

INFOGRAPHICS IMPACT ASSESSMENTS FOR TRANCHE 2 MARINE CONSERVATION ZONES - METHODOLOGY

INTRODUCTION

The IIA consists of five “example” documents:

- An A3 template for all 23 Tranche 2 sites
- A4 templates for four selected rMCZs: Offshore Overfalls, Western Channel, Holderness Inshore and Coquet St Mary

The joint 23 site IIA provides the following information:

- List of the 23 rMCZs in the consultation, with site number, area, whether inshore or offshore, and number of features
- Map showing location of sites
- Summary of features proposed for protection
- Total area of site and other relevant summary information (context, importance of these 23 sites to the proposed MPA network)
- Within icons, total estimated annual costs and benefits, and estimated annual costs and benefits per km², for all 23 rMCZs combined (see below for method used to estimate these figures)
- Descriptive text about the benefits these 23 rMCZs will provide if designated
- Costs to the business sector of designating the sites, as estimated by Defra
- Public investment required as a result of designating the sites, as estimated by Defra

Each of the 4 example site rMCZ IIAs provides the following information:

- Map of site
- Brief description of the rMCZ
- List of features proposed for protection
- Within icons, total estimated annual benefits (general and in relation to divers/anglers only) and costs , and estimated annual costs and benefits per km²(see below for method used to estimate these figures)
- Descriptive text about the benefits the rMCZs will provide if designated
- Costs to the business sector of designating the site, as estimated by Defra
- Public investment required as a result of designating the site, as estimated by Defra

Unless otherwise stated, the information and figures presented are taken from the documents published as part of Defra’s consultation on the Tranche 2 MCZs, and available on line at: <https://consult.defra.gov.uk/marine/tranche2mczs>. The IAs undertaken by the four Regional MCZ projects form the basis of the Defra consultation IAs (Defra 2012 and Defra 2015), with updated information incorporated as available.

The Defra IA consultation documents ¹ that have been used are as follows:

Annex D	Impact Assessment
Annex Da	Management scenarios for commercial fisheries
Annex Db	Explanation of benefit studies
Annex Dc	Willingness to pay study
Annex Dd	Costs to sectors and assumptions
Annex De	Impacts on non-UK vessels
Annex Dg	Summary of sites recommended for the second tranche

¹ Annex Df is not relevant to the IIA

It is important to understand that the figures themselves are not the key point of the IIA documents. The aim is rather to demonstrate that it is possible to present Impact Assessments in a form that is easier for the public and those with no economics background to understand, and also to show that benefits can be made clear, even if methods to quantify these are still in their infancy.

The following sections describe the methods used in the IIA to estimate, for each sample rMCZ and for the joint 23 sites sheet:

- Expected benefits
- Expected costs and public investment
- Impacts and evidence

1. ESTIMATION OF EXPECTED BENEFITS

The following benefits that designating MCZs would create are considered in the Defra IA:

- Maintenance or improvement in condition of the features being protected;
- Providing fish and shellfish for human consumption;
- Recreation (angling, diving, wildlife watching, sailing, coastal walking etc);
- Research and education;
- Regulating services such as:
 - Regulation of pollution e.g. breaking down of pollutants through micro-organism metabolism and sequestration of carbon;
 - Environmental resilience e.g. the features of the site contribute to the resilience and continued regeneration of marine ecosystems;
- Natural hazard protection e.g. the features may provide protection against local flooding and storms;
- Non use value - Some people will gain satisfaction from knowing that the habitats and species are being conserved (their existence value). They may also gain a value from knowing that habitats and species are being conserved for use by others in the current generation (the altruistic value) or future generations (the bequest value); and
- Option value – by protecting the features from the risk of degradation, we retain option over benefits that these features may provide in to the future.

The benefits of the Tranche 2 rMCZs are described in Section 7 (page 39, Annex D) of the Defra IA. As explained in this section:

“...the UK National Ecosystem Assessment Follow-on (NEAFO, 2014) has underlined the value of the marine environment and benefits derived from its ecosystem services. The NEAFO both recognised the need to take proper account of the benefits of marine conservation measures in decision making but also the challenges and lack of economic evidence currently available for doing so. As such, this section contains illustrative benefits from the designation of tranche 2 MCZs using the latest available literature including qualitative and quantitative examples.”

For most benefits therefore, only qualitative information is given, and this has been summarised in the IIA. However, Annex Db of the consultation IA gives a summary of the literature review on research into methods for estimating quantitative benefits of MPAs that was undertaken by the Defra economists and the studies reviewed are listed in a table. Of the six studies assessed, Defra concluded that Kenter et al (2013), was the most appropriate for illustrative purposes and Annex Dc of the consultation IA summarises the Kenter et al (2013) approach and notes its limitations.

Kenter et al (2013) uses information provided, through questionnaires, by two recreational sea user groups - divers and anglers – for each rMCZ. The study provides an *annual recreational value* for each site (estimated using a travel cost choice experiment method) and a *non-use value of protection* of each site (estimated using contingent valuation). The latter reflects the possibility of enjoying a site and its features in the future and the value of knowing that the site is protected both for future generations and for the species that live there.

1.1 BENEFITS OF 23 TRANCHE 2 SITES

In the consultation IA (Annex D, page 2), Defra explains that when doing the IA

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

Details of benefits from protection of MCZ features and designation of sites in the 2nd tranche are listed in Table 5 of Section 7. For non-use/bequest values, Defra uses Kenter et al. (2013) for “illustrative purposes” to give a quantitative estimate as follows:

“Based on Willingness to Pay estimates derived from Kenter et al study² (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 £137m to £284m (Best estimate £211m) to protect 23 of the designated sites.”

In Table 5, under the certainty column, Defra states that there is “High confidence” that there will be a non-use benefit (welfare increase), but “Low confidence” in the scale of the benefits.

For the IIA, two values have been given showing benefits per year. The lower value represents the Kenter et al. (2013) (i.e. benefits to divers and anglers only), has been annualised by dividing the best estimate given in the Defra IA (i.e. £211 million) divided by 14.71 (this is for a time-span of 20 years which is the time span of the IA and a discount rate of 3.5% which is the green book rate for time spans up to 30 years) which gives a figure of £14.3 million.

This figure is likely to under-estimate the value of a site, as it takes into account only the perceived value of the 23 sites to anglers and divers. As mentioned above, the study by McVittie & Moran (2010) uses information from the general public, thus encompassing a greater range of views. The higher value has thus been estimated using McVittie & Moran (2010) figures, weighted with the Kenter et al. (2013) estimates, to give a figure of £113.8 million a year that applies to the more general public.

1.2 BENEFITS AT SITE LEVEL

Two values are given for each site, using the same approach as for the joint 23 sites IIA as described above.

The value of a site to anglers and divers is likely to vary according to the restrictions imposed on other users – e.g. if commercial fishing is prohibited, anglers may benefit as there will be more and/or larger fish for them. These variations have thus been incorporated into the estimates. The low-cost scenario assumes that there are only very limited management restrictions at sites following designation; the high cost scenario assumes intensive management and heavy restrictions are put in place across most sites. The value of a site may also vary accord to ecological improvements and numbers of site visit, but these factors are not reflected in the estimates. Per-site monetary benefits for each site are listed in Table 16 of Kenter *et al.* (2013).

For the IIA, the figures were calculated by adding up the divers and anglers contingent valuation values for each site (Table 16 of the report³), and annualising them by dividing them by 14.71 (this is for a time-span of 20 years which is the time span that Defra is using and a discount rate of 3.5% which is the green book rate for time spans up to 30 years).

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

³ Travel cost values and visitor numbers from Table 16 have not been used.

- Diver numbers 150-250.000 (based on BSAC estimate of 200.000)
- Angler numbers: 1.1 million (Drew, 2004) - 2 million (CEFAS, 2013)

Low figure is the lower bound = no restrictions on gear; high is the higher bound = no dredging, trawling, potting or gill-netting, and mid is the average of the two bounds.

	LOW £/YR	MID £/YR	HIGH £/YR	SIZE KM²
Coquet to St Marys	£603,668	£843,420	£1,083,173	200
Holderness Inshore	£466,420	£652,175	£837,929	307
Offshore Overfalls	£368,526	£514,926	£661,327	593
Western Channel	£296,394	£414,626	£532,858	1614

These figures are likely to under-estimate the value of a site, as they take into account only the perceived values of a site to anglers and divers. As mentioned above, the study by McVittie & Moran (2010) uses information from the general public, thus encompassing a greater range of views.

By dividing the value of an rMCZ using the Kenter et al value, by the average site value calculated from the estimated national value obtained from the McVittie & Moran study, it is possible to obtain a weighting roughly approximating the interest that the site presents. Using the flat per km² value from McVittie & Moran (2013) and multiplying that by the weighting increases the value of interesting sites and drops the value of less interesting sites. That per km² value is then multiplied by the total area of the site.

		KENTER ET AL/WEIGHTED MCVITTIE & MORAN		
	% OF AVERAGE KENTER CV	LOW	MID	HIGH
Based on Anglers	1.354	£1,508,483.492	£3,068,181.797	£4,659,424.981
Based on Divers	1.517	£1,690,151.600	£3,437,685.861	£5,220,563.982

For the weighting, the lowest and highest figures are taken as the boundaries, and the mean of the two values as the average. Using this weighting method, the following range of figures is obtained for each site:

	LOW	MID	HIGH	SIZE KM²
Coquet to St Marys	£1,508,483	£3,252,934	£5,220,564	200
Holderness Inshore	£1,819,824	£3,701,846	£5,622,352	307
Offshore Overfalls	£2,734,746	£5,866,244	£9,370,159	593
Western Channel	£5,718,388	£12,059,976	£18,966,183	1614

Both studies show benefits higher than costs for the four rMCZs. The first method results in the nearshore sites having highest values, recognising their importance for divers and anglers. However, using this method, the value of Offshore Overfalls is significantly under estimated as this is known to be a very important site for anglers.

The second approach (McVittie & Moran, weighted by Kenter et al. 2013) takes account of the size of the sites and of benefits beyond those perceived by divers and anglers only. With this weighting, the large offshore rMCZ Western Channel which is of potential significant ecological value for its role in the future network and its commercial fisheries benefit, is the site of greatest value.

NON-MONETARY ASSESSMENT OF CULTURAL ECOSYSTEM SERVICES

Kenter et al. (2013) also measured the absolute and relative subjective wellbeing value of rMCZs in England for divers and recreational anglers. Values are presented as smoothed mean scores on a 5-point Likert scale where $\rightarrow 3$ is positive and $\leftarrow 3$ is negative and are shown for each site in Table 18 of the report. These are given below for the 4 demonstration rMCZs and are used in the site IIAs. Colours indicate the upper (bright green), middle (pale green) and lower (yellow) third of site rankings across UK sites.

As the terminology used in the report might not be immediately understood by the public, we have translated the indicators as follows:

IIA	KENTER ET AL (2013)
Memorable experience & impacts on life	Transformative
Education, enjoyment, inspiration	Engagement
Provides spiritual value	Spiritual
Contributes to health	Therapeutic
Provides social benefit	Social
People feel they belong in this rMCZ	Identity

Strongly positive responses for individual wellbeing indicators suggest that sites have considerable non-monetary value for recreational users. For the four sites, all scores are $\rightarrow 3$ and therefore positive.

The Kenter *et al.* (2013) report concludes that the most important benefits to divers and anglers of rMCZs are *engagement and interaction with nature* (education, enjoyment and inspiration in the IIAs), *transformative values* (memorable experiences and impact on life in the IIAs) and the sites' *social bonding value* (provision of social benefit). The four demonstration sites do not fully show this trend, although there are some similarities. All four rMCZs have *transformative values* as the most important benefits, and *engagement and interaction with nature* is at second, third or fourth place. For three sites *therapeutic values* are the second most important values. *Social* and *identity* values are rather lower.

2. ESTIMATION OF EXPECTED COSTS

The costs presented in the IIA are those provided in the individual Defra Consultation documents for each individual site, and in the consultation IA for the joint 23 site document. The IA document (Annex D) explains how the figures were calculated. The methodology is essentially the same as that used for the Regional MCZ Project IAs and the consultation IA for the first tranche, with some modifications.

The potential costs of designating each rMCZ to the main sectors that use the area are estimated. Impacts are only assessed where the activity is believed to be currently occurring within in a site or there is clear evidence that the activity is expected to occur in the future. For most sectors and sites a low cost, high cost and best estimate cost is provided. For some sectors it is not possible to quantify costs because the information is not available, and so a qualitative description is used. Impacts are assessed over a 20-year period. All values are presented as real values in 2013 prices 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.

Activities known to take place within a site that will not be affected are listed in the Defra IA.

In the Tranche 2 consultation IA, one significant change is that costs to business have been listed separately to costs to the public sector, and it is only the "costs to business" that are highlighted. For the IIA, we have used the term "public investment" in place of "cost to public sector".

The following is a summary, for each sector, of the method used by Defra as described in the overall IA document on the consultation website. Only the sectors affected by the tranche 2 sites are covered.

COSTS TO BUSINESS

AGGREGATES

Two scenarios were developed: Scenario 1 considers “existing production licensed areas” which have already been granted approval for development. There is an additional one-off cost to operators for future licence / licence renewal applications for these areas if they lie within 1 km of an MCZ, based on the need to assess the impacts on designated broad-scale habitats. Scenario 2 considers additional costs for future licence renewals for all existing production licence areas and one-off additional impact assessment costs for all future licence applications in Strategic Resource Areas (i.e. areas which have yet to be granted approval for development. Scenario 1 (the high cost scenario) is used as the best estimate as it was considered most likely to occur.

ARCHAEOLOGY

Archaeological excavations, surface recovery, intrusive and non-intrusive surveys, diver trails and visitors will be allowed. However, license applications to English Heritage and the MMO for archaeological work in MCZs will require an assessment of the impact on protected broad-scale habitats. The footprint of such activity is very small compared to the area covered by broad-scale habitats and additional costs to this sector are expected to be minimal. The consultation IA states that this approach will be tested at consultation and if specific activities are planned at particular sites, account will be taken of them in the final IA.

CABLES AND INTERCONNECTORS

Where a new cable is laid in an MCZ, the impact on designated features would need to be considered as part of the licence application, which may entail an increased cost. As it is not certain where cables will be built in the future, and where management will be required, a specific cost for the site is not available. However, the cost to the industry for all 23 rMCZs is estimated at only c. £1000/yr and so the cost for individual sites is likely to be very small.

UK COMMERCIAL FISHERIES

Several different management scenarios have been used in the IA for each rMCZ, including ‘recommended’ or ‘preferred’ management scenarios identified by the RSGs for some rMCZs. The costs to fisheries are measured using Gross Value Added (GVA) and the impact in terms of landings is also presented⁴. The best estimate of the value of landings and GVA affected is calculated using assumptions on the probability of the low cost and high cost scenarios occurring, which in turn is dependent on assessments of draft conservation objectives and current fishing pressures. The best estimate is derived from a combination of the following:

- mid-point (50%) values between the lowest and highest cost scenarios for gear types that were the primary reason for setting the conservation objectives of the features to ‘recover’,
- quartile (25%) values between the lowest and highest cost scenarios for gear types that were not the primary reason for setting the conservation objectives of the features to ‘recover’.

When fishing activity is restricted within a site, the value of that activity to the economy will not always be lost as fishers may be able to fish elsewhere, but it is difficult to predict the response to a closure and therefore to estimate displacement. Fishing grounds often have intensively fished core areas that account for the majority of fishing effort or value and less frequently fished margins. If MCZs fall within core grounds, it is less likely that displacement will be possible and this activity is more likely to be lost. Analysis indicates that many landings are likely to be displaced rather than lost.

⁴ Data for the Defra IA came from the MCZ Fisheries Model and stakeholder data gathered during the regional projects. The MCZ Fisheries Model employs MMO data on value of landings for 2007 to 2010, data on distribution of effort for under 15 metre vessels for 2004 to 2010 which was collected by the regional MCZ projects from fishers through FisherMap, and processed vessel monitoring system data on distribution of effort for over 15 metre vessels for 2007 to 2010 provided by the MMO.

Although this means that the value is not lost, it may cause other costs. For example, if catch rates do not match those attained inside rMCZs, fishing efficiency may be reduced. In response, fishers may increase the number of days spent at sea and/or increase their use of fishing gear. Both these responses would increase fuel consumption and may have negative environmental impacts, including greater pressures on stocks, other species and the sea bed outside MCZs, and increased greenhouse gas emissions. Social impacts may include increased risk to the safety of fishers and their vessels and additional time spent away from families. Because it is not possible to model displacement in more detail, the best estimate of the cost uses a generic assumption that 75% of value from fishing will be displaced (and hence recovered from fishing elsewhere), with 25% landings lost (implying costs to industry). The low and best estimate costs take account of the displacement assumption. The high cost estimate illustrates the costs to fishing if there is no displacement. In the IA, the displacement assumptions are generic for all sites while in reality these are likely to differ across sites.

NON-UK FISHING

The greatest impacts of rMCZs on non-UK fleets are anticipated to be on French and Belgian fleets using rMCZs both beyond 12nm, and between 6nm and 12 nm (in areas where these fleets have historical rights), under management scenarios where bottom trawling and dredging are prohibited. However, costs and benefits of regulatory changes to other countries are not considered in UK IAs. In addition it is not possible or proportionate to assess lost GVA to other countries as each country has different GVA ratios for different gear types and this information is not easily accessible. Some information on economic activity of non-UK fleets in the rMCZs is available and Annex De gives information on how this can be used.

OIL AND GAS EXPLORATION AND PRODUCTION, GAS INTERCONNECTORS AND GAS STORAGE (INCLUDING CARBON CAPTURE AND STORAGE)

Additional costs will be incurred in future licence applications in the assessment of environmental impact, in order to assess the impact of future oil and gas (including CCS) developments upon MCZ broad-scale habitats. However, it is assumed that no additional mitigation of impacts will be required because 1) habitats and species on the OSPAR and BAP lists are already mitigated for outside of MCZs and 2) the footprint of such developments is unlikely to significantly impact upon the area of broad-scale habitat protected within a MCZ.

PORTS, HARBOURS, SHIPPING AND DISPOSAL SITES

There will be additional cost for licence applications, with two scenarios developed for the IA: a low cost scenario and a high cost scenario using different assumptions about future Marine Dredging Protocols to give low (Option B) and high (Option A) cost ranges. The best estimate is the midpoint of this range. Assumptions were revised for the 2nd tranche IA based on the average number of applicants per MCZ rather than the number of applications for disposal sites (as used in the 1st tranche IA) as several disposal sites are frequently used by the same business meaning additional assessment costs per application is not realistic as information on the MCZ would only have to be gathered once and updated periodically. This is considered more realistic due to economies of scale as businesses with multiple applications will only have to collect information on the MCZ once per year and use it again. However, the high costs scenario used in this IA include more pessimistic assumptions about additional application costs and assumes a cost per application as a worst case scenario.

RECREATION

In general, recreational activities will not interfere with the achievement of conservation objectives of MCZs and would not need to be managed in the event of designation. This is because, for example, levels of the activity are low, alternative locations are available, the mitigation can be (or is already) provided through adoption of good practice (which should be adopted anyway, in the absence of MCZs) and existing codes of conduct. Only one site being considered for the 2nd tranche contains features sensitive to anchoring with a 'recover' objective and that is The Needles (not considered in the example site sheets).

RENEWABLE ENERGY

Since the Regional Projects presented recommendations in 2011 and the designation of the 1st tranche of MCZs in 2013, there is greater certainty in where developments are and impacts of MPAs on renewables. Designation of special areas of conservation (SACs), which have similar conservation objectives to MCZs, has shown that licence conditions imposed on developments that overlap with SACs to be minimal compared to the situation in the absence of the designation. Costs are likely to be incurred for yet to be consented wind developments but according to Crown Estate data and pre-consultation research and engagement, no such developments overlap with Tranche 2 rMCZs, and so there are no attributable costs for the wind sector. There are some costs associated with potential wave and tidal power developments which are explained further in Annex Dd and which will be tested at consultation.

PUBLIC INVESTMENT (COSTS TO PUBLIC SECTOR)

ECOLOGICAL MONITORING

Estimates of the costs of monitoring each site were provided by the SNCBs and were based on previous experience of similar surveys. Further details on how these costs were estimated have not been given in the Defra consultation IA. There is uncertainty in the level of detail and monitoring which will be required.

FLOOD AND COASTAL EROSION RISK MANAGEMENT (FCERM)

There are potential costs to the Environment Agency for additional monitoring relating to FCERM. Although there are a number of FCERM schemes related to rMCZs, an assessment of these indicates that there is unlikely to be any additional costs as a result of designation.

NATIONAL DEFENCE

Activities range from live firing, submarine exercises, explosions and sea bed sampling to surface target towing, smoke release and acoustic trials. The costs comprise a one-off cost for adjustment of electronic tools and charts and annual costs to ensure that the electronic tools and charts are up to date and that MCZs are factored into all operations. Designation of rMCZs is unlikely to have any direct impact on current levels and types of Ministry of Defence (MOD) activities but if these should change in the future, some MCZs could have an impact. It has not been possible to estimate what this might be and thus the impact of the MCZs.

MANAGEMENT

Cost estimates are provided for management measures, where it is assumed that additional management is needed in each MCZ for recreational and fishing activity. Costs have not been estimated for sites where it is anticipated that no additional management of recreation and/or fishing activity is needed. For the 2nd tranche rMCZs likely management scenarios have been updated following the latest advice from the SNCBs and management unit costs assumptions have been updated following engagement with the MMO and IFCA during pre-consultation. Management costs cover implementation and enforcement only, and exclude monitoring, verification etc for which figures are not available on a site basis. The management costs are estimated for a mixture of non-regulatory management measures (e.g. voluntary agreements, codes of conduct and education programmes) and regulatory measures (e.g. byelaws and prohibition orders).

REFERENCES

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