IA Summary (i.e. excluding implementation costs). <b>Confidence:</b> Estimates don't take account of possible cost savings of introducing one management measure that covers multiple MCZs or risk based prioritisation of monitoring.	<b>£0.59m/yr</b> Best estimate is the midpoint of the high and low cost scenarios.	<b>£0.58m/yr - £0.6m/yr</b> <b>Sensitivity around management.</b> <b>Low cost scenario:</b> looks at both non-regulatory and regulatory management measures. <b>High cost scenario:</b> only regulatory management measures for all MCZs. Both assume that only regulatory measures will be implemented in MCZs outside 12nm for recreation (including recreational angling) and commercial fisheries outside 6nm. This is because it is assumed it is impractical to implement non-regulatory measures such as voluntary agreements outside these limits	Costs to the public sector to inform users of the marine environment about MCZs.

Ecological Surveys	Annual costs to public sector for ecological surveys for baseline surveys and monitoring only. Costs for offshore sites based on similar surveys and provided by JNCC. Costs for inshore sites based on cost estimates provided by Natural England and applied to number of features in each site.  <b>Confidence:</b> costs provided by NE and JNCC based on previous experience of similar surveys, however there is still uncertainty in the level of detail and monitoring which will be required.	<b>£1.1m/yr</b> Best estimate is the low scenario as it is considered most likely as an outcome by JNCC and Natural England.	<b>£1.1m/yr - £1.9m/yr</b> <b>Sensitivity around overlap with European SACs/SPAs to combine survey resources. Applies to inshore sites only. Offshore costs same for both scenarios.</b> <b>Low cost scenario:</b> Assumes 50% of inshore overlap with European SCAs/SPAs, based on the overlap with European sites. This reduces the cost of baseline surveys. <b>High cost scenario:</b> assumes that there is no overlap with SACs/SPAs	
<b>Non-UK</b>	<b>Methodology and sources</b>	<b>Best estimate scenario</b>	<b>Low / High cost scenarios</b>	<b>Non monetised costs</b>
Non-UK commercial fisheries vessels	Figures for non-UK vessels were gathered in the Regional Projects Process. Values of landings for non-UK fleets arising from within the suite of rMCZs were provided to the regional MCZ projects only for French fleets, and these data are separated into two categories only, mobile and static gears. Further landings information was provided in response to the consultation. These are not included in the summary figures or the EANCB calculation, but informed the site selection decision. Sites with unknown, potentially high costs to non-UK vessels have been excluded from the preferred option.	Best estimate considers the GVA loss, consistent with assumptions for UK commercial vessels.		It has not been possible to make a quantitative estimate of the impact of MCZs on non-UK fleets (beyond French fleets) as was the case for the UK fishing industry. However, sites with potentially large, unmonetised costs were excluded from the options for designation in 2013.
Notes: All assumptions reached through consultation with industry representatives during the Regional Project Process. Assessment of activities in and near each proposed MCZ was undertaken to enable site-specific assessments where appropriate. Regional project methodology documents, which underlie these assumptions and costs, were externally peer reviewed <sup>10</sup> . The consultation called for further information on these assumptions. Changes from consultation assumptions and activity information have been highlighted in the IA.				

<sup>10</sup> <http://publications.naturalengland.org.uk/publication/1940011>

## **Costs amendment based on consultation responses**

- 6.10 All consultation responses have been analysed and considered to inform this revised final IA and as a result, many cost assumptions and final estimates have been amended. The summary of responses to consultation was published<sup>1</sup>.
- 6.11 Some consultation responses on costs have *not* changed the final figures for the IA. Principally this was when the consultation response provided information that:
- (i) was not *additional* to the information already available through the Regional MCZ Projects, used to inform the consultation IA,
  - (ii) was not relating to activities which were impacted (i.e. where responses provided further baseline information of activities which will *not* be affected by MCZs)
  - (iii) referred to costs already included in the baseline, from existing requirements, such as Water Framework Directive (WFD) or existing marine protections, and not additional costs due to MCZs.
- 6.12 40,632 responses were recorded, with over 95% in support of MCZs. The Government response to the consultation illustrates the breakdown of responses from sectors and organisations, as well as an overview of the main concerns raised following a designation of 28 versus 31 sites the total costs for each sector has decreased with fewer sites being designated. Site and sector specific changes to costs are described below:

### **Impact of changes to business sector costs**

- 6.13 **Domestic Commercial fisheries** –The consultation specifically asked for information relating to the **displacement assumption**. The assumption that 75% of fishing GVA can be displaced to other locations is based on the low overlap of MCZs with core fishing grounds, suggesting that it is reasonable to assume that most catch can still be sourced from existing fishing grounds<sup>2</sup>. This assumption was tested during consultation. There were two sites where new information was provided that required new displacement assumptions. (i) Hythe bay – based on an IFCA survey (displacement is likely to be lower and most landings will be lost) (ii) Stour and Orwell – based on consultation response and subsequent discussion with the IFCA. Stour and Orwell has been dropped from the list of sites designated in 2013. The Minister has decided to defer designation of the Hythe Bay MCZ. This will allow a range of possible solutions to be explored (such as zonal management) with the local fishing sector, the local IFCA and NE with the aim of delivering the conservation aims for the site and allowing the continuation of economically-viable fishing, as such the costs should the site be designated, are likely to be lower than described here. A decision on whether to designate the site will be taken in early 2014. The IA has retained the 75% displacement assumption for this site to reflect this change in approach; however the high scenario still reflects 100% loss in earnings (no displacement).
- 6.14 For the designated sites, there was no new information from the consultation responses which enabled a change to the displacement assumption. The consultation also provided anecdotal evidence of landings data, which were verified with IFCAs and MMO landings data where possible and incorporated in the summary costs for the relevant sites. Where verification was not possible, quantitative anecdotal evidence was still incorporated, in the interests of including all additional information.
- 6.15 Following new evidence on certainty of features, various features have been added or removed. This has led to changes in costs for the following sites - Blackwater, Crouch, Roach and Colne Estuaries (increase in best estimate of fisheries costs); Cumbria Coast (no fisheries costs); and Manacles (increase in best estimate of fisheries costs). It was also observed that

<sup>1</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/212695/mcz-consult-sum-resp-20130716.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/212695/mcz-consult-sum-resp-20130716.pdf)

<sup>2</sup> note that the high cost scenario estimates in IA already looked at a worst case scenario of no displacement i.e. all catch in this area lost

there was omission of a potential costs scenario for Poole rocks which has now been added making minimal changes to best estimate costs.

- 6.16 Further evidence was gathered to assess the impact which changes in national scallop management legislation and the management of European Marine Sites (EMS) would have on the costs for MCZs. A Centre for Environment, Fisheries and Aquaculture Science (CEFAS) study<sup>3</sup> highlighted that, for offshore sites, most EMS lie outside the core dredging grounds used by larger vessels and, when intersections do occur, other areas of core dredging ground are in close proximity. However, for inshore vessels, a significant proportion of dredging activity within 12nm of the English and Welsh coasts takes place in EMS. More than half of the core areas of dredging activity<sup>4</sup> were inside EMS. If dredging is restricted in EMS then this will limit the choice of areas to which vessels displaced from MCZ can relocate unless the MCZ already overlaps with EMS site<sup>5</sup> (note that this only applies to certain MCZ sites, under specific scenarios of management).
- 6.17 Some information on costs was received from non-UK fisheries interests. However, as GVA information was not provided no changes have been made to non UK fisheries but these will be lower as fewer sites are being designated. These estimates are not included in the summary figures but described in the text of the IA.
- 6.18 **Ports, harbour, commercial fishing and disposal sites** – Consultation responses raised concerns regarding the costs of current and future (unplanned) potential developments and proposed alternative boundaries. A boundary change was suggested at Newhaven (*relevant to MCZ site Beachy Head West*) which would exclude the port harbour limits. This change has been accepted as there is limited loss of features and it excludes areas of potential developments resulting in greater confidence in the costs to this sector.
- 6.19 The boundary has also been changed for the *Padstow Bay and Surrounds* site. As the disposal site now lies outside the MCZ, mitigation costs associated with the disposal site are no longer relevant and have been removed. There is a low probability that some mitigation cost could be incurred in the future if significant amounts of material (more than usual) were disposed of at any one time<sup>6</sup>.
- 6.20 Local proposals for harbour development within the *Torbay* MCZ site have the potential to affect the subtidal mud and seagrass features. The seagrass is already protected as a BAP feature so any costs related to mitigating damage would be part of the baseline and not attributable to the MCZ designation. Proposals to extend Haldon Pier within Torbay would lead to some loss of the subtidal mud feature but this would be only a small proposition of the total area. Other potential impacts on the subtidal mud are speculative. The local proposals do not include plans for dredging. So overall there are no cost changes to the site.
- 6.21 ABP Ports raised a concern that additional costs could be incurred if 'hazardous cargo exemption permits' could not be permitted due to the designation of a nearby MCZ. Two MCZ sites *Upper Fowey and Pont Pill* and *Dart estuary* were investigated further on this basis<sup>7</sup>. Closer inspection of these ports identified that they are very unlikely to have 'hazardous cargo'

---

<sup>3</sup> Interactions between inshore dredge fisheries and European Marine Sites (CEFAS, 2012); Interactions between scallop dredge fisheries and European Marine Sites (CEFAS, 2012)

<sup>4</sup> Defined as the most heavily dredged areas accounting for 70% or 80% of total dredging activity in inshore waters

<sup>5</sup> However, the CEFAS study notes that the assessment of overlap with EMS could be an overestimate: the approach used for defining core grounds may overweight the true importance of dredged areas. The bias exists because the patrol vessels and surveillance aircraft that record dredging activity do not visit all areas that may be fished. The methods of inshore analysis are based on older data (2007-2009), have relatively low spatial resolution and do not discriminate different types of dredging, therefore understanding options for displacement and consequences at the local level are challenging – site-level expertise is necessary for this local decision-making.

<sup>6</sup> This could be managed at minimal additional cost by disposing of material at certain states of the tide to ensure material moves away from the MCZ boundary. The disposal site is in a high energy environment and material is likely to readily disperse so this is only likely to be an issue should there be a significant increase in volume of material deposited, rather than for current usage

<sup>7</sup> The Environment Agency advised that this could apply to ports storing hazardous cargo within 500m of an MCZ where no other existing environmental designation exists. A GIS extraction identified that this could apply to the following MCZs: Upper Fowey and Pont Pill proposed MCZ - Ports are Fowey and Polruan; Dart Estuary recommended MCZ – Ports are Dart Harbour, Britannia Royal Naval College and Dart Marina.

licenses as they are either small fishing harbours or marinas. Therefore no changes have been made to IA.

- 6.22 **Renewable Energy:** Consultation responses corrected figures for the possible future MCZ sites. North of Lundy and Morte Platform, increasing and decreasing the costs respectively, however these sites are not proposed for designation in the first tranche. Responses also mentioned possible future tidal energy resources in specific sites, which could result in costs. However, DECC do not consider these areas as 'developable' within the 20 year period of the IA.
- 6.23 **Aquaculture:** Follow up to the consultation indicated that the consultation IA had not included the possibility that aquaculture will need to be managed in the MCZ site Upper Fowey and Pont Pill. This is now added as a new cost scenario, although we currently expect no management to be required. If additional management measures are required in the future, evidence scenarios will be considered taking full account of any associated socio-economic impacts.
- 6.24 **Cables:** Consultation responses provided additional baseline information on existing cables, and highlighted a number of newly proposed cables which have not changed the management scenarios costs, since as per existing advice<sup>8</sup> the new cables are very unlikely to require additional mitigation (low footprint of activity relative to the broadscale habitat).
- 6.25 **Historic Environment:** There were concerns of potential unmonetised restrictions to activity in consultation responses. However, intrusive archaeological activities combined with policies and legal requirements to preserve historic sites have already been considered under the costs of MCZs. The only areas where intrusive activities and anchoring could be limited in tranche 1 are peat and clay beds, or small areas of MCZs where vessel anchoring is restricted. These restrictions exist under the baseline, since peat and clay beds are already protected under existing lists and there are already some codes of conducts in place to protect any sensitive features such as archaeological sites and seagrass beds. In all cases, diver trails, visitors and non-intrusive surveys can continue. As with all activities, the Public Benefits Test (as described in para 6.7 point 2) would apply; regulators would be advised by English Heritage and any other relevant adviser.
- 6.26 **Other energy (coastal infrastructure/cooling):** This sector was not separately mentioned in the consultation IA. Consultation responses mentioned that a situation could arise where by plants in or near a MCZ are prevented from abstracting water for cooling purposes<sup>9</sup>. It is assumed that no additional mitigation of impacts of water abstraction, discharge or diffuse pollution will be required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management process (unless where the size of the Water Framework Directive water body is different to the size of the MCZ<sup>10</sup>). It is possible that any future developments (such as new plants) could potentially incur additional costs but it is not possible to monetise these at this stage.

There could be an additional licence cost (to assess impact on broad-scale habitats) and mitigation cost (to avoid environmental impact) on an existing or planned outfall pipe within a MCZ. However, consistent with advice from SNCBs for other sectors, we are assuming this is only likely to be the case where the coastal MCZ habitat feature covers a small area therefore the proportion of protected habitat area affected could be great. This incidence is likely to be low probability, especially where the habitat is small enough to be avoided through forward planning at no significant additional cost. However, an additional cost could occur where avoidance of impact on MCZ protected habitat is a) unavoidable or b) avoidable but at significant extra cost. This is more likely to be the case for new capital works rather than maintenance on existing outfalls. This could present significant potential unknown costs for some applicants. Environment

---

<sup>8</sup> Provided by the Statutory Nature Conservation Bodies

<sup>9</sup> The response does not ask this to be costed, just that it is mentioned for relevant MCZs

<sup>10</sup> WFD requires assessment of water status at a water body scale – and water bodies in estuaries and coastal waters can be a considerable size (0.1km<sup>2</sup> to 1200 km<sup>2</sup>). This can mean that to create a change in waters status, there needs to be a widespread impact at this whole water body scale. The directive looks to achieve good ecological and chemical status of waters, which includes looking at the status of ecological elements such as benthic habitats within the water bodies.

Agency and Natural England have advised that additional licence or mitigation costs for environmental permits to dispose at sea (via outfall) are unlikely due to MCZs.

6.27 **Recreation:** Consultation responses mentioned a number of recreational activities taking place in and around MCZs. For the majority of sites no new information on activities was submitted which would impact on the management of MCZs and therefore incur costs. For the *Torbay* site concern was raised regarding the potential pressure on the subtidal mud from increased anchoring outside the harbour area. However it is not possible to predict whether and to what extent local proposals for increases in berths and moorings within the harbour will lead to increased anchoring outside the harbour on the subtidal mud. Due to the degree of uncertainty around what, if any, of the local proposals will be implemented, and their potential impacts, it is not possible to quantify any potential costs associated with mitigation of speculative impacts on the subtidal mud feature. There is also uncertainty in predicting costs linked solely to the subtidal mud and excluding costs for mitigation required for the seagrass (which would be part of the baseline).

6.28 **Aggregate extraction** – Certain aggregate industry responses stated that if neither boundary nor feature extent changed for MCZ site Kingmere, then the costs to aggregate industry will be far greater than in the IA. This is because the MCZ overlaps with two licence application areas (453 & 488) where currently no aggregate extraction takes place. The site boundary has not been changed but the IA already includes an additional licence cost for these application areas. The additional costs included in the IA is mitigation for a 3-month curtailment of activity during the Black Bream nesting season for existing aggregate areas under production that are within 1km of the MCZ. In a very unlikely scenario if aggregate was not allowed to be extracted from the application areas (at all rather than just the 3 months) in the future, it would only be an economic cost if the resource could not be found from elsewhere.

6.29 **Oil & Gas:** There are no changes due to consultation responses. Figures have reduced due to smaller selection of sites.

### ***Costs changes to public sector costs***



- 6.30 **National Defence** - Responses questioned whether costs to MoD for creating by-laws for managing and the policing of navigation activities have been taken into consideration. However, the IA already includes costs that MoD will incur in adjusting Maritime Environmental Sustainability Appraisal Tool (MESAT) and other MoD environmental assessment tools in order to consider whether its activities will impact on the conservation objectives of MCZs<sup>11</sup>. It also includes additional costs in adjusting electronic charts to consider MCZs.
- 6.31 **Flood and coastal erosion risk management**- There are no changes due to consultation responses. Concerns were raised that designation of the MCZ in *Pagham Bay* may affect future consideration of coastal protection projects. Given that the site is already well protected by other designations (SSSI, SPA, Ramsar, Local Nature Reserve) the presence of an additional MCZ designation will not have any additional effect on future decisions of whether to undertake well-thought out and cost-effective plans for coastal protection.
- 6.32 **Costs to public sector of managing MCZs** – Costs have been updated to reflect changes in fisheries and recreational management for the following sites (due to addition or removal of features based on new scientific evidence) - Blackwater, Crouch, Roach and Colne Estuaries; Cumbria Coast; and Manacles.
- 6.33 **Ecological Surveys** - Updated to reflect revised costs from JNCC (now based on actual surveys) and revised number of features per MCZ for inshore sites (which is what NE costs were based on). The survey costs now include costs for baseline setting surveys and monitoring surveys only. Verification costs for all MCZs were removed from the costs as a) this is a sunk cost and b) is a result of the MCAA and is a cost incurred irrespective of, and prior to, whether MCZ is designated or not.

### ***Costs to Business (Equivalent Annual Net Costs Business)***

---

<sup>11</sup> MoD, pers. comm., 2011

- 6.34 Costs to business have been calculated in line with the Better Regulation Framework manual<sup>12</sup>. These are calculated as full economic costs – figures have been provided directly from industry during the 2 years of informal consultation as part of the Regional Projects process. External costs (i.e. costs for additional consultant time) use the mid-point of a range of quotes from UK consultancy firms. Internal costs have been provided by industry themselves and calculated in line with the Green book and Standard Cost Model methodology i.e. incorporate wage costs as well as overheads plus national insurance and overhead costs. Some figures are not split into external and internal costs, but the full figure was provided at the discretion of industry, incorporating full costs.
- 6.35 Assumptions had to be made on e.g. the number of licence applications and likely mitigation. This was verified with industry representatives on a case-by-case basis. This uncertainty is also tested in the sensitivity analysis, as described in table 4. Depending on the sector, the site and the likelihood of mitigation, the best estimate is either the low-cost scenario, high cost, or a weighted average of low and high cost scenarios. This has been agreed with industry for each sector and is described in table 4.
- 6.36 This figure is illustrative only, based on potential scenarios of costs. Decisions on the actual management (and resulting costs) will be taken on a site-by-site basis by the MMO and IFCAs, with consultation process and associated regulatory IA. These costs are taking a best estimate of what these costs *may* be.
- 6.37 Within the baseline option it is assumed that existing government policies and commitments related to the marine environment are fully implemented and achieve their desired goals. Particularly significant are commitments to implementation of the Environmental Impact Assessment Directive and the Water Framework Directive. In light of this, the IA assumes that no mitigation of impacts of water abstraction, discharge or diffuse pollutions is required over and above that which will be provided to achieve the objectives of the Water Framework Directive through the River Basin Management Plan process.

**The figures result in an EANCB figure of 0.5m/yr (2009 prices and 2010 base year). The PV cost to industry is £8.3m discounted over 20 years (PV base year is 2013). The benefits have not been monetised so they only reflect costs.**

### ***Risks, sensitivities and limitations of costs methodology***

- 6.38 The Sectoral Approach adopted makes it difficult to make links between sectors, which may mean that benefits (and reduction in costs) of co-location are missed, or potential additive impacts are not quantified. This is likely to be an issue for a very small number of sites only and has been discussed at a site-level, with no adjustment in cost data due to uncertainty. On-going research is being carried out on the benefits of co-location which will inform future work.
- 6.39 For many sectors, including Oil& Gas, National Defence, aspects of Renewable energy, some of the assumptions for this IA *cannot* be site specific, because it is not yet known where future developments will be or what they will comprise. Assumptions and results of sensitivity analysis have been taken at a regional level and verified with relevant industry representatives<sup>13</sup>.
- 6.40 There is uncertainty in the displacement assumption. The full range of possibilities is tested through sensitivity analysis, with a high cost scenario presenting no displacement (i.e. all catch in this area lost). Further information from the consultation was incorporated in the Impact Assessment. These assumptions will be tested through evaluation of the MCZs. In addition, restricting fishing activity within MCZs or certain areas raises the potential for an increase in environmental damage outside MCZs due to displaced fishing activity. There is insufficient

---

<sup>12</sup> <https://www.gov.uk/government/publications/better-regulation-framework-manual>

<sup>13</sup> It has not been possible to publish all anticipated additional costs to specific MCZs (across all sectors) and developments in the IA because of the commercial sensitivity of some of the data. Such information has been aggregated and presented in the IA. It has not been possible to verify cost estimates provided by industry.

scientific or socioeconomic evidence on this displacement and any resulting environmental impact to incorporate into costs estimates.

## 7. Benefits

**B**

7.1 The marine environment provides us with many benefits, such as food in terms of fish and shellfish, and giving millions of people the chance to enjoy sailing, angling, watching birds and other wildlife and providing environmental resilience. These can be described as ‘Ecosystem Service’ benefits. Ecosystem services are defined as services provided by the natural environment that benefit people (Defra, 2007), several of which can be considered public goods as discussed in para 2.3. The ecosystem services that may be provided by the marine environment (and MCZ features) have been assessed under the categories set out in Table 5.

Table 5: Ecosystem services assessed in the IA	
General Ecosystem service categorisation	Final ecosystem services assessed in the IA
Cultural	Recreation
	Research and education
	Non-use values - Non-use value as a category may include "option value" (the value placed on individual willingness to pay for maintaining an resource even if there is little or no likelihood of the individual actually ever using it), "bequest value" (values placed on individual willingness to pay for maintaining or an asset available for future generations); "Existence value" (benefit people receive from knowing that a particular resource exists) and "altruistic value" (the value placed on individual willingness to pay for maintaining resource so that others may make use of it)
Provisioning	Provision of fish and shellfish for human consumption
Regulating	Natural hazard protection
	Environmental resilience
	Gas and climate regulation
	Regulation of pollution

### Benefits under baseline

7.2 Section 5 above states that in the baseline option features are assumed to continue in their ‘favourable’ or ‘unfavourable’ condition over the 20 year period (i.e. their condition will not deteriorate). This is due to a lack of site-specific knowledge on the change in feature condition (see paragraphs 5.2 and 5.3 above). In the IA we therefore assume that there will be no significant change in benefit levels (or ecosystem services) under the baseline i.e. we assume a static baseline rather than a declining baseline where the feature condition continues to deteriorate leading to lower ecosystem service in the absence of MCZs being designated. Table 6 below shows some of the existing benefits of the UK marine environment using the ecosystem services framework. While not all of these benefits are specific to the MCZs under consideration they help illustrate the substantial benefits people derive from the marine environment

Table 6: Existing benefits of the UK marine environment under baseline		
Cultural	Recreation	In 2012, 286m leisure visits were made to the coast including coastal towns in England <sup>14</sup> . In the 12 months to Sept 2012, 11.2m

<sup>14</sup> Natural England Monitor of Engagement with the Natural Environment , 2012 [http://www.naturalengland.org.uk/Images/mene-report-december-2012\\_tcm6-35288.pdf](http://www.naturalengland.org.uk/Images/mene-report-december-2012_tcm6-35288.pdf)

		<p>UK adults participated in water sports and other water-based leisure activities, including boating, sea angling and coastal walking.<sup>15</sup></p> <p>The marine leisure sector added £1.29bn GVA between 1998 and 2007. Coastal towns added £2.26bn to GVA in 2005.</p> <p>Based on NEA-FO project<sup>16</sup> estimates and visitor number estimates from Defra study<sup>17</sup> the <i>baseline</i> use value for the 24<sup>18</sup> MCZ sites is estimated to be approximately <b>£37.7m over 20 years</b>. These are partial estimates as it only looks at the value of existing visits made by divers and anglers to a pool of sites. This information was gathered through an online survey where respondents were presented with a series of choices between more or less desirable alternatives<sup>19</sup>.</p>
	Research and education	Firms associated with the marine environment contribute over £40bn to GVA <sup>20</sup> . MCZs, including related research and monitoring activities, may also act as a focal point around which to develop education events and facilities. Education, research and development in the marine environment contributed £478m to GVA in 2006 <sup>21</sup> .
Provisioning	Provision of fish and shellfish for human consumption	In 2011, the GVA of fishing, aquaculture, processing and preserving was £1.2bn <sup>22</sup>
	Natural hazard protection	£1.5bn yr total value storm buffering and flood control (meta-analysis) <sup>23</sup> ; £300m 2004 value, avoidance cost of building flood control measures <sup>24</sup>
	Environmental resilience	No economic valuation data available
	Gas and climate regulation	£0.4-8.47bn yr 2002 values, avoidance cost; £6.74bn yr-1 marine Carbon-sequestration 2004 value, avoidance cost <sup>25</sup>
	Regulation of pollution	Beaumont et al (2008) and Clarkson (2002) identifies the economic value of regulating services to the UK at £420m to £8.5bn. However, this value is for all of UK seas rather than the features the MCZ protects.
<p><i>Notes of the table:</i>  <i>These are estimates of the UK marine environment rather than specific to MCZs (unless specified otherwise)</i>  <i>Detailed, site specific baseline benefit figures have been estimated for Torbay and Kingmere MCZ in Fletcher et al (2012).</i></p>		

## Benefits under preferred option: Designate 28 MCZs

<sup>15</sup> Watersports and leisure participation survey 2012 [http://www.dft.gov.uk/mca/watersports\\_participation\\_survey\\_2012\\_-\\_executive\\_summary.pdf](http://www.dft.gov.uk/mca/watersports_participation_survey_2012_-_executive_summary.pdf)

<sup>16</sup> Kenter et al (2013) <http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=Mb8nUApHh%2bY%3d&tabid=82>

<sup>17</sup> Risk and Policy Analysts (2013) Value of the Impact of Marine Protected Areas on Recreation and Tourism Services (in print)

<sup>18</sup> Benefits were not estimates for Lundy as the site has already been designated as a Special Areas of Conservation. Additional features are added. Swallow sand and South west deeps are over 100m deep and the NEAFO studies did not provide valuation estimates for individual visitor (using travel cost as a proxy) for these sites which is why they were not included in benefit estimation.

<sup>19</sup> Here, the researchers provided the respondent with choice tasks where the respondent was asked to consider hypothetical diving or angling sites with a range of environmental and recreational attributes including travel distance, which was used as a cost-proxy. Participants were asked to choose between two sites, A and B, and a 'stay at home option'. Recreational WTP was based on an estimate of return car travel cost of £0.088 per mile.

<sup>20</sup> Figures from ONS 2011 Annual Business Survey and 2008 figures from Charting Progress 2 (2010) for sectors without marine/land disaggregation.

<sup>21</sup> Defra, 2010, UK National Ecosystem Assessment, 2011

<sup>22</sup> ONS ABS - ONS Annual Business Survey <http://www.ons.gov.uk/ons/rel/abs/annual-business-survey/2011-provisional-results/abs-2011---provisional-results-statistical-bulletin--nov-2012-.html#tab=Annual-Business-Survey--ABS->

<sup>23</sup> UK National Ecosystem Assessment, 2011 from Fletcher et al (2012). Total value of service assuming it is present in all UK coastal wetland.

<sup>24</sup> Beaumont et al., 2006

<sup>25</sup> UK National ecosystem assessment (2011) and Beaumont et al. (2006), from Fletcher et al (2012)

7.3 Designation of MCZs will help to conserve the range of biodiversity in UK waters. A combined area of approximately 10,100km<sup>2</sup> will be protected by the designation of MCZs and 165 features (habitats, species, geological and geomorphologic features) will be conserved. It will complement (not duplicate) other types of designation and provide an essential component of the UK contribution to establishing an ecologically coherent network of MPAs. In the absence of MCZs, the full range of features present in the UK marine area would not be afforded protection.

7.4 MCZ designation brings benefits from the:

- Flows of ecosystem services from specific features and habitats MCZs will protect. Under the preferred option only features that are in unfavourable state (and would continue to be unfavourable in the absence of MCZs) *and* have been assigned a 'recover objective' are considered to yield additional benefits. Similarly, some features are already protected by existing legislation and benefits from these features are not considered additional to MCZ designation unless they are offered a high level of protection under MCZs
- Cumulative ecosystem service benefits of an overall network of protected areas, which these sites will contribute to along with other designations.

7.5 The different types of ecosystem service benefits expected to improve due to MCZ designation are assessed in detail in this section. Where possible additional benefits from MCZ designation have been quantified (see table 7). Relevant research has been used to further monetise some of these benefits (recreational benefits); although due technical uncertainty of the estimates means these have largely been presented as illustrative only. See Annex B and C for information on some of these studies.

7.6 There is a lack of scientific and economic research on the marine environment suitable for adapting for use in benefits evaluation and this is acknowledged as a challenge in the literature beyond this IA<sup>26</sup>. This is because of both scientific uncertainty and the lack of traded markets for some of the benefits anticipated from MCZs. In order to address some of the evidence gaps Defra has commissioned new research to consider the marginal benefits of improvements in seabed habitats<sup>27</sup>. In addition, future evaluation of MCZs and research anticipated to stem from designation is likely to enhance our quantified evidence in this area.

### ***Benefits from designation of specific features and habitats in MCZs***

---

<sup>26</sup> Interim results from the National Ecosystem Assessment marine workpackage state that there is a huge lack of valuation evidence (primary evidence) in this area.

<sup>27</sup> To be published in 2014

- 7.7 Many of the specific features of MCZs have been shown to contribute to certain ecosystem services. Improved condition of these features can therefore increase the flow of specific ecosystem services and the resulting benefit. As described in the baseline (in the absence of MCZ designation) there are a number of features which already have some level of protection through existing lists of habitats and species requiring protection<sup>28</sup> and other types of protected area e.g. EMS. Benefits from MCZs will therefore flow from additional features which are offered protection under MCZ designation and that will receive an increased level of protection through this. MCZ features with a 'recover' conservation objective are expected to improve to favourable condition and features with a 'maintain' conservation objective are expected to remain in favourable condition under MCZ designation.
- 7.8 By including only the benefits flowing from the features for which condition will improve due to MCZ designation i.e. those with a 'recover' conservation objective, the IA provides a conservative benefits estimate. There will be benefits from protecting features in their current favourable state (i.e. with conservation objective 'maintain') as this will protect them from an increase in future activity. In the absence of information of the likelihood of changes in activities (in these very specific MCZ locations), the IA does not include an assessment of the benefits of preventing potential future degradation to those features.
- 7.9 Table 7 below provides the list of ecosystem services that are derived from the features. It also provides a quantification of benefits in terms of the size of the feature (where information on extent of feature is missing record numbers or sample observations are provided). Benefits from recreational services have been monetised for illustrative purposes. Finally the table also provides information on the certainty of realising these benefits (which is based on confidence on presence of these feature).

---

<sup>28</sup> E.g. Ospar list of threatened and declining species and habitats, etc





Table 7: Benefits from protection of MCZ features and designation of sites			
Ecosystem service	Description	Quantification (where possible)	Certainty
Recreational Services	Recreational activities most likely to benefit from MCZs include recreational angling, diving and wildlife watching. Benefits to recreation are expected to stem both from changes to the ecological condition of the marine environment and from the designation label (regardless of any ecological changes). Improvements in the condition of marine habitats and species are likely to enhance the recreational experience for participants, and increase the value of the recreational ecosystem service. For example, bird populations may benefit from the protection of benthic habitats that contribute to the provision of good foraging grounds. Bird watchers may benefit from resultant improvements in bird watching experiences. There is an insufficiently developed evidence base on which to relate ecological improvements to the use-value component of recreation ecosystem services <sup>1</sup> .	While overall monetisation of the benefits from an increase in recreational use has not been possible, an illustrative example of the scale of monetised benefit is shown in Box 4 for recreational use benefits. This provides an indicative use value of <b>£ 38.3m to £77.3m</b> over the 20 year period for the designated sites, with <b>£5.1m to £10.4 m</b> estimated for the designated sites illustrative benefits for tourism. Due to the uncertainties with both the baseline and change in visitor frequency, this figure is not used in the summary pages.	<i>Med - High confidence</i> in existence of features; <i>medium confidence</i> of benefit to recreation, with <i>low confidence</i> in scale of illustrated monetisation.
Non-use / bequest values	Some groups are often keen that features and sites are preserved even if they are not currently using them and hence derive non-use benefits from protecting the site. These non-use values then to be: option value (the value of retaining the possibility of using a site in the future, including the value of avoiding irreversibility of harm (c.f. Arrow & Fisher 1974; Farber, Costanza & Wilson 2002)); bequest value (the value of securing the site for future generations) and existence value (the value of knowing that the site and its sea life is secured regardless of any other benefits).	Based on Willingness to pay estimates derived from Kenter et al study <sup>2</sup> (i.e. asking the hypothetical question - how much do you want to donate to protect the site?) one-off non-use value of protecting the sites to divers and anglers alone estimated at <b>£152m to £301m (Best estimate £227m)</b> one off to protect 24 of the designated sites <sup>3</sup> .  Further explanation on the estimates is provided in Box 4, Annex C and paras 7.10 to 7.14	<i>Med - High confidence</i> in existence of features.
Research and education	MCZ research and monitoring will contribute to our understanding of marine ecosystems and potential beneficial uses of marine species. Improvement in knowledge will support more effective marine planning and licensing in UK waters. The scale of research benefit depends on the scale of <i>additional</i> information gathered and the ability of information to enable better decisions to be made in the marine environment. There are specific research gaps in the effectiveness of MPAs in temperate areas and the role of biodiversity in ensuring the resilience of ecosystem service provision, to which these MCZs could contribute. Shore-accessible MCZs likely to benefit the greatest number of people for educational uses. Any educational benefits for	Estuaries, Rocky bottom, Coral reefs, are of particular interest to researchers but designation of all features (CO set at recover or maintain) is likely to improve the understanding of these ecosystem services	<i>Med - High confidence</i> in existence of features; <i>relatively high confidence</i> that there will be a benefit to research and education due to these designations

<sup>1</sup> Kenter et al (2013), page 19

<sup>2</sup> <http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=Mb8nUAphh%2bY%3d&tabid=82>

<sup>3</sup> Benefits were not estimates for Lundy as the site has already been designated as a Special Areas of Conservation. Swallow sand and South west deeps are over 100m deep and the NEAFO studies did not provide contingent valuation estimates for these sites which is why they were not included in benefit estimation

	visitors (including school groups) to MCZs or the coast nearby will depend on the quality of public education and interpretation material provided. MCZ designation may aid site managers in accessing funding to develop such material.		
Fish and Shellfish for human consumption	Managing damaging activities and the resulting habitat and species recovery can lead to improvements in populations of fish and shellfish. There is fairly strong evidence <sup>4</sup> that MCZs could result in improvements in populations of less mobile species such as shellfish (including crustaceans). For mobile species, the scale of benefit depends on the reduction in fishing mortality and the scale of spillover effect resulting from improved habitats and protection of nursery grounds.	<p>CEFAS have provided an expert opinion that spillover benefits of MCZs may be 0-15% of catch lost from the MCZ, which has the potential for benefits to commercial fishing as well as recreational anglers. This could lead to an illustrative GVA benefit of £0.01m/yr after 5 years<sup>5</sup> for commercial fishing, with a range from £0m to £0.3m/yr</p> <p>Intertidal mud (designated as maintain), coastal saltmarshes (designated as maintain), intertidal sediments Infralittoral rock (designated as maintain), Deep sea bed (655.54 km<sup>2</sup>; 79 records for mud habitats in deep water), Maerl beds (1.01 km<sup>2</sup>), Seagrass beds (0.92km<sup>2</sup>) are all relevant habitats<sup>6</sup> for fish, of which (657.51 km<sup>2</sup> and 79 records) will recover under MCZs 44 Habitats (excluding intertidal underboulder communities) are linked with provision of shellfish, of which (13225 km<sup>2</sup> and 115 point records) will be recover More inshore sites (1990.12km<sup>2</sup>) have nursery ground.</p>	<i>High confidence</i> in existence of features; <i>fairly high confidence</i> in impact on provisioning services for shellfish; <i>very low confidence</i> in impact on provisioning services
Natural Hazard protection	Some habitats can provide natural hazard protection, in the form of erosion control when the gradual loss of land is mitigated by coastal habitats, or in terms of sea defence services avoiding sea flooding and inundation (Turner, 2013:4)	Mudflats, Intertidal wetlands are habitats of high importance for natural hazard protection. Estuaries and Coral reefs are also important. These are all protected under MCZs. It is highly uncertain whether a change in the condition of features will impact the level of natural hazard protection.	<i>High confidence</i> in existence of features; <i>low confidence</i> in impact on regulating services
Environmental resilience	Regulating – resilience Protecting a wide range of species and habitats can increase resilience to natural and human pressures <sup>7</sup> By protecting and enhancing biodiversity, MCZs will help to ensure that natural and human pressures are absorbed by the marine environment, reducing degradation, irreversible damage and	The full range of different features and habitats is important, especially those which are not protected by other designations.	<i>High confidence</i> in existence of features; <i>medium confidence</i> in impact on environmental resilience.

<sup>4</sup> Regional project Methodology Documents Annex H5

<sup>5</sup> Based on a conservative assumption of 5% of the lost GVA

<sup>6</sup> Fletcher et al (2012)

<sup>7</sup> (Hughes and others, 2005; Tilman, Reich and Knops, 2006; in Beaumont and others, 2006).

	<p>potential cuts in all (final) marine ecosystem services. Greatest benefits of resilience come from replication and from protecting a wide range of species and habitats, many of which will respond differently to natural or human pressures. There is additional benefit in protecting these features when the marine environment outside of MCZs is under additional pressures. Major threats to marine ecosystems are anticipated as a result of climate change include rising sea temperatures, rising sea levels, greater frequency of storms, increases in the occurrence of severe storm surges, and changes in the timing of plankton production, composition and distribution<sup>8</sup>. See discussion in para 7.15 below, of the anticipated overall benefits of an MCZ network.</p>		
Gas and climate regulation	<p>Certain habitats are efficient sequesters of carbon and contribute to gas and climate regulation. Management of MCZs may reduce human pressures on these habitats that may result in a net increase in the rate of carbon sequestration.</p>	<p>Intertidal mud (designated as maintain), coastal salt marshes (designated as maintain) and saline reed beds (designated as maintain), the deep-sea bed (655.54 km<sup>2</sup>) and seagrass (beds - 0.92km<sup>2</sup>), are particularly efficient sequesters of carbon.<sup>9</sup> 656.46km<sup>2</sup> of 5 relevant habitat set to recover.</p> <p>Studies have valued the carbon benefit of certain relevant habitats <i>in their entirety</i>, for example, Beaumont et al (2010) valued saltmarshes at e.g. £6,100-62,200/km/yr<sup>10</sup>. Andrews et al (2000) valued the carbon benefit of mudflat and salt marsh sediments at £12/ha/yr. However, MCZ designation will only change the quality of these habitats, rather than complete creation (or loss) of habitat. Carbon value relating to MCZ designation will therefore be lower for each of these habitats. Scientific evidence on the value of improving the condition of marine habitats is not available.</p>	<p><i>High confidence</i> in existence of features; <i>medium confidence</i> in impact on carbon sequestration.</p>
Regulation of pollution (nutrient recycling)	<p>MCZs also contribute to regulation of pollution (nutrient recycling). To the extent that MCZs will contribute to healthier and more diverse ecosystems, they are anticipated to aid the environment's capacity to process waste and protect the regulating capacity of the marine environment.</p>	<p>Subtidal sediment habitats can act as pollution sinks, aided by the fauna resident within them<sup>11</sup> (12494.47km<sup>2</sup> set to recover). Salt marshes (designated as maintain) and seagrass beds (0.92 km<sup>2</sup>) are thought to be particularly good regulators of pollution.</p> <p>Studies have demonstrated a £1,245m/yr water quality improvement due to coastal wetlands<sup>12</sup> and</p>	<p><i>High confidence</i> in existence of features; <i>low confidence</i> in impact on regulation of pollution.</p>

<sup>8</sup> OSPAR (2010)

<sup>9</sup> Fletcher et al (2012).

<sup>10</sup> (DECC 2010 carbon price) Based on carbon sequestration rate of 0.64 - 2.19 tC/ha/yr (from Cannell et al. 1999), which is equivalent to 2.35 – 8.04 tonnes CO<sub>2</sub>; converted to km<sup>2</sup> for comparison with area of feature

<sup>11</sup> (Beaumont and others, 2006; Fletcher and others, 2012; Austen and others, 2011.)

<sup>12</sup> Results based on UK National Ecosystem Assessment, 2011

		<p>valued household willingness to pay for better coastal water quality in Scottish beaches at £5.81/person<sup>13</sup>, which is significant with the context of the 11.2m UK adults who participated in water-based leisure activities in 2012<sup>14</sup>. The changes in management proposed for the small areas will <i>not</i> have the noticeable impact which was valued in any of these studies. Overall, this will be a very small scale of impact.</p>	
<p style="text-align: center;"><i>Notes on table:</i></p> <ul style="list-style-type: none"> <li>• <i>Extent (area covered) of features are provided for those who are set to recover (rather than) as management of these will provide higher ecosystem services. However there is a cumulative impact of designating all features that will improve ecosystem services</i></li> <li>• <i>Where square km was not available number of records or samples of the feature is provided</i></li> <li>• <i>Note that size of feature does not necessarily translate into the scale of ecosystem service benefit.</i></li> <li>• <i>Information on extent of features is likely to change with more detailed modelling and surveying work in process – the km2 for the purposes of the IA uses the most up-to-date information available, which is mainly that provided from the Regional Projects.</i></li> </ul>			

<sup>13</sup> Hanley et al. (2003) combine TCM and CB data to estimate the WTP for better coastal water quality in the UK. The survey was implemented in Scotland at seven different beaches. The results suggest a 1.3% increase in the number of trips should water quality improve with an associated increase in consumer surplus of 5.81 GBP/person or 0.48 GBP/trip. Using a population estimate of 661,110 persons, this gives a figure of aggregate benefits of 1.25 million GBP/yr. Hanley, N., Bell, D., and Alvarez-Farizo, B. (2003) Valuing the benefits of coastal water quality improvements using contingent and real behaviour. *Environmental and Resource Economics* 24: 273–285.

<sup>14</sup> Figure from 2012, Watersports and leisure participation survey 2012 [http://www.dft.gov.uk/mca/watersports\\_participation\\_survey\\_2012\\_-\\_executive\\_summary.pdf](http://www.dft.gov.uk/mca/watersports_participation_survey_2012_-_executive_summary.pdf)

7.10 It can be seen from Table 7 that a lot of the MCZ features provide valuable ecosystem services (that result in increase in human welfare) even if it has not been possible to fully quantify or monetise these benefits.

7.11 Monetary estimates have been provided for recreational services using recent research by Kenter et al (2013)<sup>1</sup>. This report investigated the recreational use and non-use values of UK divers and sea anglers for 22 Scottish potential Marine Protected Areas (pMPAs), 119 English recommended Marine Conservation Zones (rMCZs) and 7 existing Welsh marine Special Areas of Conservation (SACs) using a combination of monetary and non-monetary valuation methods and an interactive mapping application to assess site visit numbers. The results are based on an online survey with 1683 divers and sea anglers run between Dec 2012 and Jan 2013. Finally, the results presented Box 4 have not been adjusted to reflect new information on feature certainty or boundary changes made in the site designation

#### Box 4: Monetisation of recreational benefits

##### Non-use values – Willingness to Pay by divers and anglers to protect the marine areas designated as MCZs

Cultural services that will be attributable to designation of sites have been assessed by a team of researchers from University of Aberdeen in partnership with the Marine Conservation Society (MCS), British Sub Aqua Club (BSAC) and the Angling Trust (AT). They carried out a case study on value of marine protected areas to divers and anglers as a part of the follow on phase of the UK National Ecosystem Assessment using a combination of primary valuation (online survey of anglers and divers) and benefits transfer, monetary (choice experiment and contingent valuation) and non-monetary valuation<sup>2</sup>.

Based on their results per site (using contingent valuation method (CVM)), it is estimated that UK divers and anglers are willing to pay to **£152m to £302m (Best estimate £227m)** one off to protect 28 sites<sup>3</sup>. Authors state that their CVM design can be thought of as eliciting an insurance value. Donations requested from respondents can be thought of as a premium to pay for the avoidance of harm to environmental goods of value<sup>4</sup>. They considered motivation for paying this premium to be associated with three sources of non-use value: option value (the value of retaining the possibility of using a site in the future, including the value of avoiding irreversibility of harm (c.f. Arrow & Fisher 1974; Farber, Costanza & Wilson 2002)); bequest value (the value of securing the site for future generations) and existence value (the value of knowing that the site and its sea life is secured regardless of any other benefits

Annex C provides a summary of the methodology used to arrive at these estimates.

##### Use values - Recreational benefit from increase in visitor number to designated MCZs

A Defra-commissioned study<sup>5</sup> illustrated the potential for *additional* use value due to MCZ designation. Based on the limited evidence available from a literature review, the study considered a scenario of a 5-10%<sup>6</sup> increase in the frequency of visitation when considering the cumulative impacts of designation on site-specific conservation value to specific users, the provision of facilities and additional promotion.

Travel cost figures<sup>7</sup> for each recreational use were used to calculate the economic benefit for any increases in frequency of visitation and potential new visitors (as reported in the MENE survey<sup>8</sup>). As well as the revealed spend on travel cost and

<sup>1</sup> Kenter et al (2013) <http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=Mb8nUAphh%2bY%3d&tabid=82>

<sup>2</sup> Kenter et al (2013) <http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=Mb8nUAphh%2bY%3d&tabid=82>

<sup>3</sup> Benefits were not estimates for Lundy as the site has already been designated as a Special Areas of Conservation. Swallow sand and South west deeps are over 100m deep and the NEAFO studies did not provide contingent valuation estimates for these sites which is why they were not included in benefit estimation. <http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=Mb8nUAphh%2bY%3d&tabid=82>

<sup>4</sup> This 'non use value' is mainly measuring the willingness to pay to protect features from an uncertain future risk and an insurance against future harm and degradation. The researchers state that knowing the precise risk of harm is not essential. They provide the example of home insurance - it seems likely that the vast majority of those who take up building or home contents insurance, while they have risk preferences generally, have little quantitative knowledge on the actual risk of fire or theft. Then, it is the value of the goods and general level of risk aversion that determine willingness to pay, rather than the actual specific risk to the object of value.

<sup>5</sup> Risk and Policy Analysts (2013) [http://randd.defra.gov.uk/Document.aspx?Document=11387\\_Case\\_study\\_report\\_Value\\_of\\_MPA\\_s\\_30July.pdf](http://randd.defra.gov.uk/Document.aspx?Document=11387_Case_study_report_Value_of_MPA_s_30July.pdf)

<sup>6</sup> No evidence was available on increases in frequency of visitation with designation. The only relevant evidence is Barry L et al (2011): implementation of a coastal walking trail to allow access to another stretch of beach would increase visits from an estimated 26 to a predicted 31 trips per person per year in Ireland. This could support an estimated increase in visitation with improvement in facilities – in this case, representing a 20% increase.

<sup>7</sup> i.e. revealed preference – the calculated cost of transport to the site

<sup>8</sup> <http://www.naturalengland.org.uk/ourwork/research/mene.aspx>



tourism, there is the potential that users may gain additional welfare (as measured by consumer surplus<sup>9</sup>) from their visit, due to improvements in experience. Very few studies were found to be suitable for benefit transfer purposes (due to the geographical location and policy changes under consideration) with limited coverage of the recreational activities. When considered suitable these were applied to the MCZ case study sites<sup>10</sup>.

This exercise was carried out for 5 representative case studies, categorised according to their recreational and tourism value and geographical spread, and then applied to the remaining 22 sites on a per km<sup>2</sup> basis by site type. Total discounted benefits to recreational users were estimated to range from £ 38.3m to £77.3m over the 20 year period for the designated<sup>11</sup> sites. This was considered net of likely displacement, i.e. only including additional visitors, rather than those substituting their visit from other sites<sup>12</sup>. Excluding consumer surplus, the benefit ranges from £20m to £41.5m.

Additional tourism spend is also anticipated, relating to the increase in recreation activity. Tourism spend includes non-travel related expenditure, such as accommodation, food and drink and activity costs. Net of likely displacement, a total tourism spend benefit of £5.1m to £10.4 m was estimated for the 28 sites<sup>13</sup>, discounted.

- 7.12 The estimates in Box 4 provide an indication that there are potentially high benefits for recreational users from using or protecting these sites. While the recreational benefits have been monetised for illustrative purposes, uncertainty over the scale of benefits means they have not been used in the summary sheets. Discussing limitations of the **non-use** estimates the authors note there may be some framing bias in responses and that use of a voluntary contribution payment vehicle may not fully reveal individual values. Also the respondents were also asked to provide a hypothetical donation to a hypothetical site, which may result in bias of benefits (although budget constraints are emphasised)<sup>14</sup> and the estimates value individual's perception to restricting the sites rather than actual ecological protection following designation.
- 7.13 For the use values there is considerable uncertainty on the visitor numbers (of divers and anglers) to these sites. The Defra benefit study uses stakmap to estimate a baseline level of visits to the site (by various recreational users) and are likely to be an underestimate of the true number of visitors. Also there was very little evidence to understand the likely increase in visits from designating the sites, which is why the 'use estimates' derived from the study are for illustrative purposes only.
- 7.14 Kenter et al. study also provided visitor estimates and use recreational values per site. These aggregate estimates at a site level have not been used in the Impact assessment. This is because of the uncertainty around the visitor numbers. The visitor estimates were based on self-reported visits and estimates of individual visit numbers also appear to be high compared to the very small number of existing studies. The limited size of the angler sample meant that anglers' visits at highly popular sites might have been underestimated while visits at less popular sites might have been overestimated.

---

<sup>9</sup> Consumer surplus measures the monetary benefit to the user as the difference between what they would be willing to pay and what they actually pay. This is calculated as the stated benefit to participants over and above what participants have been demonstrated to pay through travel cost (i.e. their revealed benefit).

<sup>10</sup> As discussed in RPA (2013) report, considering (Barry et al, (2011), King (1995), Drew Associates (2004), Bosetti and Pearce (2003))

<sup>11</sup> Benefits were not estimates for Lundy as the site has already been designated as a Special Areas of Conservation.

<sup>12</sup> For this displacement assumption, the study team considered other Marine protected Areas with similar characteristics within a local area. This is important since we are only considering the additional benefit at a UK level for benefits calculations - a shift in visit (and tourism spend) from another site would not be an additional benefit, but a transfer from one local area to another.

<sup>13</sup> These were limited to a few recreational categories (angling and informal recreation).

As above, only including additional visits and not including visitors displacing their visit and tourism spend from a different site, which would not represent additional benefit.

<sup>14</sup> Hausman, Jerry, Contingent valuation: from dubious to hopeless. Journal of Economic Perspectives 26(4):43-56, 2012; <http://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.26.4.43>

## **Anticipated overall benefits of an MPA network**

- 7.15 Marine protected areas already exist in the form of European Marine Sites (EMS) designated under the EU Habitats and Birds Directives, Sites of Special Scientific Interest (SSSI) and Ramsar sites. The MCZs to be designated have been chosen to add to and complement these, to contribute towards an overall network of marine protected areas. An overall network of marine protected areas, including a range of representative habitats sites and enough spatial areas to offer resilience and enable mobile species to move between these. These additional benefits, described below, will be beyond the site-specific benefits described above.
- 7.16 By protecting a range of representative features from across the marine environment, the government are protecting biodiversity and the genetic diversity within this. This creates biological resilience - as conditions in the marine environment change, there are species and habitats remaining which can adapt to these changed conditions. More resilience comes with replication of features and habitats, to safeguard against any loss and to capture natural variation within features. Recent studies have also found a link between higher levels of biodiversity and a lower spread of disease<sup>15</sup>.
- 7.17 Mobile fish species are considered likely to benefit from Marine Protected Areas when these protect key life stages or provide areas where fishing pressure is reduced or removed. An improvement in conditions for mobile fish species is likely to benefit commercial fishermen, recreational anglers, as well as potentially increasing non-use value, from knowledge that these species are being protected, i.e. an increase in recreational services, non-use values, as well as provisioning services as described in the table above.
- 7.18 While existing sites have not been specifically designed to protect mobile fish species some of the 28 MCZs include breeding nursery areas and management measures taken to protect the features are likely to result in reduced fishing pressures in some sites.

## **Changes in benefits due to consultation**

- 7.19 The benefit section has changed substantially following comments from consultation. These changes include:
- Quantification of benefits – The consultation responses highlighted the lack of quantification of benefits in the IA. To address the comment during the consultation period the benefits assessment was updated to include latest research and responses to the consultation. Where possible, the marginal or additional benefits from MCZ designation are quantified (see table 7).
  - There is a lack of scientific and economic research on the marine environment suitable for adapting for use in benefits evaluation. This is acknowledged as a challenge in the literature beyond this IA. This links back both to scientific uncertainty and the lack of traded markets for some of the benefits anticipated from MCZs. In order to address the evidence gaps Defra has commissioned new research to consider the marginal benefits of improvements in seabed habitats. In addition, future evaluation of MCZs and research which will stem from designation is likely to enhance our quantified evidence in this area.

---

<sup>15</sup> Johnson, P.T.J., Preston, D.L., hoverman, J.T., Richgels, K.L.D. (2013) Biodiversity decreases disease through predictable changes in host community competence. *Nature* 494, 230-234.

- Using evidence submitted during consultation – The Marine Conservation Society submitted the research which is also a part of the one of four case studies for the Shared, Plural and Cultural Values work package of the follow-on phase of the UK National Ecosystem Assessment (NEA). The results of the study have been thoroughly reviewed by Defra and used it the manner it considered suitable given the uncertainty in estimates. Please refer to paras 7.11-7.14 and Annex C for more information on the study.

### ***Risks, uncertainties and sensitivities***

- 7.20 The IA assumes that features will continue to remain in their ‘favourable’ or ‘unfavourable’ condition over the 20 year period (i.e. their condition will not deteriorate). This is due to a lack of site-specific knowledge on the change in feature condition (see paragraphs 5.2 and 5.3 above). This could potentially underestimate the benefits.
- 7.21 It has been challenging to quantify the increase in benefits arising from ecological improvements in the features following designation. It is even harder to estimate the network benefits from designating the tranche of sites. While there is strong evidence (as presented in table 5) to support the likelihood of increase in ecosystem services, given the uncertainty it has been hard to pin down the extent of increase in these services and what they mean monetarily. This is likely to result in a relative bias against the benefits versus the costs. To overcome this IA has provided an indication of the scale of these benefits by providing a illustration of recreational benefits in monetary terms. Defra is currently carrying out research to understand how best to value these marginal improvements in ecosystem services.
- 7.22 Designating in tranches may mean that vulnerable MCZ features may continue to incur damage, particularly for those at higher risk, prior to eventual designation. This may incur risks to achieving the ‘network’ benefits described above. This is in part mitigated by a risk based approach to designation (where some high risk sites are proposed for designation) and the risk of damage remains while these data certainty issues are resolved.

## **MCZ Post implementation Review Plan**

- 7.23 Following designation of MCZs regulatory authorities will put in place the management measures necessary to meet the conservation objectives taking into account any requirements to consider social and economic impacts and for local consultation with stakeholders (e.g. when implementing byelaws). MCZ sites will be subject to a rolling programme of monitoring to ensure that the measures being taken are resulting in the anticipated improvements to feature condition. The MCAA requires the Secretary of State to report every 6 years on the degree to which MCZs and the MPA network are achieving objectives, stating steps that may be necessary for success. The MCAA allows MCZ designating orders to be reviewed, amended or revoked, and the Government intends to keep MCZs under review, making alterations to boundaries, conservation objectives or management where supported by evidence. This will incorporate new data on features (habitats or species) and on the effect of pressures, and allows for changes required to meet new laws and policies. Defra will also keep the ecological coherence of the network under review taking account of any new scientific developments, which may give rise to additional designation or de-designation of MCZs. Any future designations or de-designations will be accompanied by an impact assessment setting out the costs and benefits of such changes.

## Conclusion

- 7.24 There are potentially large benefits to designating 28 sites. A combined area of approximately 10,100km<sup>2</sup> will be protected by the designation of MCZs and 165 features (habitats, species, geological and geomorphologic features) will be conserved. This is expected to result in an increase in final ecosystem services (benefits) such as increases in provisioning (i.e. increase in fish provision), regulating (i.e. climate regulation) and cultural (and recreational) services. An overall network of marine protected areas (including a range of representative habitat sites) is likely to have additional benefits such as increase in biological resilience to adapt to changed conditions.
- 7.25 The total estimated quantified economic costs of the 28 sites proposed for designation in 2013 ranges from £1.8m/yr to £7m/yr and best estimate is £2.2m/yr. This gives a present value of between £25.9 and £102.6m and a best estimate of £32.7m over the 20-year timeframe of the IA. The best estimated annual cost to business is £0.5m/yr. The main costs to industry are for ports and shipping (£0.1m/yr), commercial fisheries (£0.25m/yr) and renewables (£0.09m/yr).
- 7.26 The main costs to government under preferred option are £0.59m/yr (best estimate) for management and enforcement of sites, £1.1m/yr (best estimate) year for survey work as well as small costs to national defence (£0.008m/yr) and flood and coastal erosion (£0.001m/yr). In addition there are some costs that have not been quantified. There is possible cost to water abstraction industry from MCZs and these costs are likely to be additional to those from the Water Framework Directive. Sectors where future projects were highly uncertain have not been quantified (archaeology, oil and gas; ports, harbours and shipping; laying of inter-array cable protection). It has also not been possible to quantify impacts on local communities from restriction/management of fisheries. Other public sector costs such as costs to inform users about MCZs (including setting up educational programmes), advise public authorities on impacts of proposed licensed activities to MCZs, and costs to the public authorities considering the advice. These costs have been described qualitatively.

## References

- Attrill, M.J., Austen, M.C., Bayley, D.T.I., Carr, H.L., Downey, K., Fowell, S.C., Gall, S.C., Hattam, C., Holland, L., Jackson, E.L., Langmead, O., Mangi, S., Marshall, C., Munro, C., Rees, S., Rodwell, L., Sheehan, E.V., Stevens, J., Stevens, T.F., & Strong S. 2011. Lyme Bay – a case-study: measuring recovery of benthic species; assessing potential “spillover” effects and socio-economic changes, 2 years after the closure. Response of the benthos to the zoned exclusion of bottom towed fishing gear and the associated socio-economic effects in Lyme Bay. Final Report 1. Report to the Department for Environment, Food and Rural Affairs from the University of Plymouth-led consortium. Plymouth: University of Plymouth Enterprise Ltd.
- Austen, M., Malcolm, S., Frost, M., Hattam, C., Mangi, S., Stentiford, G. 2011. Marine. In: The UK National Ecosystem Assessment Technical Report. UK National Ecosystem Assessment. Cambridge: UNEP-WCMC.
- Balanced Seas 2011. Balanced Seas Marine Conservation Zone Project – Final Recommendations. URL: [www.balancedseas.org/page/RSG%20Resources.html](http://www.balancedseas.org/page/RSG%20Resources.html) (Accessed 25 June 2012)
- Beaumont, N., Townsend, M., Mangi, S., & Austen, M.C. 2006. Marine Biodiversity. An economic valuation. Building the evidence for the Marine Bill. London: Defra.
- Better Regulation Executive 2010. Impact Assessment Guidance. URL: [www.bis.gov.uk/policies/better-regulation/policy/scrutinising-new-regulations/preparing-impact-assessments](http://www.bis.gov.uk/policies/better-regulation/policy/scrutinising-new-regulations/preparing-impact-assessments)
- CADW (2012) Irish Seas Conservation Zones: Archaeology & Heritage. Report to Irish Sea Marine Conservation Zones project. CADW 11th June 2012.
- Chae, D.R., Wattage, P., & Pascoe, S. 2011. Estimating the Recreational Benefits of Lundy MNR. A travel cost analysis. Portsmouth: Centre for the Economics and Management of Aquatic Resources, University of Portsmouth.
- Commonwealth of Australia 2003. The Benefits of Marine Protected Areas. Department of Sustainability, Environment, Water, Population and Communities. Canberra URL: <http://www.environment.gov.au/coasts/mpa/publications/wpc-benefits.html> (Accessed 25 June 2012)
- Defra 2002. Safeguarding Our Seas. A Strategy for the Conservation and Sustainable Development of our Marine Environment. London: Defra. URL: [http://archive.defra.gov.uk/environment/marine/documents/marine\\_stewardship.pdf](http://archive.defra.gov.uk/environment/marine/documents/marine_stewardship.pdf) (Accessed 25 June 2012)
- Defra 2007. An Introductory Guide to Valuing Ecosystem Services. London: Defra. URL: <http://archive.defra.gov.uk/environment/policy/natural-environ/documents/eco-valuing.pdf> (Accessed 25 June 2012)
- Defra 2010a. Guidance on Selection and Designation of Marine Conservation Zones (Note 1). URL: <http://archive.defra.gov.uk/environment/biodiversity/marine/documents/guidance-note1.pdf> (Accessed 25 June 2012)
- Defra 2010b. Guidance on the Duties on Public Authorities in Relation to Marine Conservation Zones. URL: <http://archive.defra.gov.uk/environment/biodiversity/marine/documents/guidance-note2.pdf> (Accessed 25 June 2012)
- Defra 2010c. The Government’s Strategy for Contributing to the Delivery of a UK Network of Marine Protected Areas. URL: <http://archive.defra.gov.uk/environment/marine/documents/mpa-strategy100330.pdf> (Accessed 25 June 2012)
- Defra 2011. Consultation on the Evidence Base for a Proposed new English Scallop Order. London: Defra.
- Drew Associates Limited (2004). Research into the Economic Contribution of Sea Angling. Defra
- European Commission 2007. Benefits of Marine Protected Areas for Fish Conservation. Science for Environment Policy. DG Environment New Alert Service. European Commission.



Fletcher, S., Saunders, J., Herbert, R., Roberts, C., & Dawson, K. 2012 (a). Description of the Ecosystem Services Provided by Broad-scale Habitats and Features of Conservation Importance that are Likely to be Protected by Marine Protected Areas in the Marine Conservation Zone Project Area. Research report produced for Natural England. NECR088

Fletcher, S., Rees, S., Gall, S. Jackson, E., Friedrich, L., and Rodwell L., 2012 (b) Securing the benefits of the Marine Conservation Zone Network. A report to The Wildlife Trusts by the Centre for Marine and Coastal Policy Research, Plymouth University.

<http://www.wildlifetrusts.org/sites/default/files/Securing%20the%20benefits%20of%20MCZs.pdf>

Gell, F.R., & Roberts, C.M. 2003. The Fishery Effects of Marine Reserves and Fishery Closures. Washington DC: WWF-US.

Gubbay, S. 2006. Marine Protected Areas: A review of their use for delivering marine biodiversity benefits. English Nature Research Reports No. 688.

Hall, D., Hall, J. and S. Murray, 2002. 'Contingent valuation of marine protected areas: Southern California rocky intertidal ecosystems', *Natural Resource Modeling*, Vol. 15, No. 3, p. 335-368

HM Government 2006. Natural Environment and Rural Communities Act 2006. URL: [www.legislation.gov.uk/ukpga/2006/16/contents](http://www.legislation.gov.uk/ukpga/2006/16/contents) (Accessed 25 June 2012)

HM Government 2009. Marine and Coastal Access Act 2009. URL: [www.legislation.gov.uk/ukpga/2009/23/contents](http://www.legislation.gov.uk/ukpga/2009/23/contents) (Accessed 25 June 2012)

HM Government 2010. Ministerial Statement on Marine Protected Areas.

HM Government 2011a. Overarching Impact Assessment for the Natural Environment White Paper – The Natural Choice: Securing the value of nature. URL: [www.archive.defra.gov.uk/environment/natural/documents/newp-ia-110607.pdf](http://www.archive.defra.gov.uk/environment/natural/documents/newp-ia-110607.pdf) (Accessed 25 June 2012)

HM Government 2011b. UK Marine Policy Statement. URL: <http://archive.defra.gov.uk/environment/marine/documents/interim2/marine-policy-statement.pdf> (Accessed 25 June 2012)

HM Treasury 2003. The Green Book. URL: [www.hm-treasury.gov.uk/data\\_greenbook\\_index.htm](http://www.hm-treasury.gov.uk/data_greenbook_index.htm) (Accessed 25 June 2012)

Hoskin, M.G., Coleman, R.A., & von Carlshausen, L. 2009. Ecological Effects of the Lundy No-Take Zone: The first five years (2003–2007). Report to Natural England, Defra and WWF-UK.

Hughes, T., Bellwood, D., Folke, C., Steneck, R. and Wilson, J. 2005. New paradigms for supporting the resilience of marine ecosystems. *Trends in Ecology and Evolution*, 20(7): 380–386.

ICM Research 2012. Marine Poll. The Wildlife Trusts.

Irish Seas Conservation Zones Project 2011. Final Recommendations for Marine Conservation Zones in the Irish Sea. URL: [www.irishseaconservation.org.uk/node/92](http://www.irishseaconservation.org.uk/node/92) (Accessed 25 June 2012)

JNCC 2010. The UK Biodiversity Action Plan: Highlights from the 2008 reporting round. URL: [http://jncc.defra.gov.uk/pdf/pub2010\\_UKBAPHighlightsReport2008.pdf](http://jncc.defra.gov.uk/pdf/pub2010_UKBAPHighlightsReport2008.pdf) (Accessed 25 June 2012)

JNCC and Natural England 2010a. Ecological Network Guidance. URL: [http://jncc.defra.gov.uk/pdf/100705\\_ENG\\_v10.pdf](http://jncc.defra.gov.uk/pdf/100705_ENG_v10.pdf) (Accessed 25 June 2012)

JNCC and Natural England 2010b. Project Delivery Guidance on the Process to Select Marine Conservation Zones. URL: [www.naturalengland.gov.uk/ourwork/marine/protectandmanage/mpa/mcz/default.aspx](http://www.naturalengland.gov.uk/ourwork/marine/protectandmanage/mpa/mcz/default.aspx) (Accessed 25 June 2012)

JNCC and Natural England 2010c. Marine Conservation Zone Reference Areas: Guidance document for regional MCZ projects. Version 1.1. Peterborough: Natural England. URL: [http://jncc.defra.gov.uk/pdf/mcz\\_draftreferenceareaguidance.pdf](http://jncc.defra.gov.uk/pdf/mcz_draftreferenceareaguidance.pdf) (Accessed 25 June 2012)

JNCC and Natural England 2011a. General Advice on Assessing Potential Impacts of and Mitigation for Human Activities on MCZ Features, Using Existing Regulation and Legislation. URL: [http://jncc.defra.gov.uk/pdf/MCZ\\_ActivitiesAdvice\\_Final.pdf](http://jncc.defra.gov.uk/pdf/MCZ_ActivitiesAdvice_Final.pdf) (Accessed 25 June 2012)

JNCC and Natural England 2011b. Advice from the Joint Nature Conservation Committee and Natural England with Regard to Fisheries Impacts on Marine Conservation Zone Habitat Features. URL:



<http://jncc.defra.gov.uk/pdf/1105%20MARINE%20CONSERVATION%20ZONES%20AND%20FISHERIE%20S-FINAL.pdf> (Accessed June 2012)

JNCC and Natural England 2011c. Advice on the Impacts of MCZs on Information Provision and Decisions in Relation to Marine Licensing Proposals. URL:

[http://jncc.defra.gov.uk/pdf/MCZ\\_ImpactofMCZsonMarineLicensing.pdf](http://jncc.defra.gov.uk/pdf/MCZ_ImpactofMCZsonMarineLicensing.pdf) (Accessed 25 June 2012)

Kenter, J., Bryce, R., Davies, A., Jobstvogt, N., Watson, V., Ranger, S., Solandt, J-L., Duncan, C., Christie, M., Crump, H., Irvine, K., Pinard, M., Reed, M. The value of potential Marine Protected Areas in the UK to divers and sea anglers. UK National Ecosystem Assessment Follow-on. URL:

<http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=Mb8nUAphh%2BY%3D&tabid=82>

Lieberknecht, L.M., Hooper, T.E.J., Mullier, T.M., Murphy, A., Neilly, M., Carr, H., Haines, R., Lewin, S., & Hughes, E. 2011. Finding Sanctuary Final Report and Recommendations. A report submitted by the Finding Sanctuary stakeholder project to Defra, JNCC and Natural England. URL:

<http://findingsanctuary.marinemapping.com/> (Accessed 25 June 2012) Mangi, S., Gall, S., Hattam, C.,

Rees, S., & Rodwell, L. 2011. Lyme Bay – A case study: measuring recovery of benthic species, assessing potential spill-over effects and socio-economic changes 2 years after the closure. London:

Defra.

Lawrence, K., 2005. 'Assessing the value of recreational sea angling in South West England', *Fisheries Management and Ecology*, Vol. 12, pp. 369-375

McVittie, A. and D. Moran (2009) Valuing the non-use benefits of marine conservation zones: an application to the UK Marine Bill Ecological Economics 70 (2) Pages 413-424 Edinburgh: Scottish Agricultural College. Moffat, A. 2012 Draft: Anticipated benefits of marine protected area policy. Natural England.

Marine Management Organisation (2013)

<http://www.marinemanagement.org.uk/licensing/documents/guidance/13.pdf>

Moran, D., Hussain, S., Fofana, A., Frid, C., Paramour, O., Robinson, L., & Winrow-Giffin, A. 2007. Marine Bill: Marine nature conservation proposals – valuing the benefits. London: Defra.

Murry, N., Medio, D., & Gubbay, S. 2007. Valuing Marine Protected Areas in the UK. WWF-UK, Surrey. URL: [http://www.wwf.org.uk/filelibrary/pdf/valuing\\_mpas\\_uk.pdf](http://www.wwf.org.uk/filelibrary/pdf/valuing_mpas_uk.pdf) (Accessed 25 June 2012)

Natural England and JNCC 2011. Conservation objective guidance. URL:

<http://jncc.defra.gov.uk/PDF/MCZ%20Project%20Conservation%20Objective%20Guidance.pdf>

(Accessed 25 June 2012)

Net Gain 2011. Final Recommendations: Submission to Natural England and JNCC. URL:

<http://www.netgainmcz.org/> (Accessed 25 June 2012)

Official Journal of the European Union 2008. Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008. Establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive).

OSPAR 2010. Quality Status Report. URL: <http://qsr2010.ospar.org/en/index.html> (Accessed 25 June 2012)

Parliamentary Office of Science and Technology 2007. Ecosystem Services. Postnote No. 281. London: Parliamentary Office of Science and Technology. URL:

<http://www.parliament.uk/mps-lords-and-offices/offices/bicameral/post/publications/> (Accessed 25 June 2012)

Partnership for Interdisciplinary Studies of Coastal Oceans 2011. The Science of Marine Reserves (Second Edition: Europe). PISCO Consortium.

Pike, K., Johnson, D., Fletcher, S., Wright, P. and Lee, B. 2010. Social value of Marine and Coastal Protected Areas in England and Wales. *Coastal Management*, 38(4): 412–432.

Potts, T., O'Higgins, T., Mee, L., & Pita, C. 2011. Public Perceptions of Europe's Seas – A Policy Brief. EU FP7 KNOWSEAS Project. URL: <http://www.lwec.org.uk/publications/public-perceptions-europes-seas-policy-brief> (Accessed 25 June 2012)

Ranger, S., Lowe, R., Sanghera, A. & Solandt, J.L. 2011 and 2012. An Assessment of Non-use Value and Other Benefits of MCZs in England. 'Your Seas Your Voice', Reports for each of Balanced Seas,

Finding Sanctuary, Irish Seas Conservation Zone and Net Gain Regions. May 2009 – October 2011. Ross-on-Wye: Marine Conservation Society.

Ressurreicao, A., Gibbons, J., Kaiser, M., Ponce Dentinho, T., Zarzycki, T., Bentley, C., Austen, M., Burdon, D., Atkins, J., Santos, R.S., and Edwards-Jones, G., 2012. 'Different cultures, different values: The role of cultural variation in public's WTP for marine species conservation', *Biological Conservation*, Vol. 145, pp. 148-159).

Richardson, E.A., Kaiser, M.J., Hiddink, J.G., Galanidi, M. & Donald, E.J. 2006. Developing Scenarios for a Network of Marine Protected Areas: Building the evidence base for the Marine Bill. Research Report CRO 348. London: Defra.

Risk and Policy Analysts, 2013. Value of the Impact of Marine Protected Areas on Recreation and Tourism Services, Case studies, Methodology and Literature Review report for Defra,

*RPA, Bright Angel Coastal Consultants, Ichthys Marine, RSS Marine Ltd (2013): Value of Marine Protected Areas on recreation and tourism services, Methodology report for Defra, July 2013, Loddon, Norfolk, UK.*

South West Tourism recreational workshop. Marine Protection Areas: Opportunities and challenges for tourism

Stewart, G.B., Cote, I.M., Kaiser, M.J., Halpern, B.S., Lester, S.E., Bayliss, H.R., Mengersen, K., & Pullin, A.S. 2008. Are Marine Protected Areas Effective Tools for Sustainable Fisheries Management? I. Biodiversity impact of marine reserves in temperate zones. Systematic Review No. 23. Collaboration for Environmental Evidence.

Tilman, D., Reich, P. and Knops, J. 2006. Biodiversity and ecosystem stability in a decade-long grassland experiment. *Nature*, 441(7093): 629–632.

TNS 2009. Fishing for the Future Omnibus Survey. Natural England.

UKMMAS 2010. Charting Progress 2. URL: <http://chartingprogress.defra.gov.uk/> (Accessed 25 June 2012)

UNEP. Governing Marine Protected Areas Technical Report. March 2011