Annex H12 Approach for assessing impacts on ports, harbours, shipping and disposal sites

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H12.1 This annex outlines the method used to assess the impact of recommended Marine Conservation Zones (rMCZs) on ports, harbours and shipping activity. The method is presented under the following sections: (1) baseline description; (2) management scenarios; (3) assessment of impacts; and (4) limitations. Two management scenarios have been developed for this sector.

1 Baseline description

H12.2 A baseline description is provided for rMCZs that are anticipated to impact on activities relating to ports, harbours and shipping. The baseline describes activities relating to navigational dredging, disposal of dredged material at sea, planned port and harbour developments, and designated anchorages and moorings (for commercial vessels). This information was sourced from Geographical Information Systems (GIS) data (Lee, Stelzenmüller and Rogers, 2010), via discussions with individual port and harbour operators and using data provided by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) (pers. comm., 2012).

2 Management scenarios

H12.3 Management scenarios have been identified for the purposes of the IA to estimate the potential impacts of rMCZs upon ports, harbours and shipping activity. The scenarios are based on advice from the Joint Nature Conservation Committee (JNCC) and Natural England (JNCC and Natural England, 2011a). The scenarios identify the following additional costs that will arise due to the designation of MCZs (compared to costs that would arise in the baseline):

- additional costs to operators in future licence applications to assess the impacts of the proposed activity on the conservation objectives of features protected by rMCZs;
- costs to mitigate the potential impacts of ports, harbours and shipping activities on achieving the conservation objectives of rMCZ features.

The remainder of this section sets out the approach used to estimate these costs.

H12.4 Following MCZ designation, the management of each MCZ will be decided upon on a site-by-site basis, and may differ from the management suggested in this IA. It is assumed that activities will be managed under existing marine licensing frameworks and Harbour Order frameworks.

2.1 Assumptions about the assessment of environmental impact

H12.5 JNCC and Natural England have provided the following advice on the additional costs of assessing environmental impacts in future licence applications that could arise as a result of MCZ designation (JNCC and Natural England, 2011b).

H12.6 Two scenarios are presented in the IA to reflect the uncertainty over the distance at which smothering effects of dredged material upon marine features can occur.

Scenario 1

H12.7 Additional costs will arise in producing assessments of environmental impact provided as part of future licence applications. This is because the assessments will need to consider the

effects of the proposed activity on achieving the conservation objectives of features protected by the rMCZ (JNCC and Natural England, 2011a, c).

H12.8 Scenario 1 assumes that these additional costs will arise for licence applications for port and harbour developments (known developments only), and for all navigational dredges and disposal sites within 1km of an rMCZ (Natural England, pers. comm., 2011). Planned port and harbour developments were identified via discussions with stakeholders in each regional MCZ project. Navigational dredges and disposal sites were identified using GIS data (Lee, Stelzenmüller and Rogers, 2010), via discussions with individual port and harbour operators and using data from Cefas (pers. comm., 2012).

H12.9 JNCC and Natural England advise that the potential smothering effects of port, harbour and shipping activities on features protected by rMCZs are more likely to arise if the activity is within 1km of the rMCZ (JNCC and Natural England, 2011a). This is larger than the distance used for aggregate extraction because the particle size of the dredged material is finer for port related activity and so may travel further (JNCC and Natural England, 2011a; Natural England, pers. comm., 2011). For aggregate extraction, JNCC and Natural England advise that smothering effects (with a threshold of greater than 30cm deposition in one event) do not arise beyond 0.5km of a tidal excursion (JNCC and Natural England, 2011a).

H12.10 For future ports, harbour and shipping activity that could impact on MCZ habitats and species of conservation importance, it is assumed that no additional assessment of impacts will be required compared with the assessment required in the absence of MCZs. This is because impacts on these species and habitats need to be assessed already and independently of MCZ designation, because they are on the Oslo and Paris Convention (OSPAR) List (of Threatened and/or Declining Species and Habitats) or the UK List of Priority Species and Habitats (the UK Biodiversity Action Plan (BAP)) (JNCC and Natural England, 2011b).

H12.11 However, the impacts of activities on MCZ broad-scale habitats will need to be assessed. This is because, although impacts on habitats are currently assessed in the absence of MCZs, impacts are not specifically assessed for the broad-scale habitats protected by MCZs (JNCC and Natural England, 2011b).

H12.12 In the absence of MCZs, operators characterises the habitats and produce a biotope map of the seabed for the area covered by and around the proposed activity in their assessments of environmental impacts. If there is an MCZ in the vicinity, the operator will need to identify whether those habitats are broad-scale habitats that are protected by the MCZ and whether the activity will affect achievement of their conservation objectives. This will involve additional assessment but will not require additional collection of data. As described in Natural England and JNCC (2011a), the additional requirements are likely to comprise:

- additional time to obtain information on the MCZ, its boundary, the features it protects and their conservation objectives;
- additional time to consider the impacts of the proposed activity on the MCZ broad-scale habitat features.

H12.13 In the event that the impact of a future licence application on the ecological coherence of the Marine Protected Area (MPA) network (which MCZs will be a component of) needs to be assessed, then the IA assumes that this assessment would be undertaken by the statutory nature conservation adviser and not by the operator (JNCC and Natural England, 2011b).

H12.14 The additional costs of assessing impacts on features protected by MCZs in licence applications for port and harbour developments, disposal sites, and navigational dredges are estimated for the purposes of the IA to be £6,750 for each licence application. The estimate is based on:

- fees for additional inputs by consultants of £4,500 per licence based on the average of two estimates, £1500 and £7500, from two UK environmental consultancy firms (the names of the consultancy firms are confidential, pers. comm., 2011)
- additional costs to the operator arising from correspondence, meetings, managing consultants, reviewing draft reports, etc. estimated at 50% of the additional consultancy fee (i.e. £2,250) (ABP, pers. comm., 2012).

H12.15 The estimates of the additional costs assume that no significant impacts on achieving MCZ features' conservation objectives are identified, that no additional data collection is required, that background information on the MCZ is available and of sufficient quality, and that the activity under consideration is 'normal' for the site in question (two environmental consultancies, pers. comm., 2012).

H12.16 Scenario 1 assumes that additional costs are incurred for licence applications for all licensed navigational dredge areas within 1km of an rMCZ. It is assumed that one maintenance licence application (renewal) is submitted for each navigational dredge area once every three years from year one of the period covered by the IA (based on information provided by Natural England (pers. comm., 2012)). If an operator has provided a site-specific assumption, this has been used instead. It is assumed that no licence applications for new navigational dredge areas come forward over the 20 year period of the IA.

H12.17 It is also assumed that additional costs are incurred for future licence applications for all disposal sites within 1km of an rMCZ that are not closed to future disposal. No costs are included for disposal sites that are currently closed (which are identified based on information supplied by Cefas (pers. comm., 2011)). It is assumed that these disposal sites will not be re-opened during the 20 year period of the IA. The average number of future licence applications per year per disposal site is estimated to be the same as the average number of licence applications per year received over the period 2001 to 2010. This information is site-specific and is sourced from Marine Management Organisation's (MMO) marine licensing database (Cefas, pers. comm, 2011).

H12.18 Lastly, it is also assumed that additional costs are incurred for future licence applications for port and harbour developments within 1km of an rMCZ. These costs are assumed to arise only for specific port and harbour developments that are planned during the 20 year period of the IA that the regional MCZ projects are aware of via discussions with port and harbour operators. These additional costs are not assumed to arise for port developments that may occur over the 20 year period of the IA but that are not yet planned. This is because there is a lower level of certainty

about whether these developments will take place. Therefore, it should be noted that for this scenario, the rMCZ-specific cost will be an under-estimate.

Scenario 2

H12.19 Due to concerns raised by eight port and harbour operators in response to Scenario 1 (eight port operators, pers. comm., 2012), a Scenario 2 has been developed. For Scenario 2, the assumptions are the same for Scenario 1 expect for the following, which are based on advice provided by Natural England (pers. comms., 2011 and 2012):

- It is assumed that additional costs will be incurred for future licence applications for all navigational dredge areas and all disposal sites within 5km of an rMCZ (rather than 1km).
- It is assumed that additional costs will be incurred for future licence applications for all port and harbour developments within 5km of an rMCZ (and not just for those that are currently planned).

H12.20 A 5km buffer is used as this is consistent with the distance that is used to screen for potential effects of maintenance dredging and associated disposal activities on protected areas under the Water Framework Directive (Environment Agency, 2010). The use of 5km is based on the following (Environment Agency, 2010):

- Tidal excursions can be considerably greater than 2km (the distance used for the MMO environmental sensitivity supplement).
- Modelling of plume dispersion from dredging activities generally shows a reduction in suspended sediments to within background ranges after a few kilometres.
- The Environment Agency considers that a 5km trigger would screen in any projects of a scale likely to affect tidal currents. Effects on tidal currents are site specific and therefore difficult to encompass in a single trigger.

H12.21 Also, a 5km buffer is used in Habitat Regulation Appraisals (Natural England, pers. comm., 2012). Use of a 5km buffer also addresses stakeholders' concerns that using a 1km buffer in Scenario 1 will under-estimate the impact of rMCZs (various port and harbour operators, pers. comm., 2012). Scenario 2 is used as the best estimate of costs for the IA because it is the scenario that is most likely to arise (Natural England, pers. comm., 2012). The best estimate is the midpoint of the lowest and highest cost in the sensitivity analysis of Scenario 2 (see paragraph H12.31). However, for rMCZ The Fal Reference Area in the Finding Sanctuary project area, the best estimate of the mitigation costs is the mid-point between Scenarios 1 and 2. This is due to the uncertainty as to whether the additional mitigation costs for this site would be incurred.[1]

Future licence applications

H12.22 Estimates for the number of future licence applications for each navigational dredge and disposal site are described in paragraph 12.16 and 12.17. The same assumptions are used in Scenario 2 as in Scenario 1, except that a 5km buffer is applied in Scenario 2. The estimates are

[1] It has not been possible to establish the likelihood of either scenario for rMCZ The Fal Reference Area and therefore equal probabilities are attached to each and the best estimate of the cost is taken as the average of the two.

based on GIS data (Lee, Stelzenmüller and Rogers, 2010), via discussions with individual port and harbour operators and using data provided by Cefas (pers. comm., 2012).

H12.23 With regard to future port and harbour developments, it is assumed for the purpose of the IA that 50% of port development applications submitted each year to the MMO will be for activities taking place within 5km of an rMCZ. Therefore, it is assumed that these applications will incur an additional cost in the assessment of environmental impact due to rMCZs (ABP, pers. comm., 2012). This assumption is made as it is not known when, or for where, future port and harbour developments will come forward.

H12.24 The number of future port and harbour development licence applications is based on the number of licence applications submitted to the MMO in 2011 for activities in the MCZ project area. Ideally, the number of licence applications for future port and harbour developments would have been based on the average annual number of licence applications submitted over the past ten years. Although the MMO's website provides information on licence applications submitted since 1999, these are not a reliable estimate of future licence applications. This is because the number of submitted licence applications has increased dramatically since the Marine and Coastal Access Act (2009) was implemented by the MMO in 2010 (in the 'construction' category alone, 20 were submitted in 2009, 55 in 2010 and 215 in 2011).[2] Therefore, the number of anticipated future licence applications can only be reliably based on the number of licence applications submitted in 2011.

H12.25 Also, the MMO data is limited as the website lists all licence applications submitted for activities in all types of marine sectors under various categories. Therefore, it is difficult to identify applications for port, harbour and shipping activity from applications for, for example, activities in the renewable energy and aggregate extraction sectors. It is also difficult again, to select port and harbour development licence applications from other types of port, harbour and shipping activity such as navigational dredging and disposal at sea (more reliable estimates of licence applications for navigational dredges and disposal at sea are provided in the IA based on data provided by Cefas (pers. comm. 2012)). Lastly, it is not possible to identify which licence applications are for activities in ports and harbours within 5km of an rMCZ only. The figure that is used is for activities in the entire MCZ project area.

H12.26 To manage these limitations, only licence applications that were listed as a 'construction' project that were obviously not for a wind farm development or aggregate extraction (based on the name of the project or the name of the company applying), were included in the final figure. Licence applications for port and harbour developments associated with other sectors were included in the estimate as it is recognised that some port development takes place to support growth in other sectors.

H12.27 It should be noted that MMO data was only used to inform the number of future port and harbour development applications for the assessment of costs for each project area, and for the suite of rMCZs. It is this figure that is used in the IA Summary. A very rough estimate of the site-

[2] https://marinelicensing.marinemanagement.org.uk/mmo/fox/live/MMO_PUBLIC_REGISTER/search?area=7 [accessed 18.6.2012]

specific costs for Scenario 2 are provided in Table 2 in Annex I for sites where these costs arise. This estimate is based on the crude assumption that 50% of ports within 5km of the rMCZ would submit a licence application at some point over the 20-year period of the IA and it does not reflect the existence of Maintenance Dredging Protocols (discussed further below). These assumptions were made because it was not possible to relate the number of historic applications submitted to the MMO to the location of individual rMCZs. Equally, it would be incorrect to assume that the proportion of future licence applications impacted by rMCZs would be the same as the proportion of licence applications for developments and harbours within 5km of an rMCZ in 2011. Site specific costs are not a reliable estimate of the actual cost incurred under Scenario 2 and for this reason they are not used to calculate the costs for the IA Summary.

Maintenance Dredging Protocols

H12.28 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). The document also provides the opportunity to determine whether there is a link between the current level of dredging and the condition of protected habitats and species (JNCC and Natural England, 2011a). The protocol is intended to offer a streamlined method for robust but proportionate consideration of the implications of on-going maintenance dredging operations. It does this by providing a framework for assessing dredging activity for a given estuary. Defra's *Maintenance Dredging & The Habitats Regulations 1994 – A Conservation Assessment Protocol* (Defra, 2007) provides guidance in terms of how to assess the potential impact of maintenance dredging upon Special Protection Areas and Special Areas of Conservation (JNCC and Natural England, 2011a). The guidance helps to ensure that ports consider the impacts of their maintenance dredging operations upon protected habitats and species in a consistent and proportionate manner.

H12.29 Natural England has advised Defra that the guidance is extended to MCZs (Natural England, pers. comm., 2012). No information is available regarding Defra's position on this. Implementation of an MDP is voluntary on the part of the port or harbour operator (Natural England, pers. comm., 2012). Therefore, the cost of implementing a MDP is assumed in the IA to be voluntary and is not included in calculation of costs for the IA Summary. The assessment of environmental impact, which is part of the MDP, is a statutory requirement (Natural England, pers. comm., 2012). Therefore, it is only the cost of the assessment of impact on MCZ features, undertaken as part of the MDP that can be attributed to the designation of MCZs and therefore is considered to be a cost to the sector in the IA (based on advice provided by Natural England (pers. comm., 2012)).

H12.30 Ports and harbours within an estuary can group together to produce a single MDP that assesses impacts of maintenance dredging operations upon protected habitats and species (Natural England, pers. comm., 2012). Although costly to implement (in the region of £20,000 (ABP, pers. comm, 2012)), 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 (compared to preparing assessments of impact separately for each individual licence application) (Natural England, pers. comm., 2012). Disposal at sea of dredge material,

capital navigational dredges and port development activities all require separate licence consents. In some instances, an MDP may assess the impacts of disposal at sea of dredge material if this occurs within the estuary or harbour and affect the sediment budget being assessed (Natural England, pers. comm., 2012). However, it is assumed for the purposes of the IA that MDPs undertake assessments of environmental impact for future licence applications for navigational maintenance dredging only.

Sensitivity analysis

H12.31 Two estimates are provided in order to assess the sensitivity of the results to assumptions made in the analysis about the number of MDPs that will be implemented. This is because it is not known how many ports will collaborate and implement joint MDPs (for example, within an estuary) in order to assess the impact of their operations upon rMCZs. The sensitivity analysis is included in Scenario 2 only and is represented as a high and a low cost. MDPs are not considered in Scenario 1.

H12.32 In both the low and the high cost in Scenario 2 it is assumed that, as a result of MCZs, that:

- An additional cost will be incurred for future licence applications for disposal sites within 5km of an rMCZ. The number of licence applications that this will apply to is based on the annual number of licence applications received in last ten years (Cefas, pers. comm., 2012). This is consistent with Scenario 1.
- An additional cost will be incurred for future licence applications for navigational dredge areas within 5km of a rMCZ. The IA assumes that each maintenance dredge licence is renewed once every 3 years. This is consistent with Scenario 1.
- An additional cost will be incurred for all future licence applications for port developments within 5km of an rMCZ (Scenario 1 assumes this cost for developments only where they are known to be planned).

H12.33 The high cost option in Scenario 2 assumes that the 12 MDPs that currently exist or are in draft (Natural England, pers. comm., 2012) for ports and harbours that are within 5km of an rMCZ, will be updated to include MCZ features. For the entire suite of MCZs, it is assumed that these MDPs will be used in support of 30% of future licence applications for maintenance dredging of navigational channels that will need to consider impacts on MCZ features. This figure is calculated based on the number of ports within 5km of a rMCZ that are currently part of these MDPs, as a percentage of the total number of ports and harbours within 5km of a rMCZ. It is assumed that assessment of impacts on MCZ features required for these licence applications will be provided by the MDP (and further information will not be required for each individual licence application).

H12.34 It is assumed that the remaining 70% of future licence applications for maintenance dredging of navigational channels that will need to consider impacts on MCZ features will not be supported by MDPs. As a result, the additional costs for assessing impacts on MCZ features will be incurred for each of these individual licence applications (calculations are provided in Annex N11).

H12.35 The percentages provided above are for the entire suite of sites. The proportion of licence applications that will need to consider impacts on MCZ features that are supported by MDPs is different for each region depending on the number of ports represented by MDPs. The proportions are given in Annex N11 and in Table 1 below. The low cost option in Scenario 2 assumes that at the time that MCZs are designated, the number of MDPs in place will increase to 36 MDPs for ports and harbours that are within 5km of an rMCZ. This estimate is based on the 12 MDPs that currently exist plus the potential for a further 24 MDPs for ports and harbours with 5km of an rMCZ (Natural England, pers. comm., 2012). The low cost option assumes that these MDPs will be used in support of 55% of future licence applications for maintenance dredging of navigational channels that will need to consider impacts on MCZ features. It is assumed that 45% of individual licence application that will need to assess impacts on MCZ features will not be supported by MDPs. It is assumed that additional costs for assessing impacts on MCZ features will be incurred for each of these individual licence applications (calculations are provided in Annex N11).

H12.36 The IA assumes that the cost of providing information on MCZ features for a new MDP is the same as the cost of updating an existing MDP to include MCZ features. The IA assumes that the additional cost of updating the baseline in an MDP to include MCZ features is £8438 per MDP. This is the midpoint of a range of costs (£6750 to £10,125[3]) provided by Associated British Ports (ABP, (pers. comm, 2012)). For ease of analysis, the number of MDPs considered in each option is static over the 20 years of the IA though in reality it will change over time. Table 1 summarises the assumptions made in each of the options.

H12.37 The analysis assumes that the proportion of all future licence applications for maintenance dredging of navigational channels supported by MDPs is the same as the proportion of ports that have MDPs. This is subject to error as MDPs cover maintenance dredging activities and not other port related activities such as disposal at sea or port development. Also, the spatial distribution of activities subject to future licence applications that need to consider impacts on MCZs is unlikely to be such that the proportion supported by MDPs is the same as the proportion of harbours covered by MDPs.

[3] The higher cost reflects where a baseline document specific to an MCZ may be required for a licence application in addition to updating baseline data in the existing MDP (ABP, pers. comm., 2012)

Table 1: Summary of sensitivity analysis undertaken for Scenario 2

Type of activity within 5km of an rMCZ for which an additional cost is incurred	**High cost (baseline)**	**Low cost**	**Additional cost estimate per licence application used in both low and high cost**
Percentage of additional licence application cost (in absence of MDPs for future licence applications within 5km of an rMCZ) that is not informed by MDP (for navigational dredging only). Rounded to nearest 5% for ease of analysis.	70% - all regions 75% - Finding Sanctuary 50% - Balanced Seas 100% - Net Gain 60% - Irish Sea	45% - all regions 45% - Finding Sanctuary 25% - Balanced Seas 80% - Net Gain 50% - Irish Sea	£6750 (see paragraph 12.14 for a breakdown. This is the same as the cost used in Scenario 1)
No. existing or draft/potential MDPs within 5km of an rMCZ. See Annex N11 for a list. Sourced from Natural England (pers. comm, 2012).	12 - all regions 3 - Finding Sanctuary 7 - Balanced Seas 0 - Net Gain 2 - Irish Sea	36 - all regions 11 - Finding Sanctuary 17 - Balanced Seas 5 - Net Gain 3 - Irish Sea	£8438 (see paragraph 12.35 for further information) .
No. ports and harbours covered by MDPs within 5km of an rMCZ. See Annex N11 for a list. Sourced from regional MCZ projects.	40 - all regions 13 - Finding Sanctuary 22 - Balanced Seas 0 - Net Gain 5 - Irish Sea	73 - all regions 29 - Finding Sanctuary 34 - Balanced Seas 4 - Net Gain 6 - Irish Sea	-
Total number of ports within 5km of a rMCZ. Sourced from regional MCZ projects.	131 - all regions 52 - Finding Sanctuary 46 - Balanced Seas 20 - Net Gain 13 - Irish Sea	131 - all regions 52 - Finding Sanctuary 46 - Balanced Seas 20 - Net Gain 13 - Irish Sea	-

2.2 Assumptions about mitigation of impact on rMCZ features

H12.38 The IA uses assumptions about the additional mitigation that is likely to be needed because the outcome of any future licensing decisions is not yet known. The assumptions do not pre-judge the outcomes of future licensing decisions relating to applications for specific proposals. Following MCZ designation, the management of activities in MCZs will be decided upon on a site-by-site basis and may differ from the scenarios employed in the IA.

H12.39 For both Scenarios 1 and 2, the mitigation of impacts on MCZ features that is likely to be needed has been identified on a site-by-site basis based on advice provided by Natural England (pers. comm., 2011 and 2012). Where there is uncertainty about the mitigation that may be needed, a low cost option for providing mitigation is included in Scenario 1 and a high cost option for providing mitigation is included in Scenario 2. To inform the IA, affected operators and authorities were asked to provide estimates of costs for the additional mitigation that has been included in the management scenarios for specific sites.

H12.40 For a few sites in the Balanced Seas project area, it is anticipated that existing port, harbour or shipping-related activities will impact on achieving the conservation objectives of MCZ features and mitigation would not allow the activities to continue (at the necessary level in the case of rMCZ 22). The IA assumes that these activities will continue because of their economic importance (further detail is provided in Annex I) and impacts will not be mitigated. The impacts in both the Scenarios 1 and 2 are assessed in terms of the costs to the operator of providing benefit that is equivalent to the impact that continuation of the activity would have on the MCZ's features (as specified in Section 126(7) of the Marine and Coastal Access Act 2009). In the absence of information about what undertaking, or make arrangements for the undertaking of, measures of equivalent environmental benefit would entail, how it would be determined, and whether it will be necessary, this impact has not been quantified in the IA. This could be a significant unknown cost.

H12.41 The impacts have been assessed in this way because the assessment is of the impacts of the regional MCZ projects' site recommendations that were submitted in September 2011. The Minister's decision about designating this site will be also informed by Natural England's and JNCC's statutory advice on MCZs that was published on 18 July 2012. Where it is feasible, it is anticipated that the advice will suggest that the site recommendation is adjusted to increase the likelihood that the MCZ features' conservation objectives can be achieved. Such adjustment is not included in the IA because the IA is an assessment of the regional MCZ projects' recommendations.

For rMCZs that are rMCZ Reference Areas

H12.42 Extractive and depositional activities, as well as activities that are damaging or disturbing, will not be permitted in rMCZ Reference Areas (JNCC and Natural England, 2010). Navigational dredging is classed as an extractive activity, disposal at sea as a depositional activity, and construction of structures as an extractive and depositional activity, and will therefore not be permitted in rMCZ Reference Areas. Designated anchoring and mooring areas may result in damage and/or disturbance to features protected by rMCZ Reference Areas and may be prohibited depending on site-specific circumstances (JNCC and Natural England, 2010). Any restrictions on anchoring will not apply in emergencies (JNCC and Natural England, 2011a).

H12.43 Advice on the mitigation of impacts for activities that would potentially be damaging or disturbing to features protected by an rMCZ Reference Area has been provided by Natural England on a site-by-site basis (Natural England, pers. comm., 2012). This advice was provided based on information about the activities that are known to take place within and in the vicinity of each rMCZ. Some activities that take place outside rMCZ Reference Area may impact on achieving the rMCZ's features' conservation objectives through secondary effects (such as a sediment plume). The IA assumes that activities that impact on rMCZ Reference Area features in this way will not be permitted.

For rMCZs that are not rMCZ Reference Areas

H12.44 It is assumed that for features protected by rMCZs that have 'maintain at favourable condition' as their conservation objective, that no additional mitigation of impacts for existing activities will be required compared with if there was no rMCZ (Natural England, pers. comm., 2011). However, where a particular risk has been identified that indicates that the above assumption may not hold true, a management scenario has been employed that has been developed based on advice provided by Natural England on the mitigation that may be needed.

H12.45 The mitigation scenarios used in the IA for each rMCZ are set out in Annex I under the heading 'Source of costs'. Calculations of the costs are provided in Annex N11. Where there is uncertainty over the additional mitigation required, Management scenarios that provide a high and a low estimate of the cost of mitigation are employed.

2. 3 *Additional concerns raised by port operators about impacts of MCZs*

H12.46 Concerns were raised by eight port interests[4] in their feedback on Scenario 1 in January 2012, regarding the possible impact of MCZs on port operations. These concerns are summarised in Annex J1d.

H12.47 The feedback received from eight port interests informed the development of a set of assumptions to ensure that their concerns are represented in the IA. The assumptions were further developed with ABP during February and March 2012. This provided an assessment of the impact of the entire suite of MCZs on the ports sector. It was not possible to break this down to each rMCZ due to the varying and unknown nature of future port developments.

H12.48 This assessment provides the highest value of costs in the IA and is not the best estimate of impact (Natural England, pers. comm., 2012). This is because many of the costs outlined in this assessment, would occur in the absence of MCZs and so cannot be attributed to them. For this reason, this cost is not included in the headline summary of the IA but is provided in the supporting Evidence Base. The sector's assumptions are the same as those included in Scenarios 1 and 2 apart from the differences set out in Table 2.

H12.49 The assessment only considers port and shipping activities within 5kms of rMCZs, in keeping with Scenarios 1 and 2, and in keeping with the eight port interests' experience of impact assessments for other environmental designations.

[4] Yarmouth Harbour, the Port of London Authority, ABP, Portland Port, South West Regional Ports Association, Truro & Penrhyn Ports, Poole Harbour Commissioners and Harwich Harbour Authority

Table 2: Industry assessment of costs. Assumptions are based on information supplied by eight port operators. Cost estimates supplied by ABP (ABP, pers. comm., 2012)

Additional costs that could be incurred due to MCZ designation, and estimation of likelihood (based on information provided by eight port operators)	**How this assumption is applied**	**Additional cost estimates (ABP, pers. comm. 2012)**			
		Type of cost (one-off or ongoing)	**Estimated additional cost – low (£m) (provided by the ports sector)**	**Estimated additional cost – high (£m) (provided by the ports sector)**	**Year (of IA period) in which cost is likely to occur)**
1 Additional costs associated with **existing activities** (due to designation of an MCZ)					
1a Additional costs associated with compiling MDP documents (or equivalent environmental information) to inform licensing					
Updating MDP baseline documents to take account of rMCZs or producing separate MCZ baseline document, depending on policy choice. Desk-based assessment only. Does not include costs of additional surveys and data collection, etc.	Apply to all known MDPs within 5km of an rMCZ: e.g. Thames (Port of London Authority), Humber Estuary, Southampton Water (Port of Southampton), Stour and Orwell Estuaries (Harwich, Felixstowe and Ipswich), The Wash, Morecambe Bay (Barrow, Fleetwood, Heysham), Wyre, Mersey (Liverpool etc.), Poole Harbour.	Ongoing cost.	0.00675	0.0101	2013 and every 6 years thereafter, per MDP.
Implementation of a new MDP where one does not currently exist.	Apply to each port (i.e. 1 MDP per port) that has port activities within 5km of an rMCZ.	Ongoing cost.	0.02	0.02	2013 and every 6 years thereafter, per rMCZ.
1b Additional studies to inform baseline (or equivalent) study where existing information is inadequate in terms of MCZ features					
Baseline sediment modelling.	Apply to 20% of disposal sites and maintained navigation channels within 5km of an rMCZ.	One-off cost.	0.01	0.075	2015.
Dredged material dispersal studies.	Apply to 20% of disposal sites and maintained navigation channels within 5km of an rMCZ.	One-off cost.	0.005	0.01	2015.

Additional costs that could be incurred due to MCZ designation, and estimation of likelihood (based on information provided by eight port operators)	**How this assumption is applied**	**Additional cost estimates (ABP, pers. comm. 2012)**			
		Type of cost (one-off or ongoing)	**Estimated additional cost – low (£m) (provided by the ports sector)**	**Estimated additional cost – high (£m) (provided by the ports sector)**	**Year (of IA period) in which cost is likely to occur)**
Discussions on or consideration of the beneficial use of sediments/alternative disposal options.	Apply to 10% of disposal sites and maintained navigation channels within 5km of an rMCZ.	One-off cost.	0.005	0.03	2015.
Additional fish survey work to inform the MDP baseline.	Apply to 50% of disposal sites and maintained navigation channels within 5km of an rMCZ supporting highly mobile species (eel, smelt, undulate ray).	One-off cost.	0.01	0.1	2015.
Additional monitoring of sediment dispersion and habitats to assess impacts.	Apply to 20% of disposal sites and maintained navigation channels within 5km of an rMCZ.	Annual cost.	0.005	0.05	Annually after 2013.
1c Cost of additional mitigation measures					
Implementation of sediment management scheme and/or modifications to disposal practices.	Apply to 5% of disposal sites and maintained navigation channels within 5km of an rMCZ.	Annual cost.	0.05	1	Annually after 2013.
2 Additional costs associated with **new developments/activities** (due to designation of an MCZ)					
2a Additional costs associated with compiling EIAs, etc.					
Additional costs associated with compiling EIAs are likely to be small relative to the overall costs of EIA. However, consultation costs are likely to increase (including legal fees) and project timescales will be extended. Also creates an additional risk of public inquiry.	Apply to 50% of the annual estimated number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ.	One-off cost for any given development, but ongoing cost in IA terms.	0.01	1	Five per year after 2013.

Additional costs that could be incurred due to MCZ designation, and estimation of likelihood (based on information provided by eight port operators)	**How this assumption is applied**	**Additional cost estimates (ABP, pers. comm. 2012)**			
		Type of cost (one-off or ongoing)	**Estimated additional cost – low (£m) (provided by the ports sector)**	**Estimated additional cost – high (£m) (provided by the ports sector)**	**Year (of IA period) in which cost is likely to occur)**
2b Costs of additional studies where existing information is inadequate in the vicinity of an MCZ					
Baseline sediment modelling.	Apply to 20% of the annual number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ.	One-off cost for any given development, but ongoing cost in IA terms.	0.01	0.075	Two per year after 2013.
Dredged material dispersal studies.	Apply to 20% of the annual number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ .	One-off cost for any given development, but ongoing cost in IA terms.	0.005	0.01	Two per year after 2013.
Discussions on or consideration of the beneficial use of sediments/alternative disposal options.	Apply to 10% of the annual number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ.	One-off cost for any given development, but ongoing cost in IA terms.	0.005	0.03	One per years after 2013.

Additional costs that could be incurred due to MCZ designation, and estimation of likelihood (based on information provided by eight port operators)	**How this assumption is applied**	**Additional cost estimates (ABP, pers. comm. 2012)**			
		Type of cost (one-off or ongoing)	**Estimated additional cost – low (£m) (provided by the ports sector)**	**Estimated additional cost – high (£m) (provided by the ports sector)**	**Year (of IA period) in which cost is likely to occur)**
Additional monitoring of sediment dispersion and habitats to assess impacts.	Apply to 20% of the annual number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ.	Annual cost.	0.01	0.1	Two per year after 2013.
Additional fish survey work to inform new port development.	Apply to 20% of the annual number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ supporting highly mobile species.	One-off cost for any given development	0.01	0.1	One per year after 2013.
Additional assessment of fish to inform the port development EIA.	Apply to 20% of the annual number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ supporting highly mobile species.	One-off cost for any given development.	0.005	0.01	One per year after 2013.
Additional monitoring of construction works to protect fish.	Apply to 20% of the annual number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ supporting highly mobile species.	One-off cost for any given development.	0.05	0.5	One per year after 2013.
Additional monitoring post-construction to protect fish.	Apply to 5% of the annual number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ supporting highly mobile species.	One-off cost for any given development.	0.1	0.5	One every 4 years after 2013.

Additional costs that could be incurred due to MCZ designation, and estimation of likelihood (based on information provided by eight port operators)	**How this assumption is applied**	**Additional cost estimates (ABP, pers. comm. 2012)**			
		Type of cost (one-off or ongoing)	**Estimated additional cost – low (£m) (provided by the ports sector)**	**Estimated additional cost – high (£m) (provided by the ports sector)**	**Year (of IA period) in which cost is likely to occur)**
2c Cost of additional mitigation measures (due to an MCZ)					
Implementation of sediment management scheme and/or modifications to disposal practices.	Apply to 5% of the annual number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ.	Annual cost.	0.05	1	Annually after 2013.
Additional costs of a public inquiry with regard to a proposed port development in the vicinity of an MCZ designation.	Assume one every 3 years.	Recurring cost every 3 years.	0.1	3	Every 3 years after 2013
Mitigation of capital dredging associated with port development.	Apply to 5% of the annual number of port developments where associated disposal sites and maintained navigation channels are within 5km of an rMCZ.	One-off cost for any given development.	0	1	One per year after 2013.
Mitigation of percussive piling with regard to fish.	Apply to 20% of the annual number of port developments within 5km of an rMCZ supporting highly mobile species.	One-off cost for any given development.	0	1	One per year after 2013.
Mitigation of fish impacts.	Apply to 5% of the annual number of port developments within 5km of an rMCZ supporting highly mobile species.	Annual cost for 10 years.	0.1	0.5	Annually after 2013 for 10 years.

Additional costs that could be incurred due to MCZ designation, and estimation of likelihood (based on information provided by eight port operators)	**How this assumption is applied**	**Additional cost estimates (ABP, pers. comm. 2012)**			
		Type of cost (one-off or ongoing)	**Estimated additional cost – low (£m) (provided by the ports sector)**	**Estimated additional cost – high (£m) (provided by the ports sector)**	**Year (of IA period) in which cost is likely to occur)**
3 **Other costs** (solely due to designation of an MCZ)					
Closure of disposal site.	Potential to occur once during the IA period due to extra MCZ designation.	One-off cost.	Not possible to estimate at this time.	Not possible to estimate at this time.	Date at which cost incurred unknown – best estimate 2020.
Closure of dredge channel.	Potential to occur once during the IA period due to MCZ designation only. Assumes that this would be a small port rather than a major port.	One-off cost.	Not possible to estimate at this time.	Not possible to estimate at this time.	Date at which cost incurred unknown – best estimate 2020.
Closure of designated anchorage.	Potential to occur to 15% of overall anchorages.	One-off cost.	Not possible to estimate at this time.	Not possible to estimate at this time.	Date at which cost incurred unknown – best estimate 2020.

Additional costs that could be incurred due to MCZ designation, and estimation of likelihood (based on information provided by eight port operators)	**How this assumption is applied**	**Additional cost estimates (ABP, pers. comm. 2012)**			
		Type of cost (one-off or ongoing)	**Estimated additional cost – low (£m) (provided by the ports sector)**	**Estimated additional cost – high (£m) (provided by the ports sector)**	**Year (of IA period) in which cost is likely to occur)**
Speed or draught restrictions on visiting vessels.	Potential to occur once during the IA period due to MCZ designation only.	One-off cost.	Not possible to estimate at this time.	Not possible to estimate at this time.	Date at which cost incurred unknown – best estimate 2020.
Future blight of port development associated with MCZ designation.	Not possible to estimate at this time.	Not possible to estimate at this time.	Not possible to estimate at this time.	Not possible to estimate at this time.	Not possible to estimate at this time.

Source: ABP, pers. comm., 2012

2.4 Costs of updating charts and informing mariners

H12.50 The Maritime and Coastguard Agency (MCA) (pers. comm., 2012) has advised that updating charts and informing mariners about MCZs and the management required for them could incur four types of costs as follows. These costs have not been quantified in the IA are only described here and in the Evidence Base. This is because it is not possible to link the costs provided to specific years of the IA period and it is not clear what proportion of the possible costs identified below could be incurred because of the designation of MCZs. The costs are subject to considerable uncertainty which include: the number and location of rMCZs that impact on shipping activities, the level of information that mariners choose to obtain concerning MCZs (beyond the legal requirement), whether provision of information concerning MCZs coincides with other information that mariners require.

- The cost to the UK Hydrographic Office (UKHO) to update, produce and announce new editions of nautical charts. UKHO is a trading fund of the Ministry of Defence (MoD) (MCA, pers. comm., 2012). Costs for the UKHO to update MoD charts and electronic tools are included in the IA under the analysis of national defence activity (see Annex H) and are not repeated here. Further information was not available on additional costs to the UKHO. It should be noted that if charts need to be updated for another reason as well (e.g. a newly built wind farm), the cost will not be fully attributable to MCZs.

- The cost to MCA to notify mariners (merchant ships, fishing vessels and recreation craft) of MCZs on charts through Radio Navigational Warnings and Notices to Mariners services until the information is provided in revised UKHO charts are produced. MCA has stated that it would seek to recover the costs of Radio Navigation Warnings from Defra. The cost to the MCA is estimated at £50 per notice (MCA, pers. comm., 2012). It should be noted that Radio Navigational Warnings or Notices to Mariners services may be needed for another reason (e.g. a newly built wind farm) and so the cost will not be fully attributable to MCZs. This cost would only be incurred for rMCZs with proposed restrictions on shipping activity that currently takes place in the site.

- The costs to ship owners/mariners to purchase updated charts (this is a legal requirement). On the basis that approximately 6,500 individual ships visit UK ports each year and that each will need six UKBA charts (at least), 39,000 new charts will be purchased (assuming every chart has an MCZ). Assuming each chart costs £25, this could incur a one-off cost to the shipping sector of £975,000. This does not include ships that sail within UK waters and use UKBA charts that do not visit a UK port. If this number of ships is included, this could increase the cost to £1.95m (in the first year that MCZs are designated) (MCA, pers. comm., 2012). However, not all of this cost can be attributable to MCZs as charts may be re-purchased for other reasons (including for example, to obtain updates on the locations of newly built wind farms). Also not all charts will contain an MCZ. This estimate will be an over-estimate. The estimate provided here does not include the cost incurred to fishing vessels and non-commercial mariners.

- The costs to ship owners/mariners to purchase the Sailing Directions for the area. There are six UK volumes (by geographic area) at £54.80 each. Assuming that the UK's 13,000 ships need an average of two new volumes (as they do not all visit all areas of the UK, and there will not be MCZs in the MCZ project area in all six geographic regions), MCZs are likely to incur a one-off

cost to mariners in the region of £1.5m. (MCA, pers. comm., 2012). This does not include the cost incurred to fishing vessels and non-commercial mariners.

H12.51 MCA conclude that the one-off cost to ports, harbours and shipping sector of updating charts and informing mariners about MCZs and their management could be as much as £3.5m, though it is anticipated that this cost is a significant over-estimated and as indicated above, not all of the cost will necessarily be attributable to MCZs. It does not include the on-going cost to update charts and publications subsequently, if management of shipping activity within MCZ's changes at any point over the 20-year period of the IA. MCA anticipates that if such revisions were needed, much of this cost would be absorbed by planned updates to the charts. However, radio navigation warnings and notification to mariners would be additional costs incurred. MCA has identified no other costs outside those outlined above. (MCA, pers. comm., 2012).

3 Economic impact

H12.52 The economic impact of the effect of MCZs is estimated for the IA in terms of the impact on gross value added (GVA). Sufficient data were not available with which to calculate the impact via changes to consumer and producer surplus, the measures used in conventional economic cost–benefit analysis; therefore, GVA was used as an appropriate alternative. GVA measures the contribution to the economy of each individual producer, industry or sector and is used across government to measure national, regional and sub-regional economic performance (Wainman, Gouldson and Szary, 2010).

H12.53 For rMCZ management scenarios that affect the value of revenue generated by a business, the resultant impact on GVA has been estimated by estimating the contribution of that revenue to GVA using appropriate statistics. Further details are provided in the relevant spreadsheets in Annex N11. Increases in costs to operators are assumed to translate in to a direct impact on GVA.

H12.54 Where significant costs to the local economy have been identified, adjustments have been made to estimated impacts on the local economy to allow for substitution effects between locations and activities, in order to describe the UK-level impact. Impacts on local economies do not necessarily reflect the impact on the UK economy as activities displaced from an rMCZ may be relocated to elsewhere in the UK.

H12.55 Additional costs are estimated per dredge area, per disposal site or per port. Where a one of these is within 1km (in the case of Scenario 1) or 5km (in the case of Scenario 2) of two or more rMCZs, the additional cost attributed to that activity is only included once in the calculation of the costs at the scale of the regional MCZ project area and the entire suite of rMCZs to avoid double counting.

4 Limitations

H12.56 There are a number of limitations associated with the approach used in the IA and the assumptions that underpin it. These include the following.

H12.57 The IA uses assumptions about the additional mitigation that is likely to be needed because the outcomes of future licensing decisions are not yet known. The assumptions do not

pre-judge the outcomes of licensing decisions for applications for specific proposals, which may differ from the assumptions being used. If, after licensing decisions have been taken, the mitigation requirements differ from those assumed, this may result in the IA having significantly underestimated or overestimated the true costs.

H12.58 The need for management of damaging and disturbing activities (JNCC and Natural England, 2010) in rMCZ Reference Areas will be established following MCZ verification and monitoring. The management scenarios included in the IA are adopted according to advice based on the best available information. As such, the management scenarios for these activities included in the IA may result in overestimates or underestimates of the true impact.

H12.59 For future activities, estimates of the costs of the mitigation of impacts on MCZ features are based on relatively limited details of both the activity and the mitigation. The costs presented in the IA may therefore underestimate or overestimate the true costs of the mitigation.

H12.60 The additional costs of assessing environmental impacts for future licence applications may differ from those used in this IA if the following do not hold true: there are no significant impacts to MCZ conservation objectives, no additional data collection is required, and background information on the MCZ is available and of sufficient quality.

H12.61 No costs are included for updating MDPs over the 20 year period that may be attributable to MCZs. Although this cost is not known, it is not expected to be significant; however it could be significant for MDPs where any new plan or project is considered likely to affect estuarine morphology and also the MCZ features.

H12.62 The conversion of affected revenue streams to GVA is based on a relatively crude method. Consequently, the estimates of the impact on GVA may underestimate or overestimate the true value.

H12.63 Where evidence is not available on which to base adjustments for substitution in calculating impacts on national GVA, arbitrary assumptions have been used based on an understanding of the nature of the activity being affected. As a result, the quantitative impacts may underestimate or overestimate the true impacts on the UK economy.

References

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