Annex H2 Approach for assessing impact on aggregate extraction

Contents

H2.1 This annex outlines the method taken to assess the impacts of recommended Marine Conservation Zones (rMCZs) on aggregate extraction. The method is presented under the following sections: (1) baseline description; (2) management scenarios; and (3) assessment of impacts.

1 Baseline description

H2.2 It is assumed, within the 20-year period of the Impact Assessment (IA), that aggregate extraction will take place within existing production, application and prospecting licensed areas and also within some strategic resource areas.[1] It is anticipated that licence applications will be submitted for prospecting and production in strategic resource areas during the next 20 years as and when supplies in current licence areas become exhausted (The Crown Estate, feedback on draft IA material, 2011; British Marine Aggregate Producers Association (BMAPA), pers. comm., 2011).

H2.3 A description of aggregate extraction in the baseline is provided only for rMCZs with management scenarios that involve additional mitigation of impacts on MCZ features by marine aggregate operators. This applies to the management scenarios for rMCZ 16 and rMCZ Reference Area 13 in the Balanced Seas project area only (see paragraphs H2.23 and H2.29 respectively) (Natural England, pers. comm., 2012). No site-specific baseline descriptions are given for rMCZs that overlap with strategic resource areas. This is because it is not known whether licence applications for strategic resource areas will be submitted during the 20-year period of the IA, the what activities these will entail, the location of the activities and therefore what if any mitigation of impacts might be required.

H2.4 The future licence applications that it is assumed could be affected by MCZs in Scenario 1 are summarised in Table 1 later in this document and are described for the relevant sites in Table 2 in Annex I. The number of future licence applications that it is assumed are affected in Scenario 2 are summarised in Table 2 later in this document and in the Evidence Base. For Scenario 2, this includes future licence applications for strategic resource areas.

2 Management scenarios

H2.5 It is assumed that the impact of aggregate extraction on MCZ features will be managed under the existing marine licensing framework. Two scenarios have been developed to capture the most likely costs of rMCZs to the aggregate extraction sector. The best-estimate is provided by Scenario 1, as this represents the costs that are most likely to arise. The assumptions do not pre-judge any future site-specific licensing decisions. After MCZ designation, the management of activities in MCZs will be decided on a site-by-site basis and may differ from the IA assumptions.

[1] Commercial dredging of marine aggregates comprises three main phases: resource surveying or prospecting (including some extractive sampling); application for a licence; and subsequent commercial extraction (if a licence is awarded). Typically an aggregate dredging application is for extraction from an area of at least 1 km^2 and for a period of up to 15 years (JNCC and Natural England, 2010b). Strategic resource areas are areas where there is potential for marine sand and gravel deposits to be found based on evidence of geological features and depositional processes. Currently, the areas are not licensed and aggregate extraction does not take place in them (feedback on draft IA material, The Crown Estate, 2012).

H2.6 The site-specific impacts of rMCZs on costs for future licence applications are assessed in the IA only for Scenario 1. For Scenario 2, the impacts on costs for future licence applications are assessed only for the entire suite of sites. This is summarised in the Evidence Base and details are provided in Annex N1. However, in Scenario 2, costs of additional mitigation are assessed at a site-specific level (for the relevant sites in Table 2 in Annex I).

2.1 Assumptions made about future licence applications that will be subject to additional costs

H2.7 The British Marine Aggregate Producers Association (BMAPA), Joint Nature Conservation Committee (JNCC), Natural England, and the Marine Management Organisation (MMO) have advised that as a result of MCZs, the following extra costs are likely to arise for the assessment of environmental impacts that is undertaken in support of future licence applications for aggregate extraction.

H2.8 To support licence applications, impacts of proposed operations on features of conservation importance that could be protected by MCZs need to be assessed already in the absence of MCZs. This is because the features of conservation interest are on the Oslo and Paris Convention (OSPAR) List (of Threatened and/or Declining Species and Habitats), on the UK List of Priority Species and Habitats (UK Biodiversity Action Plan (BAP)) and in Schedule 5 of the Wildlife and Countryside Act 1981 (JNCC & Natural England, 2011b). Currently, applications for aggregate extraction licences determine whether impacts could arise on these species through a bottom-up review of available evidence of the presence of species/habitats at the site and sub-regional scale (BMAPA pers. comm., 2012). The available evidence that is used includes existing data (both published and grey literature) together with site specific and regional scale environmental characterisation survey data the operator may have acquired (BMAPA pers. comm., 2012).

H2.9 It is anticipated that as a result of MCZ designation, aggregate extraction operators are going to incur additional costs in assessing impacts on MCZ features of conservation interest in future licence applications for aggregate extraction. These costs arise from implementation and adoption of BMAPA's newly initiated regional Biodiversity Action Plan (BAP) approach, which will provide an agreed framework for addressing biodiversity issues that individual operators can draw upon (BMAPA pers. comm., 2012). The cost of this is attributed to MCZs because the approach was developed by BMAPA in response to the MCZ process, to position the sector so it can comprehensively and robustly address what was viewed as an issue of growing significance to the Environmental Impact Assessment (EIA) and licensing process and the subsequent mitigation and management of marine aggregate operations (BMAPA pers. comm., 2012)[2].

H2.10 BMAPA's regional BAP approach will enable aggregate extraction operators to provide a more consistent 'top-down' assessment of impacts on features of conservation importance in future licence applications, by identifying which habitats/species may be present in each dredging region, and by screening out those that are not. It will provide individual operators with an

[2] The approach mirrors that taken by the aggregate extraction industry to address marine heritage issues in the early 'noughties'. In that case, the industry proactively worked with the national heritage advisor to develop a guidance note which identified the heritage issues that needed to be addressed, and the way that they could be assessed, mitigated and monitored in a consistent manner. This then acted as an agreed blue print which individual operators could then apply to their operations at a site specific scale (BMAPA pers. comm., 2012).

approach to addressing marine biodiversity issues that is consistent regionally and nationally, that is updated annually and is provided at a lower cost than if equivalent approaches were delivered by individual operators (BMAPA pers. comm., 2012). Estimates of the costs of this are provided below in Section 3.

H2.11 For future licence applications, additional costs will also be incurred in assessing the potential impacts of marine aggregate extraction (prospecting and production) upon MCZ broad-scale habitats. 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 & Natural England, 2011b). As described in Natural England & JNCC (2011c), the IA assumes that the additional requirements are likely to comprise:

- obtaining information on the MCZ, its boundary, the features it protects and their conservation objectives;
- considering the impacts of the development proposal on the MCZ broad-scale habitat features and their conservation objectives.

H2.12 In BMAPA's view (pers. comm. 2011), additional costs will be incurred because of the need to demonstrate the impact pathways and sensitivity of any features that are at risk of direct or indirect pressure from the proposed extraction activity. Given the paucity of information surrounding the distribution of features on many rMCZ sites, and based on experiences with other MPA designations, BMAPA also anticipates that it is highly likely that operators will have to acquire additional survey data for marine aggregate sites that are in relatively close proximity to rMCZs. These data will be required to ensure that licensing decisions are based on sound evidence relating to feature distribution and relative exposure to pressure, rather than simply deferring to a precautionary position (BMAPA pers. comm., 2011). Estimates of the costs of this are provided below in Section 3.

H2.13 It is assumed that operators will not incur additional costs undertaking an assessment of impact upon the overall ecological coherence of the MCZ network. This is because it is assumed that, if such an assessment is necessary, it will be undertaken by Natural England or JNCC (JNCC & Natural England, 2011b). However, BMAPA (pers. comm., 2011) has indicated that, based on experience with other MPAs, there can often be a significant cost burden placed on operators to provide the levels of information and evidence required to allow the agency in question to make a robust decision

H2.14 It is assumed for the IA that all marine aggregate extraction licences are renewed after 15 years (the maximum term for a licence (BMAPA pers. comm., 2011).

Table 1: Future Licence applications that are assumed to be subject to additional costs as a result of MCZs in Scenario 1

rMCZ	Aggregate extraction licence areas for which additional costs will arise in future licence applications (because they are within 1km of the rMCZ)	Status of licence	Year in which additional cost will be incurred for future licence applications
Net Gain			
rMCZ NG 4 (Wash Approach)	107 440	Production Production	2027 [a, b] 2014 and 2029 [c]
rMCZ NG 6 (Silver Pit)	105 480	Production Production	2027 [a, b] 2020 [a]
Balanced Seas			
rMCZ 16 (Kingmere)	396/1 396/2 435/2 453 488	Production Production Production Licence application Licence application	2019 [c] 2019 [c] 2019 [c] 2027 [a, b, d] 2027 [a, b, d]
rMCZ 17 (Offshore Overfalls)	122/1F 122/1G 451/1 451/2 451/3	Production Production Production Production Licence application	2026 [b, e] 2026 [b, e] 2017 and 2032 [c] 2017 and 2032 [c] 2026 [b, d]
rMCZ 22 (Bembridge)	122/3	Production	2026 [b, e]
rMCZ 28 (Utopia)	351 [f] 395/1 [f] 395/2 [f]	Production / application [g] Production Production	2026 [b, d] 2013 and 2028 [c] 2013 and 2028 [c]
rMCZ 28 Reference Area 13 (North Utopia)	351 [f] 395/1 [f] 395/2 [f]	Production / application [g] Production Production	2026 [b, d] 2013 and 2028 [c] 2013 and 2028 [c]
rMCZ 29 (East Meridian)	464/1 [f] 464/2 [f]	Production [h] Production [h]	2021 [c] 2021 [c]
rMCZ 29.2 (Eastern Section)	464/1 [f] 464/2 [f]	Production [h] Production [h]	2021 [c] 2021 [c]

[a] Date when costs first incurred provided by BMAPA. It is assumed that licences will be awarded and costs will be incurred again 15 years later on licence renewal.

[b] Assessment of impacts on rMCZ features was carried out for recent licence applications for these areas but because the costs were incurred before 2013 these costs are not included in the calculation of costs for the IA.

[c] IA assumes that the additional costs for licence renewal will be incurred 14 years after date of issue of current licence (as the maximum licence term is 15 years (BMAPA pers. comm., 2011)). Information on date of issue of the current licence was provided by The Crown Estate (pers. comm., 2012).

[d] Assumes the licence will be issued in 2012 and additional costs will be incurred the year before licence renewal.

[e] Licence renewal sought in 2012 (The Crown Estate, pers. comm., 2012).

[f] Duplication of costs is removed for this licence area in regional and national summaries.

[g] Current production licence with a renewal application under consideration (The Crown Estate, pers. comm., 2012).

[h] The Crown Estate has advised that a production licence was issued in 2007 (pers. comm., 2012).

Scenario 1

H2.15 Scenario 1 assumes that the additional costs of assessing the impact of marine aggregate activity upon MCZ features will be incurred for licence renewals over the next 20 years for existing production, application and prospecting areas that are within 1km of an rMCZ. The licence areas (listed in Table 1) have been identified based on data on licence areas on The Crown Estate's

website[3] (described by The Crown Estate as data last reviewed on 8 March 2012). The renewal dates have been identified based on information provided by BMAPA, Natural England and The Crown Estate as specified in Table 1.

H2.16 It is assumed that future licence applications will not be submitted for areas that are currently unlicensed in option areas that are within 1km of an rMCZ. The Crown Estate has issued an operator with an option for each of these areas, following its acceptance of the operator's tender to extract aggregates from the area. The operator has applied for licences to extract aggregates within the option area, usually for smaller areas than the area that it initially tendered for. Further licence applications may be developed over the ten year period for which the operator has the option (The Crown Estate, pers. comm., 2012). Because licences have already been sought within all of the option areas that are within 1km of an rMCZ, and in the absence of information on future development of new licences, it is assumed that licences will not be sought for unlicensed areas.

H2.17 Scenario 1 is assumed to provide the best estimate of impact on future licence applications in the IA. This is because Natural England has advised that additional costs are likely to be incurred only for licence applications within 1km of an rMCZ (Natural England, pers. comm. 2011). Also BMAPA has indicated that this represents the situation that should arise in theory based on discussions throughout the regional project process. BMAPA is content for Scenario 1 to be used to calculate the best estimate (BMAPA, pers. comm., 2012).

Scenario 2

H2.18 Scenario 2 assumes that the additional cost for future licence applications applies to the following. Data on these are presented in Table 2:

- Additional costs for future licence applications are incurred for future licence renewals for all 70 existing production licence areas in the MCZ project area irrespective of distance from an rMCZ. BMAPA anticipates that these costs will arise even for licence renewals for areas that are some distance from an MCZ in order to provide sufficient information to the regulator and statutory nature conservation adviser (BMAPA, pers. comm., 2011). This is because, based on previous experience with other marine protected areas, it anticipates that there will be in a need to consider wider cumulative and in combination impacts on the MPA network. Although it is understood that this work is to be undertaken by JNCC and Natural England, BMAPA anticipates that the operator will be required to provide any additional data/evidence that may be required to inform the assessment (BMAPA, pers. comm., 2012).

- The high cost estimate for scenario 2 also includes additional costs for anticipated future licence applications for aggregate extraction in strategic resource areas that The Crown Estate has identified overlap with or are 'in close proximity' (distance not specified) to rMCZs (in feedback on draft IA material, 2011). These costs are included only in Scenario 2 to reflect uncertainty about whether licence applications will be submitted for strategic resource areas in future. Details of the information, including the numbers of anticipated future licence applications for the strategic resources areas, provided by The Crown Estate is included in Appendix 1 of this Annex.

[3] http://www.thecrownestate.co.uk/marine/downloads/marine-aggregate-downloads/

Table 2: Licence applications that are assumed to be subject to additional costs as a result of MCZs in Scenario 2

rMCZ	Areas for which it is assumed that additional costs for future licence applications will be incurred as a result of MCZs	Number of anticipated licence applications during the 20 year period covered by the IA	Year in which it is assumed that an additional cost will be incurred (during the 20 year period covered by the IA)
Entire MCZ project area	All existing licensed production areas within the MCZ project area	70 licences, with 2 applications per licence anticipated during the 29 year period covered by the IA [a]	The IA assumes that additional costs for these will be incurred in 2013 and 2028.
Balanced Seas project area	Strategic resource areas that overlap with or are in close proximity to an rMCZ	10 [b]	2027
Finding Sanctuary project area	Strategic resource areas that overlap with or are in close proximity to an rMCZ	1 [b]	2027
Irish Sea Conservation Zones project area	Strategic resource areas that overlap with or are in close proximity to an rMCZ	2 [b]	2027
Net Gain project area	Strategic resource areas that overlap with or are in close proximity to an rMCZ	4 [b]	2027

[a] Source: BMAPA (pers. comm., 2011).

[b] Source: The Crown Estate, feedback on draft material for the IA (2011).

H2.19 In Scenario 2, it is assumed that licences for every existing production licence area (and application determined within the first five years) will need to be renewed twice over the next 20 years. This is because the maximum term permitted is 15 years and around half of existing production licences will need to be renewed in the next 3–4 years (BMAPA, feedback on draft IA material, 2012). To apply consistent assumptions and avoid under-estimation of costs, the IA assumes that these costs will be incurred in 2013 and 2028. This is based on advice from Natural England (pers. comm., 23.6.2011) that the terms of about 40 existing production licences will end at the end of 2013 and is employed given that it is not proportionate for the analysis to employ the licence renewal date for each licence. The cost of Scenario 2 is estimated for the suite of rMCZs in the MCZ project area. It is not broken down by individual rMCZs because the costs for production licences could be incurred by one or more MCZs irrespective of where they are located.

H2.20 For strategic resource areas, it is assumed that the additional costs for future licence applications will be incurred in 2027 and that the applications will be submitted in 2028. This is because it is thought that the capacity of existing licences will be sufficient until at least this time (Natural England, pers. comm., 2011). Though the additional costs for future licence applications for strategic resource areas could be attributed to individual MCZs, this has not be done in the IA because they comprise only 12% of the licence applications considered in Scenario 2.

2.2 Assumptions made about mitigation of impacts of aggregate extraction upon features protected by rMCZs that are not rMCZ Reference Areas

Existing production, application and prospecting licences

H2.21 For existing production, application and prospecting licences, it is assumed that no additional mitigation of impacts is required, with the exception of rMCZ 16 in the Balanced Seas project area. This is because for all other rMCZs:

- there are no aggregate extraction, application or prospecting licence areas within 0.5km of a tidal excursion[4] from any habitats or species recommended for protection by the rMCZs that are sensitive to smothering. This assessment, which was conducted by Natural England with BMAPA, is based on consideration of the part of a licensed area that is actively extracted, tidal prisms, wider regional sediment processes and also where operators screen their loads (Natural England, pers. comm., 2011). While aggregate extraction production, application or prospecting areas may be located within 0.5km of an rMCZ, if the feature is neither at risk of nor sensitive to smothering, it is assumed that no additional mitigation is required;
- it is assumed that smothering effects (with a threshold of greater than 30cm deposition in one event) will not arise beyond 0.5km of a tidal excursion from a marine aggregate extraction, application or prospecting licence area (JNCC & Natural England, 2011a and d; Natural England, pers. comm., 2011). BMAPA (pers. comm. 2011) is content with this assumption.

H2.22 Between 0.5km and 2km, one can reasonably expect to encounter altered sea bed forms, such as sand waves and sand streaks, which may not be present if aggregate activity were absent (JNCC & Natural England, 2011a). In the screening process carried out by Natural England to inform the IA, these halo distances were applied in relation to known feature distribution within rMCZs. It was found that while rMCZs fall within 2km of aggregate extraction activity, no impact would occur beyond 0.5km. This is because the protected features within rMCZs have no exposure pathway, because, for example, they are elevated above the sediment veneers or facies (Natural England, pers. comm., 2011).

H2.23 The mitigation put forward for rMCZ 16 in the Balanced Seas project area is a three-month closure of marine aggregate extraction during the period that black bream *Spondyliosoma cantharus* nest in the rMCZ. The operators for the two production, application and licence areas adjacent to rMCZ 16 have been engaged in the discussions with the Balanced Seas project team and Natural England relating to rMCZ 16 and have offered the seasonal closure as a possible form of mitigation (BMAPA, pers. comm., 2011). It is assumed in the IA that this is a condition that would be applied to the marine licence for the full 15-year term and for subsequent years if the licence is renewed. BMAPA has indicated that, subject to this area being successfully permitted and then renewed, the area is likely to be used for aggregate extraction for 30 years based on what has happened with other production licence areas nearby (pers. comm., 2012). The seasonal closure that has been offered does not pre-judge the mitigation that would be required in practice.

H2.24 It is not thought that the overall tonnage available to the operators would be affected by the mitigation (Natural England, pers. comm., 2011), but additional costs could arise if there is not

[4] This refers to 0.5km along the tidal axis within the tidal extent footprint.

sufficient capacity in other nearby licence areas to maintain supplies to existing markets during the temporal restriction. In particular, if suitable replacement production licence areas are not within a 12-hour cycle time of the receiving wharves at Shoreham and Newhaven, the cost implications to the operator could be considerable (BMAPA, pers. comm., 2012). To reflect the range of costs, two management scenarios are employed in the IA for this site. BMAPA is content that these scenarios represent the most likely mitigation (pers. comm., 2011):

- Scenario 1: a three-month closure of the marine aggregate extraction area to mitigate impacts on nesting black bream, which is assumed not to incur any costs.
- Scenario 2: a three-month closure of marine aggregate extraction to mitigate impacts on nesting black bream, which is assumed to incur costs because it reduces the quantity of aggregates that is extracted from the area. The cost is estimated based on the cost of replacing the shortfall with aggregate sourced from a licensed area 40km away (further details provided in Section 3).

H2.25 The IA assumes that the best estimate of the mitigation costs is Scenario 1, on the grounds that it is reasonable to assume that the seasonal closure offered by the operators will not impact on production. BMAPA is content with this assumption (pers. comm., 2012)

Future strategic resource areas

H2.26 It is not known whether licence applications for prospecting or production in strategic resource areas will be submitted during the 20-year period of the IA, where they will be located and what activities will be proposed. Therefore, it is not possible for the IA to identify whether additional mitigation of impacts on MCZs will be required and therefore whether operators will incur additional costs as a result.

H2.27 The potential costs of mitigating the impacts on MCZ features of future proposals for aggregate extraction in strategic resource areas could be significant. In the event that mitigation impacted on the quantity extracted, the shortfall of supply could potentially be met through increased extraction from other licensed areas in the region (if they are operating below capacity), or from alternative sources, such as other marine licences in the UK, terrestrial extraction or recycling or imports. The immediate shortfall in supply might be met at increased cost in the short term, such as the cost of increasing capacity in other licences, but over the long term it is anticipated that the aggregate sector would adapt and utilise lower cost sources. Because of the high level of uncertainty, it is not possible to estimate the cost associated with additional mitigation.

2.3 Assumptions made about the mitigation of impacts of aggregate extraction upon features protected by rMCZ Reference Areas

Scenarios 1 and 2

H2.28 For the purposes of the IA, it is assumed that any aggregate extraction activity will be prohibited within 0.5km of a tidal excursion from any potential rMCZ Reference Area. This is because aggregate extraction is a depositional and extractive activity, which will not be permitted in an rMCZ Reference Area (JNCC & Natural England, 2010a).

H2.29 Only one rMCZ Reference Area is within 0.5km of a production area: rMCZ Reference Area 13 in the Balanced Seas project area. Further information is needed to determine what mitigation would be required, because this will depend on the impact that aggregate extraction has on the features in the rMCZ Reference Area. The Balanced Seas regional stakeholder group (RSG) specified that rMCZ Reference Area 13 should be taken forward only if the existing licensed activities taking place adjacent to it are allowed to continue (RSG meetings, 2011). However, given that the IA makes the assumption that no depositional activities will be permitted within an rMCZ Reference Area (JNCC & Natural England, 2010a), for the purpose of the analysis it is assumed that there is a risk that aggregate extraction could not continue within 0.5km of a tidal excursion of the rMCZ. To reflect this uncertainty, two management scenarios are employed in the IA for the site. BMAPA is content that these scenarios represent the most likely mitigation (pers. comm., 2011):

- Scenario 1: aggregate extraction can continue outside the rMCZ Reference Area and the operator is required to undertake ongoing monitoring of the site to assess the impact of aggregate extraction activity.
- Scenario 2: closure of the licensed area to mitigate impacts on features in the rMCZ Reference Area. The costs of this are estimated based on the cost of replacing lost aggregate supply with production from a licensed area 40km away (further details provided in Section 3).

H2.30 These scenarios do not pre-judge the mitigation that will be required in practice. The IA assumes that the best estimate of the costs of mitigation for the site is Scenario 1 because of the conditions under which the RSG recommended the site. BMAPA is content with this assumption (pers. comm., 2012)

3 Assessment of impacts

3.1 Assumptions about the increased costs of assessing environmental impacts

Scenarios 1 and 2

H2.31 BMAPA estimates that the regional BAP approach will cost £10,000/yr for it to produce a baseline report in the first year and an annual biodiversity action plan report in subsequent years (for as long as the approach is adopted). The annual report will update the baseline report so it reflects the current situation, informed by EIAs and monitoring programmes (BMAPA pers. comm., 2011 and 2012). The IA includes this as an annual cost arising from the suite of rMCZs in both Scenarios 1 and 2 and does not attribute it to individual rMCZ. BMAPA (pers. comm., 2011) anticipates that it will cost £2k per licence application for an operator to incorporate the assessment informed by the regional BAP approach into the EIA process. This is a one-off cost that is incurred for each licence renewal.

H2.32 In addition, BMAPA has estimated that the extra costs incurred in ensuring that licence decisions are based on sound advice will be in the region of £10,000 to £40,000 per licence application or renewal (BMAPA pers. comm., 2011). The upper figure is based on the assumption that two extra days of survey work are required and the cost of the resulting analysis, reporting, assessment and iterations and discussions between applicants, contractors, regulators and advisers. This range of additional costs represents a 4% to 8% increase in costs for the operator per individual licence application. It is subject to uncertainty as it is difficult to generalise the site specific impacts of the need for additional survey data, the processing and reporting associated

with this, and the additional assessment effort required, particularly as some sites will require work while others will not. There is also the uncertainty of the costs associated with supporting and informing the coherence impact assessment to be undertaken by the SNCB's (BMAPA pers. comm., 2011).

H2.33 Based on the above data, the IA assumes that the combined additional costs for assessing impacts on features of conservation interest and broadscale habitats per licence application is between £12,000 £42,000 per licence application. The midpoint of this range is employed in the analysis (£27,000 per licence application).

3.2 Assumptions about the increased costs of mitigation

H2.34 Management scenario 1 involves mitigation costs only for rMCZ Reference Area 13 in the Balanced Seas project area. It is estimated that the monitoring that would be required to demonstrate that aggregate extraction is having no adverse effect on the features of rMCZ Reference Area 13 would cost an additional £10,000 /yr. This cost would be incurred throughout the lifetime of the licence term. The estimate, which is based on information provided by BMAPA (pers. comm., 2011), includes the costs of the additional survey effort, analysis and reporting needed.

Table 3: Annual estimated costs of replacing lost aggregate supply with production from a similar licence 40km away and the associated assumptions

Description	Quantity
Assumptions:	
Licence tonnage (t)	500,000t
Average cargo size	1,840t
Number of cargos required to dredge 500,000t	272 cargos
Operational days to dredge tonnage on existing 12-hour cycle	136 days
Operational days to dredge replacement tonnage on new 24-hour cycle	272 days
Cargos lost based on 12:24 comparison	136 cargos
Revenue lost to business through reduced vessel productivity	£1,501,440
Additional fuel burnt	247t
Additional CO_2 emissions	787t
Cost of additional fuel (max)	£160,403
Cost of additional fuel (min)	£61,694
Maximum annual cost to business	£1,661,843

*The above estimates are based on the following additional assumptions: 1) operational cycle times for vessels determined by the tidal cycle – with vessels being able to access wharves only around high water; 2) transit speed of 10 knots (18.52km/hr) – any additional steaming beyond 20km distance (40km per cycle) would not be able to be accommodated within existing cycle times; 3) fuel is consumed at a constant rate over a 12-hour period, irrespective of distance travelled; 4) maximum fuel cost £650/t (based on 24-month period); 5) minimum fuel cost £250/t (based on 24-month period); and 6) tonnes CO_2 per tonne fuel burnt: 3.19t.
Source: BMAPA pers. comm. (2011).

H2.35 For Scenario 2, mitigation costs arise for both rMCZ 16 and rMCZ Reference Area 13 in the Balanced Seas project area. These are estimated using a case study example of the costs of replacing lost aggregate supply with production from a licensed area 40km away, which was

produced by BMAPA for the near-shore Special Area of Conservation Impact Assessment process (pers. comm., 2011). The estimates, presented in Table 3, are based on the assumption that the 500,000 tonnes of aggregates are lost from the closure of the licence area and are replaced with production from a licensed area 40km away. It is assumed that a vessel would change from a 12-hour cycle time to a 24-hour cycle time as a result. These assumptions are made to avoid under-estimation of the additional costs. The costs were provided by BMAPA as a case study for use in IAs for previous recommendations of marine protected areas. It is assumed that the operational costs that could be incurred for management scenarios that involve seasonal and full closure of the licence areas adjacent to rMCZ 16 and rMCZ Reference Area 13 respectively could be similar (BMAPA, pers. comm., 2011).

H2.36 For rMCZ Reference Area 13, it is assumed that the costs in Table 3 would be incurred annually if the licensed area were closed permanently. For rMCZ 16, it is assumed the costs of a three-month closure are a quarter of the costs of an annual closure. As rMCZ 16 is adjacent to two licence areas (453 and 488), the IA assumes that the cost arises for both licence areas (it is doubled) to calculate the total cost of mitigation to the operators.

H2.37 The costs presented in Table 3 do not include the financial consequences to the operator of the loss of an existing production licence area. They also do not include the additional costs per cargo arising from increased wear and tear on vessels from additional distance travelled or the increased routine maintenance costs per cargo arising from a less efficient operating cycle. As such, the actual cost of closing a licensed marine aggregate production area would be greater than the total given in Table 3 (BMAPA, pers. comm., 2011), but estimates of these impacts are not available.

3.3 Concerns about additional impacts raised by BMAPA:

H2.38 Concerns raised by BMAPA about additional impacts that MCZs could have on aggregate extraction are summarised in Annex J1a.

4 Limitations

H2.39 There are a number of limitations associated with the approach adopted for the analysis that derive from the assumptions made for the purposes of the IA. These include the following:

- The licence applications that will be submitted in future are not known with certainty. BMAPA has indicated that new tender rounds are likely to take place (pers. comm., 2011). The Crown Estate has indicated the strategic resource areas that licence applications may be submitted for over the 20-year period of the IA and the number of applications that may be submitted (feedback on draft IA material, 2011). However, these estimates are subject to considerable uncertainty. Consequently, the IA may underestimate or over estimate the number of future licence applications that will subject to additional costs as a result of MCZs and therefore incorrectly estimate the additional cost.

- The additional mitigation of impacts of aggregate extraction on features protected by MCZs is not yet known as it will be determined in future licensing decisions. Consequently, the IA may under estimate or over estimate the costs of the mitigation of impacts that will be required.

- It is not known whether mitigation of impacts will be needed for future aggregate extraction from strategic resource areas or what form this mitigation would take. The costs of this could be potentially significant.

- The additional cost of assessing impacts on MCZ features for future licence applications may differ depending on the nature of the aggregate extraction activity and the MCZ in question. The estimated additional average cost per licence employed in the IA may over-estimate the additional costs or under-estimate them (for example for a proposal that needs to consider impacts on more than one MCZ).

- In Scenario 2, the costs of sourcing aggregate supplies from an alternative source do not include the full costs to the operator.

References

JNCC & Natural England. 2011a. *Draft assumptions for use in the Impact Assessment for Marine Conservation Zones (MCZs) about the additional mitigation of impacts from certain licensed activities that is likely to be required for features protected by MCZs. 24.6.2011*

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Natural England & JNCC. 2011d. *Supplementary advice on the impacts of MCZs on information provision and decisions in relation to marine licensing proposals.* Version 4.0 (working draft).

JNCC & Natural England. 2010a. *Annexes to Marine Natura 2000 Site Impact Assessments.*

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Appendix 1: Information provided by The Crown Estate on strategic resource areas

Source: The Crown Estate, feedback on draft IA material (2011).

"Based on the overlay, and forward thinking of the future leasing round planned this year, The Crown Estate has attempted to predict the likely number of licence applications within each of these [strategic resource] areas to account for the additional cost and effort that might be required for EIAs to assist with Impact Assessment:

Aggregate Resource:

Netgain

- Netgain MCZ 4 (Source: Prospective area: BGS 2011) A 'prospective area' means an area of high potential for marine sand and gravel deposits to be found, based on evidence of geological features and depositional processes. There is the potential to be at least 1 licence application in the next twenty years.
- Netgain MCZ 6 (Source: Prospective area: BGS 2011) A 'prospective area' means an area of high potential for marine sand and gravel deposits to be found, based on evidence of geological features and depositional processes. There is the potential to be at least 1 licence application in the next twenty years.
- Netgain MCZ 9 (Source: Prospective area: BGS 2011) A 'prospective area' means an area of high potential for marine sand and gravel deposits to be found, based on evidence of geological features and depositional processes. There is the potential to be at least 1 licence application in the next twenty years.
- RA NG4 (Prospecting area: source BGS 2011) 0 licence applications within area in a twenty year period but likely to be at least one application in close proximity that would subject to additional EIA requirements

Balanced Seas

- Balanced Seas MCZ 8 Goodwin Sands (MaRS 2011) 1 potential licence application in twenty years and also one in close proximity outside that would be subject to EIA licence requirements
- Balanced Seas MCZ RA 6 Goodwin Sands (MaRS 2011) 1 potential licence application in twenty years and also one in close proximity outside that would be subject to EIA licence requirements
- Balanced Seas MCZ 9 Offshore Foreland (MaRS 2011) 0 licence applications within area in a twenty year period but likely to be at least one application in close proximity that would subject to additional EIA requirements
- Balanced Seas MCZ 13.1 Beachy Head (MaRS 2011) 0 licence applications within area in a twenty year period but likely to be at least one application in close proximity that would subject to additional EIA requirements
- Balanced Seas MCZ 31 Inner Bank (MaRS 2011) 1 potential licence application in twenty years
- Balanced Seas MCZ 17 Offshore Overfalls (MaRS 2011) up to 2 potential licence application in twenty years

- Balanced Seas MCZ 22 Bembridge (MaRS 2011) 0 – too close to current licences
- Balanced Seas MCZ 30 Kentish knock East (MaRS 2011) 0 licence applications within area in a twenty year period but likely to be at least one application in close proximity that would subject to additional EIA requirements

Finding Sanctuary

- Finding Sanctuary North of Lundy (MaRS 2011) 0 licence applications within area in a twenty year period but likely to be at least one application in close proximity that would subject to additional EIA requirements

Irish Sea

- Irish Sea MCZ Mud Hole (MaRS 2011) 1 potential licence application in twenty years
- Irish Sea MCZ Mud Hole RA 1 (MaRS 2011) 0 licence applications within area in a twenty year period but likely to be at least one application in close proximity that would subject to additional EIA requirements

The Crown Estate has only provided input on where the higher value resource is likely to be impacted. Please note there are other areas within the UK seabed that offer good resource potential but it is the areas listed above which offer the most important strategic resource which should be safeguarded to service future industry."