Annex F1 Regional Summary (Balanced Seas)

Contents

1 Introduction

F1.1 This annex provides a summary of the baseline situation for the environment and human activities in the Balanced Seas Project Area, in the absence of Marine Conservation Zones (MCZs), over the Impact Assessment's (IA's) 20-year period of analysis. A summary of impacts is also provided for human activities that will be impacted by recommended Marine Conservation Zones (rMCZs), over the IA's 20-year period of analysis.

F1.2 In the Balanced Seas Project Area, the recommended Marine Protected Area (MPA) network is presented as two alternative network options, since the regional stakeholder group (RSG) has put forward two configurations for one particular site (rMCZ 29 and rMCZ 29.2), where the sector representatives could not reach agreement on a single option. The expectation of the RSG was that the IA would demonstrate the economic and social implications of each of the options (rMCZs 29 and 29.2), which will assist in the decision-making process (Balanced Seas Final Report, 2011). The only sector impacted in rMCZs 29 and 29.2 is commercial fisheries, and issues associated with the two network options have thus only needed to be addressed in the 'Commercial fisheries' section (see below).

2 Environment

2.1 Regional baseline summary

F1.3 The Balanced Seas project area covers the sea surrounding England's south-east coast, from just north of the Suffolk border (ending at the northern shore of the River Deben) around to the Hampshire/ Dorset border, and out to the median line that separates the UK continental shelf from France, Belgium and the Netherlands. With a total of about 18,700 km^2, it is the second smallest project area out of the four regional MCZ projects (less than one quarter of the size of Finding Sanctuary and Net Gain's project areas), but involves some of the busiest and most heavily used UK waters (UKMMAS, 2010).

F1.4 The Balanced Seas Project Area is predominantly shallow (10–40 metres below chart datum), with a gently sloping sea bed; the maximum depth is 85 metres in St Catherine's Trench, south of the Isle of Wight. The shallow nature of these waters results in high productivity, although this is constrained by the fairly high turbidity, a result of the extensive areas of sediment sea bed, especially in near-shore waters and in the southern North Sea and Dover Strait. Visibility in inshore waters can reach a maximum of about 8 metres, but 1–3 metres is more typical. As a result of the turbidity, algal biomass in sublittoral waters is relatively low, but there is a high biomass and diversity of animal life, especially suspension feeders (UKMMAS, 2010).

F1.5 The seas around south-east England include sea caves, kelp forests, meadows of anemones and sponges, chalk reefs and other habitats supporting an array of species, including pilot whales, mantis shrimp, sharks, thornback and rays, sole, plaice, dab and other fish. Extending from the shore is a complex mosaic of habitat, varying with depth, current strength, substrate type, turbidity and other physical parameters (Browning, 2002). The coastline habitats consist of shelving sand, shingle and pebble beaches, interspersed with significant stretches of cliffs. The main offshore habitats are large expanses of sands and gravels. Tidal currents are strong and the water is well mixed and relatively turbid. Sea-surface temperatures vary from 4 °C in winter to 19 °C in summer (James and others, 2011).

F1.6 Of the features listed in the Ecological Network Guidance (ENG), 22 broad-scale habitats, 17 species of conservation interest and 14 habitats of conservation interest occur in the South-East. The 17 species and 14 habitat Features of Conservation Importance (FOCI) have statutory protection, as they are included on the Oslo and Paris Convention (OSPAR) List (of Threatened and/or Declining Species and Habitats), the UK List of Priority Species and Habitats (the UK Biodiversity Action Plan) and/or Schedule 5 of the Wildlife and Countryside Act 1981. However, none of the MCZ features currently have conservation objectives under these listings. Any species and habitats already protected by Special Protection Areas (SPAs) or Special Areas of Conservation (SACs) that overlap with an rMCZ are not proposed for MCZ designation.

F1.7 The Balanced Seas Project Area supports 68% of the UK extent of coastal chalk exposures and 5.8% of the total number of submerged sandbanks in European waters. Important littoral and sublittoral reefs of chalk limestone, sandstone, mudstone and clay, and some of the UK's largest offshore gravel deposits, are also found in the Balanced Seas Project Area (James and others, 2011).

F1.8 In the northern part of the Balanced Seas Project Area, the waters are shallow and estuaries are common. Here, there are ancient river valleys filled with gravel and other sediment, sandbanks and sandwaves, with ecologically important subtidal sand present further offshore. A large native oyster population is found in the Blackwater Estuary, and this is the only place in the South-East inhabited by the lagoon sea slug *Tenellia adspersa* (Browning, 2002). The beds of the Thames, Medway and Swale Estuaries are composed of shells, pebbles, sands and mud (James and others, 2011). The Thames Estuary supports the largest population of the rare tentacled lagoon worm *Alkmaria romijni*, as well as being a nursery area for smelt and eel.

F1.9 A change of habitat occurs in the Thanet area of the coastline, where chalk cliffs dominate and subtidal chalk ledges and reefs occur, but the sea bed remains shallow with numerous sandbanks, including the Goodwin Sands which lies offshore. Around Dover, the sea bed deepens abruptly offshore, reaching 20 metres in depth 1.5km from the coast. Offshore, unusual habitats can be found (e.g. rMCZ 11.4 Folkestone Pomerania), where deep holes in the sea bed provide sanctuary for fragile sponges, sea anemones and slow-growing Ross corals.

F1.10 The Sussex coast has a gently sloping sea bed, where chalk and sandstone reefs, subtidal chalk gullies and ledges provide suitable habitat for an abundance of marine life. The adjacent offshore sea bed is predominantly rocky, with some sands and gravels present (UKMMAS, 2010). This portion of the sea bed is the surface of the submerged Thames-Rhine river system that flowed between the English coast and the continent before and during the last ice age.

F1.11 Sands, gravels, scattered sandstone and rocky chalk outcrops dominate the sea bed to the west of Brighton and support a rich variety of biodiversity and important fishing grounds. The Solent, Isle of Wight and Hampshire coasts have a huge diversity of marine wildlife and habitats. Areas of offshore sand and gravel banks are found to the south of Sussex, providing a rich habitat for sand eels, undulate rays and bass. The Solent is shallow throughout, typically reaching a maximum dredged depth of 15–20 metres in the central channel. Off Hurst Spit in the western Solent, strong tidal currents scour the channel to over 50 metres deep. South of the Isle of Wight, the sea bed drops to a gently sloping plain 30–50 metres deep. In the southernmost parts of the

Balanced Seas Project Area, close to the Median Line, the water depth is about 50–60 metres (Browning, 2002).

F1.12 The Balanced Seas Project Area falls into two of the regions covered by Charting Progress 2, which describes the state of the UK seas (UKMMAS, 2010): the southern North Sea region; and the Eastern Channel region. The main issues for these regions are as follows.

- Although there are signs in some areas that the quality of demersal fish communities is improving, fishing is still having an impact on commercial fish stocks, demersal fish and sea bed sediment habitats.
- Inputs of many hazardous substances are decreasing, but there is a persistent legacy of some substances in industrialised estuaries, with some of the highest concentrations of these in the country.
- Although eutrophication is no longer a problem for coastal waters, there are still problems in coastal harbours and estuaries.
- Populations of dolphins, whales and porpoises are in good condition in some areas but impacted by fisheries by-catch in others; harbour seal populations are decreasing in some areas but the cause of the decrease is not known.
- Seabird populations have experienced declines, and this has been linked to summer storms and predation.

F1.13 Other threats to marine systems in the South-East include: changes in ocean processes, including a rise in sea temperature; rise in sea levels (see paragraph F1.13 and ocean acidity; and human activities threatening and damaging sensitive ecosystems. Such changes pose threats to the long-term viability of marine ecosystems (UKMMAS, 2010).

F1.14 South-east England has one of the highest rates of relative sea-level rise in the UK. This is both a function of global sea-level rise and the local lowering of the land, which is caused by continued tilting of the British landmass as it readjusts from the weight of the last British ice sheet. (Land is rising/rebounding in northern Britain, in areas that the ice sheet occupied, and lowering in much of southern Britain, where the ice sheet was not present (Browning, 2002). This is resulting in loss of littoral habitats due to coastal erosion, inundation and coastal squeeze (the process by which coastal habitats and natural features are progressively lost or drowned, caught between coastal defences and rising sea levels (Natural England, pers. comm., 2012)), and means that coastal defence and shoreline management plans are important issues in this Balanced Seas Project Area.

2.2 Regional summary of impacts

F1.15 The final recommended network configuration in the Balanced Seas Project Area consists of 30 rMCZs (two of these are alternative options for one site, as explained in paragraph F1.2, so that the recommendations are for a suite of 29 rMCZs and one rMCZ Reference Area) and 25 rMCZ Reference Areas. These sites, combined, cover a total area of 3816.20km^2 (Option 1 including rMCZ 29.2) and 4022.41km^2 (Option 2 including rMCZ 29), which is approximately 20% and 22% respectively of the total Balanced Seas Project Area. A range of estuarine, inshore and offshore rMCZs capture the full range of benthic habitats in the Balanced Seas Project Area.

F1.16 The 30 rMCZs in the Balanced Seas Project Area propose designated protection for 17 species FOCI, 14 habitat FOCI and 22 broad-scale habitats. A total of 333[1] conservation objectives are proposed comprising:

- 80 'recover' conservation objectives across 28 rMCZ features;
- 142 'maintain' conservation objectives across 51 rMCZ features;
- within rMCZ Reference Areas, 111 'recover' conservation objectives across 46 rMCZ features.

F1.17 Recommended MCZs with 'maintain' conservation objectives are likely to prevent deterioration in ecosystem services, while rMCZs with 'recover' conservation objectives are likely to increase the level of ecosystem services. In addition, the rMCZs would have the following anticipated benefits in terms of improvement of the environment:

- enabling the protection and management of representative examples of marine ecosystems to ensure their long-term viability and the maintenance of genetic diversity;
- enabling the protection of rare, threatened and/or endangered species and populations and the conservation of the habitats critical to the survival of such species;
- providing benefits to commercial species as a result of biodiversity conservation measures.

F1.18 The rMCZs in the Balanced Seas Project Area capture the full range of ENG features present in the Balanced Seas region, and thus would enable protection and management of representative examples of marine ecosystems and biodiversity in the region, and also enable the protection of those rare, threatened and/or endangered species and populations in the region and the conservation of the habitats on which they depend.

F1.19 For example, broad-scale habitats would be protected in 27 rMCZs (90% of the total number of rMCZs). Of particular importance in the South-East are: A5.4 subtidal mixed sediments (covers 40% of the Balanced Seas Project Area); A5.2 subtidal sand (32% of the Balanced Seas Project Area); and A5.1 subtidal coarse sediment (12% of the Balanced Seas Project Area). The rMCZs, combined with existing MPAs in the South-East, will protect 25–27%, 19–20% and 20% of these broad-scale habitats respectively within the Balanced Seas Project Area (the ranges relate to the two network options). For these broad-scale habitats, there are 33 'recover' conservation objectives, generally relating to bottom gear. Closure of these rMCZs to mobile bottom gear would therefore potentially result in the recovery of nearly one quarter of the area of these habitats in the South-East.

F1.20 The 14 habitat FOCI would be protected in 28 rMCZs (93%), through 43 'recover' conservation objectives and 37 'maintain' conservation objectives. Of particular importance in the South-East are littoral chalk, native oyster beds, Ross worm reef, seagrass beds, subtidal chalk and subtidal sands and gravels.

[1] One conservation objective (for *Sabellaria* in rMCZ 14 has yet to be confirmed, and has not been included in this total.

F1.21 The 17 species FOCI would be protected in 18 rMCZs (60%). Of particular importance in the South-East, on account of their rarity and the fact that this region provides key conditions for their existence, are native oyster, peacock's tail (eastern limit of distribution) and tentacle lagoon worm. For these species of conservation importance, there are only three 'recover' conservation objectives for rMCZs (all for native oyster), but in many cases, the key populations of the species FOCI have been identified for protection within an rMCZ Reference Area.

F1.22 In terms of providing benefits to commercial species through biodiversity conservation, rMCZ 3 Blackwater, Colne, Roach and Crouch Estuaries would be very important in promoting the health of this area for the benefit of the native oyster. In the Solent, rMCZ 22 Bembridge, rMCZ 23 Yarmouth to Cowes and rMCZ 24.2 Fareham Creek would similarly contribute to the recovery of the marine environment for this species.

3 Aggregates

3.1 Regional baseline summary

F1.23 The predominance of sedimentary habitats in the Balanced Seas Project Area means that this is one of the most important regions in England for the aggregates industry, which has three major extraction areas here: off the Sussex coast, adjacent to the Isle of Wight, and in the Outer Thames. In the Balanced Seas Project Area, there are 13 production licences within 1km of an rMCZ (rMCZs 16 (Kingmere), 17 (Offshore Overfalls), 22 (Bembridge), 28 (Utopia), rMCZ 28 Reference Area 13 (North Utopia), 29 (East Meridian), and 29.2 (Eastern Section)) (identified using data from The Crown Estate's website; for further details see Annex H2). Three licence applications are currently being considered for areas within 1km of an rMCZ (rMCZs 16 (Kingmere), 17 (Offshore Overfalls), 28 (Utopia), rMCZ 28 Reference Area 13 (North Utopia)).

F1.24 There are existing licences in all option areas[2] within 1km of an rMCZ. In the Balanced Seas Project Area, 8 rMCZs overlap with or are in close proximity to a strategic resource area (The Crown Estate, feedback on draft IA material, 2011). These are areas that are not currently licensed where evidence of geological features and deposition processes suggests there is potential for sand and gravel deposits to be found) (The Crown Estate, feedback on draft IA material, 2011).

3.2 Regional summary of impacts

F1.25 Two management scenarios are employed in the IA, which provide low and high cost estimates that illustrate the potential range of impacts of rMCZs upon the marine aggregate extraction sector. Further details on the specific management scenarios and calculation of the costs for individual rMCZs are provided in Annex I.

Low cost management scenario impacts

F1.26 The low cost scenario assumes that future licence applications for aggregate extraction (for production and application) within 1km of an rMCZ will need to assess the potential impact of the

[2] The Crown Estate issues an operator with an option following its acceptance of the operator's tender to extract aggregates from an area. The operator applies for licences to extract aggregates within the option area, usually for smaller areas than the area that it initially tendered for (The Crown Estate, pers. comm., 2012).

activity upon the MCZ features' conservation objectives. It is estimated that the additional cost will be incurred for a total of 20 applications for 16 licensed areas over the 20 years covered by the IA. It is assumed that as well as the additional one-off average cost of £0.027m per licence application (based on information provided by BMAPA, pers. comm., 2011) BMAPA will also incur a total cost of £0.010m/yr to provide information that all operators can use for these assessments. This cost arises from the entire suite of suites.

F1.27 The operators of licence number 395 are assumed to incur additional costs (of £0.010m/yr; BMAPA, pers. comm., 2011) to monitor the impact of aggregate extraction upon features in rMCZ Reference Area 13 (North Utopia). It is assumed that no costs are incurred as a result of the three month closure to aggregate extraction offered by operators to mitigate impacts on features of rMCZ 16 (Kingmere) in the same project area. Overall, the total cost to the aggregate sector of the low cost management scenario for all rMCZs is estimated to be £0.033m/yr and the present value is estimated to be £0.453m over the 20-year period of the IA. Scenario 1 provides the best estimate of the impacts of rMCZs on aggregate extraction, and BMAPA is content with this (pers. comm., 2012)..

High cost management scenario impacts

F1.28 The high cost scenario assumes that an additional cost to assess impacts on MCZ features will be incurred for future licence applications for all existing production licences in the MCZ project area. It is estimated that this will apply to a total of 140 applications for 70 licensed areas over the 20 years covered by the IA (BMAPA, pers. comm., 2011). As for the low cost scenario, it is assumed that BMAPA will incur an annual cost of £0.010m/yr to provide information that operators will use for their assessments. The scenario also assumes that additional costs will be incurred for future licence applications for strategic resource areas. It is estimated that a total of 17 applications (The Crown Estate, feedback on draft IA material, 2011) will be submitted in 2028. It is assumed that capacity of existing resources will be sufficient at least until this time (based on advice of Natural England, pers. comm., 2011). As for the low cost scenario, it is assumed that the additional one-off cost per licence application is £0.027m per licence application..

F1.29 The high cost scenario also assumes that costs arise from mitigation of impacts on features at two sites. It is assumed that the three month closure offered by operators of adjacent licensed areas (453 and 448) to mitigate impacts on Balanced Seas rMCZ 16 (Kingmere) results in a reduction in aggregate extraction. It is also assumed that closure to extraction at licence area 395 is necessary to mitigate impacts on features in Balanced Seas rMCZ Reference Area 13 (North Utopia). In both cases, the additional costs are estimated in terms of replacing the shortfall with aggregate sourced from a licensed area 40km away. This does not include increased routine maintenance costs that may arise and greenhouse gas emissions may increase as a result of transporting aggregates over greater distances.

F1.30 For licence areas 453 and 448, the seasonal closure for three months to mitigate impacts on breeding black bream in rMCZ 16 Kingmere) is estimated to result in additional costs of £0.415m/yr for each of the 2 operators.

F1.31 In the high cost scenario, permanent closure of licence area 395 to mitigate impacts on features of rMCZ Reference Area 13 is estimated to result in additional costs of £1.662m/yr.

BMAPA has indicated that for the two companies that operate the licence, this scenario would result in loss of sunk investment, loss of value of the aggregate asset in the site and could also result in loss of potential value added (particularly from ready-mixed concrete) and impacts on local businesses and employment (pers. comm., 2012). The licence is a significant part of the business of both operators (it is the only marine aggregate licence held by one of them) and the consequences for the operators of impacts arising from constraints on the licence could be significant (BMAPA pers. comm., 2012). The licence area is also expected to have an increasingly significant role in the supply of aggregates for use in construction and coastal defence in southern England in the long term (BMAPA feedback on draft IA material, 2012)

F1.32 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.

Additional concerns raised by stakeholders

F1.33 The Crown Estate is very concerned about the impact of rMCZ 8 (Goodwin Sands) and rMCZ 8 Reference Area 6 (Goodwin Knoll) on strategic aggregate resource. This is because as well as offering features of important conservation value, the Goodwin Sands bank system is a dynamic highly mobile system which contains highly significant volumes of aggregate resource of various grading. Within the boundary of rMCZ 8 (Goodwin Sands), there is an important block of potential aggregate resource which includes South Sand Head, the Historic Area 342 aggregate licence (Dover Harbour Board) and the North Head of South Calliper. The block contains a strategic resource, both in volume and location terms, for coastal defence, coastal development and construction to supply a range of markets and projects. Goodwin Sands has been dredged previously primarily for fill aggregate for infrastructure projects at Dover and Ramsgate, with 5 licences being issued covering the North Goodwin and South Goodwin areas (293/1, 304, 342, 352 and 365) with over 9.5 million tonnes (6.3 million m3) extracted between 1976 and 1998 (The Crown Estate, feedback on draft IA material, 2011).

F1.34 The Crown Estate seeks ability for dredging to occur within this potential resource block should it be required in the future, though there is not necessarily a presumption that dredging will occur across the block. The Crown Estate has indicated that closure of the resource block to aggregate extraction would have significant economic impacts on aggregate industry and potential knock on effects on construction, beach recharge and coastal protection operations. To safeguard this strategically important resource for the forthcoming leasing round, The Crown Estate suggests that rMCZ 8 (Goodwin Sands) is designated using a zonal approach that would allow aggregate extraction from the potential resource block for essential mineral resource supply (The Crown Estate, feedback on draft IA material, 2011).

4 Aquaculture

F1.35 No impact of rMCZs on aquaculture in the Balanced Seas Project Area is anticipated under any of the IA scenarios. As such, no further description of the sector is provided here. (As noted in

Annex I1, aquaculture takes place in at least two rMCZs (3 and 10), but these sites will not impact this sector at current levels).

5 Archaeological heritage

5.1 Regional baseline summary

F1.36 The data sources for the national baseline description provided by English Heritage (pers. comm., 2012) for archaeology are set out in the method paper (see Annex H4).This national baseline description summarises known archaeology in all rMCZs and includes archaeological features both within and in the vicinity of rMCZs (terrestrial features are thus sometimes included). Archaeological activities, for the purpose of the IA, comprise diver trails, recreational and educational visits, surveys (both intrusive, including sediment sampling, and non-intrusive), surface recovery of artefacts and full site excavations.

F1.37 In the Balanced Seas Project Area, evidence of archaeological features is found in, or adjacent to, a total of 22 rMCZs that are not rMCZ References Areas and in, or adjacent to, 19 rMCZ Reference Areas. These features include both designated and non-designated sites.

F1.38 Designated sites include designated historical shipwreck sites, Scheduled Monuments, listed buildings, registered parks and gardens, battlefields and World Heritage Sites. In the south-eastern rMCZs there are some 12 designated shipwrecks designated under the 1973 Protection of Wrecks Act. rMCZ 8 Goodwin Sands has a particularly high concentration, with 5 designated wrecks (*Restoration*, *Northumberland*, *Stirling Castle*, *Rooswijk*, the *Admiral Gardner*); other designated wrecks are HMS *Bulwark* (rMCZ 6), the *Langdon Bay* (rMCZ 11.1), the *Amsterdam* (rMCZ 13.1), *Yarmouth Roads* (rMCZ 23) and HR Submarine A1 (rMCZ 31), and HMS *Assurance* and HMS *Pomone* (rMCZ 20) (English Heritage, pers. comm., 2012). There are several listed buildings abutting rMCZ Reference Areas, such as Droit House and Beachy Head Lighthouse. Non-designated sites include all features that might be considered part of the historical environment – from prehistoric flint scatters, artefacts, evidence of previous settlement activity to shipwrecks. Within the Balanced Seas rMCZs, there are numerous non-designated ship and aircraft wrecks of mixed European origin, evidence of WWII activity, 17th-century to 19th-century salt workings, Viking and Anglo-Saxon artefacts, and evidence of Neolithic, Iron Age and Bronze Age activity (see Annex I1 for details).

5.2 Regional summary of impacts

F1.39 The designation of rMCZs could impact on the assessment of wreck sites that are candidates for designation under the Protection of Wrecks Act 1973. This often requires the removal of objects (e.g. ceramics, dendrochronology samples) for dating purposes. English Heritage may also incur associated costs to ensure support for rMCZ conservation objectives through adopting ‘approved’ archaeological investigative techniques. Any consideration of such techniques must include all aspects of delivery, including how vessels employed on archaeological projects must anchor on site.

Source of costs

F1.40 Management of archaeological activity is anticipated to differ in rMCZ Reference Areas and non-Reference Area rMCZs (see Annex H4 for further details).

F1.41 In non-Reference Area rMCZs, there will be an anticipated increase in costs of assessing environmental impacts for future licence applications. However, it is not anticipated that any additional mitigation of impacts on features protected by the rMCZ will be needed relative to the mitigation provided in the baseline. Archaeological excavations, surface recovery, intrusive and non-intrusive surveys, diver trails and visitors will be allowed.

F1.42 In rMCZ Reference Areas, there will be an anticipated increase in costs of assessing environmental impacts for future licence applications. Archaeological excavations, surface recovery and intrusive surveys will be prohibited from the entire site. Diver trails, visitors and non-intrusive surveys will be allowed.

Management scenario impacts

F1.43 An extra cost would be incurred in the assessment of environmental impact made in support of any future licence applications for archaeological activities in an rMCZ. This may be in an rMCZ with existing archaeological sites or in one where there are no existing records of archaeological heritage. The likelihood of future licence applications being submitted is unknown, so no overall cost to the sector has been estimated. Based on the prevalence of existing records, and accessibility issues, licence applications are more likely in coastal and inshore rMCZs than those further offshore. The additional cost for one licence application could be in the region of £500–£10,000 (English Heritage, pers. comm., 2012).

F1.44 It is anticipated that the prohibition of archaeological activities in rMCZ Reference Areas (with the exception of diver trails, visitors and non-intrusive surveys, which will be allowed) would potentially have an impact on 19 locations (i.e. those rMCZ Reference Areas identified by English Heritage as having important archaeological features). In rMCZ Reference Areas, if archaeologists respond to the prohibition of excavation by undertaking an alternative archaeological excavation in another locality, this could result in additional costs to the archaeologists. As it is not possible to predict when, or how often, this could occur, this is not costed in the IA.

F1.45 The rMCZ Reference Area of greatest concern to English Heritage is rMCZ Reference Area 6 Goodwin Knoll, which is on the Goodwin Sands where large numbers of wrecks are found. This rMCZ Reference Area contains a large quantity of archaeological evidence (674 records) and thus has the potential to impact excavation activities greatly.

F1.46 The prohibition of excavation and therefore interpretation of archaeological evidence from the site will decrease acquisition of historical knowledge of past human communities from the site, resulting in a cost to society.

6 Cables

6.1 Regional baseline summary

F1.47 There are numerous telecommunication and power cables that pass through rMCZs in the Balanced Seas Project Area. Most are operational, but some are proposed and have yet to receive consent.

6.2 Regional summary of impacts

F1.48 It is not anticipated that any existing or operational cables will be impacted on by rMCZs in the Balanced Seas Project Area. The IA assumes that only licence applications for future cable proposals could incur an additional cost due to rMCZs.

F1.49 It is not yet known where future cables will be proposed. However, the IA estimates that between none and two cables will be proposed in the Balanced Seas Project Area over the 20-year period of the IA (lowest and highest estimate respectively). The best estimate is that one cable will be proposed in the Balanced Seas Project Area over this timeframe. It is not anticipated that any future cable proposals will seek to pass through rMCZ Reference Areas in the Balanced Seas Project Area (UK Cable Protection Committee, pers. comm., 2012).

F1.50 It is assumed that each licence application will be required to consider its impact on MCZ features and its conservation objectives. The additional cost per licence application to do this is estimated to be £0.001m. The present value of the cost to the sector of rMCZs in the Balanced Seas Project Area is estimated to range from £0.013m to £0.040m over the 20-year period of the IA (lowest and highest cost respectively). The best estimate of impact is £0.027m over the 20-year period of the IA.

7 Coastal development (excluding ports and harbours)

7.1 Regional baseline summary

F1.51 The Balanced Seas Project Area is subject to heavy coastal development, given its high population and that it includes both the capital city and several major ports. In the context of the IA, there are three proposed coastal developments within (or within close proximity of) rMCZs that are of particular note: the Thames Airport and the Lower Thames Crossing (rMCZ 5); and the Bradwell Nuclear Power Station (rMCZ 3).

F1.52 Proposals for rMCZ 5 Thames Estuary involve:

- a new airport in the Thames estuary, which would require a new road and rail link between Kent and Essex, a tidal surge barrier, three tidal lagoons to harness hydro-electric power and a new sea port (www.halcrow.com/Thames-Hub/PDF/Thames_Hub_vision.pdf).
- the Lower Thames Crossing, for which three major options have been proposed to the east of the Dartford crossing (tunnel/QE11 Bridge): (i) an additional road crossing at the current Dartford Crossing**,** removing the old Dartford crossing tunnels; (ii) a new road crossing in the Swanscombe Peninsula area, connecting the A2 near Dartford (south) to the A1089 road, north of the Tilbury Docks; or (iii) a new road crossing connecting the M2 motorway and M20 motorways in the south with the M25 (Kent County Council, 2010).

F1.53 The old Bradwell Nuclear Power Station is being decommissioned but the site is one of eight in the UK identified in 2010 as suitable for construction of a new nuclear power station (World Nuclear Association, 2012). Should this site be chosen, it would lie within rMCZ 3 Blackwater, Crouch, Roach and Colne Estuaries.

7.2 Regional summary of impacts

F1.54 It is likely that all of these developments will incur additional costs of mitigation of impact and additional costs in the assessment of environmental impact in future licence applications due to the designation of rMCZs. It has not been possible to identify costs of licences or mitigation so early on in the proposals, as the impact is currently unknown.

8 Commercial fisheries

8.1 Regional baseline summary

F1.55 The Balanced Seas Project Area encompasses a wide range of fisheries. In 2008, approximately 614 UK fishing vessels were registered as having home ports in the Balanced Seas Project Area, of which 88% were under or equal to 10 metres in length and 12% over 10 metres in length (Marine Management Organisation (MMO), 2009). It is not known what proportion of these vessels actively fish in this area. Commercial fishing takes place to varying degrees in nearly all of the rMCZs in the Balanced Seas Project Area. As such, a wide range of fisheries occur across the suite of rMCZs.

F1.56 UK fishing vessels in the Balanced Seas Project Area mainly operate within 6 nautical miles (nm). Most of the fleet is multi-purpose and targets different types of fish depending on the season, landing their catch daily. Parts of the coastline have no man-made or natural harbour, and in these areas boats moor offshore or launch straight from the shore. A small number of larger (over 10 metre) offshore fishing vessels are also based in the Balanced Seas Project Area; for example, larger boats use the deep-water moorings at Shoreham and Newhaven as a temporary base when fishing in the eastern English Channel and beyond. Some UK bottom trawlers from ports outside the Balanced Seas Project Area have ‘grandfather’ rights to fish in parts of the Balanced Seas Project Area within 6nm of the English coast.

F1.57 In the Balanced Seas Project Area, the recommended MPA network is presented as two alternative network options, since the RSG has put forward two configurations of one particular site (rMCZ 29 and rMCZ 29.2), where the sector representatives could not reach agreement on a single option. The expectation of the RSG was that the IA would demonstrate the economic and social implications of each of the options (rMCZs 29 and 29.2) that would assist in the decision-making process (Balanced Seas Final Report, 2011). Table 1 provides a summary of the average value of landings/yr for the years 2007 to 2011 from the south-east rMCZs for the two options, showing that Network Option 1 (which includes rMCZ 29.2, rather than the larger rMCZ 29) has a lower estimated value of landings than Network Option 2.

Table 1: UK vessel fishing activity in south-east rMCZs between 2007 and 2011.

	Network Option 1 including 29.2)		Network Option 2 including 29)	
Gear type	**Estimated value of landings affected (£m/yr)**	**UK gross value added (GVA) affected (£m/yr)**	**Estimated value of landings affected (£m/yr)**	**UK GVA affected (£m/yr)**
Dredges	3.068	1.457	3.538	1.680
Bottom trawls	1.801	0.754	1.936	0.811
Mid-water trawls	0.365	0.204	0.387	0.216
Pots and traps	0.846	0.410	0.846	0.410
Nets	1.222	0.542	1.301	0.577
Hooks and lines	0.073	0.043	0.076	0.044
Collection by hand	0.000	0.000	0.000	0.000
Total	**7.374**	**3.409**	**8.083**	**3.738**

Source: Estimates made using the MCZ Fisheries Model. Further details provided in Annex I1 and Annex N4.
Note: These figures have been adjusted to account for overlaps between rMCZs and rMCZ Reference Areas.

F1.58 The Balanced Seas rMCZs have a slightly higher baseline value of landings (£8.080m/yr – or 32% of the total) compared to the rMCZs in the Net Gain Project Area (£7.671m/yr – 31%), and a higher value than that for the Irish Sea Conservation Zones Project Area (£5.637m/yr) and the Finding Sanctuary Project Area (£3.743m/yr). This may reflect the difficulty that the Balanced Seas RSG encountered in identifying potential locations for rMCZs that both met the ENG criteria and minimised socio-economic impact. In order to meet the ENG targets, particularly for broad-scale habitats, rMCZs in several instances lie in areas of heavy commercial fishing.

F1.59 Non- UK vessels (Belgian, French and Dutch) are active in at least nine rMCZs in the Balanced Seas Project Area. France and Belgium have historical rights for a range of species in the eastern part of rMCZ 8, and from 6nm to 12nm in rMCZs 17, 29, 29.2, 30 and 31. Dutch and German fleets have historical rights for herring only in the eastern part of rMCZ 8. Beyond 12nm, French, Belgian and Dutch over 15 metre vessels are active in several sites as follows.

- French vessels use mainly rMCZs 9, 14, 29, 30, 31 and, to a lesser extent, rMCZs 17 and 21.
- Belgian vessels use rMCZs 9 and 13.1, which lie between 6nm and 12nm, where they have historical rights; and rMCZs14, 17, 21, 29, 29.2, 30 and 31, which lie fully or partially beyond 12nm.
- The Dutch fleet operates beyond 12nm in rMCZs 14, 29, 29.2, 30 and in a small part of 31; rMCZ 30 is important for the Dutch sole fishery (bottom trawling).

F1.60 The main gears used by non-UK vessels are bottom trawls and dredges (Belgian vessels principally use a modified beam trawl (‘sumwing’)).

Dredges

F1.61 The highest values of landings in the Balanced Seas project area overall are for shellfish (scallops, oysters, cockles and mussels), which are harvested with mechanised dredges. For the UK fleets, the greatest value of landings from dredging is for shellfish in rMCZ3 Blackwater Crouch, Roach and Colne Estuaries (£1.703m/yr); this is the location of the most important oyster fishery in the South-East, involving two high-value species (native and Pacific oysters). The next highest value of landings for dredges is found in rMCZ 29 East Meridian (£0.602m/yr), the location of an important scallop fishery (also a high-value species). The most intensive part of this fishery is located in the western part of this rMCZ, as demonstrated by the fact that landing values for rMCZ 29.2 (the eastern half of this site and the alternative option) are only £0.132m/yr, which is less than 25% of those from the entire site. Other important rMCZs where shellfish are dredged are rMCZ 14 Offshore Brighton (scallops), rMCZ 17 Offshore Overfalls (scallops), rMCZ 5 Thames Estuary (cockles), and rMCZ31 Inner Bank (scallops). For the non-UK fleets, the offshore rMCZs 14 Offshore Brighton (the southern part and the associated rMCZ Reference Area 10 Dolphin Head), 21 Wight-Barfleur, 31 Inner Bank, 17 Offshore Overfalls (southern part), 29 East Meridian (a key site) and 29.2 East Meridian (eastern side) are heavily used by French dredgers for scallops.

Bottom trawls

F1.62 Bottom trawls also have a very high value of landings in the Balanced Seas Project Area. Fishing with bottom trawls targets mainly sole, but also cod, whiting, skates, rays and various other flatfish species. UK bottom trawl vessels active in the Balanced Seas rMCZ suite operate from the ports around the south-east coast and also ports elsewhere in the UK. The greatest value of UK landings taken by bottom trawls is from the non-coastal rMCZs in the Eastern Channel: rMCZ 14 Offshore Brighton (£0.833m/yr); rMCZ 29 East Meridian (£0.268m/yr, of which £0.133m/yr comes from the eastern part of the site rMCZ 29.2); and rMCZ 17 Offshore Overfalls (£0.238m/yr). French and Belgian bottom trawlers use rMCZ 9 Offshore Foreland (particularly the north-eastern half of the site) and rMCZ 14 Offshore Brighton and the associated rMCZ Reference Area 10 (Belgian bottom trawlers operate mainly in the eastern part of rMCZ 14). French bottom trawlers use rMCZ 17 Offshore Overfalls (primarily the southern part of the site), rMCZ 21 Wight-Barfleur and the associated rMCZ Reference Area 14, rMCZs 29 Eastern Meridian and 29.2 Eastern Meridian (eastern side) and rMCZ 31 Inner Bank. Dutch and Belgian trawlers use the offshore parts of rMCZ 17 Offshore Overfalls.

Nets

F1.63 Nets are the third most important gear type in the Balanced Seas Project Area. UK vessels that fish using demersal, gill, trammel and entangling nets (using either fixed or drift nets) are usually under 10 metres in length and operate throughout the year in pursuit of whichever stock is available during the relevant season. Typically they target sole from spring to autumn, bass in summer and cod in winter. The greatest value of landings taken from rMCZs in the Balanced Seas project area is from rMCZ 13.1 Beachy Head East (£0.499m/yr). Other important sites are rMCZ 31 Inner Bank (£0.131m/yr) and rMCZ 8 Goodwin Sands (£0.111m/yr). Non-UK vessels use nets in some of the rMCZs as follows: rMCZ 9 is used by small netters from Boulogne and Calais; rMCZ 29 and 29.2 is used by French set and gill netters; Dutch and Belgian netters use the offshore parts of rMCZ 17; and Belgian netters use the eastern part of rMCZ 8.

Pots and traps

F1.64 Pots and traps are the fourth most important gear type by value of landings in the Balanced Seas Project Area and are used by mainly under 10 metre vessels to target brown crab and lobster. The main pot and trap fisheries in the south-east area are along the south coast. The greatest values of landings taken from rMCZs is at rMCZ 13.1 Beachy Head East (£0.206/yr), rMCZ 22 Bembridge (£0.159/yr) and rMCZ 16 Kingmere (£0.133/yr). The part of rMCZ 17 beyond 12nm, particularly to the south and east, is used by the Belgian, Dutch and French potting sectors.

Other gear types

F1.65 Mid-water trawls and hooks and lines account for a small proportion of the value of the landings in the Balanced Seas Project Area. Recommended MCZ 14 Offshore Brighton (£0.208m/yr) and rMCZ 9 Offshore Foreland (£0.054m/yr) are the most important sites for mid-water trawl landings. Recommended MCZ 13.1 Beachy Head East (£0.015m/yr) and rMCZ 17 Offshore Foreland (£0.014m/yr) are the most important sites for hook and line landings. French and Belgian fleets use mid-water trawls in rMCZ 14 and the associated rMCZ Reference Area; French mid-water trawlers use the southern part of rMCZ 17, rMCZ 21 and its associated rMCZ Reference Area, and rMCZs 29 and 29.2.

Values of landings for non-UK vessels

F1.66 Values of landings in the Balanced Seas rMCZs for non-UK vessels are only available for the French fleets, and are separated into two categories only: mobile gear (trawls, dredges, seines (excluding purse seines) and glass eel sieves); and static gear (lines, long-lines, nets, pots and traps). A full breakdown by gear type is not possible. The highest values of landings for French vessels using mobile gear are for: rMCZ 29 Eastern Meridian (£1.030m/yr), with rMCZ Eastern Meridian (eastern side) accounting for £0.631m/yr; and rMCZ 17 Offshore Overfalls (£0.754m/yr). The highest values of landings for French vessels using static gear are for rMCZ9 Offshore Foreland (£0.001m/yr), rMCZ31 Inner Bank (£0.001m/yr) and rMCZ 21 Wight-Barfleur (0.001m/yr). Dutch and Belgian fishing representatives provided information on values of landings for the project area as a whole.

8.2 Regional summary of impacts

Source of costs

F1.67 The use of multiple scenarios allows the IA to cover a range of possibilities. A number of different management scenarios have been identified for individual rMCZs, with some rMCZs having up to three different management scenarios, depending on the nature of the features being protected and their exposure to commercial fishing activity. Multiple scenarios are used to reflect uncertainty about whether additional management of fisheries will be needed. Further information may be needed on the extent of impact of demersal trawls, dredges, lines, nets, pots and traps on benthic features. If additional management is needed, an experimental closure might initially be required (to determine the responses of features to the removal of pressures). Currently, it is not possible to comment on the exact details of such a closure.

F1.68 The impacts of the suite of rMCZs in the Balanced Seas Project Area are summarised here to present the range of potential costs to the UK fisheries sector for:

- **the lowest cost management scenario:** this is the management scenario in each rMCZ that results in the lowest cost to the commercial fishing sector. For seven rMCZs (9 Offshore Foreland, 13.2 Beachy Head East, 16 Kingmere, 26 Hythe Bay, 29.2 Eastern Meridian Eastern Side, 30 Kentish Knock and 31 Inner Bank) this is a scenario of 'no additional management'; and for ten rMCZs (see Annex I1), the lowest cost scenario is either zoned management as recommended by the Balanced Seas RSG or a management scenario recommended by the Statutory Nature Conservation Bodies (SNCBs) and relating to a particularly fragile feature (Ross worm *Sabellaria spinulosa* or seagrass beds). These scenarios give the lowest potential cost for Network Option 1 (i.e. it includes rMCZ 29.2 but not rMCZ 29, which is the larger site with higher landing values);

- **the highest cost management scenario:** this is the management scenario used in the IA for each rMCZ that results in the highest cost to the commercial fishing sector. This scenario gives the highest potential cost for Network Option 2 (i.e. it includes rMCZ 29, but not rMCZ 29.2); in all rMCZs except two, this scenario (recommended by the SNCBs) involves closure of the rMCZ to all gear sites; in rMCZ 16 Kingmere and rMCZ 9 Offshore Foreland, it is not full closure (see details in Annex I1);

- **best estimate:** this is an estimate that represents the more likely cost. A mid-point of 50% has been used between the low and high cost scenarios for most rMCZs. However, for those gears that were not the cause of a 'recover' conservation objective, but that the SNCBs felt might nevertheless need some management, for each rMCZ a 25% point between the low and high cost scenarios has been used for those gear types (see Annex N4).

F1.69 The extent to which the rMCZs will result in the displacement of affected fishers from the rMCZs, and the extent to which they will result in a reduction in fishing effort and landings, is not fully clear. For many fishers currently operating in Balanced Seas Project Area rMCZs, displacement would provide only a low level of compensation for the loss of fishing grounds and revenues. Most of the sample of fishers interviewed to inform the IA felt that displacement is not a viable option. Their reasons for this included the following: most of the fishing fleet cannot travel far (as most are under 10 metres); additional travel time would increase operating costs; options for diversification (of catches and gears) are limited; increased effort on other fishing grounds would increase competition, and the potential of higher risks to safety. In the absence of a better understanding of the effect of rMCZs on fishing decisions, and since many fishers in the South-East consider that the rMCZs will have a major negative impact on their activities, it is assumed that the impact on the sector is equivalent to the value of landings attributed to the rMCZs.

F1.70 For further details on the rMCZ-specific lowest cost and highest cost management scenarios, and the best estimates considered in this Annex, please refer to the management method papers and maps provided in Annex H7 and Annex I1.

Impacts of the lowest cost management scenario

F1.71 Table 2 sets out the total value of UK landings per year and the associated gross value added (GVA) per year that will be affected by the lowest cost management scenario for the rMCZs (Network Option 1) in the South-East. The total value of UK landings impacted by the suite of rMCZs in the South-East is highest for bottom trawls (£0.946m /yr) and dredges (£0.530m/yr),

followed by pots and traps (£0.021m/yr) and nets (£0.024m/yr). Landings by mid-water trawls, collection by hand, and hooks and lines will not be impacted.

F1.72 The most significant impacts on value of landings arise from rMCZ 14 Offshore Brighton at £0.833m/yr for (bottom trawling) and £0.341m/yr (for dredging). In the lowest cost management scenario, the bottom trawl fleets will experience the greatest number of rMCZs closed to fishing and the highest value of landings affected.

Table 2: Value of UK landings/yr and associated GVA/yr that will be affected by the lowest cost management scenario for rMCZs in the South-East (Network Option 1) between 2007 and 2011

Gear type	Number of rMCZs affecting £0.001m/yr or more of landings	Total value of landings affected (£m/yr)	GVA/yr affected (£m/yr)
Dredges	10	0.530	0.252
Bottom trawls	15	0.946	0.396
Mid-water trawls	0	0.001*	0.000
Pots and traps	5	0.021	0.010
Nets	6	0.024	0.010
Hooks and lines	1	0.000	0.000
Collection by hand	0	0.000	0.000
Total	**21**	**1.522**	**0.668**

Source: MCZ Fisheries Model (totals adjusted for rMCZ overlaps).

* For four rMCZs, values of mid-water trawl landings will be affected, but for each site this will be less than £0.001m/yr.

Impacts of the highest cost management scenario

F1.73 Table 3 sets out the value of landings per year and the associated GVA per year that will be affected by the rMCZs under the highest cost management scenario for different gear types. This scenario reflects the highest cost for Network Option 2, which includes the large rMCZ 29, and not the smaller area rMCZ 29.2. In the highest cost management scenario, the bottom trawl fleets will experience the greatest number of rMCZs closed to fishing and will have the highest value of landings affected.

F1.74 While the total value of landings affected is lower for dredges, pots and traps, nets, and hooks and lines, impacts on fisheries employing these gears nevertheless arise in a high number of rMCZs. Recommended MCZ 13.1 Beachy Head East accounts for approximately a third of the total pot and trap landings affected by the rMCZs, while rMCZ 13.1 Beachy Head East and rMCZ 17 Offshore Overfalls each account for approximately a quarter of the total hook and line landings affected by the rMCZs.

F1.75 The largest impacts incurred through the high cost management scenario are on value of landings that arise for rMCZ 14 Offshore Brighton at £0.833m/yr (for bottom trawling), rMCZ 29 East Meridian at £0.602m/yr (for scallop dredging) and rMCZ 13.1 Beachy Head East at £0.499m/yr (for netting). In some instances, the continued viability of fishing businesses would be affected by individual rMCZs under such a management scenario. In the case of rMCZ 13.1 Beachy Head East, the fishers and Sussex Inshore Fisheries and Conservation Authority (IFCA) plan to develop what they consider would be a suitable management scenario, involving variable management across the site, which would be implemented under an IFCA Voluntary Code of Conduct that would aim to enable businesses to continue to operate and protect the rMCZ's

features (see Selection Assessment Document for rMCZ 13.1). In the case of rMCZ 29 East Meridian, where closure to dredges would have a major impact on the scallop fishing industry, the alternative option of rMCZ 29.2 has been recommended.

Table 3: Value of landings and associated GVA between 2007 and 2011 that would be affected by the highest cost management scenario for rMCZs in the South-East (Network Option 2)

Gear type	Number of rMCZs affecting £0.001m/yr or more of landings	Total value of landings affected (£m/yr)	GVA/yr affected (£m/yr)
Dredges	16	1.649	0.783
Bottom trawls	22	1.832	0.768
Mid-water trawls	0	0.001*	0.000
Pots and traps	20	0.755	0.366
Nets	21	1.078	0.478
Hooks and lines	11	0.058	0.034
Collection by hand	0	0.000	0.000
Total	**26**	**5.373**	**2.429**

Source: MCZ Fisheries Model (totals adjusted for rMCZ overlaps).

* For four rMCZs, values of mid-water trawl landings will be affected, but for each site this will be less than £0.001m/yr.

Best estimate of cost

F1.76 Based on the lowest cost and highest cost management scenarios, best estimates of costs for each site and gear type have been estimated (for more detail on the approach used to calculate the best estimate, see Annex H7 and Annex N4). These estimates are shown in Table 4, where they are compared with the low and high cost values described above.

Table 4: Best estimate of value of landings between 2007 and 2011 that would be affected by the range of management scenarios for rMCZs in the South-East

Gear type	Number of rMCZs affecting £0.001m/yr or more of landings	Low cost Network Option 1 (£m/yr)	High cost Network Option 2 (£m/yr)	Best estimate (£m/yr)	GVA (m/yr)
Dredges	16	0.530	1.649	1.122	0.533
Bottom trawls	22	0.946	1.832	1.414	0.592
Mid-water trawls	0	0.001	0.001	0.001	0.000
Pots and traps	18	0.021	0.755	0.356	0.172
Nets	20	0.024	1.078	0.430	0.191
Hooks and lines	5	0.000	0.058	0.015	0.009
Collection by hand	0	0.000	0.000	0.000	0.000
Total	**25**	**1.522**	**5.373**	**3.337**	**1.497**

Impacts on non-UK fleets

F1.77 The greatest impacts will be on French and Belgian fleets that operate in rMCZs that lie fully or partially beyond 12nm, and in rMCZs between 6nm and 12nm where they have historical rights, under management scenarios where bottom drawling and dredging are prohibited (i.e. rMCZs 9, 14, 17, 29 and 29.2, 30 and 31). Dutch fleets will also be impacted in some of these sites. The two offshore rMCZ Reference Areas 10 and 14 will also have an impact on these fleets.

F1.78 Detailed quantitative information is not available to assess the impact on values of landings of non-UK vessels. However, the landings data available for the French vessels indicate that

under the low cost scenario, French vessels will be affected by one rMCZ (rMCZ 14 Brighton) and two rMCZ Reference Areas (rMCZ 14 Reference Area 10 Dolphin Head and rMCZ 21 Reference Area Wight Barfleur). The estimated value of French vessel landings affected is £0.175m/yr, all of which is by mobile benthic gears. It has not been possible to obtain information on the value of other non-UK vessel landings affected by the rMCZs.

F1.79 Under the high cost scenario, French vessels using static gears, bottom trawls/dredges and mid-water trawls will be affected to varying degrees by rMCZs. A total of six rMCZs (rMCZs 9, 14, 17, 30, 31 and either 29 or 29.2) and two rMCZ Reference Areas (10 and 14) will affect French vessels under this scenario. The estimated value of French vessel landings affected is £2.257/yr, of which £2.253m/yr is by mobile benthic gears. It has not been possible to obtain information on the value of other non-UK vessel landings affected by the rMCZs.

F1.80 The best estimate is that £1.373m/yr of French vessel landings will be affected by the suite of rMCZs, with a present value over 20 years of £19.511m. Best estimate values are not available for other non-UK landings. Further detail on the impact of the rMCZs on non-UK fleets is provided in Annex J3a.

Other impacts of the fisheries management scenarios

F1.81 The total value of UK landings impacted by the rMCZ Reference Areas is highest for: Reference Area 10 Dolphin Head within rMCZ 14 at £0.101m/yr (mainly bottom trawling and dredging); rMCZ Reference Area 6 Goodwin Knoll within rMCZ 8 at £0.017m/yr (mainly netting); and St Catherine's Point West at £0.016m/yr (mainly pots and traps). There are a further two rMCZ Reference Areas that affect a total value of landings between £0.002 m/yr and £0.010m/yr (14 Wight-Barfleur and 25 Flying Fortress). There are eight rMCZ Reference Areas that affect a total value of landings of £0.001m/yr and 12 rMCZ Reference Areas that would have no impact on fisheries, with zero landing values.

F1.82 Some rMCZs may increase the costs of fishing, by increasing 'steaming' distances (distances that vessels travel to reach their fishing grounds), if fishers respond to closures by fishing other grounds. If fishers decide to fish alternative grounds further from shore, then risks to the safety of fishers and their vessels may be increased. Furthermore, increases in fuel consumption as a result of increased steaming will result in increased greenhouse gas emissions by the commercial fishing sector.

F1.83 Redistribution of fishing effort may reduce fishing efficiency. This may increase the number of days spent at sea by fishers, causing fishers to be away from their families for longer periods. Less efficient fishing may also increase time spent fishing and increase the use of fishing gear, for example through an increased number of tows by trawlers. These may have negative environmental impacts, including greater pressures on benthic habitats from fishing gears, and again may increase greenhouse gas emissions from increased fuel consumption.

F1.84 Conflict between mobile and static fishing gears may increase as a result of displacement of bottom trawl fishing effort from rMCZs. This could result in social tensions within local fishing communities.

F1.85 Port businesses and associated markets, as well as secondary and ancillary businesses, may be affected by any significant decline in landings throughput. The fisheries management scenarios for some rMCZs could result in loss of regional, national and international sales. For example, closure of the St Catherine's Point West rMCZ Reference Area 18 off the southern Isle of Wight to the summer crab potting fleet would have a major impact on a number of local businesses that carry out the crab processing, on fish retail outlets in Bembridge, Freshwater and Lymington, and on local pubs, restaurants and fish stalls, with potential subsequent impacts on the tourist industry.

9 Flood and coastal erosion risk management (FCERM)

9.1 Regional baseline summary

F1.86 The rate at which flood and coastal erosion take place is predicted to increase over the next 20 years, as climate change brings about a rise in sea levels, stormier seas and more frequent rainfall in the UK. Shoreline management plans have been prepared for the entire extent of the coastal area within the Balanced Seas Project Area, and cover all 18 coastal and estuarine rMCZs and associated rMCZ Reference Areas. These plans are in place to manage the future impact of floods and coastal erosion on property, infrastructure and human welfare. The policies range from 'no active intervention', which is to allow the natural evolution of the coastline to continue without intervention; 'managed realignment', which is to allow natural processes to continue with minimal intervention (such as moving pathways and car parks, etc.); and 'hold the line', which is to maintain the current line of defence with intervention (for example maintenance of defence walls or construction of new defences).

F1.87 South-east England has one of the highest rates of relative sea-level rise in the UK, which means that coastal defence and shoreline management plans are particularly important issues in the Balanced Seas Project Area.

9.2 Regional summary of impacts

F1.88 Natural England and the Environment Agency have identified a large number of inshore rMCZs in the Balanced Seas Project Area where it is expected that the relevant shoreline management plan policy could potentially impact on some of the features in the rMCZs.

F1.89 In the majority of cases, the proposed/current shoreline management plans are considered to be compatible with the rMCZs. However, there may be impacts on future licence applications. At least 11 future licence applications (most are anticipated to be submitted between 2013 and 2018) are likely to incur an additional cost in the assessment of environmental impact. These estimates look over the 20-year period but are not definitive, and are based on the contents of the local Medium Term Plan (MTP). They are as follows.

Kent

F1.90 By 2018/19, it is estimated that at least five applications will be submitted for a minimum of five schemes in Kent. These applications will incur an additional cost to consider the impact of the proposed scheme. No further information is available.

East Sussex

F1.91 By 2018/19, it is estimated that at least six applications will be submitted for a minimum of six schemes in East Sussex, and these applications will incur an additional cost to consider the impact of the proposed scheme on the following rMCZs:

- rMCZ 13.1: Pevensey Bay Public Private Partnership (PPP); Bulverhythe; Eastbourne (see Annex I1);
- rMCZ 13.2: Seaford (shingle recycling below Mean High Water (MHW)), Peacehaven Cliffs (groyne maintenance) and dredging activities at Newhaven and Brighton Marina (see Annex I1).

West Sussex

F1.92 An estimate of the future number of licence applications is not available, For rMCZ 25.2 Selsey Bill and the Hounds, Natural England advises that mitigation is not needed for the current plans for FCERM activities as these arise from natural processes associated with managed realignment). In addition, Natural England may provide advice that Defra should consider an alternative boundary arrangement for this site at the time of public consultation.

Other counties

F1.93 For other parts of the Balanced Seas Project Area, further clarification is needed from the Environment Agency in relation to future licence applications. No estimate of the future number of licence applications is available for Hampshire and the Isle of Wight.

F1.94 For the northernmost part of the Balanced Seas Project Area (Essex and Suffolk), licence applications are combined with those for Norfolk. For the combined area, the Environment Agency has estimated a total of 1,200 applications over 20 years (or 300 over 5 years) (Environment Agency, 20 January 2012). This is a forward projection of 40 applications that have been submitted between April and December 2011. For rMCZs, these future licence applications could incur an additional cost in their future licence application, due to Stour and Orwell Estuaries (rMCZ 2), Blackwater Roach, Crouch and Colne Estuaries (rMCZ 3) and that part of the Thames Estuary rMCZ 5 that lies within Essex.

F1.95 For rMCZ Reference Areas in Suffolk and Essex, potential licence applications have been estimated by the Environment Agency using numbers of previous flood defence consents from 1990 to autumn 2011. Over this period, there have been consents in the following rMCZ Reference Areas: three consented licence applications in each of rMCZ Reference Area 1 Colne Point and rMCZ Reference Area 23 Abbots Hall Farm (both in rMCZ 3); and 13 consented licence applications in rMCZ Reference Area 3 Holehaven Creek (in rMCZ 5). It is reasonable to expect that over the next 20 years the number of licence applications will double in these rMCZ Reference Areas to 38 licence applications. For rMCZ reference areas 22 North Mistley and 24 Harwich Haven, see Annex I1.

F1.96 It is anticipated that FCERM schemes in two rMCZs within the Balanced Seas Project Area (rMCZs 13.1 and 13.2) will require additional mitigation measures in order to be compatible with the rMCZ features (based on information provided by the Environment Agency and Natural England). Such measures are anticipated to include re-creation of habitat and monitoring of

shingle movement. The Environment Agency estimates these additional one-off costs to be in the region of £0.012m (present value) over the 20-year period of the IA.

F1.97 One rMCZ (rMCZ Reference Area 3 Holehaven Creek) has features recommended for protection that are not considered to be compatible with the proposed/current shoreline management plan (SMP) (TE2100 flood risk management plan for the Thames Estuary). The economically important commercial and residential properties surrounding the rMCZ Reference Area are at serious risk from flooding if the operation of the three tidal barriers that currently regulate water levels is restricted, and if coastal defences are not maintained and improved. It is therefore assumed that it is not possible to mitigate the impacts of the flood risk management plan on the recommended features, given the FCERM that is considered essential for social and economic reasons. For the purposes of the IA, the impact is assessed in terms of the cost of the operator in providing benefit equivalent to the impact that continuation of the plan 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 making 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.

F1.98 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 (and for Holehaven Creek, this is unlikely), 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.

10 National defence

10.1 Regional baseline summary

F1.99 National defence activities are known to take place within 14 rMCZs in the Balanced Seas Project Area, of which five are rMCZ Reference Areas. The types of activity are numerous, ranging from live firing to submarine exercises. A brief summary of the activities that take place in each rMCZ is provided in Annex I1. Detailed information is not available.

10.2 Regional summary of impacts

F1.100 The MOD has stated (MOD, pers. comm., 2011) that designation of rMCZs is unlikely to have any direct impact on the current level and type of MOD activity in the Balanced Seas Project Area. However, should the future level of MOD activity increase, there is a possibility that some MCZs could impact on future military activity. It is assumed that the MOD will mitigate the impact of military activity on MCZ features through additional planning consideration during operations and training (MOD, pers. comm., 2011). The cost to the MOD to do this is assessed at the national level only (see the Evidence Base) and cannot be broken down for the region.

11 Oil and gas

11.1 Regional baseline summary

F1.101 The baseline describes only those aspects of oil and gas exploration and production, gas interconnectors and gas storage activities (hereafter referred to as 'oil and gas activity') and carbon capture and storage (CCS) that could be impacted on by rMCZs. The IA assumes that only the costs of future oil and gas (including CCS) licence applications could be impacted on by MCZ designation. Therefore, currently consented developments of oil and gas production are not described in the baseline. In addition, these activities would not be permitted in rMCZ Reference Areas.

F1.102 There are currently no existing oil and gas or CCS developments in the Balanced Seas Project Area. In the 26th Seaward Licensing Round, in October 2010 and December 2011, six licensed blocks in the Balanced Seas Project Area were offered and all were awarded to operators for commercial extraction of oil and gas. In the absence of more detailed information about future oil and gas licence applications, the IA assumes that during the 20-year period of analysis, one licence application is submitted for each of these six blocks. In the 26th Round, none of the potential rMCZ Reference Areas overlapped with blocks with 'significant discoveries' or 'fallow blocks with discoveries' (see Annex H10).

F1.103 In the 27th Seaward Licensing Round, some licensed blocks were also offered in the Balanced Seas Project Area. These overlap with 14 rMCZ Reference Areas (4 Westgate Promontory, 5 Turner Contemporary, 6 Goodwin Knoll, 7 South Foreland Lighthouse, 9 Belle Tout to Beachy Head, 11 Church Norton Spit, 12 Mixon Hole, 13 North Utopia, 15 Tyne Ledges, 18 St Catherine's Point West, 19 Newtown Harbour, 20 Stalked Jellyfish, 21 Culver Spit and 25 Flying Fortress). None of these blocks yet has discoveries, and it is not known if any will be of commercial interest. The Department of Energy and Climate Change (DECC) has stated that it is unlikely that any rMCZ Reference Areas will overlap with future oil and gas (including CCS) infrastructure (DECC, pers. comm., 2012).

F1.104 No future licence applications for Carbon Capture Storage (CCS) are anticipated in the Balanced Seas Project Area during the 20-year period of the IA (Carbon Capture Storage Association (CCSA), 2011).

11.2 Regional summary of impacts

F1.105 The estimated cost of rMCZs to oil and gas and CCS operators comprises solely the additional costs anticipated in the assessment of environmental impact, which is completed in support of a future licence application. In rMCZs that are not rMCZ Reference Areas, based on the advice of DECC, the Joint Nature Conservation Committee (JNCC) and Natural England, it is assumed that no additional costs will be incurred to operators to mitigate impacts on MCZ features (compared to what is required now in the absence of MCZs). Although the IA assumes that construction of infrastructure and drilling would be prohibited in rMCZs that are rMCZ Reference Areas, DECC has advised (DECC, pers. comm., 2012) that it is unlikely that any future oil and gas (including CCS) activity would take place in any of the rMCZ Reference Areas based on where they are located in relation to existing oil and gas infrastructure.

F1.106 The present value of impact of MCZs on oil and gas and CCS operators is estimated to range from: £0.029m (low cost estimate) to £0.087m (high cost estimate) over the 20-year period

of the IA. This only includes costs anticipated to future licence applications in blocks offered or awarded in the 26th Seaward Licensing Round, and this does not apply to rMCZs in the Balanced Seas Project Area.

F1.107 The recently announced 27th Seaward Licensing Round is covered only in the assessment of national impact in the Evidence Base. For the Balanced Seas Project Area, the impacts are predominantly associated with rMCZ Reference Areas 4 Westgate Promontory, 5 Turner Contemporary, 6 Goodwin Knoll, 7 South Foreland Lighthouse, 9 Belle Tout to Beachy Head, 11 Church Norton Spit, 12 Mixon Hole, 13 North Utopia, 15 Tyne Ledges, 18 St Catherine's Point West, 19 Newtown Harbour, 20 Stalked Jellyfish, 21 Culver Spit and 25 Flying Fortress. This is considered to be the best estimate of impact, as it is based on the advice of DECC, Natural England and JNCC. A breakdown of estimated costs by region is provided at Annex N10.

F1.108 Oil & Gas UK and CCSA are concerned that additional costs could be incurred to operators to mitigate the impact of their activities on MCZ features. They suggest that additional costs could be incurred if:

- pipelines need to be re-routed around rMCZs (only rMCZ Reference Areas for the oil and gas sector and all rMCZs for the CCS sector);
- horizontal drilling to resources underneath rMCZs that are rMCZ Reference Areas is not allowed;
- additional mitigation of spills and leakages is required;
- additional costs for ongoing monitoring of the impact on rMCZ features as a licence condition is required.

F1.109 The Carbon Capture Storage Association (CCSA) is concerned about the knock-on impacts that such mitigation, if it were required, could have on the economic viability of developments and on meeting the UK climate change targets. An industry assessment of the potential cost is provided in the Evidence Base.

12 Ports, harbours, shipping and disposal sites

12.1 Regional baseline summary

F1.110 There are 46 ports and harbours within 5km of an rMCZ in the Balanced Seas Project Area (Ports and Harbours of the UK, 2012), ranging from major international trading gateways, such as at Felixstowe and Dover, to small harbours with limited fixed infrastructure, such as Wivenhoe and Herne Bay. In order to fulfil their statutory duties, ports and harbours have to carry out regular maintenance dredging of navigation channels as well as maintenance and laying of berths, moorings, anchorages, lights and buoys. They also carry out maintenance works to infrastructure, undertake new capital works to provide for expanding demand, and regulate the movement of vessels, among other activities.

F1.111 **Signficant expansion and/or redevelopment** is being planned or is under way at Felixstowe Port and Bathside Bay (rMCZ 2), Port of London (rMCZ 5), Dover (rMCZs 11.1 and 11.2), Folkestone (rMCZ 11.2) and Newhaven (rMCZ 13.2). All 46 ports and harbours that lie within 5km of 14 rMCZs in the Balanced Seas Project Area potentially may undergo development at some point in the future.

- **Navigational maintenance dredging** occurs within both 1km and 5 km of 15 rMCZs and 3 rMCZ Reference Areas, managed by the following port authorities: Hutchinson Ports, Harwich Haven Authority (HHA),Ipswich Harbour, Brightlingsea Harbour Commissioners, Bradwell Waterside, Crouch Harbour Authority, Port of London, Southend-on-Sea, Medway Ports, Port of Ramsgate, Whitstable Harbour Board, Dover Harbour Board, Sovereign Harbour, Brighton Marina, Newhaven Port Authority, Associated British Ports, Queen's Harbour Master (Portsmouth), Lymington Harbour Commissioners and Yarmouth Harbour Commissioners. Some of these authorities have adopted, or are preparing Maintenance Dredging Protocol (MDP)s[3] in relation to European marine sites.

- **Disposal of dredged material at disposal sites:** the large number of port activities in close proximity to rMCZs in the Balanced Seas Project Area means that many disposal sites lie within or near rMCZs. A total of 49 disposal sites lie within 5km of, 16 rMCZs, 37 of which are situated within 1km of rMCZs. A total of 23 disposal sites (49% of the total number) lie within rMCZ 2 Stour and Orwell Estuaries and are associated with the ports of Harwich Haven and Felixstowe.

- **Anchoring of commercial shipping:** a large part of St Helen's Road Anchorage, an important anchorage for the Solent ports, lies within the northern part of rMCZ 22 Bembridge.

12.2 Regional summary of impacts

Source of costs

F1.112 Two scenarios are presented in the IA to estimate the most likely impact of rMCZs upon ports, harbours and shipping. The lowest cost management scenario assesses costs to the sector of activities within 1 km of an rMCZ; the highest cost management scenario assesses costs to the sector for activities within 5 km of an rMCZ. Both are summarised here. The best estimate is the mid-point of the low and high cost in Scenario 2 (see Annex H for an explanation). The best

[3] The MDP provides assistance to operators and regulators seeking, or giving, approval for maintenance dredging activities that could potentially affect N2K sites around the coast of England.

estimate of the present value of the cost to the sector from rMCZs in the Balanced Seas Project Area is estimated to be £7.34m over the 20-year period of the IA.

F1.113 Further details on the specific management scenarios for any individual rMCZ are provided in Annex I1. The method used to assess the costs is presented in Annex H12. Annex N11 provides a breakdown of all values for each region and for each rMCZ

Lowest cost management scenario impacts

F1.114 A total of 16 rMCZs and 3 rMCZ Reference Areas in the Balanced Seas Project Area are anticipated to impact upon ports, harbours and shipping activities in this scenario. The impact is estimated to be an increased cost in future licence applications for navigational dredging and disposal of dredged material that takes place within 1km of an rMCZ. The present value of the cost to the sector for future licence applications from rMCZs in the Balanced Seas Project Area is estimated to be £3.726m over the 20-year period of the IA.

F1.115 Additional mitigation of impact from the disposal of dredged material is assumed to be needed to achieve the conservation objective of features in one rMCZ: 13.1 Beachy Head East. For the purpose of the IA, it is assumed that disposal of dredged material in the site would need to take place biannually instead of annually, with smaller amounts of material being deposited at any one time to reduce the impact on the rMCZ features. The greater work involved in spreading the impact of the dredged material over a longer period of time is estimated to increase costs to the operator by £0.039m/yr.

F1.116 Impacts of the development plans for Felixstowe and Bathside Bay, Newhaven, Dover, Folkestone and London cannot be assessed because, in many cases, the plans are at an early stage, and costs of mitigation are yet to be identified.

Highest cost management scenario impacts

F1.117 A total of 17 rMCZs and 3 RAs in the Balanced Seas Project Area are anticipated to impact upon ports, harbours and shipping activities in this scenario. The impact is estimated to be an increased cost in future licence applications for navigational dredging, disposal of dredge material and port development that takes place within 5km of an rMCZ. In some instances, MDP documents may need to be updated or new ones created which will increase the costs to operators of carrying out environmental assessments.The present value of the cost to the sector for future licence applications from rMCZs in the Balanced Seas Project Area is estimated to be £7.282m to £7.398m over the 20 year period of the IA.

F1.118 For the single case where it is assumed that there is a need for additional mitigation – at rMCZ 13.1 Beachy Head East (see description above under low cost scenario) – the cost is considered to be the same for the highest cost scenario as for the lowest cost scenario, i.e. £0.039m.Three rMCZ Reference Areas in the Balanced Seas project area (rMCZ Reference Area 3 (Holehaven Creek), rMCZ Reference Area 22 (North Mistley), rMCZ Reference Area 24 (Harwich Haven)) overlap with existing maintenance navigational dredges. These are incompatible with the management requirements for Reference Areas which prohibits extraction. However, closure of three rMCZs to maintenance would ultimately result in the closure of the Port of Mistley, use of berths at Pitsea Creek, and closure of Harwich Haven Port activities. Also rMCZ 22

(Bembridge) overlaps with a designated anchoring area for commercial shipping which it is assumed impacts on the MCZ's features. Moving such a large and busy anchorage is not considered possible by the relevant sectors for commercial and safety reasons. A variety of options for mitigation have been reviewed (see Annex I1), but none have been considered acceptable by the operator, the Queen's Harbour Master, although the ports sector has suggested a management scenario (see Annex I1). For these 3 rMCZ Reference Areas and one rMCZ, because the mitigation proposed by Natural England 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.

F1.119 For these activities in the 4 rMCZs, the impacts in both the high and low cost scenarios 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 200). 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.

F1.120 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.

Industry assessment of costs

F1.121 Representatives of the ports, harbour and shipping sector are concerned that MCZs could incur greater costs to the sector than those represented by the scenarios. To reflect this uncertainty in the IA, the sector has made its own assumptions about how it could be impacted upon by MCZs. The sector anticipates that further costs could be incurred as a result of future licence conditions, including the requirement to provide additional environmental surveys, additional monitoring of environmental impact and additional mitigation of impact requirements, in particular with regard to sediment dispersal.

F1.122 The assessment is based on assumptions developed from information provided by eight port operators. The assumptions inform a national assessment of impact; however, it is not possible to break this down by region or by rMCZ due to the varying and unknown nature of future port developments. More information is provided in the Evidence Base, Annex H and Annex N.

13 Recreation

13.1 Regional baseline summary

F1.123 Recreation is a large sector in terms of participants and economic value in the south-east rMCZs, due to easy access from major cities such as London. The heaviest concentration of

activities is in coastal and estuarine rMCZs, such as those in the Solent, where there is the highest participation level and which is home to several national and international sailing regattas and races. The marine sector generates around a quarter of the total economic turnover in the Solent (a total of about £2,600m in GDP with a GVA contribution of £1,900m) (PUSH Report, 2009). The rMCZs off the Essex coast also have very high participation levels for recreation.

F1.124 Recreational boating takes place in a number of rMCZs, with the most intensive activity in the Isle of Wight sites. The Solent is by far the most popular part of the Balanced Seas Project Area, particularly for sailing, with 72% of sailing schools in the South-East found here and 32% of the clubs. Participation in boating activities, including racing events, leisure sailing day trips and holidays, generates further income, through visitor expenditure in shops, restaurants and pubs and on travel and accommodation. For example, £6.4m is generated by local businesses that directly benefit from tourism expenditure during Cowes Week, and £8.2m is spent by visiting leisure boats on ancillary items, such as taxi services, eating out and shopping, which benefits other local businesses (PUSH Report, 2009).

F1.125 The IA addresses anchoring, angling, bait collection diving, fossil collection, motorised boating, rockpooling, walking (including dog walking) and wildfowling, as these are the recreational activities that are impacted by rMCZs and rMCZ Reference Areas.

Anchoring

F1.126 Most recreational boaters (motorised and non-motorised) preferably anchor in sheltered bays or near popular recreational locations. A number of such anchorages lie in rMCZs (e.g. Osborne Bay in rMCZ 19 Norris to Ryde; rMCZ 22 Bembridge; rMCZ 23 Yarmouth to Cowes). A smaller number of boaters use moorings that are installed by harbour authorities or by sailing clubs who are licensed by The Crown Estate (examples of both are found in rMCZ 23 Yarmouth to Cowes). Racing events and regattas also involve anchoring, in the form of anchored buoys to mark the race route and anchored safety vessels. More environmentally friendly mooring and anchoring equipment is now available but not yet widely used, due to the high costs and uncertainty over its suitability in strong tidal conditions, such as those found in the Solent. Recreational sea anglers (including charter boats) do not tend to use fixed moorings or designated anchoring areas, but rather anchor close to good fishing spots (these often also depend on the weather and safety factors). Anchors used by small private angling boats tend to be smaller than those used by the yachting and charter boat sectors.

Angling

F1.127 Recreational sea angling by private individuals (shore- or boat-based) and charter operators is very popular in the south-east, with an estimated 419,000 individuals involved (Water Sports and Leisure Participation Survey, 2009). Since sea anglers use all areas that are good fishing spots (and therefore likely to be in areas of high productivity) and have suitable access, this activity coincides with 29 rMCZs and 22 of the 25 rMCZ Reference Areas. Angling is the most popular activity undertaken by charter boats and attracts individuals from across the country. Inshore rMCZs are used all year round, particularly in the winter, when the weather prevents use of offshore areas that are used mainly during the summer months. Wreck fishing is also popular (e.g. in rMCZ 11.4 Folkestone Pomerania). At least one rMCZ is used by non-UK (French) charter

boats (rMCZ 21 Wight-Barfleur Extension. Seven of the rMCZ Reference Areas are used by UK charter boats, and at least one of these is used by French charter boats:

- Goodwin Knoll and Flying Fortress (which are used by 26 operators);
- Dolphin Head;
- Wight-Barfleur (one of the most popular wreck-fishing destinations and a regular stop during two-day trips across the English Channel for both UK and European charter vessels);
- St Catherine's Point West (a popular recreational multi-species fishery);
- South Foreland Lighthouse (charter boats shelter here from prevailing winds and fish close to shore due to the strong tides);
- Hythe Flats.

Bait collection

F1.128 Bait collection (including crab collection and lugworm digging) occurs in five rMCZs and the five associated rMCZ Reference Areas reflecting the high level of angling in the South-East: rMCZ 2 Stour and Orwell; rMCZ 3 Blackwater, Crouch, Roach and Colne Estuaries; rMCZ 7 Thanet Coast; rMCZ 19 Norris to Ryde; rMCZ 25.1 Pagham Harbour. In a number of cases, this activity is managed; for example, bait collection within rMCZ 25.1 Pagham Harbour is allowed under a permitting scheme, and in rMCZ 2 Stour and Orwell Estuaries it is carried out under a voluntary code of conduct.

Motorised boating

F1.129 Motorised boating (personal water craft and jet skis) is a common activity throughout the South-East and probably takes place within all rMCZs. Essex and Kent are particularly popular areas; for example, rMCZ 3 Blackwater, Crouch, Roach and Colne Estuaries is used by clubs across Essex and north Kent, and has an estimated 629 users/yr (StakMap).

Wildfowling

F1.130 Wildfowling is popular in several wetlands, saltmarsh and foreshore areas in the South-East. Crown Estate licences for wildfowling overlap eight rMCZs and one rMCZ Reference Areas.

13.2 Regional summary of impacts

Source of costs

F1.131 Six rMCZs (rMCZs 2, 10, 13.2, 19, 22, 23) have impacts on recreational anchoring. In order to show the potential range of costs of different management scenarios, there are two management scenarios, although depending on the site only one of these may be necessary :

- closure to recreational anchoring (except in emergency) and racing marks in those parts of the site where features to be protected are impacted by this activity;
- closure to recreational anchoring (except in emergency) of those parts of the site where features to be protected are impacted by this activity, but with provision of an alternative in the form of eco-moorings installed away from the feature. In rMCZs 22 Bembridge and 23 Yarmouth to

Cowes, this is the only scenario used because of the high level of anchoring over features and because existing moorings would need to be replaced.

F1.132 For the 22 rMCZ Reference Areas that would impact on recreational activities, there is only one management scenario: closure to all extractive and depositional activities (i.e. bait digging, anchoring, angling, wildfowling). For some rMCZ Reference Areas that impact on recreational anchoring it may be feasible to install eco-moorings outside the boundaries and this has been assessed where appropriate. A best estimate of costs for the region has been provided, which **represents the more likely cost.** This is arbitrarily assumed to be the mid-point of the low and high cost scenarios where the two scenarios are employed, which for recreation results in a present value of costs over 20 years of £16.567m. Further i**nformation on the low and high cost scenarios is given below.**

Impacts of the lowest cost management scenario

F1.133 **Recreational anchoring:** The lowest management costs reflect the cost of creating no anchoring zones in rMCZs and rMCZ Reference Areas (and no provision of an alternative). Three rMCZS (2 Stour and Orwell, 10 Swale and 13.2 Beachy Head West) have a conservation objective of 'recover' for certain features as a result of recreational anchoring, but work undertaken for the IA has shown that little or no anchoring occurs over these features in these sites. The impact of these three rMCZs on recreational anchoring will therefore be negligible. All rMCZ Reference Areas except two (rMCZ 3 Reference Area Holehaven Creek and rMCZ 24 Reference Area Harwich Haven) have negligible or no recreational anchoring, or the anchoring can be displaced to a nearby location and thus will not be impacted. Closure of the Mixon Hole rMCZ Reference Area and Flying Fortress rMCZ Reference Area to anchoring would possibly impact the diving and snorkelling sector but it has not been possible to estimate costs. For three rMCZs (19 Norris to Ryde, 23 Yarmouth to Cowes, 22 Bembridge), and one rMCZ Reference Area (rMCZ 5 Reference Area 3 Holehaven Creek) there would be an impact from the creation of no-anchoring zones without provision of an alternative, given the number of users affected, as people would not be able to anchor in the location of their choice (see Annex I1 for details). This might also have impacts on revenues of local businesses, such as pubs and coastal facilities. Information is not available to cost these impacts.

F1.134 **Recreational sea angling:** 22 rMCZ Reference areas overlap with angling, but most of these sites are small, and are likely to have alternative angling marks nearby, in which case the impact from closure of these sites to fishing would be negligible. However, two rMCZ Reference Areas, Holehaven Creek in rMCZ 5 and St Catherine's Point West, will significantly diminish the quality of private sea angling for those affected (see Annex I1) due to the number of users affected and the lack of alternatives, but it has not been possible to estimate costs. Charter boats would be affected by the closure of eight rMCZ Reference Areas. For six of these sites, costs have been quantified using information on daily revenue provided by the sector (see Table 6). The remaining two sites, Mixon Hole rMCZ Reference Area in rMCZ 25.2 and Dolphin Head rMCZ Reference Area in rMCZ 14, will also impact the charter boat sector, but it has not been possible to obtain costs for these sites. The total present value of the charter boat loss of earnings is £9.355m, with an average cost of £0.658m/yr.

Table 6: Value of charter boat earnings and associated GVA that would be affected for rMCZs in the South-East

Site name	Number of charter boats affected	Estimated value of earnings affected (£m/yr)	UK GVA affected (£m/yr)
rMCZ 8, Reference Area 6 Goodwin Knoll	26	0.390	0.183
rMCZ 11.1, Reference Area 7 South Foreland Lighthouse	26	0.195	0.092
rMCZ 11.4, Reference Area 25 Flying Fortress	26	0.176	0.082
rMCZ 21, Reference Area 14 Wight-Barfleur	2*	0.080	0.038
rMCZ 26, Reference Area 8 Hythe Flats	14	0.210	0.099
Reference Area 18 St Catherine's Point West	25**	0.350	0.165
Total	**119**	**1.401**	**0.658**

Source: Costs of daily revenue and approximate number of fishing days supplied by charter boat representatives from Balanced Seas RSG, Solent/Isle of Wight/Hants Local Group and interviewees from StakMap data collection.
*Total numbers are unconfirmed. Charter boats from elsewhere in the UK, France and Belgium also use the site and would incur losses.
** Charter boats based within the Balanced Seas Project Area only; information is not available for the vessels that use the site but come from elsewhere.

F1.135 **Wildfowling:** This activity impacts on one rMCZ Reference Areas. North Mistley rMCZ Reference Area (in rMCZ 2) includes a prime wildfowling spot within a wider wildfowling area, and its closure would diminish the quality of the wildfowling available and might also impact on commercial revenues from wildfowling. It has not been possible to estimate costs..

F1.136 **Bait collection:** This activity will impact on four rMCZ Reference Areas. For rMCZ Reference Area 17 King's Quay within rMCZ 19; and Reference Area 4 Westgate Promontory within rMCZ 7, it is considered that there will be minimal or negligible impact on the sector, because of: the low numbers of collectors; the presence of alternative locations; and the fact that anglers have agreed to these rMCZ Reference Areas. One rMCZ Reference Area –3 Holehaven Creek (rMCZ 5) –is anticipated to have a small, but unknown, cost due to increased travel as a result of displacement. rMCZ Reference Area 22 North Mistley (within rMCZ 2) is used extensively by local anglers and three professional bait diggers in the summer months. It is anticipated that there will be a much greater impact within this site, but it has not been possible to obtain costs.

F1.137 Over the 20-year timeframe of the IA, the present value of net (of substitution effects) direct costs to the recreation sector of the south-east rMCZs, under the low cost scenario from mitigation of recreational anchoring and losses of charter boat revenue, is estimated to be £11.575m.

Impacts of the high cost management scenario

F1.138 **Recreational anchoring:** The high cost management scenario would involve the creation of no-anchoring zones, and the provision of an alternative in the form of eco-moorings. For the three rMCZs (19 Norris to Ryde, 22 Bembridge and 23 Yarmouth to Cowes) and two rMCZ Reference Areas (3 Holehaven Creek and 24 Harwich Haven) that will have a significant impact on recreational anchoring (see above), estimated costs for the eco-moorings are shown in Table

7. The total PV of the highest cost management scenario is £12.204m, with an average cost of £0.678m/yr. Some of these rMCZs may also have an impact on racing (if there is a need to mitigate the laying of racing marks) but it has not been possible to estimate a cost for this.

Table 7: The estimated costs for removal of existing moorings and installation of eco-moorings with associated annual costs for rMCZs in the south-east

Site name	Number of moorings needed	One-off capital costs	Annual costs (mooring fees and maintenance)
rMCZ 19 Norris to Ryde	200	0.800	0.180
rMCZ 22 Bembridge	300	1.134	0.271
rMCZ 23 Yarmouth to Cowes	100	0.433	0.090
rMCZ 5, Reference Area 3 Holehaven Creek	30	0.187	0.068
rMCZ 2, Reference Area 24 Harwich Haven	6	0.103	0.068
Total	**636**	**2.657**	**0.678**

F1.139 The annual costs include the fees to be paid by users of the eco-moorings that would be used for maintenance. Such costs may put off visitors to an area and push trade elsewhere, incurring a loss of revenue for the organisations maintaining the moorings and local businesses. It has not been possible to estimate this loss. For other recreational sectors (sea angling, wildfowling and motorised boating) there is only a single management scenario and thus costs are as described under the lowest cost management scenario above.

F1.140 Over the 20-year timeframe of the IA, the present value of net (of substitution effects) direct costs to the recreation sector of the south-east rMCZs, under the high cost scenario from mitigation of recreational anchoring and losses of charter boat revenue, is estimated to be £21.599m.

Other recreational activities

F1.141 Four rMCZ Reference Areas (5 Turner Contemporary, 11 Church Norton Spit, 15 Tyne Ledges and 24 Harwich Haven) will require dog walkers to remove and dispose of dog faeces. Three reference areas may require bird-watchers and walkers to keep to designated pathways (1 Colne Point, 5 Turner Contemporary and 11 Church Norton Spit).

F1.142 **Motorised boating:** For Holehaven Creek rMCZ Reference Area (in rMCZ 5) it may be necessary to close certain areas to motorised boats (personalised watercraft and water skis) where scouring may affect the protected features. It has not been possible to estimate costs. The Port of London Authority (PLA) Personalised Watercraft Code of Conduct limits the speed of motorised boating in Holehaven Creek and requires other restrictions at low tide to mitigate damages to sea-floor features (Personalised Watercraft Code of Conduct, 2012). If these

management measures are found to be adequate mitigation for an rMCZ Reference Area, closed areas to motorised boating may not be necessary (PLA, pers. comm., March, 2012).

14 Renewable energy

14.1 Regional baseline summary

Wind energy

F1.143 In the Balanced Seas Project Area, there are four operational wind farms (Gunfleet Sands I and II (part of a single operation), Kentish Flats, Thanet), two consented wind farms (London Array 1 and London Array 2) and four planned wind farms (Rampion, West of Isle of Wight, Kentish Flats 2 Extension and Gunfleet Sands 3-Demonstration Project). Gunfleet Sands I and II lie within 1km of rMCZ 3 Blackwater, Crouch, Roach and Colne Estuaries. No other operation lies within 1km of rMCZs. However, the cable route for the London Array wind farm overlaps with rMCZ 10 The Swale, the cable route for Thanet overlaps with rMCZ 8 Goodwin Sands, and the proposed cable route for the Gunfleet Sands 3-Demonstration Project overlaps with rMCZ 3 Blackwater, Crouch, Roach and Colne Estuaries.

Wave energy

F1.144 There are currently no existing or planned wave energy developments in the vicinity of rMCZs in the Balanced Seas Project Area.

Tidal energy

F1.145 DECC has identified Potential Development Areas (PDAs) that have potential for tidal energy installations in the Balanced Seas Project Area (DECC, pers., comm., 2012). Three PDAs overlap or are within 1km of one or more rMCZs, including: the East of Isle of Wight Area of Potential (overlaps with rMCZ 17, 22, 25.2, 28 and rMCZ Reference Area 13); Solent Energy Offshore deployment site (overlaps with rMCZ Reference Area 18); and Solent Energy Nearshore deployment site (overlaps with rMCZ 20 and 23) which is the most advanced and is scheduled for development by 2015. The Solent Energy Ocean Centre test and demonstration facility has plans for potential energy-generation capacity of 21MW/yr around the Isle of Wight (J. Fawcett, tidal energy lead, Isle of Wight Council email, 7 March 2012).

14.2 Regional summary of impacts

F1.146 Two scenarios (Scenarios 1 and 2) have been developed for this sector. Based on the very low likelihood of costs in Scenario 2 being incurred to the wind energy sector (Natural England and JNCC, pers. comm., 2012), the best estimate of impact is assumed to be 15% of the cost of the wind energy sector in Scenario 2, plus 100% of the cost to the wave and tidal energy sector in Scenario 2. Annex H provides further explanation. For renewable energy developers in the Balanced Seas Project Area, the best estimate of the present value of the cost is estimated to be £7.139m over the 20-year period of the IA

Source of costs

F1.147 Three management scenarios were used: two for rMCZs, and one for rMCZ Reference Areas. The management scenarios for rMCZs are:

- **Management scenario 1:** An increase in the costs of assessing environmental impacts for licence applications.;
- **Management scenario 2:** An increase in the costs of assessing environmental impacts for licence applications and an increase in cable protection installation costs

The management scenarios for rMCZ Reference Areas are:

Management scenario 1: Installation of renewable energy devices and cables not permitted within the rMCZ. Increase in costs of assessing environmental impacts for future licence applications in the vicinity of an rMCZ (it is not anticipated that any additional mitigation of impacts on features protected by the rMCZ will be needed relative to the mitigation provided in the baseline.

Low cost scenario

F1.148 The low cost scenario is based on advice provided by Natural England and JNCC (JNCC and Natural England, 2011). This assumes that additional costs will be incurred in future licence applications only, to assess the impact of the proposed activity upon MCZ features. It assumed that no additional mitigation of impacts will be required (compared with what is required in the absence of MCZs). For renewable energy developers in the Balanced Seas Project Area, the present value of the cost is estimated to be 0.073m over the 20-year period of the IA. These costs are associated with the potential designation of rMCZs 3, 8 and 10. Future licence applications for tidal energy installations are likely to be impacted on as follows in each of the three PDAs in the South-East:

- Solent Energy Nearshore deployment site: two licence applications impacted on by rMCZs 20 and 23, with a total one-off cost of £0.029m between 2010 and 2015;
- Solent Energy Offshore deployment site: two licence applications (one between 2010 and 2015 and another between 2020 and 2025) impacted by rMCZ Reference Area 18 rMCZ, with a total cost of £0.028m;
- East of Isle of Wight Area of Potential: five future licence applications potentially impacted on by rMCZ 17, 22, 28, 25.2 and rMCZ Reference Area 13, with a total cost of £0.058m between 2020 and 2025.
- Unknown potentially significant costs are assumed to arise as a result of rMCZ Reference Areas 13 and 18 that overlap with the Solent Energy Offshore deployment site and the East of Isleof Wight Area of Potential. This is because renewable energy developments and installation of cables will not be permitted within rMCZ Reference Areas.

F1.149 Over the 20-year timeframe of the IA, the total present value of these costs to developers is £0.047m.

High cost scenario

F1.150 s The high cost scenario is the same as the low cost scenario but also assumes that additional costs could be incurred to install alternative cable protection on not-yet-consented cables (export and inter-array cables) in rMCZs. It is also assumed that there will be additional

mitigation costs for re-routing cables around rMCZ Reference Areas. Annex H provides more detail. For renewable energy developers in the Balanced Seas Project Area, the present value of the cost is estimated to be £47.329m over the 20-year period of the IA. These costs are associated with the potential designation of rMCZs 3, 8 and 10.

F1.151 **References**

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